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TECHNICAL EVALUATION REPORT

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

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
SALEM NUCLEAR GENERATING STATION UNIT 1

VOL. 1 OF 2

NRC DOCKET NO. 50-272

FRC PROJECT C5257

NRC TAC NO. 42467

FRC ASSIGNMENT 13

NRC CONTRACT NO. NRC-03-79-118

FRC TASK 468

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

July 15, 1982

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A Division of The Franklin Institute

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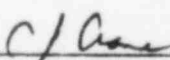
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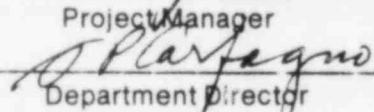
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FOREWORD

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.

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T. J. DeLgaizo from WESTEC Services, Inc., R. Garrison from ORFI Systems, Inc., and M. A. Fedele from Evaluation Associates, Inc., also contributed to the technical preparation of this report through subcontracts with Franklin Research Center.

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 [10] 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 environment 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" [2]. (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" [2], 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:

- o 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.
- o The requirement to qualify equipment needed to complete one path of achieving and maintaining a cold shutdown condition has been deleted.
- o A new section has been added, covering the qualification of equipment located in mild environments.
- o 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 [8] 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 a preliminary evaluation of the Licensee's response, documented in a technical evaluation report (TER). The NRC Office of Inspection and Enforcement (IE) performed an onsite verification inspection (November 5-6, 1980) of selected safety-related electrical equipment. Components associated with the component cooling water system, reactor coolant pump, drain tank, letdown heat exchanger flow and discharge control panels were inspected. The inspection 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 in report IE 50-272/80-29. No deficiencies were noted.

On October 31, 1980, PSE&G provided the NRC with an equipment environmental qualification submittal in response to IE Bulletin 79-01B for the Salem Unit 1 plant [1].

PSE&G submitted further equipment environmental qualification information to the NRC in response to IE Bulletin 79-01B on December 1, 1980 [11, 12].

The NRC issued a Safety Evaluation Report (SER) to PSE&G on June 8, 1981 [15].

On June 8, 1981, FRC issued the Salem Unit 1 Technical Evaluation Report [13] to NRC.

Requests for information [71, 72] were transmitted to the NRC by FRC to obtain qualification documentation referenced by the Licensee in their submittals, TMI Action Plan information, and correlations to NUREG-0737 [10].

By letter dated September 10, 1981, PSE&G transmitted to the NRC a response to the SER [16].

On February 3, 1982 [17] and May 28, 1982 [64], PSE&G 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:

- o DOR Guidelines, "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," November 1979 [2]
- o NUREG-0588, Revision 1, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," July 1981 [9].

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

- o 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 [3, 4, 5, 6]
- o NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980 [10]. 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
	CP SER Before 7/1/74	CP SER After 7/1/74	
DOR GUIDELINES	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 a 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:

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

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

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

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 [8] 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 activities¹ 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:
- o 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.

¹Such 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).

- o 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. Submergence Outside Containment
- 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 $T_{SAT} + 20^\circ F$ 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	M - Margin
T - Temperature	I - HELB Evaluation Outside Containment Not Completed
QT - Qualification Time	QM - Qualification Method
RT - Required Time	RPN - Equipment Relocation or Replacement, Adequate Schedule Not Provided
P - Pressure	EXN - Exempted Equipment Justification Inadequate
H - Humidity	SEN - Separate Effects Qualification Justification Inadequate
CS - Chemical Spray	QI - Qualification Information Being Developed
A - Material Aging Evaluation, Replacement Schedule, Ongoing Equipment Surveillance	RPS - Equipment Relocation or Replacement Schedule Provided
S - Submergence	
(R) - Licensee has committed to replace equipment	

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, Public Service Electric and Gas Company, provided a response to the SER and additional qualification information in its submittals [16, 17, 64] to the NRC for the Salem Unit 1 Nuclear Power Plant.

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

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

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

- o 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
- o Qualification deficiencies identified in the SER (see Figure 3-1)
- o Licensee's response to the SER
- o Licensee's statements and rationale for qualification
- o Licensee's corrective action and replacement schedule
- o Evaluation of qualification including identification of all deficiencies
- o 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, 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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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

- o 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.

- o 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

 Franklin Research Center A Division of The Franklin Institute 20th and Race Streets, Phila. Pa. 19103 (215) 448-1000	NRC Contract No. NRC-03-79-118 FRC Project No. C5257 FRC Assignment No. 13 FRC Task No. _____	Page 2
EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. ____		

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

<u>NRC REQUIREMENTS</u>	<u>DESIGNATION:</u> <u>X = DEFICIENCY</u>																		
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)	_____																		
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"><u>NRC QUALIFICATION CATEGORY</u></td> <td style="width: 40%; text-align: right;"><u>DESIGNATION:</u> <u>X = CATEGORY</u></td> </tr> <tr> <td>I.a Equipment Qualified</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>I.b Equipment Qualification Pending Modification</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>II.a Equipment Qualification Not Established</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>II.b Equipment Not Qualified</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>II.c Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>III.a Equipment Exempt From Qualification</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>III.b Equipment Not in the Scope of the Qualification Review</td> <td style="text-align: right;">_____</td> </tr> <tr> <td>IV Documentation Not Made Available</td> <td style="text-align: right;">_____</td> </tr> </table>		<u>NRC QUALIFICATION CATEGORY</u>	<u>DESIGNATION:</u> <u>X = CATEGORY</u>	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	_____
<u>NRC QUALIFICATION CATEGORY</u>	<u>DESIGNATION:</u> <u>X = CATEGORY</u>																		
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.

- o 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).

- o 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.

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

TABLE 4-2
 QUALIFICATION DEFICIENCY SUMMARY

NRC REQUIREMENT	NUMBER OF DEFICIENT EQUIPMENT ITEMS
1. DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE----- [EQUIPMENT ITEM NO(S).: 1, 2, 8, 12, 13, 14, 17, 18, 19, 22, 25, 26, 27, 28, 29, 30, 31, 32, 34, 38, 44, 50, 54, 57, 61, 62, 63, 64, 67, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 91, 92]	51
2. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED----- [EQUIPMENT ITEM NO(S).: 5, 15, 16, 18, 19, 25, 44, 47, 50, 65, 66, 68, 69, 89, 93, 94]	16
3. AGING DEGRADATION EVALUATED ADEQUATELY----- [EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 15, 16, 36, 38, 42, 43, 47, 52, 65, 66, 68, 69, 89, 90, 91, 93]	21
4. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)----- [EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 15, 16, 36, 42, 43, 47, 50, 52, 65, 66, 68, 69, 89, 93]	19
5. PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION----- [EQUIPMENT ITEM NO(S).: 50]	1
6. CRITERIA REGARDING AGING SIMULATION (IF REQUIRED)----- [EQUIPMENT ITEM NO(S).: 52]	1
7. CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:	
A. - PEAK TEMPERATURE ADEQUATE-----	0
B. - PEAK PRESSURE ADEQUATE-----	0
C. - DURATION ADEQUATE----- [EQUIPMENT ITEM NO(S).: 15, 16, 65, 89]	4

Table 4-2 (Cont.)

QUALIFICATION DEFICIENCY SUMMARY

NRC REQUIREMENT	NUMBER OF DEFICIENT EQUIPMENT ITEMS
D. - REQUIRED PROFILE ENVELOPED ADEQUATEL ----- [EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 15, 16, 44, 89]	8
E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE-----	0
8. CRITERIA REGARDING SPRAY SATISFIED----- [EQUIPMENT ITEM NO(S).: 1, 2, 36, 90]	4
9. CRITERIA REGARDING SUBMERGENCE SATISFIED----- [EQUIPMENT ITEM NO(S).: 35]	1
10. CRITERIA REGARDING RADIATION SATISFIED----- [EQUIPMENT ITEM NO(S).: 50]	1
11. CRITERIA REGARDING TEST SEQUENCE SATISFIED-----	0
12. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES (IF ANY) SATISFIED----- [EQUIPMENT ITEM NO(S).: 3, 4, 15, 16, 65, 66, 89, 89]	7
13. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED----- [EQUIPMENT ITEM NO(S).: 1, 2, 47]	3
14. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED----- [EQUIPMENT ITEM NO(S).: 1, 2, 15, 16, 65, 66, 68, 89]	8
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).: 2, 3, 4, 8, 12, 15, 16, 22, 25, 26, 27, 28, 32, 34, 57, 61, 62, 63, 64, 66, 68, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 92]	42
2. EQUIPMENT MODIFICATION-----	0
3. EQUIPMENT RELOCATION ABOVE SUBMERGENCE LEVEL-----	0
4. RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE----- [EQUIPMENT ITEM NO(S).: 17]	1
5. VERIFY QUALIFICATION BY ADDITIONAL TESTING/ANALYSIS-----	0
6. EQUIPMENT RELOCATION TO A MILD ENVIRONMENT----- [EQUIPMENT ITEM NO(S).: 67]	1
7. QUALIFICATION TESTING OF EQUIPMENT IN PROGRESS----- [EQUIPMENT ITEM NO(S).: 54]	1
8. OTHER (FOR DETAILED DESCRIPTION SEE SPECIFIC EQUIPMENT ITEMS)-- [EQUIPMENT ITEM NO(S).: 1, 5, 13, 14, 29, 30, 31, 69, 87, 93]	10
SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED (SEE SPECIFIC EQUIPMENT ITEM FOR COMPLETION DATE)----- [EQUIPMENT ITEM NO(S).: 1, 2, 3, 4, 5, 8, 12, 13, 14, 15, 16, 17, 22, 25, 26, 27, 28, 29, 30, 31, 32, 34, 61, 63, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 92, 93]	49

Table 4-4

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

		FRC EQUIPMENT ITEM NUMBERS														
		1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015
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															
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															X
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															X
	D. - REQUIRED PROFILE ENVELOPED ADEQUATELY	X	X	X	X											X
	E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE															
8.	CRITERIA REGARDING SPRAY SATISFIED	X	X													
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			X	X											X
13.	CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED	X	X													
14.	CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED	X	X													X
15.	TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED															
16.	CRITERIA REGARDING MARGINS SATISFIED (NUREG-0568, CAT. 1)															
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																
I.A	EQUIPMENT QUALIFIED								X							
I.B	EQUIPMENT QUALIFICATION PENDING MODIFICATION			X	X	X			X				X	X	X	X
II.A	EQUIPMENT QUALIFICATION NOT ESTABLISHED	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							X		X	X	X				
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	X	X				X				X			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)	X				X							X	X		
	SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED	X	X	X	X	X			X			X	X	X	X	X

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

		FRC EQUIPMENT ITEM NUMBERS															
		1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																	
1.	DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE-----		X	X	X	X		X									
2.	ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED-----	X		X	X						X	X	X	X	X	X	
3.	AGING DEGRADATION EVALUATED ADEQUATELY-----	X								X							
4.	QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)-----	X															
5.	PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION-----	X															
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-----	X															
	E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE-----	X															
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-----	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-0500, CAT. 1)-----																
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																	
I.A	EQUIPMENT QUALIFIED-----																
I.B	EQUIPMENT QUALIFICATION PENDING MODIFICATION-----	X	X					X			X	X	X	X	X	X	
II.A	EQUIPMENT QUALIFICATION NOT ESTABLISHED-----																
II.B	EQUIPMENT NOT QUALIFIED-----			X	X												
II.C	EQUIPMENT SATISFIES ALL REQUIREMENTS EXCEPT QUALIFIED LIFE OR REPLACEMENT SCHEDULE JUSTIFIED-----																
III.A	EQUIPMENT EXEMPT FROM QUALIFICATION-----					X	X		X	X							
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						X			X	X	X	X			
2.	EQUIPMENT MODIFICATION-----																
3.	EQUIPMENT RELOCATION ABOVE THE SUBMERGENCE LEVEL-----																
4.	RELOCATE OR SHIELD EQUIPMENT FROM RADIATION SOURCE-----		X														
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	X	
	SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED-----	X	X				X			X	X	X	X	X	X	X	

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

		FRC EQUIPMENT ITEM NUMBERS															
		1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																	
1.	DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	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			
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)																
7.	CRITERIA REGARDING TEMPERATURE/PRESSURE EXPOSURE:																
	A. - PEAK TEMPERATURE ADEQUATE																
	B. - PEAK PRESSURE ADEQUATE																
	C. - DURATION ADEQUATE															X	
	D. - REQUIRED PROFILE ENVELOPED ADEQUATELY																
	E. - STEAM EXPOSURE (IF REQUIRED) ADEQUATE							X									
8.	CRITERIA REGARDING SPRAY SATISFIED							X									
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-0388, CAT. 1)																
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																	
I.A	EQUIPMENT QUALIFIED										X	X	X			X	
I.B	EQUIPMENT QUALIFICATION PENDING MODIFICATION	X	X		X										X		
II.A	EQUIPMENT QUALIFICATION NOT ESTABLISHED						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			X				X									
IV	DOCUMENTATION NOT MADE AVAILABLE																
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																	
1.	EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT	X			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)	X															
	SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED	X	X		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				
2.	ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED				X												
3.	AGING DEGRADATION EVALUATED ADEQUATELY	X						X									
4.	QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)	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																
	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	X															
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	X		X							X			X			
I.B	EQUIPMENT QUALIFICATION PENDING MODIFICATION		X			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							X									
III.A	EQUIPMENT EXEMPT FROM QUALIFICATION								X		X	X	X	X	X	X	
III.B	EQUIPMENT NOT IN THE SCOPE OF THE REVIEW																
IV	DOCUMENTATION NOT MADE AVAILABLE				X		X										
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										X						
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														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
		1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																
1.	DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	X	X	X	X	X			X			X	X	X	X	X
2.	ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED															
3.	AGING DEGRADATION EVALUATED ADEQUATELY						X	X		X	X					
4.	QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)						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						X									
	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						X	X								
13.	CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED															
14.	CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED						X	X		X						
15.	TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED															
16.	CRITERIA REGARDING MARGINS SATISFIED (NUREG-0580, CAT. 1)															
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)																
I.A.	EQUIPMENT QUALIFIED															
I.B.	EQUIPMENT QUALIFICATION PENDING MODIFICATION	X	X	X	X			X	X	X	X	X	X	X	X	X
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 REVIEW															
IV.	DOCUMENTATION NOT MADE AVAILABLE															
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																
1.	EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT	X	X	X	X			X		X		X	X	X	X	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								X							
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	X		X			X	X	X	X	X	X	X	X	X	X

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Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

		FRC EQUIPMENT ITEM NUMBERS															
		1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)																	
1.	DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2.	ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED														X	X	
3.	AGING DEGRADATION EVALUATED ADEQUATELY														X		
4.	QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)														X	X	
5.	PROGRAM ESTABLISHED TO IDENTIFY AGING DEGRADATION														X		
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														X		
	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																
13.	CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED														X		
14.	CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED																
15.	TEST DURATION MARGIN (1 HOUR + FUNCTION TIME) SATISFIED														X		
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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
II.A	EQUIPMENT QUALIFICATION NOT ESTABLISHED																
II.B	EQUIPMENT NOT QUALIFIED															X	
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													X			
IV	DOCUMENTATION NOT MADE AVAILABLE																
CORRECTIVE ACTION SPECIFIED (DESIGNATION: X = ACTION SPECIFIED)																	
1.	EQUIPMENT REPLACEMENT WITH QUALIFIED EQUIPMENT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	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		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Table 4-4 (Cont.)

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

		FRC EQUIPMENT ITEM NUMBERS			
		10911	0921	0931	0941
NRC REQUIREMENTS (DESIGNATION: X = DEFICIENCY)					
1.	DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE	X	X		
2.	ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED			X	X
3.	AGING DEGRADATION EVALUATED ADEQUATELY	X		X	
4.	QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)			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				
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-0580, CAT. 1)				
NRC QUALIFICATION CATEGORY (DESIGNATION: X = CATEGORY)					
I.A.	EQUIPMENT QUALIFIED				
I.B.	EQUIPMENT QUALIFICATION PENDING MODIFICATION		X	X	
II.A.	EQUIPMENT QUALIFICATION NOT ESTABLISHED	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)			X	
	SCHEDULE FOR COMPLETION OF CORRECTIVE ACTION(S) HAS BEEN PROVIDED		X	X	

4.3 METHODOLOGY USED BY THE LICENSEE

This section includes observations concerning the Licensee's qualification methodology presented in the response [16] to the NRC SER.

4.3.1 Completeness of Safety-Related Equipment List

Section 3.1 of the NRC SER [15] expressed 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."

In response, the Licensee stated [16]:

"Display instrumentation mentioned in the Emergency Operating Procedures was included as part of the Salem environmental qualification review effort. This instrumentation was included in the master list and evaluation forms under the applicable systems. For example, steam generator level is included under Main Steam. A separate listing of all the primary instruments and attendant cables, panels, terminal blocks, etc., was not deemed necessary since all the devices were included in the system performing the function. Other devices which do not perform a safety system function were included under 'Containment Parameters' or 'Miscellaneous' in Section IV of the report. In the next revision to the Salem Environmental Qualification Report, a cross-indexing of display instrumentation will be provided.

Those instrumentation items which were included in the Emergency Operating Procedures but are not required for any operator action do not require environmental qualification. The operating procedures have been revised to reflect potential inaccuracy of the devices. The operators will be aware of their potential failure. A discussion of these items was provided in the following Bases of Section VII of the report: 18B, 21, 23, 29, 33 and 37."

The Licensee has resolved the NRC concern.

4.3.2 Environmental Service Conditions

The NRC SER [15] identified the following concern:

"The staff has reviewed the qualification documentation to ensure that the qualification specifications envelope the conditions established by the licensee. During this review, the staff assumed that for plants designed and equipped with an automatic containment spray system which satisfies the single-failure criterion, the main-steam-line-break (MSLB) environmental conditions are enveloped by the large-break-LOCA environmental conditions. The staff assumed, and requires the licensee to verify, that the containment spray system is not subjected to a disabling single component failure."

The Licensee response stated [16]:

"The Salem containment spray system has been designed such that a single failure will not result in loss of spray capability. The containment spray system design bases are described in FSAR Section 6.4.1. The system has been designed in accordance with ECCS criteria of redundancy, single failure, etc. This item was addressed in Section VIII of our report."

The Licensee has resolved the concern identified by the NRC.

4.3.3 Temperature, Pressure, and Humidity Conditions Inside Containment

The NRC SER [15] expressed the following concern:

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

	<u>Max Temp (°F)</u>	<u>Max Press (psig)</u>	<u>Humidity (%)</u>
LOCA	271	43.2	100
MSLB	350	42.8	100

The staff has concluded that the minimum temperature profile for equipment qualification purposes should include a margin to account for higher-than-average temperatures in the upper regions of the containment that can exist due to stratification, especially following a postulated MSLB. 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 either a postulated LOCA or MSLB, whichever is controlling, as to potential adverse environmental effects on equipment.

The licensee's specified temperature (service conditions) of 271°F does not satisfy the above requirement. Furthermore, the licensee specified pressure is low as compared to the plants of similar design. The

licensee is requested to verify that the pressure profile in the FSAR was calculated based on the code requirements defined in the NUREG-0588. If, by using these codes, the peak containment pressure is still 43.2 psig, then a saturation temperature corresponding to the pressure profile (289°F peak temperature at 43.2 psig) should be used. If, however, the calculated peak pressure is higher than 43.2 psig, then the saturation temperature corresponding to the new pressure profile should be used.

The licensee has provided the results of the analysis which was performed to predict the equipment surface temperature during the MSLB event. The staff needs the sample calculation--including bases and assumptions--and the confirmation that the temperature measured during the qualification testing was the surface temperature and not the ambient temperature to make the judgment on the acceptability of the equipment qualification."

The Licensee provided the following response [16]:

"Wyle Labs Report 44439-2 for Salem Generating Station instrument panel testing has already been submitted to the NRC Staff. Ten (10) copies of the original issue of 44439-2 were sent by letter, Mr. R. L. Mittl, PSE&G to Mr. Olan D. Parr, NRC on April 12, 1979 and ten (10) copies of Revision A of 44439-2 were sent by letter, Mr. R. L. Mittl, PSE&G to Mr. Olan D. Parr, NRC on October 23, 1979.

A lower temperature profile for some items was established due to their location within instrument panel enclosures inside the containment. The peak containment temperature for exposed equipment is 350°F. The instrument panel testing demonstrates that when the containment temperature is 350°F, equipment within the panels see temperatures less than 300°F. This is due to the thermal protection afforded by the instrument panel during the initial temperature rise transient."

It appears that the Licensee has not resolved the NRC concern. 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.

4.3.4 Submergence

In the SER [15], the NRC expressed 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 83 ft 1 in. Equipment below this level has been identified by the Licensee, along with the proposed corrective action. The licensee identified 17 types of safety-related electrical components as having the potential for becoming submerged after a postulated event.

The licensee proposes procedural modifications for some cases and indicates that the functional requirements of the potentially submerged components will be completed prior to submergence. The licensee should provide an assessment of the failure modes associated with the submergence of components. Assurance should also be provided that the subsequent failure of these components 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 the referenced components 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."

The Licensee response [16] stated:

"An evaluation of submerged components and their effect on other equipment and safety functions was performed with the results presented in the response to FSAR Question 6.28. The safety of the plant would not be jeopardized by the submerged components. As part of the environmental qualification review effort, submerged components were reevaluated to assure the safety function was performed prior to submergence. In all cases this would be accomplished in a timely fashion prior to submergence. Bases 28 and 29 provide the discussion of this topic in our report. Supporting documentation is included with our environmental qualification files in the corporate home office.

A high energy line break analysis was performed for equipment outside the containment at Salem. This analysis did not identify flooding outside the containment as a safety concern. This was due to the use of drains outside the containment to take care of leakage, encapsulation of piping to limit mass release from breaks and direct it to acceptable areas and that major pipe breaks are in areas which are provided with relief panels to direct the mass release to the atmosphere. The high energy line break analysis is described in FSAR Section 14.5. Therefore, submergence of safety-related equipment outside the containment was not specifically addressed in the previous report."

The Licensee has not resolved the SER concern on submergence inside containment.

4.3.5 Chemical Spray

The NRC SER [15] expressed the following concern:

"The Licensee's FSAR value for the chemical concentration is 0.2 wt% solution caustic and 1.2 wt% boric acid, resulting in a pH greater than 8.5. The exact volume percent used by the vendors for qualification testing should be verified 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, the Licensee provided the following information [16]:

"The environmental qualification review of the acceptability of chemical spray testing of equipment was based on the use of boric acid and sodium hydroxide in a solution creating a pH of greater than 8.5 for a duration greater than 22.5 hours."

The Licensee response addresses pH and duration but does not identify boric acid and sodium hydroxide concentrations. The Licensee should provide this information.

4.3.6 Aging and Qualified Life

Section 3.7 of the NRC SER [15] indicated the following concern:

"Section 7 of the DOR guidelines does not require a qualified life to be established for all safety-related electrical equipment. However, the following actions are required:

- (1) Make a detailed comparison of existing equipment and the materials identified in Appendix C of the DOR guidelines. The first supplement to IEB-79-01B requires licensees to utilize the table in Appendix C and identify any additional materials as the 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 specified qualified life was established (for example, 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."

The Licensee response [16] stated:

"The Salem Aging Evaluation Program is described in Section X of the report. This information was included in Revision 2 update issued 1/16/81. Maintenance or replacement schedules were established for selected equipment based on this review. This information has been included in revised Qualification Evaluation Data Forms where appropriate in Section V of the report. In our discussion we indicated that aging evaluation is an ongoing effort as part of the surveillance programs for safety-related equipment and activities of the industry by the PWR and BWR owners groups, EPRI, licensee event reports, new testing and NRC Bulletins and Circulars. This information will be factored into an overall aging program."

The Licensee has adequately responded to the NRC concern.

4.3.7 Radiation (Inside and Outside Containment)

Section 3.8 of the NRC SER [15] stated the following:

"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 maximum value required by the licensee inside containment is an integrated dose of 5×10^7 rads; however, the minimum value for inside containment has not been provided. This value may not envelope the minimum requirements of NUREG-0588. Therefore the licensee is requested

to either provide justification for using the lower value or provide values established using the methodology of NUREG-0588. If the latter is chosen, then the analysis, including the basis and assumptions used and a sample calculation, should be provided.

Required values outside containment of 1×10^6 have been used by the licensee to specify limiting radiation levels for the RHR equipment 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 provided the following information in response [15]:

"We are unaware of minimum radiation value used to establish adequate environmental qualification. The maximum value of 5×10^7 R has been used as the benchmark for qualification review. The Staff has established a different method for radiation exposure calculation for the Reactor Coolant System Temperature Monitors (RTD's). We have indicated that these will be replaced each refueling outage pending installation of qualified devices meeting Staff requirements. This item was established in NRC Safety Evaluation for Salem Supplement 4 dated April, 1980."

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 |

 | SALEM |

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FRC ITEM NO.	COMPONENT	MANUFACTURER	MODEL NUMBER	LOCATION
1	RTD	ROSEMOUNT	176KF	CONTAINMENT
2	RTD	ROSEMOUNT	176KS	CONTAINMENT
3	PRESSURE TRANSMITTER	BARTON	763 LOT 2	CONTAINMENT
4	D/P TRANSMITTER	BARTON	764 LOT 2	CONTAINMENT
5	PRESSURE TRANSMITTER	ROSEMOUNT	1153AGA	CONTAINMENT
6	SOLENOID VALVE	ASCO	R21002	CONTAINMENT
7	LIMIT SWITCH	NAMCO	EA180	CONTAINMENT
8	D/P TRANSMITTER	BARTON	384	CONTAINMENT
9	TRANSDUCER, E/P	FISHER GOVERNOR	546	INBOARD/OUTBOARD PENETRATION AREAS
10	PRESSURE TRANSMITTER	FISCHER AND PORTER	50EP1041	INBOARD/OUTBOARD PENETRATION AREAS
11	ELECTRIC MOTOR	WESTINGHOUSE	77C27257	CONTAINMENT
12	LIMIT SWITCH	MASONEILAN	4962	INBOARD/OUTBOARD PENETRATION AREAS
13	CONTROL SWITCH	MICRO SWITCH	910PCD533	INBOARD/OUTBOARD PENETRATION AREAS
14	TERMINAL BLOCK	CINCH JONES	ND	INBOARD/OUTBOARD PENETRATION AREAS
15	D/P TRANSMITTER	FISCHER AND PORTER	10B2495	INBOARD/OUTBOARD PENETRATION AREAS
16	D/P TRANSMITTER	FISCHER AND PORTER	10B2495	VARIOUS
17	SQUARE ROOT EXTRACTOR	FISCHER AND PORTER	50E53212	INBOARD/OUTBOARD PENETRATION AREAS
18	PUMP MOTORS	WESTINGHOUSE	ND	AUXILIARY BLDG., ELEV. 84'-0"
19	PUMP MOTORS	WESTINGHOUSE	ND	AUXILIARY BLDG., ELEV. 45'-0"
20	TRANSDUCER, E/P	FISHER CONTROLS	546	AUXILIARY BLDG., ELEV. 45'-0"
21	FLOW TRANSMITTER	BARTON	289A	AUXILIARY BLDG., ELEV. 45'-0"
22	SOLENOID VALVE	ASCO	FT8321A2	INBOARD/OUTBOARD PENETRATION AREAS
23	LEVEL TRANSMITTER	BARTON	332352	AUXILIARY BLDG., ELEV. 84'-0"
24	ELECTRICAL CONNECTOR	AMP	4906R1475/4800R147P	CONTAINMENT
25	SOLENOID VALVE	ASCO	FT8321A4	INBOARD/OUTBOARD PENETRATION AREAS
26	LIMIT SWITCH	NAMCO	D2400XST	MECHANICAL PENETRATION AREA, ELEV.
27	LIMIT SWITCH	MASONEILAN	4962	MECHANICAL PENETRATION AREA, ELEV.
28	LIMIT SWITCH	NAMCO	D2400X	MECHANICAL PENETRATION AREA, ELEV.
29	SQUARE ROOT EXTRACTOR	FISCHER AND PORTER	50E53212	MECHANICAL PENETRATION AREA, ELEV.
30	FLOW CONTROLLER	FISCHER AND PORTER	53EG3000	MECHANICAL PENETRATION AREA, ELEV.
31	TRANSDUCER, E/P	FISCHER AND PORTER	53EI3000	MECHANICAL PENETRATION AREA, ELEV.
32	PRESSURE TRANSMITTER	BARTON	332/351	MECHANICAL PENETRATION AREA, ELEV.
33	PRESSURE TRANSMITTER	BARTON	351	CONTAINMENT
34	LIMIT SWITCH	NAMCO	D2400X	MECHANICAL PENETRATION AREA, ELEV.
35	SOLENOID VALVE	ASCO	NP SERIES	VARIOUS
36	LIMIT SWITCH	NAMCO	EA180	ND
37	PANEL, I AND C	PSE&G	1,2,3,4 BAY VERTICAL NEMA 12 E	VARIOUS
38	MOTORIZED VALVE ACTUATOR	LIMITORQUE	SMB, CLASS B INSULATION	OUTSIDE CONTAINMENT
39	TERMINAL BLOCK	BUCHANAN	2B112N	CONTAINMENT
40	ELECTRICAL CABLE SPLICE	RAYCHEM	WCSFN	CONTAINMENT
41	ELECTRICAL PENETRATION	COHAX	CANISTER TYPE LVP/HVP	CONTAINMENT
42	ELECTRICAL CABLE	AMERICAN INSULATED WIRE	ND	CONTAINMENT
43	ELECTRICAL CABLE	SAMUEL MOORE	EPR (EPDM) INSULATION	CONTAINMENT
44	ELECTRICAL CABLE	BOSTON INSULATED WIRE	COAXIAL TEFZEL/ETFE	CONTAINMENT
45	ELECTRICAL CABLE	TRIANGLE	ND	CONTAINMENT
46	ELECTRICAL CABLE	ANACONDA WIRE AND CABLE	ND	CONTAINMENT
47	ELECTRICAL CABLE	ROCKBESTOS	ND	CONTAINMENT
48	ELECTRICAL CABLE	OKONITE	ND	CONTAINMENT
49	MOTOR CONTROL CENTER	GENERAL ELECTRIC	7700 SERIES	AUXILIARY BLDG., ELEV. 84'-0"

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| EQUIPMENT ENVIRONMENTAL QUALIFICATION |

| EQUIPMENT ITEM CHECKSHEET INDEX |

| SALEM 1 |

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FRC ITEM NO.	COMPONENT	MANUFACTURER	MODEL NUMBER	LOCATION
50	ELECTRIC MOTOR	WESTINGHOUSE	SPIN #PSE-RCADCF	CONTAINMENT, ELEV. 130'
51	HYDROGEN RECC'BINER	WESTINGHOUSE	ND	CONTAINMENT, ELEV. 130'
52	ELECTRICAL CONNECTOR	BURNDY	HT LUG	CONTAINMENT
53	THERMOCOUPLE	TEM TEX	304250TG12SA21HCCTC	CONTAINMENT
54	LEVEL SWITCH	GEMS	LS800	CONTAINMENT
55	THERMOCOUPLE	WESTINGHOUSE	SPIN #RCRIUI (583F014)	CONTAINMENT
56	HUMIDITY DETECTOR	FOXBORO	2711AG	CONTAINMENT
57	RADIATION MONITOR	FOXBORO	TA63A	CONTAINMENT
58	REED SWITCH	WESTINGHOUSE	KD880512	CONTAINMENT
59	RADIATION DETECTOR	WESTINGHOUSE	SR #WL23706, IR #WL23707, PR #	CONTAINMENT
60	ELECTRIC MOTOR	WESTINGHOUSE	TBFC	CONTAINMENT
61	SOLENOID VALVE	ASCO	HT344A75	MECHANICAL PENETRATION AREA, ELEV.
62	HYDROGEN-OXYGEN ANALYZER	BACHARACH	ND	CONTAINMENT
63	LIMIT SWITCH	NAMCO	EA17011302	MECHANICAL PENETRATION AREA, ELEV.
64	LIMIT SWITCH	NAMCO	D2400X	CONTAINMENT
65	PRESSURE TRANSMITTER	FISCHER AND PORTER	50EP1041	MECHANICAL PENETRATION AREA
66	D/P TRANSMITTER	FISCHER AND PORTER	10B2495	MECHANICAL PENETRATION AREA, ELEV.
67	SQUARE ROOT EXTRACTOR	FISCHER AND PORTER	50E53212	INBOARD/OUTBOARD PENETRATION AREA
68	D/P TRANSMITTER	FISCHER AND PORTER	10B2496	ND
69	PRESSURE TRANSMITTER	ROSEMOUNT	1153AGA	INBOARD/OUTBOARD PENETRATION AREAS
70	LIMIT SWITCH	NAMCO	D2400X2	INBOARD/OUTBOARD PENETRATION AREAS
71	SOLENOID VALVE	ASCO	LB831654	MECHANICAL PENETRATION AREA, ELEV.
72	SOLENOID VALVE	ASCO	HTX8344A75	MECHANICAL PENETRATION AREA, ELEV.
73	SOLENOID VALVE	ASCO	HTX834475	MECHANICAL PENETRATION AREA, ELEV.
74	SOLENOID VALVE	ASCO	X8342822	MECHANICAL PENETRATION AREA, ELEV.
75	SOLENOID VALVE	ASCO	HTX834477	MECHANICAL PENETRATION AREA, ELEV.
76	SOLENOID VALVE	ASCO	HT834477	MECHANICAL PENETRATION AREA, ELEV.
77	SOLENOID VALVE	ASCO	HT834475	MECHANICAL PENETRATION AREA, ELEV.
78	SOLENOID VALVE	ASCO	LBX83146	MECHANICAL PENETRATION AREA, ELEV.
79	SOLENOID VALVE	ASCO	FT8320A101	MECHANICAL PENETRATION AREA, ELEV.
80	SOLENOID VALVE	ASCO	FT8321A2	MECHANICAL PENETRATION AREA, ELEV.
81	SOLENOID VALVE	ASCO	831654	MECHANICAL PENETRATION AREA, ELEV.
82	SOLENOID VALVE	ASCO	X8342822	MECHANICAL PENETRATION AREA, ELEV.
83	SOLENOID VALVE	ASCO	FT83154	MECHANICAL PENETRATION AREA, ELEV.
84	SOLENOID VALVE	ASCO	FT831486	MECHANICAL PENETRATION AREA, ELEV.
85	SOLENOID VALVE	ASCO	FT831654	MECHANICAL PENETRATION AREA, ELEV.
86	LIMIT SWITCH	MICRO SWITCH	LS0051	MECHANICAL PENETRATION AREA, ELEV.
87	LIMIT SWITCH	MASONEILAN	4002	CONTAINMENT
88	LIMIT SWITCH	MICRO SWITCH	LS0051	CONTAINMENT
89	PRESSURE TRANSMITTER	FISCHER AND PORTER	50EP1031RCXANS	CONTAINMENT
90	MOTORIZED VALVE ACTUATOR	LIMITROUQ	SMB, CLASS B INSULATION	CONTAINMENT
91	MOTORIZED VALVE ACTUATOR	LIMITROUQ	SMB, CLASS H INSULATION	CONTAINMENT
92	SOLENOID VALVE	ASCO	X8342822	CONTAINMENT
93	PRESSURE TRANSMITTER	ROSEMOUNT	1153AHA	ELECTRICAL PENETRATION AREA, ELEV.
94	ELECTRICAL CABLE	ROCKBESTOS	ND	CONTAINMENT



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

EQUIPMENT ITEM NO. 1
 RESISTANCE TEMPERATURE DETECTOR LOCATED IN THE CONTAINMENT
 ROSEMOUNT MODEL 176KF AC
 REQUIRED OPERATING TIME: MSLJ, LESS THAN 30 SECS
 TER CHECKSHEET NO. 1
 LICENSEE REFERENCE(S): 687, 25, 26, 27
 FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYSTEM (TA0040, 41, 50, 51,
 60, 61, 70, 71)
 SERVICE: RC HOT/COLD LEG NARROW RANGE TEMPERATURE
 LICENSEE SUBMITTAL: SCEW(S): 1
 FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYSTEM (TA2437, 38, 40, 41,
 43, 44, 46, 47)
 SERVICE: RC HOT/COLD LEG NARROW RANGE TEMPERATURE
 LICENSEE SUBMITTAL: SCEW(S): 1 [12]

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

R, T, Q^T, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 (qualify by June 1982)
- 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 June 30, 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 | II.c Qualified Life Deficiency |
| I.b Modification | III.a Exempt |
| <u>II.a</u> Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | 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	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
Program Established to Identify Aging Degradation	<u>---</u>
Criteria Regarding Aging Simulation Satisfied (If Required)	<u>---</u>
Criteria Regarding Temperature/Pressure Exposure:	
o Peak Temperature Adequate	<u>---</u>
o Peak Pressure Adequate	<u>---</u>
o Duration Adequate	<u>---</u>
o Required Profile Enveloped Adequately	<u>X</u>
o Steam Exposure (If Required) Adequate	<u>---</u>
Criteria Regarding Spray Satisfied	<u>X</u>
Criteria Regarding Submergence Satisfied	<u>---</u>
Criteria Regarding Radiation Satisfied	<u>---</u>
Criteria Regarding Test Sequence Satisfied	<u>---</u>
Criteria Regarding Test Failures or Severe Anomalies (If Any) Satisfied	<u>---</u>
Criteria Regarding Functional Testing Satisfied	<u>X</u>
Criteria Regarding Instrument Accuracy Satisfied	<u>X</u>
Test Duration Margin (1 hour + Function Time) Satisfied	<u>---</u>
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	<u>---</u>

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	<u>---</u>
I.b	Equipment Qualification Pending Modification	<u>---</u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u>---</u>
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	<u>---</u>
III.a	Equipment Exempt From Qualification	<u>---</u>
III.b	Equipment Not in the Scope of the Qualification Review	<u>---</u>
IV	Documentation Not Made Available	<u>---</u>



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: RTD
(Rosemount)

MODEL: 176KF A,C

COMPONENT NO.: TA0040, TA0041, TA0050, TA0051, TA0060, TA0061, TA0070, TA0071,
TA2437, TA2438, TA2440, TA2441, TA2443, TA2444, TA2446, TA2447.

NRC IDENTIFIED DEFICIENCIES: A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 1.

An aging review is being conducted for these devices. As of date a qualified life has not been established. Qualification is expected prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 1 details our position and justification for continued operation.

PSE&G's evaluation of noted deficiency has reaffirmed that plant safety is not jeopardized pending qualification.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

LICENSEE RESPONSE TO NRC SER (CONTINUED)

Basis No. 1

Deficiency: Incomplete Aging Review of Miscellaneous Equipment.

Justification:

Wyle Laboratories is currently performing an aging review for PSE&G in accordance with the requirements of NUREG 0588, of equipment for which aging data is incomplete and the equipment has not been scheduled for replacement. This will encompass the identification of materials which are susceptible to aging mechanisms and which could affect equipment operation. A qualified life will be determined and maintenance programs established for the devices as required.

This matter is considered to have little safety significance for the time frame in question. Aging degradation, if it is a problem, is not expected to occur in this short period but on the order of years.

This case has been classified as Group II.4 item (II.4.2).

Corrective Action:

The aging review being performed by Wyle Laboratories is to be essentially complete by January 1, 1981.

The Wyle review contains the following elements:

- 1 - Existing qualification data is searched to determine if documentation exists which satisfies the required LOCA/MSLB profiles and contains pre-aging data.

Applicable data is compared with the Salem plant conditions. If the equipment qualified life is based on conditions similar to those appropriate for Salem, this value is used as the estimate of the equipment's qualified life for use at Salem.

If the aforementioned estimated qualified life was calculated at a temperature significantly different than the Salem plant conditions, the qualified life for Salem is extrapolated by use of the Arrhenius equation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

LICENSEE RESPONSE TO NRC SER (Continued)

- 2 - If qualification data exists which does not include pre-aging, an attempt is made to demonstrate that the equipment is not subject to aging mechanisms which would prevent it from functioning at some future time during a LOCA/MSLB.

Equipment materials are identified and the thermal and radiation aging characteristics are researched. If it can be shown that the thermal and radiation resistance results in no significant aging for a 40 year service life, the material can be exempted from aging considerations.



Franklin Research Center
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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 1

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

EQUIPMENT ITEM NO. 2
 RESISTANCE TEMPERATURE DETECTOR LOCATED IN THE CONTAINMENT
 ROSEMOUNT MODEL 176 KS
 REQUIRED OPERATING TIME: LOCA/MSLB
 TER CHECKSHEET NO. 2
 LICENSEE REFERENCE(S): 687, 25, 26, 27
 FUNCTION (PLANT ID): POST-ACCIDENT MONITORING (T0043, 53, 63, 73; TA2757, 58,
 59, 60)
 SERVICE: RC HOT/COLD LEG WIDE RANGE TEMPERATURE
 LICENSEE SUBMITTAL: SCEW(S): 2 [64]

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

R, T, QV, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 2

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 by 6/30/82.)
- 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 |
| <input checked="" type="checkbox"/> 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. 2

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

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

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	<u> </u>
I.b	Equipment Qualification Pending Modification	<u> </u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u> </u>
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	<u> </u>
III.a	Equipment Exempt From Qualification	<u> </u>
III.b	Equipment Not in the Scope of the Qualification Review	<u> </u>
IV	Documentation Not Made Available	<u> </u>

Note: Licensee has stated equipment will be replaced with qualified equipment by June 30 1982. Supporting data in Licensee's EQ-10 file (see pg 3a) does not adequately address existing deficiencies.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: RTD (Rosemount, Inc.)

MODEL: 176 KS

COMPONENT NO.: TA0043, TA0053, TA0063, TA0073,
TA2757, TA2758, TA2759, TA2760

NRC IDENTIFIED DEFICIENCIES: RT, QT, CS, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Our submittal, Volume 1, Section V, page 2 addresses all the above NRC noted deficiencies. Supporting data referenced is available in our file EQ-10. RTD's at Salem are being replaced every outage pending requalification by the manufacturer to more conservative guidelines dictated by NRC in letter dated 10/13/79. PSE&G plans to install fully qualified RTD's by 6/30/82 deadline per licensing requirement.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending a permanent solution to the problem.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 2

MAINTENANCE AND REPLACEMENT SCHEDULE SUMMARY

The following information regarding the maintenance and replacement schedule(s) for components, sub-components, and materials has been provided by the Licensee.

The wide range RTDs are replaced at each refueling pending requalification per NRC requirements in NRC SER for Salem (Supp.4) NUREG 0517, Apr 1980; pg 3-15,



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

EQUIPMENT ITEM NO. 3
 PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT
 BARTON MODEL 763 PROD LOT 2
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 3
 LICENSEE REFERENCE(S): 28, 1570
 FUNCTION (PLANT ID): REACTOR COOLANT SYSTEM PRESSURE POST ACCIDENT MONITORING
 (PA0039 & PA8088)
 LICENSEE SUBMITTAL: SCEW(S): 3 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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	6a, 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:

- The Licensee (has/~~has not~~) provided a response to the SER concerns.
- The Licensee (has/~~has not~~) specifically stated that the equipment is ~~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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b</u> 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. 3

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	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Barton)

MODEL: 763 Prod. Lot 2

COMPONENT NO.: (PA0039, PA8088)
(Unit 1)

NRC IDENTIFIED DEFICIENCIES: RT, A, S

PSE&G EVALUATION OF DEFICIENCIES:
Ref. Qualification Data Evaluation Form page 3.

These pressure transmitters will be replaced with qualified units prior to 6/30/82, Our submittal, Volume I, Section VII, basis 2, gives this schedule and our justification for continued operation. These transmitters not submerged. The evaluation form indicates they are above the flood level. PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.

TERMINED



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 3

NOTES:

The review and evaluation of reference 1570
is presented in detail in item 4 Checksheet.
The only difference is that this item is
a Barton model 763 product Ltd.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

EQUIPMENT ITEM NO. 4
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE
 CONTAINMENT
 BARTON MODEL 764 PROD LOT 2
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 4
 LICENSEE REFERENCE(S): 28, 1570
 FUNCTION (PLANT ID): PRESSURIZER LEVEL POST-ACCIDENT MONITORING (LA0086,
 LA0087, LA0088)
 FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYS. AND POST ACCIDENT
 MONITORING
 LICENSEE SUBMITTAL: SCEW(S): 5 [64]
 SERVICE: STEAM GENERATOR NARROW RANGE WATER LEVEL TRIP INPUT FOR REACTOR
 PROTECTION SYSTEM AND POST ACCIDENT MONITORING (LA0005, LA0006,
 LA0007)
 LICENSEE SUBMITTAL: SCEW(S): 12 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 4

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 by 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 4

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	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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. 4

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Barton)

MODEL: 764 Prod. Lot 2

COMPONENT NO.: (LA0086, LA0087, LA0088)
(Unit 1)

NRC IDENTIFIED DEFICIENCIES: RT, A

PSE&G EVALUATION OF DEFICIENCIES:
Ref. Qualification Data Evaluation Form page 5.

These pressure transmitters will be replaced with qualified units prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 2, gives
this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 4

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

EQUIPMENT ITEM NO. 5
 PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT
 ROSEMOUNT MODEL 1153AGA
 REQUIRED OPERATING TIME: LOCA/MSLB, LESS THAN 5 MIN [12]; POST-ACCIDENT
 MONITORING [29]
 TER CHECKSHEET NO. 5
 LICENSEE REFERENCE(S): 29, 30, 31, 32, 1764, 3297
 FUNCTION (PLANT ID): PRESSURIZER PRESSURE TRIP INPUT TO REACTOR PROTECTION
 SYSTEM (PA0082, PA0083, PA0084 & PA0087)
 LICENSEE SUBMITTAL: SCEW(S): 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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 5a ₁ , 5b ₁ , 5e ₁ , 5f ₁ , 5g ₁ , 5h ₁ , 5i ₁ , 5k ₁
Installed TMI Lessons Learned Implementation Equipment Summary	6a, 6b 5l, 5m
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:

- 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 (qualify for aging or replace)
 - 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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 5

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Rosemount)

MODEL: 1153AGA

COMPONENT NO.: PA0082, PA0083, PA0084, PA00⁸~~7~~

NRC IDENTIFIED DEFICIENCIES: A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 7.

An aging review is being conducted for these devices. As of date a qualified life has not been established. These transmitters will either be qualified or replaced prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 1 details our position and justification for continued operation.

PSE&G's evaluation of noted deficiency has reaffirmed that plant safety is not jeopardized pending qualification.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	PRESSURE TRANSMITTER	DIFFERENTIAL PRESSURE TRANSMITTER	
Manufacturer's Name (5.2.2/-/-)	ROSEMOUNT	ROSEMOUNT	
Model Number (5.2.2/-/-)	1153AGA	1153DAS	X see note 1 and note 4
Serial Number	—	106186 THRU 106188	
Features/Mounting (5.2.6/-/-)	ROSEMOUNT BRACKET	1153 SERIES A	
Connections/Interfaces (5.2.6/-/-)	—	ROSEMOUNT MOUNTING BRACKET	
Location/Elevation	SEE Pg 1a	LOW SIDE PLUMBED TO ATMOSPHERIC	
Equipment ID No.	SEE Pg 1a	N/A	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	RMT 3788	RMT 3788	[1764]
Report Date	N/A	March 23, 1978	
Issued by	N/A	Rosemount	
Prepared for	N/A	Rosemount	
Referenced Reports	N/A	RMT 37821	[4423]
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	TEST	TYPE TEST	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	NA	UNIT POWERED AND PRESSURIZED	
Operating Conditions (-/2.2.10/2.2.10)	NA	0 - 750" H ₂ O Range	
Load/Cycles/Voltage/ Current/Freq.		4 - 20 ma.	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NRC REQUIREMENTS WITH SECTION REFERENCE (DCR/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	$\pm 5\%$ G.O.S MPAD/h, 40 MPAD $\pm 8\%$ DURING STM TEST	
Accuracy (5.2.5/-/-)	N/A	MAX. OUTPUT SIGNAL DEVIATION $+3.7\%$ OF SPAN DURING RADIATION, $+6.95\%$ STEAM	NOTE 2
Number of Specimens	N/A	3	
Test Instruments Calibrated	N/A	YES/NBS	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	ACTIVE	N/A	
Test Duration (5.2.1/-/-)	N/A	64 hr 20 min	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	> 24 hours	N/A	
Required Function Time	≤ 5 min	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	RADIATION/SEISMIC/ STEAM-PRESSURE/SPRAY	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)	N/A	N/A	
1. Representative Sample			
2. Baseline Data			
3. Performance Extremes			
4. Thermal Aging			
5. Radiation Aging		N/A	
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)	Unit 1	NONE	X - see note 5
Thermal Aging/Basis	[PSR-30]		
Material Aging Evaluation (7.0/-/-)	10°C rule	NONE	X see note 5
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	[PSR-28] Unit 2	NONE	X see note 5
Radiation Aging, Type		GAMMA Co ⁶⁰	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

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	SEE ACCIDENT DOSE	
Radiation Aging, Dose Rate	N/A	SEE ACCIDENT DOSE	
Radiation Aging, Method	N/A	TEST	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	NOT STATED	NO	
Operational Aging (-/4.2/-)	N/A	N/A	
Other Age Conditioning (-/4.2/-)	N/A	N/A	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	[PSR-30]	NOT STATED	X - see note 5
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	N/A	N/A	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	N/A	NOT STATED	X
On-Going Analysis of Failures and Degradation (7.0/-/-)	N/A	NOT STATED	
Margin (General) (6.0/3.0/3.0)	N/A	10% ON RADIATION	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	N/A	N/A	
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. 5

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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	N/A	
Radiation Type	GAMMA	GAMMA C ⁶⁰	
Radiation Dose (rd) (4.1.2/1.4/1.4)	4 x 10 ⁷ R	44 x 10 ⁶ RAD	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	NOT STATED	0.5 x 10 ⁶ R/HR TEST	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	NA	N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	NA	N/A	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	4 x 10 ⁷ R	44 x 10 ⁶ RAD	
Plateout Dose Considered (-/1.48/1.48)	[PSR-31]	N/A	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)		N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5°F/3PSI/min	1.5 % / 0.67 PSI/S	
Peak: °F/psig/RH/Time	350/43.2/100/3h	* 350/120/100/0-10M	* 2 CYCLES in 3 hour INTERVAL
Decrease To: °F/psig/RH/Time	286/20/100/3h	303/55/100/8HR	
Decrease To: °F/psig/RH/Time	219/20/100/21h	250/15/100/56HR	
Decrease To: °F/psig/RH/Time	152/5/100/-	ROOM TEMP.	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	NONE	
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)	H ₃ BO ₃ NAOH Ph > 8.5	H ₃ BO ₃ 15000 PPM NAOH PH 10.5 @ 77°F	
Spray Density (gpm/Ft ²)	> 22.5 hr	0.15 gpm/Ft ²	
Spray Duration		10 - 24 hours	see note 3
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	NONE	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	NO LEAKAGE DETECTED	
Time to Submergence	NA	N/A	
Dust Environment (-/2.2.11/2.2.11)	NA	N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

Note 1. *The test report stated the following:*

// These test units are representative of the whole 1153 Series A model line. The remainder of the model line differ by the spring constant (thickness) of the sensing diaphragm and by the process pressure level. The stiffness of the metal sensing diaphragm, whose movement is minute - .004 inches, does not constitute a significant design difference. Radiation, vibration, and steam temperatures would not effect diaphragm stiffness to the extent that performance would exceed the specified acceptance criteria limits. Also, all transmitters within the model line have a design capability of withstanding a process pressure proof load of 10,000 psi. This is more than twice the maximum operating pressure range of any transmitter. Hence, process pressure is a static load which is well below the design proof load and the effects of this static loading would not be significantly enhanced by exposure to the qualification testing.

Thus, the entire 1153 Series A model line is qualified to the acceptance levels specified in this document by virtue of similarity to the test units.

<u>Model No.</u>	<u>Type</u>	<u>Span</u>		<u>Maximum Working or Maximum Static</u>
		<u>Min.</u>	<u>Max.</u>	
1153DA3	Differential	0-5" H ₂ O	0-30" H ₂ O	2000 psig
1153DA4	"	0-25" H ₂ O	0-150" H ₂ O	"
1153DA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153DA6	"	0-17 psid	0-100 psid	"
1153DA7	"	0-50 psid	0-300 psid	"
<u>1153DA8</u>	"	0-170 psid	0-1000 psid	"



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

1153HA4	Differential	0-25" H ₂ O	0-150" H ₂ O	4500 psig
1153HA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153HA6	"	0-17 psid	0-100 psid	"
1153HA7	"	0-50 psid	0-300 psid	"
1153AA5	Absolute	0-10" HgA	0-55" HgA	2000 psig
1153AA6	"	0-17 psiA	0-100 psiA	"
1153AA7	"	0-50 psiA	0-300 psiA	"
1153AA8	"	0-170 psiA	0-1000 psiA	"
1153AA9	"	0-500 psiA	0-3000 psiA	4500 psig
11536A3	Gauge	0-5" H ₂ O	0-30" H ₂ O	2000 psig
1153GA4	"	0-25" H ₂ O	0-150" H ₂ O	"
1153GA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153GA6	"	0-17 psiG	0-100 psiG	"
1153GA7	"	0-50 psiG	0-300 psiG	"
1153GA8	"	0-170 psiG	0-1000 psiG	"
1153GA9	"	0-500 psiG	0-3000 psiG	4500 psig "

It is concluded that the installed equipment (model 1153AGA) differs in model designation from the units tested or analyzed. No analysis was provided by the licensee to resolve this discrepancy. We believe that this discrepancy can be easily resolved.

Note 2 - the report stated:

Summary of Radiation Results

During the exposure period, the following worst case output signal deviations were noted: -.6%, +3.7%, and +1.5% of span for serial numbers 106186, 106187, and 106188; respectively. These results are well within the expected error band of ±5% upper range limit. The post-test calibration check indicates that all transmitters returned to near normal performance; all transmitters were within 0.5% of the pre-test data. No changes worthy of noting were seen in liftoff voltage or time constant parameters in the before to after comparison. The temperature coefficient data do indicate that radiation does have an effect on this parameter; however, the magnitude of this effect is small. The largest difference between the pre-to-post test data at the hot temperature (200°F) was only 1.3% of span.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES: Note 3 - the report stated:

The deviation from procedure resulted from a problem with the filtration system for the chemical spray. The plumbing for the spray became clogged such that units 106186, 106187, and 106188 were sprayed for 10, 21, and 24 hours; respectively. The procedure originally specified 24 hours of chemical spray. This deviation does not impact the results of the test for three reasons. First, the transmitter design is one in which all exposed surfaces are of ferrous material and are chemically compactable with the spray. Second, the strip chart data for signal output and past development testing indicate that the output signal is unaffected by the spray introduced into the chamber. Third, unit 106188 did experience the required amount of spray and, therefore, demonstrates the design compactability with the 24 hours of spray.

It is concluded from the results present that all three units met the requirements of the steam/chemical test.

Note 4 - the report stated:

CONCLUSIONS

It is concluded from the data obtained from this type-test program, a summary of which is document in this report, that all three test units have successfully demonstrated the Rosemount Model 1153 Series A pressure transmitter to be qualified for Class 1E service in those applications requiring compliance with the 1971 IEEE standards.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

(5.) Reference 30 (Salem 1) and 28 (Salem 2)
EQ 11.01 uses the 10° Rule to
extrapolate the equivalent time of expected
life. The result is ≈ 78 days.

It is concluded that the 10° C rule is
an empirical relationship applicable to
some simple aging (chemical) reactions.
Application of the 10° C rule to complex
structures (components, materials) without
analysis or justification is inappropriate
and yields invalid data.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

CONCLUSION BASED ON REVIEW OF REPORT

Three differential range 1153DA5 transmitters were sequentially tested. These units are representative of the entire 1153 Series A model line. The remainder of the model line differs by the sensing diaphragm, spring thickness, and the process pressure rating. These differences are not significant with respect to qualification testing. Thus, the following model line is qualified by virtue of similarity:

- 1153DA3 through 8
- 1153HA4 through 7
- 1153AA5 through 9
- 1154GA3 through 9

However, the installed unit is a Rosemount 1153AGA.

The transmitters were exposed to a radiation exposure rate of 0.5 Mrd per hour for a total integrated dose of 44 Mrd. The maximum output signal deviation noted was +3.7% of span.

The three transmitters were LOCA tested in a steam temperature/pressure/chemical-spray environment for 64 hours. The maximum error exhibited was +6.95% of span.

all units successfully passed test in accordance with acceptance criteria. Testing was under IEEE-323(71) standard. Qualification program satisfies all applicable criteria of the DOR Guidelines except that aging degradation and qualified life or replacement schedule has not been addressed. In addition, adequate similarity between equipment installed and test specimen has not been established, however, this could be easily resolved if the licensee.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type		GAUGE PRESSURE TRANSMITTER	
Manufacturer's Name (5.2.2/-/-)	<i>See check sheet</i>	ROSEMOUNT	
Model Number (5.2.2/-/-)	<i>5a ↓</i>	1153 GA9	
Serial Number		108584	
Features/Mounting (5.2.6/-/-)		NOT STATED	<i>see note 1</i>
Connections/Interfaces (5.2.6/-/-)		NOT STATED	
Location/Elevation		N/A	
Equipment ID No.		N/A	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number		RMT NO. 37821 REV.B	[4423]
Report Date		24 AUG-78	
Issued by		ROSEMOUNT	
Prepared for		ROSEMOUNT	
Referenced Reports		RMT NO. 3788	[1764]
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		TEST	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)		UNIT POWERED AND PRESSURIZED	<i>see note 2 and note 3 and note 7</i>
Operating Conditions (-/2.2.10/2.2.10)		0-3000 PSIG	
Load/Cycles/Voltage/ Current/Freq.		NOT STATED	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

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)	<i>see checksheet SB ↓</i>	<i>± 8% of upper range</i>	<i>see note 5 and note 7</i>
Accuracy (5.2.5/-/-)		<i>-3.25% of SPAN 50% scale</i>	
		<i>-2.60% of SPAN 20% scale</i>	
Number of Specimens		<i>ONE</i>	
Test Instruments Calibrated		<i>YES</i>	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)		<i>N/A</i>	
Test Duration (5.2.1/-/-)		<i>3hr 20min.</i>	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)		<i>N/A</i>	
Required Function Time		<i>N/A</i>	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		<i>STEAM/CHEMICAL SPRAY</i>	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		<i>N/A</i>	
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		<i>NONE</i>	
Material Aging Evaluation (7.0/-/-)		<i>NONE</i>	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		<i>NOT STATED</i>	
Radiation Aging, Type		<i>N/A</i>	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NRC REQUIREMENTS WITH SECTION REFERENCE (DGR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	<i>see Checklist 5a ↓</i>	<i>1.5%/0.67PSIG/S</i>	
Peak: °F/psig/RH/Time		<i>*350/120/100/0-10M</i>	<i>see note 4</i>
Decrease To: °F/psig/RH/Time		<i>303/55/100/2HR</i>	<i>*2 CYCLES IN 3 HOUR INTERVAL</i>
Decrease To: °F/psig/RH/Time		<i>250/15/100/1.5HR</i>	
Decrease To: °F/psig/RH/Time		<i>ROOM TEMPERATURE</i>	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)		<i>NOT STATED</i>	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)		<i>TEST</i>	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)		<i>BORIC ACID 15000 PPM</i>	
Spray Density (gpm/ft ²)		<i>0.15 GPM/FT²</i>	
Spray Duration		<i>NOT STATED</i>	
Submergence Duration (4.1.3/2.2.5/2.2.5)		<i>N/A</i>	
In-Leakage Considered (5.2.6, 5.3.2/-/-)		<i>YES</i>	<i>see note 6</i>
Time to Submergence		<i>N/A</i>	
Dust Environment (-/2.2.11/2.2.11)		<i>N/A</i>	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

1. Report states that "new electronic circuit boards were used in each test". Also "new O-rings were installed between the electronic housing and cover for the second test". Assume "new" means "fresh" components.
2. Report states that "two tests were run - one with unit powered and pressurized at 50% full scale (1500 PSIG), and the second with the unit powered and pressurized at 20% full scale (600 PSIG)."
3. The report states that the goal of the testing was to assess the accuracy of the test specimen at the temperature level of 350, 303, 250 °F.
4. Report states that hold periods were terminated after transmitter signal had stabilized at a steady-state value. Hold periods: 350°F for 10M / 303°F for 2 hours, & 250°F for 1.5 hours



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

5. *The report stated the following regarding accuracy.*

//

TEST RESULTS

Accuracy deviations at the input pressures of 50 and 20% full scale (F.S.) are plotted versus time in Figures 2 and 3. These data indicate the maximum output signal deviation occurs during the 10 minute hold period at 350°F. The worst errors from the 50% and 20% full scale pressure tests during this period were -3.25 and -2.60 percent of span, respectively. At the 303°F temperature, the accuracy deviations were less than +1.5 and -0.8% of span for the 50% and 20% F.S. tests. At the 250°F temperature, the deviations were less than +1.8 and -0.6% of span. //

6. *Concerning leakage, the report stated:*

//

Two anomalies developed during the testing. The first was a minor leak developed at the threads between the process fluid bleed valve body and the process flange. This joint is sealed using a Loctite thread sealant. The leak was minimal, only a few drops of fluid per minute. The bleed valve assembly was removed and re-installed using a tape thread sealant in order to expeditiously finish the performance testing. Subsequent to the steam testing, an evaluation was made to reaffirm the design adequacy of the Loctite thread sealant at 350°F and 3000 psig



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

fluid pressure. A set of four flanges were assembled with bleed valves by the Production Department per procedures for the Model 1153. These were then heated in an oven to 350°F for four hours. They were removed from the oven and immediately pressurized to 3000 psig for a period of 20 minutes. During the twenty minutes, they were visually checked for leakage; none was detected. It was concluded that Loctite is an adequate thread sealant for these conditions. "

7. *Test report stated the following regarding anomalous behavior during calibration check after cooldown:*

" The second anomaly involved the output signal at the 100% full scale pressure, i.e. 3000 psig. After the first test had been completed and the unit had cooled to room temperature, a calibration check was made at 20% F.S. intervals. The 100% F.S. signal exhibited anomalous behavior characterized by an erratic output to a level 1.25% of span below the expected reading. Immediate cycling between zero and full scale, 3 cycles, indicated the 100% F.S. output signal to be a normal steady value each time. The transmitter was then reworked for the second phase of testing; new electronics and new O-rings were installed.

A calibration check prior to subjecting the transmitter to the second steam test showed normal operation. Also, during the steam test the unit exhibited expected performance characteristics. However, after cooling at room temperature, the 100% F.S. reading again showed abnormal behavior after pressure cycling.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

ADDENDUM 1
INVESTIGATION INTO THE CAUSE OF
THE PERFORMANCE ABNORMALITIES

Due to the abnormalities of the 100% output after the original steam test, an attempt was made to determine if the abnormalities were caused by the transmitter or by some other part of the test.

In an effort to determine what part of the transmitter wasn't working properly, the capacitance module was disconnected from the transmitter and its capacitance checked. While at room temperature, it was cycled at 80% F.S. pressure, 100% F.S. pressure, 110% F.S. pressure and 120% F.S. pressure; the cell acted erratically, changing its capacitance readings by up to 7.5% of the nominal readings. At the same time, a new capacitance module was subjected to the same test and performed perfectly. Thus, the abnormality can be traced to some problem with the original capacitance module used in the steam test.

After the electronics were replaced, the unit gave very smooth readings. The largest error seen was -3.13% of F.S. during the 350° temperature spike. The errors were -.95% of span during the 303°F phase of the test and -.44% of span during the 250°F portion.

CONCLUSION

The abnormalities that appeared in the original steam test were apparently caused by a defective capacitance module. An investigation was made to try to pinpoint the exact cause of the problem, but no conclusive results were ever obtained. However, due to the good performance of the new capacitance module when subjected to a steam test, it can be concluded that the problems with the original cell were of a random nature and that the transmitter will operate within the ±8% of upper range limit specification. //



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

Conclusion: The Model 1153 Series A (1153GA9)
Gauge Pressure transmitter has been
shown that it can operate within
the acceptance criteria $\pm 8\%$ of
upper range during and after
exposure to the environment noted herein.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

Overall Conclusion based on review of 4423 and 1764 in addition to the licensee's response:

• Reference 1764 establishes the fact that all three 1153DA5 units represent the 1153 series A model line and the qualification program satisfies the applicable criteria of the DOR Guidelines except for the assessment of aging degradation and qualified life. The testing was under IEEE-323 (71) standards. The report established:

- Three differential range 1153DA5 transmitters were sequentially tested. These units are representative of the entire 1153 Series A model line. The remainder of the model line differs by the sensing diaphragm, spring thickness, and the process pressure rating. These differences are not significant with respect to qualification testing. Thus, the following model line is qualified by virtue of similarity:

1153DA3 through 8
1153HA4 through 7
1153AA5 through 9
1154GA3 through 9

However, the installed unit is a model 1153AGA. *The licensee shall provide analysis of this deviation.*

- The transmitters were exposed to a radiation exposure rate of 0.5 Mrd per hour for a total integrated dose of 44 Mrd. The maximum output signal deviation noted was +3.7% of span.
- The three transmitters were LOCA tested in a steam temperature/pressure/chemical-spray environment for 64 hours. The maximum error exhibited was +6.95% of span.

• Reference 4423 established that model 1153GA9 demonstrated accuracy within the $\pm 8\%$ upper range acceptance criteria for given test conditions. Anomalies were traced to a random failure.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 5

NOTES:

- We note the following information abstracted from applicable and available qualification documentation associated with the overall NRC equipment environmental qualification review program:

"Rosemount testing to qualify a transmitter to meet IEEE 323-1974 requirements has resulted in failure. A combination of thermal aging, irradiation and chemical spray test specification parameters has resulted in failed components. The initial failed element was an O-ring comprised of sulphur cured polyethylene rubber. This allowed steam/chemical spray to affect electronic components. The O-ring mode of failure is attributed to high temperature vs. time necessary for the Arrhenius curve time compression to satisfy aging test requirements."

Based on these considerations, it is concluded that the licensee should contact Rosemount for details of the current testing. In addition, since FRC has not evaluated or seen the results of the current Rosemount testing, an assessment of the current Rosemount test program should be conducted by NRC.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 6

EQUIPMENT ITEM NO. 6
 SOLENOID VALVE LOCATED IN THE CONTAINMENT
 ASCO MODEL 821002
 REQUIRED OPERATING TIME: LOCA/MSLB
 TER CHECKSHEET NO. 6
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION(PLANT ID): CONTROL (SV1198, SV1199)
 SERVICE: AIR SUPPLY VALVE FOR PRESSURIZER PORV'S
 LICENSEE SUBMITTAL: SCEW(S): 8 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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. 6

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. 6

THE LICENSEE SCEN(S) REFERS TO BASIS No. 3

Basis No. 3

Deficiency: Unavailable Qualification Data (PORV control)

Justification:

Environmental Qualification of the controls for the pressurizer power operated relief valves was not previously required. NRC IE Bulletin 80-18 has been issued which implies that under certain accident conditions during which the PORV's do not operate (unqualified) that a problem could develop with the minimum flow capability of the centrifugal charging pumps. The devices were included in this review to indicate they were not qualified and that the particular problem of Bulletin 80-18 may be applicable for Salem. An analysis has been completed which addresses Bulletin 80-18. The analysis confirms that the PORV's do not require qualification. This justification is applicable for both Salem units.

Our September 19, 1980 submittal provided additional information pertinent to the Salem #2 valves 2PR47 and 2PR48 as follows:

The August 26 report listed this as a problem area because of the assumption that valves 2PR47 and 2PR48 could perform a pressure-relief function during high temperature operation. These valves, however, are part of the low-temperature, overpressure protection system (POPS) and are not used during design basis accident, or power operation transient conditions. The motive power for the solenoid is locked-out during normal operation and cannot open spuriously. Using these considerations, the valves can only be considered as auxiliary devices, not required for mitigation of accident conditions, and thus do not require qualification.

No changes are required for this case.

The September 19, 1980 submittal identified the above case as a Group II.1 item.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. C

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

Reason for Non-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)

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.

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 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.

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)

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. 7

EQUIPMENT ITEM NO. 7
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 NAMCO MODEL EA 180
 REQUIRED OPERATING TIME: LOCA/MSLB
 TER CHECKSHEET NO. 7
 LICENSEE REFERENCE(S): 898, 33, 34
 FUNCTION (PLANT ID): POSITION INDICATION OF PORV'S PR1, PR2
 SERVICE: POSITION INDICATION FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 10 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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)

- | | |
|---|--------------------------------|
| <input checked="" type="checkbox"/> 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. 7

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 detailed evaluation see
 Item 36*



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 7

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Namco)

MODEL: EA-180

COMPONENT NO.: 1PR3, 1PR4, 1PR5, 1WL12, 1WL96, 1VC7, 1VC9, 1VC11, 1VC13

NRC IDENTIFIED DEFICIENCIES: A, T, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 61.

A - The aging evaluation review was completed with maintenance schedules established. This information was added to the Evaluation Form in Revision 2.

T - The actual test resulted in a peak temperature of 349°F for 3 hours. The Salem required profile is 350°F for one minute. This is more than adequate to assure operability at Salem.

CS - This item was addressed in our submittal.

Further supporting data is available in our file EQ-13.

PSE&G's evaluation of the NRC noted deficiencies was reaffirmed that Namco, EA-180 limit switches, are capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

EQUIPMENT ITEM NO. 8
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE
 CONTAINMENT
 BARTON MODEL 384
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 8
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): STEAM GENERATOR WIDE RANGE WATER LEVEL POST ACCIDENT
 MONITORING (LA0009, LA0015, LA0021, LA0027)
 LICENSEE SUBMITTAL: SCEW(S): 14 [12]
 FUNCTION (PLANT ID): ACCUMULATOR LEVEL INDICATION (LA0228, LA0229, LA0233,
 LA0234, LA0237, LA0238, LA0241, LA0242)
 LICENSEE SUBMITTAL: SCEW(S): 14A [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 8

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 8

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
 X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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	_____



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Barton)

MODEL: 384

COMPONENT NO.: LA0009, LA0015, LA0021, LA0027

NRC IDENTIFIED DEFICIENCIES: RT, A

PSE&G EVALUATION OF DEFICIENCIES:
Ref. Qualification Data Evaluation Form page 14.

These pressure transmitters will be replaced with qualified units prior to 6/30/82,
Our submittal, Volume I, Section VII, basis 5, gives
this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Pressure Transmitter
(Barton)

MODEL: 384

COMPONENT NO.: LA0228, LA0229, LA0233, LA0237, LA0238, LA0241, LA0242, LA0234

NRC IDENTIFIED DEFICIENCIES: RT, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 14A.

These pressure transmitters will be replaced with qualified units prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 24, gives
this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

LICENSEE RESPONSE TO NRC SER (Continued)

Basis No. 5

Deficiency: Unavailable Qualification Data (Stm. Gen. Wide Range Level)

Justification:

The Steam Generator Wide Range instruments do not provide any protection system inputs. They had been used by the operator during accident recovery to verify increasing steam generator water level as noted in the Salem Emergency Operating Procedures.

Although the wide range level may be lost due to an accident inside containment, the three qualified narrow range levels per steam generator will be available, as well as the auxiliary feedwater flow measurements outside of the containment. No adverse environment will affect the auxiliary feedwater flow channel due to an accident inside containment. These diverse parameters provide suitable backup to assure a secondary heat sink following an accident.

Plant operation may proceed since the operators can maintain plant safety with diverse parameters. Reference to the wide-range devices has been deleted from the procedures.

During accidents occurring outside containment, the wide-range levels are suitable for use as either primary or back-up indication.

This case has been classified as a Group II.2 item (II.2.B.1).

Corrective Action:

It is planned to replace these transmitters on a schedule contingent upon equipment availability and a suitable outage duration. They will be replaced no later than June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



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FRC Assignment No. 13
FRC Task No. 468/S17

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 8

LICENSEE RESPONSE TO NRC SER

Basis No. 24

Deficiency: Unavailable Qualification Data (Accumulator Instruments)

Justification:

The accumulator injection system safety function is performed independently of the operability of the instrumentation associated with the accumulators. The system is entirely passive and will inject the contents of the tanks when reactor coolant pressure decreases below the accumulator pressure which is maintained during normal operation.

Requirements for qualified accumulator pressure or level indication have been specified in Regulatory Guide 1.97. Since operator actions are not based on these devices for either short or long term conditions, plant operation may continue until compliance with R.G.1.97 is achieved.

This case is classified as a Group II.1 item (II.1.C).

Corrective Action:

The accumulator instrumentation will comply with R.G.1.97 requirements by June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

EQUIPMENT ITEM NO. 9
 TRANSDUCER, E/P LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISHER GOVERNOR MODEL 546
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 9
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): CONTROL
 SERVICE: CONTROL FOR ATMOSPHERIC RELIEF VALVES MS10'S
 LICENSEE SUBMITTAL: SCEW(S): 15 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 9

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 _____.)
- 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 | <u>III.a</u> 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. 9

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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

LICENSEE RESPONSE TO NRC SER

SALEM UNITS 1 AND 2

PSE&G RESPONSE TO NRC SAFETY EVALUATION REPORT

EQUIPMENT: E/P Converter
(Fischer + Porter)

MODEL: 546

COMPONENT NO.: 11RH20, 11RH18, 12RH18

NRC IDENTIFIED DEFICIENCIES: EXN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 30.

By procedural changes these units are rendered incapable of affecting accident conditions and no operator action is required during an accident. This position is detailed in our submittal, Volume I, Section VII, basis ~~6~~.

PSE&G is confident that plant safety is maintained with this resolution.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

LICENSEE RESPONSE TO NRC SER (Continued)

Basis No. 6

Deficiency: Insufficient Documentation (Main Steam Power Operated Atmospheric Relief Valve Control MS10's - E/P and Pressure Transmitter)

Justification:

This item was addressed in LER 79-58. It describes the problem resulting from unqualified MS10 valve controls and the acceptability of such a condition. The procedure changes noted in the LER have been completed.

The main steam power operated atmospheric relief valves are operated by a steam pressure transmitter control signal through an electric/pneumatic converter. These are control grade instruments and are not required to be operable for accident mitigation. However, a malfunction could result in the inadvertent opening of the power operated relief valves.

Each MS10 valve has an individual steam pressure transmitter and electric/pneumatic converter associated with it. The (11) 21MS10 and (13) 23MS10 associated transmitters and electric/pneumatic converters are located in the inboard penetration area and the (12) 22MS10 and (14) 24MS10 associated devices are located in the outboard penetration area. These are physically separated areas in the plants, so that a high energy line pipe break (MSLB) in one area will not affect equipment in the other area.

The potential misoperation of the MS10 valves was discussed in LER 79-58, submitted for Salem #1. Although the analysis was written specifically for Unit 1, it is applicable to Unit 2. The analysis demonstrated that potential misoperation of MS10 valves in a particular penetration area due to postulated steam line or feedwater line breaks in that penetration area was not a safety consideration for Salem and does not invalidate any safety analyses performed for Salem.

Steam line and feedwater line breaks inside the containment will not cause an adverse environment in the inboard/outboard penetration areas. A loss of coolant accident will not result in an adverse environment in the inboard/outboard penetration areas during the initial stages of the accident. During long term recovery, the inboard/outboard penetration areas could be subject to radiation exposure.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

LICENSEE RESPONSE TO NRC SER (Continued)

It is believed that the devices would operate during the first few hours of recovery, however, a misoperation would not pose a safety hazard. The MS10 can be closed by turning off the control power and/or air supply (fail closed valve) thereby assuring that the valve cannot misoperate during recovery.

Existing procedure EI-I-4.6 incorporated results of the LER 79-58 analysis to provide assurance of capability to detect a need to close the valves. The procedural changes consisted of precautionary statements regarding potential valve opening.

The indication of an open MS10 valve is provided by limit switches and qualified steam flow, steam generator level and pressure indication.

These cases have been identified as a Group I.1 item (I.1.A).

Corrective Action:

Since the failure of this equipment results in operator actions which are consistent with existing analyses, qualified equipment is not required.

The existing limit switches will be replaced prior to June 30, 1982 as described in Basis 10B. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 9

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

Reason for Non-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)

- 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. 10

EQUIPMENT ITEM NO. 10
 PRESSURE TRANSMITTER LOCATED IN THE INBOARD/OUTOBOARD PENETRATION AREAS
 FISCHER AND PORTER MODEL 50EP1041
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 10
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): STEAM PRESSURE CONTROL FOR ATMOSPHERIC RELIEF VALVES
 MSIO'S (PA8593, PA8596, PA8594, PA8595)
 LICENSEE SUBMITTAL: SCEW(S): 17 [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, Ncne,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. LQ

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 _____.)
- 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 | <u>III.a</u> 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. 10

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. 10

THE LICENSEE SCHEM(S) REFERS TO BASIS NO. 6

Notes:

A. THE PEAK TEMPERATURE SHOULD BE LOWER BECAUSE OF THERMAL PROTECTION AFFORDED BY INSTRUMENT PANEL (RISE TIME)

B. (W) DOCUMENTATION IS NOT A SEQUENTIAL TEST (SEPARATE EFFECTS). DATA IS STILL UNDER REVIEW CONSIDERING THERMAL PROTECTION OF PANEL REGARDING PEAK TEMPERATURE DIFFERENCES

C. REFER TO BASIS 6

Basis No. 6

Deficiency: Insufficient Documentation (Main Steam Power Operated Atmospheric Relief Valve Control MS10's - E/P and Pressure Transmitter)

Justification:

This item was addressed in LER 79-58. It describes the problem resulting from unqualified MS10 valve controls and the acceptability of such a condition. The procedure changes noted in the LER have been completed.

The main steam power operated atmospheric relief valves are operated by a steam pressure transmitter control signal through an electric/pneumatic converter. These are control grade instruments and are not required to be operable for accident mitigation. However, a malfunction could result in the inadvertent opening of the power operated relief valves.

Each MS10 valve has an individual steam pressure transmitter and electric/pneumatic converter associated with it. The (11) 21MS10 and (13) 23MS10 associated transmitters and electric/pneumatic converters are located in the inboard penetration area and the (12) 22MS10 and (14) 24MS10 associated devices are located in the outboard penetration area. These are physically separated areas in the plants, so that a high energy line pipe break (MSLB) in one area will not affect equipment in the other area.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. Lo

BASIS NO. 6 CONTINUED

The potential misoperation of the MS10 valves was discussed in LER 79-58 submitted for Salem #1. Although the analysis was written specifically for Unit 1, it is applicable to Unit 2. The analysis demonstrated that potential misoperation of MS10 valves in a particular penetration area due to postulated steam line or feedwater line breaks in that penetration area was not a safety consideration for Salem and does not invalidate any safety analyses performed for Salem.

Steam line and feedwater line breaks inside the containment will not cause an adverse environment in the inboard/outboard penetration areas. A loss of coolant accident will not result in an adverse environment in the inboard/outboard penetration areas during the initial stages of the accident. During long term recovery, the inboard/outboard penetration areas could be subject to radiation exposure.

It is believed that the devices would operate during the first few hours of recovery, however, a misoperation would not pose a safety hazard. The MS10 can be closed by turning off the control power and/or air supply (fail closed valve) thereby assuring that the valve cannot misoperate during recovery.

Existing procedure EI-I-4.6 incorporated results of the LER 79-58 analysis to provide assurance of capability to detect a need to close the valves. The procedural changes consisted of precautionary statements regarding potential valve opening.

The indication of an open MS10 valve is provided by limit switches and qualified steam flow, steam generator level and pressure indication.

These cases have been identified as a Group I.1 item (I.1.A).

Corrective Action:

Since the failure of this equipment results in operator actions which are consistent with existing analyses, qualified equipment is not required.

The existing limit switches will be replaced prior to June 30, 1982 as described in Basis 10B. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 10

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

Reason for Non-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)

Backup (equipment/system) is not fully capable of performing the intended safety function or accident mitigating function.

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 not environmentally qualified and can be exposed to a hostile environment simultaneously with the primary equipment.

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)

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. 10

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 46)

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 3a)

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

Basis No. 6 provides sufficient assurance that the power operated atmospheric relief valves are (1) not required for accident mitigation (2) do not pose a plant hazard should misoperation occur and (3) can be isolated to prevent misoperation during accident recovery. Additionally, because of physical separation, all of the relief valves (pressure transmitters, E/P converters, etc.) are not exposed to a harsh environment simultaneously, therefore, a number of valves are always available for use if desired.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

EQUIPMENT ITEM NO. 11
 ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL 77C27257
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 11
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): MOTIVE POWER FOR FAN (CONTROL ROD DRIVE VENT FANS)
 SERVICE: COOLING TO ROD DRIVE MECHANISMS
 LICENSEE SUBMITTAL: SCEW(S): 88B [64]

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	<u>7a, 7b, 7c</u>



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

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 _____.)
- 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 | <u>III.a Exempt</u> |
| 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. 11

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. 4

The item SCEW01 refers to Basis No. 36.

Basis No. 36

Deficiency: Documentation Unavailable (Nozzle Support Fans, Reactor Shield Vent Fans and Control Rod Drive Fans)

Justification:

These ventilation fans are located inside the containment and are not required for accident mitigation. The Salem emergency operating procedures call for the operator to start these fans following a loss of secondary coolant. The vent fans have not been qualified for steam breaks inside containment and do not require qualification since safety is not affected. The operators will be notified that their use is not required and the procedures modified accordingly.

Additional information submitted on September 19 classified this case as a Group II.1 item based on the following:

The nozzle support fans, reactor shield vent fans and the control rod drive vent fans were listed only because they are mentioned in the emergency procedures. They are not required to perform a safety function, and inadvertent operation (on or off) of these devices does not affect the proper course of actions in response to design basis accidents. The equipment does not require environmental qualification.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 11

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

Reason for Non-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)

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.

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 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.

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)

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. 12

EQUIPMENT ITEM NO. 12
 LIMIT SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 MASONEILAN MODEL 4962
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 12
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (11, 12, 13MS7; 11,
 12, 13, 14 GB4)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 20 [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. 12

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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
- 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. 12

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Masoneilan)

MODEL: 496-2

COMPONENT NO.: 11MS7, 12MS7, 13MS7, 13MS7

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 20.

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 10A states
our intentions and reasoning for continued operation.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.

Note: underlined items are corrections to NRC SER.



Franklin Research Center
A Division of The Franklin Institute
20th and Race Streets. Phila. Pa. 19103 (215) 448-1000

NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

Page
3b

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 12

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Limit Switch
(Masoneilan)

MODEL: 496-2

COMPONENT NO.: 11GB4, 12GB4, 13GB4, 14GB4

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 44

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 18A states
our intentions and reasoning for continued operation.

PSE&G's evaluation of these, NRC noted, deficiencies has reaffirmed that plant
safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 13

EQUIPMENT ITEM NO. 13
 CONTROL SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 MICRO SWITCH MODEL 910 PGD533
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 13
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPEN VALVE CONTROL (CMC-MS167'S)
 SERVICE: LOCAL CONTROL OF MS167 HYDRAULIC PUMP
 LICENSEE SUBMITTAL: SCEW(S): 21 [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, EPS, None

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

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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. 13

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 (modify circuit)
- 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 December 15, 1980.)
- 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)

- | | |
|---|---|
| <input type="checkbox"/> I.a Qualified | <input type="checkbox"/> II.c Qualified Life Deficiency |
| <input checked="" type="checkbox"/> I.b Modification | <input type="checkbox"/> III.a Exempt |
| <input type="checkbox"/> II.a Qualification Not Established | <input type="checkbox"/> III.b Not in Scope |
| <input type="checkbox"/> II.b Not Qualified | <input type="checkbox"/> 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 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. 13

LICENSEE SCREW(S) REFER TO BASIS NO. 11

Basis No. 11

Deficiency: Documentation Unavailable (CMC and enclosure
for local control of MS167)

Justification:

Each main steam isolation valve is equipped with a local control switch and an enclosed terminal block which are used for testing the valves during normal plant operation. The control switches operate a hydraulic pump motor to open and close the valves. The failure of these devices cannot prevent the safety function of steamline isolation due to interlocks with the plant protection system to prevent operation of the hydraulic pump motor. The hydraulic pump motor is not needed for closing the valve under accident conditions.

A reset of the main steam isolation signal removes the interlock and could result in a valve opening if the switch contacts were failed.

This case has been classified as a Group I.1 item (I.1.B.3).

Corrective Action:

The control switch will be removed from the valve control circuit prior to exceeding the 5% power level (Unit #2). Unit #1 will have the circuit changed by December 15, 1980.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 14

EQUIPMENT ITEM NO. 14
 TERMINAL BLOCK LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 CINCH JONES, MODEL NOT STATED
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 14
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): CMC (MS167'S) CONTROL
 SERVICE: ELECTRICAL CONNECTION
 LICENSEE SUBMITTAL: SCEW(S): 22 [12]

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

R, T, Q1, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 19

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 (current modification)
- 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 December 15, 1980.)
- 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 |
| <u>II.b Modification</u> | 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. 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
- 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. 14

LICENSEE SCREW(S) REFERS TO BASIS No. 11

Basis No. 11

Deficiency: Documentation Unavailable (CMC and enclosure
for local control of MS167)

Justification:

Each main steam isolation valve is equipped with a local control switch and an enclosed terminal block which are used for testing the valves during normal plant operation. The control switches operate a hydraulic pump motor to open and close the valves. The failure of these devices cannot prevent the safety function of steamline isolation due to interlocks with the plant protection system to prevent operation of the hydraulic pump motor. The hydraulic pump motor is not needed for closing the valve under accident conditions.

A reset of the main steam isolation signal removes the interlock and could result in a valve opening if the switch contacts were failed.

This case has been classified as a Group I.1 item (I.1.B.3).

Corrective Action:

The control switch will be removed from the valve control circuit prior to exceeding the 5% power level (Unit #2). Unit #1 will have the circuit changed by December 15, 1980.



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468

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 1a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

EQUIPMENT ITEM NO. 15
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN THE INBOARD/OUTBOARD PENETRATION
 AREAS
 FISCHER AND PORTER MODEL 10B2495
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 15
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW 11, 12, 14 SG POST ACCIDENT
 MONITORING (FA1087, FA1091 & FA1097)
 LICENSEE SUBMITTAL: SCEW(S): 23 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 15

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 prior to 6/30/82.)
 - 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 |
| <u>I.b Modification</u> | 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. 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	_____
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	_____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	_____
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	_____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	_____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	_____

See Page 5K for Conclusion



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Fischer & Porter)

MODEL: 10B2495

COMPONENT NO.: FA1087, FA1091, FA1097

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 23.

These pressure transmitters will be replaced with qualified units prior to 6/30/82,
Our submittal, Volume I, Section VII, basis 12 gives
this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety
is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

Checksheets 5a thru 5k 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
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION NOT STATED)
 FISCHER AND PORTER MODEL 10B2495
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 16
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): MONITORS RHR PUMP DISCHARGE (FA1416, FA14919, FA0432)
 FUNCTION (PLANT ID): MONITORS CONTAINMENT SPRAY ADDITION TANK HEADER (FA0218)
 FUNCTION (PLANT ID): FLOW CONTROL FOR SERVICE WATER VALVES (FA3160Z-1, FA3165Z-1, FA3169Z-1, FA3172Z-1, FA3176Z-1)
 LICENSEE SUBMITTAL: SCEW(S): 58 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification of the 4, 7 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, 6
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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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	_____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	_____
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	_____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	_____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	_____

See equipment item 15 for details of the evaluation. Since the location is not stated by the licensee, a HELB area is assumed (eg High Temperature, steam, radiation).



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 16

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Fischer & Porter)

MODEL: 10B2495

COMPONENT NO.: FA3160Z-1, FA3165Z-1, FA3169Z-1, FA3172Z-1, FA3176Z-1,
FA1416, FA1419, FA0218, FA0432

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 58.

These pressure transmitters will be replaced with qualified units prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 20+27 gives
this schedule and our justification for continued operation.

PSE&G's evaluation of this, NRC noted, deficiency has reaffirmed that plant safety
is not jeopardized pending replacement.

Note: underlined items are correction to NRC SER



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 17

EQUIPMENT ITEM NO. 17
 CONTROLLER LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISCHER AND PORTER MODEL 50ES3212
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 17
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW #11, #12, #14SG, POST ACCIDENT
 MONITORING (FA3969, FA3970 & FA3972)
 LICENSEE SUBMITTAL: SCEW(S): 25 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 17

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 June 30 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 | 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. 17

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 17

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Square Root Extractor

MODEL: 50ES3212

COMPONENT NO.: FA3969, FA3970, FA3972

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 25.

These *instruments* will be *relocated* prior to 6/30/82, as they become available. Our submittal, Volume I, Section VII, basis 12 gives this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not jeopardized pending *equipment relocation*.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 17

LICENSEE RESPONSE TO NRC SER (Continued)

Basis No. 12

Deficiency: Documentation Unavailable (Steam Generator Auxiliary Feedwater Flow Transmitters and Signal Processing Equipment)

Justification:

Auxiliary feedwater flow measurement involves the use of transmitters and signal processing devices which are located outside containment in the penetration areas. Indication of auxiliary feedwater flow is a backup method of determining the existence of an adequate heat sink during transients or accidents which require auxiliary feedwater. The primary indication of heat sink availability is the narrow-range steam generator level measurement which is qualified for both inside and outside containment line breaks.

An erroneous indication of auxiliary feedwater flow would not lead the operator to termination of auxiliary feedwater. Outside containment line breaks cannot affect all of the flow indication; at least two auxiliary feedwater flow indications would be available. Alternate methods of determining auxiliary feedwater flow are also available (e.g. pump running and valves open).

These cases have been classified as a Group II.2 item (II.2.B.3).

Corrective Action:

Qualified transmitters will be installed and the signal processing equipment will be relocated by June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

EQUIPMENT ITEM NO. 18
 PUMP MOTORS LOCATED IN THE AUXILIARY BUILDING
 WESTINGHOUSE, MODEL NOT STATED
 REQUIRED OPERATING TIME: RECIRC., 120 DAYS
 TER CHECKSHEET NO. 18
 LICENSEE REFERENCE(S): 604, 639, 35
 FUNCTION (PLANT ID): DRIVES CHARGING/SAFETY INJECTION PUMP (11C/L, 12C/L)
 LICENSEE SUBMITTAL: SCEW(S): 27 [64]
 FUNCTION (PLANT ID): DRIVES SAFETY INJECTION PUMP (11SI, 12SI)
 LICENSEE SUBMITTAL: SCEW(S): 28 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, <u>3c</u> , 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:

- 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 |
| <u>II.a</u> Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | IV Documentation Not Available |



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
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	<u>X</u>
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

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pump Motor - Charging/Safety Injection
(Westinghouse)

MODEL: W Spin #PNGCSAPCH (Unit 2)
 #PSECSAPCH (Unit 1)

COMPONENT NO.: 11C/L, 12C/L

NRC IDENTIFIED DEFICIENCIES: A, RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 27.

Environmental Qualification of these motors has been demonstrated. Our submittal addresses the NRC noted deficiencies. The Required Time and Aging data was arrived at based on Westinghouse test data which envelopes our plant profile. The aging information was added in Revision 2.

Supporting data is available in our file EQ-16.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that these motors are capable of performing their safety function in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Pump Motor - Safety Injection
(Westinghouse)

MODEL: W Spin #PNJ SIAPSI (Unit 2)
PSE SIAPSI (Unit 1)

COMPONENT NO.: 11SI, 12SI

NRC IDENTIFIED DEFICIENCIES: A, RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 28

Environmental Qualification of these motors has been demonstrated. Our submittal addresses the NRC noted deficiencies. The Required Time and Aging data was arrived at based on Westinghouse test data which envelopes our plant profile. The aging information was added in Revision 2.

Supporting data is available in our file EQ-16.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that these motors are capable of performing their safety function in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Pump Motor - Chemical Spray
(Westinghouse)

MODEL: W Spin #PSESIAPCS (Unit 1)
 #PNISIAPCS (Unit 2)

COMPONENT NO.: 11CS, 12CS

NRC IDENTIFIED DEFICIENCIES: A, RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 79.

Environmental Qualification of these motors has been demonstrated. Our submittal addresses the NRC noted deficiencies. The Required Time and Aging data was arrived at based on Westinghouse test data which envelopes our plant profile. The aging information was added in Revision 2. A required time of 120 days will be added in the next EQ submittal revision.

Supporting data is available in our file EQ-16.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that these motors are capable of performing their safety function in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

Checksheets 5a thru 5d, 5f & 5g have been removed due to the
proprietary nature of information contained therein.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 18

MAINTENANCE AND REPLACEMENT SCHEDULE SUMMARY

The following information regarding the maintenance and replacement schedule(s) for components, sub-components, and materials has been provided by the Licensee.

*Replace oil for motor bearings
every 12 months.*



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

EQUIPMENT ITEM NO. 19
 PUMP MOTORS LOCATED IN THE AUXILIARY BUILDING
 WESTINGHOUSE, MODEL NOT STATED
 REQUIRED OPERATING TIME: RECIRC., 120 DAYS
 TER CHECKSHEET NO. 19
 LICENSEE REFERENCE(S): 604, 639, 35
 FUNCTION (PLANT ID): DRIVES RHR PUMP (11RHR, 12RHR)
 LICENSEE SUBMITTAL: SCEW(S): 29 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 19

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 _____.)
- 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 |
| <u>I.i.a</u> Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | 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	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
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	<u>X</u>
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

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pump Motor - RHR
(Westinghouse)

MODEL: W - Spin #PSEACAPRN (Unit 1)
 #PJNACAPRN (Unit 2)

COMPONENT NO.: 11RHR, 12RHR

NRC IDENTIFIED DEFICIENCIES: A, RT

PSE&G EVALUATION OF DEFICIENCIES:
Ref. Qualification Data Evaluation Form page 29 .

Environmental Qualification of these motors has been demonstrated. Our submittal addresses the NRC noted deficiencies. The Required Time and Aging data was arrived at based on Westinghouse test data which envelopes our plant profile. The aging information was added in Revision 2. A required time of 120 days will be added in the next EQ submittal revision.

Supporting data is available in our file EQ-16.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that these motors are capable of performing their safety function in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

Checksheets 5a thru 5d, 5f + 5g have been removed due to the proprietary nature of information contained therein.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 19

MAINTENANCE AND REPLACEMENT SCHEDULE SUMMARY

The following information regarding the maintenance and replacement schedule(s) for components, sub-components, and materials has been provided by the Licensee.

*Replace Motor Bearing oil
every 6 months.*



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

EQUIPMENT ITEM NO. 20
 TRANSDUCER, E/P LOCATED IN THE AUXILIARY BLDG.
 FISHER CONTROLS MODEL 546
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 20
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE CONTROL (11RH20, 11RH18, 12RH18)
 SERVICE: CONTROL FOR VALVES 1RH20, 11RH18, 12RH18
 LICENSEE SUBMITTAL: SCEW(S): 30 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 | <u>III.a Exempt</u> |
| 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. 20

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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: E/P Converter
(Fischer + Porter)

MODEL: 546

COMPONENT NO.: 11RH20, 11RH18, 12RH18

NRC IDENTIFIED DEFICIENCIES: EXN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 30.

By procedural changes these units are rendered incapable of affecting accident conditions and no operator action is required during an accident. This position is detailed in our submittal, Volume I, Section VII, basis 15.

PSE&G is confident that plant safety is maintained with this resolution.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

LICENSEE RESPONSE REFERS TO BASIS NO. 15

Basis No. 15

Deficiency: Documentation Unavailable [E/P for RH20 (RHR Heat Exchanger Bypass Valve) and RH18 (Heat Exchangers Outlet Valve)]

Justification:

Electric/pneumatic converters are used in the position control for the RHR system valves to modulate flow through and around the RHR system heat exchangers for temperature control during normal cooldown. Modulation of these valves is not required during accident conditions. The position of RH20 is unimportant since manual valves upstream are closed during power operation. They are opened when the RHR system is aligned for a normal cooldown.

A potential misoperation of the device causing valve movement during recirculation can be avoided. The control air supply to the RH18 valves can be isolated during normal power operation. This causes the RH18 valves to open and remain open. Any subsequent misoperation of the electric/pneumatic converter would not cause the valve to change position. The air supply would be restored only when the RHR system is aligned for normal shutdown operation. No action is required by the operator during the initial stages of an accident or post-accident recovery. The RH20 valve plays no part in safety at the Salem plant as presently designed and operated.

Administrative control is suitable as a final resolution since it renders the E/P devices incapable of affecting accident conditions and requires no additional operator actions during an accident.

This case has been classified as a Group I.1 item (I.1.C.1).

Corrective Action:

The control air supply to the RH18 valves will be isolated during normal power operation to prevent valve misoperation. This administrative control will be invoked by procedure OI II.6.3.2. Restoration of control air to the valves for normal shutdown operations will be governed by procedure OI II.6.3.3. Approved procedures will be in effect prior to exceeding 5% power (Unit #2). The Unit #1 change will be made prior to December 15, 1980.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 20

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

Reason for Non-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)

- 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.



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 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

EQUIPMENT ITEM NO. 21
 FLOW TRANSMITTER LOCATED IN THE AUXILIARY BLDG.
 BARTON MODEL 289A
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 21
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): RHR PUMP RECIRC. FLOW CONTROL (FA2569, FA2481)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 31 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 | <u>III.a Exempt</u> |
| 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. 21

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 _____



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Flow Transmitter
(Barton)

MODEL: 289A

COMPONENT NO.: FA2569, FA2481

NRC IDENTIFIED DEFICIENCIES: EXN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 31.

These devices do not see a harsh environment during normal plant operation. During the recirculation phase and post accident recovery phase of the accident they will be subject to high integrated radiation exposure. The operator has manual control capability of the RH29 valves associated with these flow transmitters. Procedural changes will assure that these valves are correctly position during an accident. Our position is detailed in our submittal, Volume I, Section VII, basis 16.

PSE&G is confident that plant safety is maintained with this resolution.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

LICENSEE RESPONSE REFERS TO BASIS NO. 16
Basis No. 16

Deficiency: Documentation Unavailable [RHR Pump Recirc Flow Control (RH29)]

Justification:

Each RH29 valve is controlled by a Barton 289A flow switch measuring RHR pump discharge flow.

These devices are located in an area of the plant which will not be subject to a harsh environment during the initial stages of an accident. The devices are in an area subject to high integrated radiation exposures during the recirculation, post-accident recovery phase.

The safety analysis for the plant considers the RH29 valves closed during recirculation. In addition, the Salem emergency operating procedures require the operator to verify the closed status of the RH29 valves during recirculation. This can be accomplished using qualified devices. A failure of the flow switch during recirculation could cause the RH29 valves to open. The operator has the capability for manual override of the automatic control and therefore can close the valve. Once closed by manual action, a failure of the switch will not cause valve operation. The manual override portion of the circuit is not subject to a harsh environment. The RH29 valves are motor operated and have adequate qualification documentation for recirculation operation.

Plant emergency operating procedures will be revised to instruct the operator to manually close the RH29 valves from the control console and verify closure.

Corrective Action:

Procedure EI-I-4.4 will be modified and in effect prior to exceeding 5% power (Unit #2). The equivalent Unit #1 procedure will be modified and in effect prior to December 15, 1980.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 21

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

Reason for Non-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)

- 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. 22

EQUIPMENT ITEM NO. 22
 SOLENOID VALVE LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 ASCO MODEL FT8321A2
 REQUIRED OPERATING TIME: MSLB LESS THAN 5 SEC.
 TER CHECKSHEET NO. 22
 LICENSEE REFERENCE(S): 1849
 FUNCTION (PLANT ID): VALVE OPERATION (SV0269, 78, 79, 88; SV0581, 83, 85, 87)
 SERVICE: PILOT VALVES FOR MAIN STEAM DRAIN & WARM UP
 LICENSEE SUBMITTAL: SCEW(S): 18A [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, Q', RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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:

- 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*) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 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
- 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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 22

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT8321A2

COMPONENT NO.: (SV0269, SV0279, SV0278, SV0288, SV0578, SV0581, SV0585, SV0583)
(Unit I Only)

NRC IDENTIFIED DEFICIENCIES: RPN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Data Form page 18A.

These solenoid valves will be replaced with qualified valves prior to 6/30/82, as they become available. Our submittal, Volume I, Section VII, basis 8A and 8C gives this schedule and our justification for continued operation. Further supporting data is in our file EQ-12.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

EQUIPMENT ITEM NO. 23
 LEVEL TRANSMITTER LOCATED IN THE AUXILIARY BLDG., 84' ELEVATION
 BARTON MODEL 332/352
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 23
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (LA-0217)
 SERVICE: CONTAINMENT SPRAY ADDITIVE TANK LEVEL INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 53 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 23

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 FDE 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. 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 X
- III.b Equipment Not in the Scope of the Qualification Review _____
- IV Documentation Not Made Available _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Level Transmitter

MODEL: Barton 332/352

COMPONENT NO.: LA-0217

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Data Form page 53.

Basis 23 of Section VII indicates that this instrument does not perform a safety function needed by the operator. Plant safety is not affected whether the device fails or not. Replacement is not required.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not dependent on this instrument.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

LICENSEE RESPONSE REFERS TO BASIS NO 23
Basis No. 23

Deficiency: Documentation Unavailable (Containment Spray
- Additive Tank Level Instruments)

Justification:

Current procedures instruct the operator to monitor tank level to assure that sodium hydroxide is added during containment spray. Operator action is independent of the tank level reading since spray is continued until a low-low level is reached in the refueling water storage tank despite the spray additive tank level indication. The system used to inject the NaOH solution operates on a passive eductor principle. As long as the spray pump is pumping water and the spray additive tank discharge line is open, the solution from the additive tank will be educted into the spray. These conditions are indicated by qualified devices.

This case has been classified as a Group II.2 item (II.2.E.2).

Corrective Action:

Qualification of the additive tank level instruments is not required since they do not perform a safety function.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

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

Reason for Non-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)

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.

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 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.

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)

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. 24

EQUIPMENT ITEM NO. 24
 ELECTRICAL CONNECTOR LOCATED IN THE CONTAINMENT
 AMP MODEL 4806R147S 4800R147P
 REQUIRED OPERATING TIME: LOCA/MSLB
 TER CHECKSHEET NO. 24
 LICENSEE REFERENCE(S): NOT CITED
 SERVICE: ROD POSITION INDICATION WIRE CONNECTORS
 LICENSEE SUBMITTAL: SCEW(S): 100 [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:

<u>Contents</u>	<u>Checkshaet Page No.</u>
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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:

- 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 | <u>III.a Exempt</u> |
| 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. 24

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. 24

LICENSEE SCEW REFERS TO BASIS NO. 38

Basis No. 38

Deficiency: Documentation Unavailable (Rod Position ...
Indication)

Justification:

The existing Salem emergency operating procedures require the operator to verify reactor trip by monitoring the rod bottom lights.

If a successful trip is not indicated, a manual reactor trip is initiated in accordance with procedures.

This case has been classified as a Group II.2 item (II.2.F).

Corrective Action:

None required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

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. 25

EQUIPMENT ITEM NO. 25
 SOLENOID VALVE LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 ASCO MODEL FT8321A4
 REQUIRED OPERATING TIME: MSLB LESS THAN 5 SEC
 TER CHECKSHEET NO. 25
 LICENSEE REFERENCE(S): 1849
 FUNCTION (PLANT ID): CONTROL (SV0270, 71, 74, 75, 80, 81, 84, 85)
 SERVICE: CONTROL FOR MAIN STEAM ISOLATION VALVES
 LICENSEE SUBMITTAL: SCEW(S): 41 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 25

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
 X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
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	<u>X</u>
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	_____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 25

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT8321A4

COMPONENT NO.: SV0274, SV0275, SV0280, SV0281, SV0270, SV0271, SV0284, SV0285

NRC IDENTIFIED DEFICIENCIES: RPN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form, page 41.

These solenoid valves will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume 1, Section VII, basis 88 gives
this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety
is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

EQUIPMENT ITEM NO. 26
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D2400XST
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 26
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATION INDICATION & VALVE CONTROL (WL108, 13, 97, 99;
 NT25; WR80)
 SERVICE: POSITION INDICATION FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 42 AND 43 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 26

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 26

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) Satisfie_ _____
- 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 _____



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 26

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch

MODEL: D-2400X-ST

COMPONENT NO.: WL108, WL13, WL97, WL99, NE25, WR80

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 42

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 3A
states our intentions and reasoning for continued operation.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468

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 1a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

EQUIPMENT ITEM NO. 27
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 MASONEILAN MODEL 4962
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 27
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (11GB4, 12GB4,
 13GB4, 14GB4)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 44 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 27

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 27

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 _____



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 27

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Masoneilan)

MODEL: 496-2

COMPONENT NO.: 11GB4, 12GB4, 13GB4, 14GB4

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 44

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 18A states
our intentions and reasoning for continued operation.

PSE&G's evaluation of these, NRC noted, deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

EQUIPMENT ITEM NO. 28
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 28
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (1CC215, 1CC113,
 1SJ53, 1SJ60, 1NT32, 1SS49)
 SERVICE: POSITION INDICATOR & VALVE CONTROL
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (1SS64, 1SS33,
 1SS27, 1VC8, 1VC10, 1VC12, 1VC14)
 SERVICE: POSITION INDICATOR & VALVE CONTROL
 LICENSEE SUBMITTAL: SCEW(S): 45 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 28

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 prior to 6/30/82.)
- 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 Lege.d)

- | | |
|------------------------------------|--------------------------------|
| I.a Qualified | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 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 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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 28

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switches
(Namco)

MODEL: D-2400X

COMPONENT NO.: 1CC216, 1CC113, 1SJ53, 1SJ60, 1NT32, 1SS49, 1SS64,
1SS33, 1SS27, 1VC8, 1VC10, 1VC12, 1VC14

NRC IDENTIFIED DEFICIENCIES: A, RPN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 45.

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 18A
states our intentions and reasoning for continued operation.

PSE&G's evaluation of these NRC Noted deficiencies has reaffirmed that plant
safety is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

EQUIPMENT ITEM NO. 29
 SQUARE ROOT EXTRACTOR LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 50ES3212
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 29
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW/PRESSURE CONTROL (FA3165Z-2, 69Z-2, 72Z-2, 76Z-2;
 FA3160Z-2)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 47 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 29

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 (design change)
- 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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 29

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
 X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Square Root Extractor
(Fischer & Porter)

MODEL: 50ES3212

COMPONENT NO.: FA3165Z-2, FA3169Z-2, FA3172Z-2, FA3176Z-2, *FA3160Z-2*

NRC IDENTIFIED DEFICIENCIES: RPN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 47.

These devices are not exposed to an adverse environment for initial stages of accident, therefore, actuation of fan cooler units can be accomplished. During long term recovery high radiation could cause failures. As an interim measure the operator will procedurally be required to de-energize control power to the flow control devices to assure service water flow. Prior to 6/30/82 design changes will be incorporated to eliminate the need for any operator action. PSE&G's position is detailed in our submittal, Volume 1, Section VII, basis 20.

PSE&G is confident that plant safety will not be jeopardized pending final resolution of this problem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 24

LICENSE RESPONSE REFERS TO BASIS NO. 20
Basis No. 20

Deficiency: Documentation Unavailable (Flow Control for SW223 valves, Fan Cooler Units)

Justification:

These service water valves are provided with flow control equipment consisting of Fischer-Porter 53EG3000 flow controllers, Fischer-Porter 53EI3000 electric/pneumatic converter, Fischer-Porter 50ES3212 square root extractor and Fischer-Porter [10B2495] A,C differential pressure transmitter. These devices are all located outside the containment.

The safety functions of the fan cooler units can be accomplished irrespective of flow control operability based on the following:

- Accidents (LOCA/MSLB) inside the containment will not result in adverse environments in the area where the devices are located for the automatic actuation of the fan cooler units.
- Accidents outside the containment do not require high cooling capacity for the fan coolers.
- During long term recovery from accidents inside the containment, the devices will be exposed to high integrated radiation doses which could affect service water flow. The operator can assure high flow by de-energizing control power to the flow control devices which will cause the valves to remain open.

The safety function of the containment fan coolers will be accomplished without the need for operator action. Long term recovery may require operator action to compensate for equipment failures.

This case has been classified as a Group I.1 item (I.1.G.2)

Corrective Action:

As an interim measure, Procedure EI-I-4.4 will be modified to assure long-term flow to fan coolers. Procedure modification is to be completed prior to exceeding 5% power (Unit #2). The Unit #1 change will be made prior to December 15, 1980.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 29

The modified procedure will instruct the operator to de-energize the valve control circuit which assures that the valve cannot be closed by controller failure. This action is covered by the procedure change for Item I.1.G.1. (Basis #19).

The final resolution of this item will be to redesign the flow control system before or during first refueling outage (Unit #2). The Unit #1 change will be made prior to June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

EQUIPMENT ITEM NO. 30
 FLOW CONTROLLER LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 53EG3000
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 30
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW CONTROLLER (FA3160C1, 2, 3; FA3165C1, 2, 3;
 FA3169C1, 2, 3)
 SERVICE: NOT STATED
 FUNCTION (PLANT ID): FLOW CONTROLLER (FA3172-1, 2, 3; FA3176-1, 2, 3)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL. SCEW(S): 48 [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, QM, RPN EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 30

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 (design change)
- 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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 30

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
 X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Flow Controller
(Fischer & Porter)

MODEL: 53EG3000

COMPONENT NO.: FA3160C-1, FA3160C-2, FA3165C-1, FA3165C-2, FA3165C-3,
FA3169C-1, FA3169C-2, FA3169C-3, FA3172-1, FA3172-2,
FA3172-3, FA3176-1, FA3176-2, FA3176-3, ~~FA3160C-3~~

NRC IDENTIFIED DEFICIENCIES: RPN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 48.

These devices are not exposed to an adverse environment for the initial stages of the accident, therefore, actuation of fan cooler units can be accomplished. During long term recovery high radiation could cause failures. As an interim measure, the operator will procedurally be required to de-energize control power to the flow control devices to assure service water flow. Prior to 6/30/82 design changes will be incorporated to eliminate the need for operator action. PSE&G's position is detailed in our submittal, Volume 1, Section VII, basis 20.

PSE&G is confident that plant safety will not be jeopardized pending final resolution of this problem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

LICENSEE RESPONSE REFERS TO BASIS NO. 20

Basis No. 20

Deficiency: Documentation Unavailable (Flow Control for SW223 valves, Fan Cooler Units)

Justification:

These service water valves are provided with flow control equipment consisting of Fischer-Porter 53EG3000 flow controllers, Fischer-Porter 53EI3000 electric/pneumatic converter, Fischer-Porter 50ES3212 square root extractor and Fischer-Porter [10B2495] A,C differential pressure transmitter. These devices are all located outside the containment.

The safety functions of the fan cooler units can be accomplished irrespective of flow control operability based on the following:

- Accidents (LOCA/MSLB) inside the containment will not result in adverse environments in the area where the devices are located for the automatic actuation of the fan cooler units.
- Accidents outside the containment do not require high cooling capacity for the fan coolers.
- During long term recovery from accidents inside the containment, the devices will be exposed to high integrated radiation doses which could affect service water flow. The operator can assure high flow by de-energizing control power to the flow control devices which will cause the valves to remain open.

The safety function of the containment fan coolers will be accomplished without the need for operator action. Long term recovery may require operator action to compensate for equipment failures.

This case has been classified as a Group I.1 item (I.1.G.2)

Corrective Action:

As an interim measure, Procedure EI-I-4.4 will be modified to assure long-term flow to fan coolers. Procedure modification is to be completed prior to exceeding 5% power (Unit #2). The Unit #1 change will be made prior to December 15, 1980.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 30

The modified procedure will instruct the operator to de-energize the valve control circuit which assures that the valve cannot be closed by controller failure. This action is covered by the procedure change for Item I.1.G.1. (Basis #19.)

The final resolution of this item will be to redesign the flow control system before, or during first refueling outage (Unit #2). The Unit #1 change will be made prior to June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

EQUIPMENT ITEM NO. 31
 TRANSDUCER, E/P LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 53EI3000
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 31
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW/PRESSURE CONTROL (FA3160, 65, 69, 72, 76; SW223)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 49 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, X
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:

- 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 (design modification)
- 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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 31

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 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. 31

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: E/P Converter
(Fischer & Porter)

MODEL: 53EI3000

COMPONENT NO.: FA3160
FA3165
FA3169 SW223
FA3172 Flow Control
FA3176

NRC IDENTIFIED DEFICIENCIES: RPN

PSE&G EVALUATION OF DEFICIENCIES:
Ref. Qualification Data Evaluation Form page 49.

The safety function of containment fan coolers can be accomplished regardless of flow control operability. The safety function of the fan coolers will be accomplished without need for operator action. Long term recovery may require operator action to compensate for potential failures.

As an interim measure procedural changes will suffice to assure long term flow to fan coolers.

The final resolution will be to redesign flow control system so that operator action is not required to accomplish long term flow.

Our submittal, Volume I, Section VII, basis 20 details our schedule and justification for continued operation.

PSE&G's evaluation of noted deficiency has reaffirmed that plant safety is not jeopardized pending final resolution.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

LICENSEE RESPONSE REFERS TO BASIS NO. 20

Basis No. 20

Deficiency: Documentation Unavailable (Flow Control for SW223 valves, Fan Cooler Units)

Justification:

These service water valves are provided with flow control equipment consisting of Fischer-Porter 53EG3000 flow controllers, Fischer-Porter 53EI3000 electric/pneumatic converter, Fischer-Porter 50ES3212 square root extractor and Fischer-Porter [10B2495] A,C differential pressure transmitter. These devices are all located outside the containment.

The safety functions of the fan cooler units can be accomplished irrespective of flow control operability based on the following:

- Accidents (LOCA/MSLB) inside the containment will not result in adverse environments in the area where the devices are located for the automatic actuation of the fan cooler units.
- Accidents outside the containment do not require high cooling capacity for the fan coolers.
- During long term recovery from accidents inside the containment, the devices will be exposed to high integrated radiation doses which could affect service water flow. The operator can assure high flow by de-energizing control power to the flow control devices which will cause the valves to remain open.

The safety function of the containment fan coolers will be accomplished without the need for operator action. Long term recovery may require operator action to compensate for equipment failures.

This case has been classified as a Group I.1 item (I.1.G.2)

Corrective Action:

As an interim measure, Procedure EI-I-4.4 will be modified to assure long-term flow to fan coolers. Procedure modification is to be completed prior to exceeding 5% power (Unit #2). The Unit #1 change will be made prior to December 15, 1980.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 31

BASIS NO. 20 (CONTINUED)

The modified procedure will instruct the operator to de-energize the valve control circuit which assures that the valve cannot be closed by controller failure. This action is covered by the procedure change for Item I.1.G.1. (Basis #19.)

The final resolution of this item will be to redesign the flow control system before, or during first refueling outage (Unit #2). The Unit #1 change will be made prior to June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



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 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

EQUIPMENT ITEM NO. 32
 PRESSURE TRANSMITTER LOCATED IN THE MECHANICAL PENETRATION AREA
 BARTON MODEL 332 351
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 32
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (PA2344, PA2345, PA2346, PA2568)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 52 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 32

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 32

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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Barton)

MODEL: 332/351

COMPONENT NO.: PA2344, PA2345, PA2346, PA2568

NRC IDENTIFIED DEFICIENCIES: RT, R, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 52.

The subject transmitter will be replaced with a qualified unit prior to 6/30/82. Our submittal, Volume I, Section VII, basis 22 details our intensions and gives our reasons for continued operation.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

EQUIPMENT ITEM NO. 33
 PRESSURE BELLOWS LOCATED IN THE CONTAINMENT
 BARTON MODEL 351
 REQUIRED OPERATING TIME: 120 DAYS
 TER CHECKSHEET NO. 33
 LICENSEE REFERENCE(S): 687, 37
 FUNCTION (PLANT ID): CONTAINMENT PRESSURE TRIP FUNCTION FOR REACTOR
 PROTECTION SYSTEM (PA2344-46, 2568)
 LICENSEE SUBMITTAL: SCEW(S): 54 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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 _____.)
- 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 | <u>III.b</u> Not in Scope |
| II.b Not Qualified | 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 _____
- III.b Equipment Not in the Scope of the Qualification Review X _____
- IV Documentation Not Made Available _____

Mechanical equipment item



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 33

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Sensing Bellows
(Barton)

MODEL: 351

COMPONENT NO.: PA2344, PA2345, PA2346, PA2568

NRC IDENTIFIED DEFICIENCIES: T, A, CS, R, RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 54.

RT - The next update of our submittal will indicate a required time of 120 days.

A,R- The material composing this instrument is metallic and is insensitive to the effects of Aging and Radiation.

T - The next revision to our submittal will indicate a qualified temp of 350^oF.
This temperature is arrived at based on Westinghouse test data which envelopes out plant profile.

CS - This item is addressed in our submittal. The EQ submittal will be revised to include information on the oil filled system.

Other supporting data is available in our file EQ-28.

PSE&G's evaluation of these instrument has reaffirmed that they can perform their safety related function in a harsh environment.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

EQUIPMENT ITEM NO. 34
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D 2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 34
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (SJ78, SJ79, SJ108)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 56 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 34

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 34

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 34

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switches
(Namco)

MODEL: EA-170, D2400X

COMPONENT NO.: SJ78, SJ79, SJ108

NRC IDENTIFIED DEFICIENCIES: RT, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form pages 56 and 90.

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 26
states our intentions and reasoning for continued operation.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

EQUIPMENT ITEM NO. 35
 SOLENOID VALVE LOCATED IN THE CONTAINMENT
 ASCO MODEL NP SERIES
 REQUIRED OPERATING TIME: LOCA/MSLB AS NECESSARY
 TER CHECKSHEET NO. 35
 LICENSEE REFERENCE(S): 712, 1849, 36
 FUNCTION (PLANT ID): VALVE OPERATION (SV0491, 492, 493, 427, 518, 521, 399, 397, 519)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0401, 802, 803, 927, 759, 760, 920, 921, 922)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0923, 924, SV1022, 026, 077, 079, 081, 083)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0506, 520)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 LICENSEE SUBMITTAL: SCEW(S): 60 [64]

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, (), M, I, QM, RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 3e
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:

- 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/nas 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 |
| <u>II.a</u> Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | IV Documentation Not Available |



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

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 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 _____



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: NP Series

COMPONENT NO.: SV0491, SV0492, SV0493, SV0427, SV0518, SV0519, SV0520, SV0521,
SV0399, SV0397, SV0401

NRC IDENTIFIED DEFICIENCIES: RT, A, CS, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form, Page 60.

RT, CS - All NP series valves are fully qualified for adverse environmental conditions. All NRC noted deficiencies are addressed in our submittal. All supporting information for these valves is contain in our file EQ12.

A - These valves are qualified for a 40 year life provided coils and elastomers are replaced every 4.4 years.

S - These valves perform their function prior to being submerged. Basis 28 in Volume 1, Section VII states our position.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that ASCO NP series valves are capable of performing safety functions in a harsh environment.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER REFERS TO BASIS No. 28

Basis No. 28

Deficiency: Flooding of Containment Motor-Operated Valves,
Isolation Valve Solenoids and Instrument Panels

Justification:

The motor-operated valves are Limitorque SMB's. The solenoid valves are the ASCO NP series. Both devices have been qualified for post-accident operation inside the containment but the data does not support operability in a submerged state. The devices are located at an elevation in the containment that will not become flooded prior to performing their isolation functions. The valves close within 30 seconds. Afterwards when the devices become flooded, valve operation is not required. Operability in a submerged state for one hour as required by NUREG-0588 is not warranted under these conditions.

The solenoid valves are located in instrument panels which have been qualified for post-accident operation to assure that the solenoids perform their function but have not been proven in a submerged state. This is immaterial in this case also, since the isolation function is accomplished prior to submergence.

The electrical circuits are protected by Class 1E breakers should shorts develop during submergence. The effect of a potential loss of control power on other devices fed from the same circuit has been analyzed for safety implications.

The results, as described in FSAR response to Question 6.28, show that plant safety is not affected. This analysis has been reviewed by the NRC and found acceptable as reported in Safety Evaluation Report for Salem Units 1 and 2, Supplement 1, June 1976.

This case has been classified as a Group I.1 item (I.1.E.1).

Corrective Action:

No additional qualification is required.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: NP Series

COMPONENT NO.: SV0802, SV0803, SV0927, SV0759, SV0760

NRC IDENTIFIED DEFICIENCIES: A, RT, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 60.

All NP series valves are fully qualified for adverse environmental conditions. All NRC noted deficiencies are addressed in our submittal. All supporting information for these valves is contained in our file EQ-12. *The aging information was included in revision 2.*

PSE&G's evaluation of NRC noted deficiencies, has reaffirmed that ASCO NP Series valves are capable of performing safety functions in a harsh environment.



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20th and Race Streets, Phila. Pa. 19103 (215) 448-1000

NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: NP Series

COMPONENT NO.: SV0924

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 60.

All NP series valves are fully qualified for adverse environmental conditions. All NRC noted deficiencies are addressed in our submittal. All supporting information for these valves is contained in our file EQ-12. *This solenoid valve does not require replacement.*

PSE&G's evaluation of NRC noted deficiencies, has reaffirmed that ASCO NP Series valves are capable of performing safety functions in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: NP Series

COMPONENT NO.: SV0920, SV0921, SV0922, SV0923, SV0924, SV1022, SV1026, SV1077,
SV1079, SV1081, SV1083, SV0506

NRC IDENTIFIED DEFICIENCIES: A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 60.

All NP series valves are fully qualified for adverse environmental conditions. All NRC noted deficiencies are addressed in our submittal. All supporting information for these valves is contained in our file EQ-12. This solenoid valve does not require replacement. These valves are qualified for a 40 year life provided coils and elastomers are replaced every 4.4 years.

PSE&G's evaluation of NRC noted deficiencies, has reaffirmed that ASCO NP series valves are capable of performing safety functions in a harsh environment.



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 ~~concurrency~~/non-concurrency with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

Reason for Non-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)

- 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. 35

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

- ___ 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.
- X Other (see page 46)

LICENSEE STATEMENT

See page 3a of this checksheet.

EVALUATION OF LICENSEE STATEMENT

The Licensee states that the valves have not been proven in a submerged state but that electrical circuits are protected by Class 1E breakers and that the effect of a potential loss of control power has been analyzed for safety implications. The Licensee also states that the analysis has been reviewed and approved by the NRC. FRC does not have any information regarding this analysis, however, and therefore an independent assessment of the status of these valves in a submerged state can not be performed.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 35

MAINTENANCE AND REPLACEMENT SCHEDULE SUMMARY

The following information regarding the maintenance and replacement schedule(s) for components, sub-components, and materials has been provided by the Licensee:

" These valves are qualified for a 40 yr. life, provided the coils and elastomers are replaced every 4.4 yrs. "



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

EQUIPMENT ITEM NO. 36
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 NAMCO MODEL EA 180
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 36
 LICENSEE REFERENCE(S): 33, 34, 898
 FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE CONTROL (1PR3, 4, 5;
 1WL12; 1VC7, 9, 11, 13)
 SERVICE: VALVE POSITION INDICATOR
 FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE CONTROL (1CV3, 1CV4, 1CV5,
 1SJ123, 1WL98)
 SERVICE: VALVE POSITION INDICATOR
 LICENSEE SUBMITTAL: SCEW(S): 61 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 3e, 3d
System Consideration Review	4a, 4b, 4e, 4d, 4c, 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. 36

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 _____.)
- 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 |
| <u>II.a Qualification Not Established</u> | III.b Not in Scope |
| II.b Not Qualified | 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	_____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	_____



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Namco)

MODEL: EA-180

COMPONENT NO.: 1PR3, 1PR4, 1PR5, 1WL12, 1WL96, 1VC7, 1VC9, 1VC11, 1VC13

NRC IDENTIFIED DEFICIENCIES: A, T, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 61.

A - The aging evaluation review was completed with maintenance schedules established. This information was added to the Evaluation Form in Revision 2.

T - The actual test resulted in a peak temperature of 349^oF for 3 hours. The Salem required profile is 350^oF for one minute. This is more than adequate to assure operability at Salem.

CS - This item was addressed in our submittal.

Further supporting data is available in our file EQ-13.

PSE&G's evaluation of the NRC noted deficiencies was reaffirmed that Namco, EA-180 limit switches, are capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Limit Switches
(Namco)

MODEL: EA-180

COMPONENT NO.: 1CV3, 1CV4, 1CV5, 1SJ123, 1WL98

NRC IDENTIFIED DEFICIENCIES: A, S, T, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 61.

- A - The aging evaluation review was completed with maintenance schedules established. This information was added to the Evaluation Form in Revision 2.
- S - The submergence issue was addressed in our submittal Section VII, basis 29. Procedure changes were made to correct this problem. Physical location precludes installation of switch above flood level. The potential flooding of these switches does not affect plant safety.
- T - The actual test resulted in a peak temperature of 349°F, for 3 hours. The Salem required profile is 350°F for one minute. This is more than adequate to assure operability at Salem.
- CS - This item was addressed in our submittal.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>Limit Switch</i>	Limit Switch	
Manufacturer's Name (5.2.2/-/-)	<i>NAMCO</i>	NAMCO Controls	
Model Number (5.2.2/-/-)	<i>EA-180</i>	EA-180, Type 23	
Serial Number	<i>N/A</i>	EA-180-11302, Rev.-D	
Features/Mounting (5.2.6/-/-)	<i>on valves</i>	Horizontal in Autoclave	
Connections/Interfaces (5.2.6/-/-)	<i>Not stated</i>	Teflon Tape used to seal conduit threads	See Note 1
Location/Elevation	<i>none</i>	Not Applicable	
Equipment ID No.	<i>none</i>	Not Applicable	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	<i>N 2/0.</i>	No Report I/D Number	
Report Date	<i>9/5/78</i>	September 5, 1978	
Issued by	<i>acme Cleveland</i>	ACME CLEVELAND DEVELOPMENT COMPANY	
Prepared for	<i>NAMCO</i>	NAMCO CONTROLS	
Referenced Reports	<i>w/1944-17</i>	Not Stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	<i>N/A</i>	Sequential Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>N/A</i>	Make/break contact	
Operating Conditions (-/2.2.10/2.2.10)	<i>Not stated</i>	0.5Amps @ 100 Vdc	
Load/Cycles/Voltage/ Current/Freq.			



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

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/-/-)	N/A	Not Stated	
Number of Specimens	N/A	One (1)	
Test Instruments Calibrated	N/A	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	Active	Active	
Test Duration (5.2.1/-/-)	N/A	30 days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	> 24 hrs	Not Applicable	
Required Function Time	120 days	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/-)	N/A		
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)	analysis	200 hours @ 200°F per ANSI draft std N278.2.1	X Note 2
Thermal Aging/Basis			
Material Aging Evaluation (7.0/-/-)	analysis of material	Not Stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	yes	Not Stated	
Radiation Aging, Type	Gamma	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	<i>Not stated</i>	204 Megarads	*
Radiation Aging, Dose Rate	<i>Not stated</i>	0.7 Megarads/ hour	
Radiation Aging, Method	<i>N/A</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>Not stated</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>N/A</i>	100,000 Actuation Cycles	
Other Age Conditioning (-/4.2/-)	<i>N/A</i>	Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>1.75 yrs</i>	None Claimed	<i>Note 2</i>
Normal Ambient Temperature	<i>not stated</i>	Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>Salem Program</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	<i>Salem Program</i>	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Stated/ Not Applicable	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	Not Stated	
1. Temperature (+15°F)			
2. Pressure (+10%, 10 psig max)			
3. Radiation (not required)			
4. Time (+10%, +1 hour + function time minimum)			

* Radiation aging and accident doses were combined in a single Exposure prior to the LOCA Simulation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	5 x 10 ⁷ R	204 Megarads	*
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	Not stated N/A	0.7 Megarads per hour Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	Not stated	Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	Not stated	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	Not stated	Not Stated	
Plateout Dose Considered (-/1.48/1.48)	Not stated	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	Not stated	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. 36

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3psi/sec	11°F/8psi/sec	
Peak: °F/psig/RH/Time	350/43.2/100/3m	340/115/100/3h4s	
Decrease To: °F/psig/RH/Time	286/20/100/3h	140/-/-/2h4r 340/105/100/3hrs	
Decrease To: °F/psig/RH/Time	219/20/100/21h	320/76/100/2hrs 300/57/100/1hr	
Decrease To: °F/psig/RH/Time	152/5/100/-	250/25/100/4days 150/10/100/25 days	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not Applicable	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)	Boric Acid & NaOH pH > 8.5	Boric Acid/water/sodium thiosulfate/sodium hydrox- ide	X Note 3
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration	> 225 hrs	30Days	
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Applicable	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

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. "

The Licensee has not identified the Salem method. EFS

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 in EQ-13.01B40 stated that using an activation energy of 0.8 recommended by NRC, the life is 1.75 years for the gaskets, after replacement old life would be 40 years. However no analysis was provided to establish the qualified life beyond the 1.75 years

3.) There is not sufficient information on the concentrations of chemicals used



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 36

NOTES:

Note 3 cont'd

in the test and in the plant
to determine whether the plant
conditions are enveloped by the test.

Accordingly it is concluded that
the qualified life/replacement schedule
and the chemical spray capabilities
of the installed unit switches have
not been established



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

EQUIPMENT ITEM NO. 37

INSTRUMENTATION AND CONTROL PANEL LOCATED OUTSIDE CONTAINMENT

PSE&G MODEL 1,2,3,4BAY; VERTICAL NEMA 12 ENCLOSURES

REQUIRED OPERATING TIME: LOCA/MSLB PROVIDE SUITABLE PROTECTION FOR EQUIPT.
 TER CHECKSHEET NO. 37

LICENSEE REFERENCE(S): 38, 3297

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTS (335, 445A-H, 444A-M, 684A-D,
 685A-D, 686A-D)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTS (241, 245, 238, 6831A-D,
 6681A-D, 6891A-D)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (687A-D, 691A-C, 215,
 219, 202, 101, 102, 743)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (311, 233, 234, 235, 236,
 208, 325, 318, 713, 714)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (317, 440A-F, 224A-C,
 316A, 316B, RPI RACK, 690)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (237)

SERVICE: ENCLOSURE FOR INSTRUMENTATION

LICENSEE SUBMITTAL: SCEW(S): 64 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 37

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 _____.)
- 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 | <u>III.b</u> Not in Scope |
| II.b Not Qualified | 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 _____
- 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. 37

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Instrument Enclosures
(PSE&G)

MODEL:

COMPONENT NO.: 241, 245, 238

NRC IDENTIFIED DEFICIENCIES: S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 62.

Submergence is not a problem. Panels will fill with water and cause instruments to be flooded. Flooding of instruments in these panels has been previously addressed and poses no problem since they perform their functions prior to flooding.

This item is addressed in our submittal, Volume I, Section VII, basis 28.

Further supporting data is available in our file EQ-20.

PSE&G's evaluation of the NRC noted deficiency has reaffirmed that these Instrument Enclosures will perform their safety function in a harsh environment.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

Page
3b

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Instrument Enclosures
(PSE&G)

MODEL: 1, 2, 3, 4 Bay Vertical & NEMA 12 Enclosures

COMPONENT NO.: 335, 445A-H, 444A-M, 684A-D, 685A-D, 686A-D, 6831A-D, 6681A-D, 6891A-D,
687A-D, 691A-C, 215, 219, 202, 101, 102, 743, 311, 233, 234, 235, 236,
208, 325, 318, 713, 714, 317, 440A-F, 224A-C, 316A, 316B, RPI RACK, 690,
Unit 2 only - 797A, 797B
Unit 1 only - 241, 237

NRC IDENTIFIED DEFICIENCIES: RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 62.

Instrument enclosures must only be able to survive the initial pressure and temperature transients. The time duration is approximately 24 hours. After 24 hours our plant profile shows a steady state condition, and these steel enclosures will not be affected.

A 24-hour LOCA test was conducted by PSE&G to prove these instrument enclosures. Results of tests are available in our file EQ-20.

PSE&G's evaluation of the noted deficiencies has reaffirmed that PSE&G instrument enclosures can perform safety functions in a harsh environment.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 37

NOTES:

Reference 38 (unit 1 - reference 36 for unit 2) states that the purpose of the Wyle test was not to qualify the instrumentation contained in the Instrument Enclosure but rather to establish what environments the instruments would see.

With respect to instrumentation Conduit Seals reference 38 (unit 1) states;

ADDITIONAL COMMENTS: CONAX PG SERIES GLAND SEALS SEAL THE OUTER JACKET OF THE CABLE TO THE TRANSMITTER CASE. THEREFORE THE INTEGRITY OF THE CABLE JACKET OVER ITS ENTIRE LENGTH IS REQUIRED TO ASSURE A MOISTURE SEAL. CABLE DAMAGE DURING A LOCA COULD VIOLATE THE SEAL. RECOMMEND REPLACEMENT WITH CONAX ECCA'S (REF. 22.00, ON A MAINTENANCE BASIS.

The licensee SCEW 62 states that Panels 238, 241 and 245 are subject to submergence however it is stated in reference 16 (unit 1) that this is not a concern because the instrumentation has been previously addressed.

Volume 1, section VII, basis 28 is cited as justification for the licensee's position, this basis discusses limit torque motorized valve actuators and solenoid valve submergence. This equipment is discussed under the respective equipment item.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 32

NOTES:

Based on this review it is concluded that the instrument enclosures are mechanical equipment items and therefore out of the scope of this review. This equipment is assigned to category III.B

It is assumed that there are no exposed terminal blocks within the enclosures.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

EQUIPMENT ITEM NO. 38

MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT

LIMITORQUE MODEL SMB, CLASS B INSULATION

REQUIRED OPERATING TIME: NOT STATED

TER CHECKSHEET NO. 38

LICENSEE REFERENCE(S): 639, 635, 1590, 59, 19

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1SJ1, 1SJ2, 1SJ4, 1SJ5, 1SJ12, 1SJ13, 12SJ45)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CV68, 1CV69, 1CV139, 1CV140, 1CV175, 1CV40)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11SJ113, 12SJ113, 1SJ30, 12SJ40, 11SJ134)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (12SJ134, 1S135, 11RH4, 12RH4, 11SJ49)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (12SJ49, 11RH29, 12RH29, 11RH19, 12RH19)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11CS36, 12CS36, 12CS36, 11CS2, 1CS14)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CS16, 1CS17, 11CC16, 11CC17, 11CC18)

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a ₁ , 1a ₂
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, 5a ₂ , 5b ₂ , 5c ₂ , 5d ₂ , 5e ₂ , 5a ₃ , 5b ₃ , 5c ₃ , 5d ₃ , 5e ₃ , 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. 38

EQUIPMENT ITEM NO. 38 (CONTINUED)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CC136,
 1CC131, 1CV116, 11SJ44, 12SJ44)

SERVICE: REFERENCE SPECIFIC SYSTEM

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11SJ45, 11SJ40)

LICENSEE SUBMITTAL: SCEW(S): 63-2 [12]

~~DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:~~

~~(See Section 3 of this TER for Legend)~~

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

~~Not stated, Not applicable~~

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 |
| <u>II.a</u> Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | 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	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
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-0586, Cat. I)	_____

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	_____
I.b	Equipment Qualification Pending Modification	_____
II.a	Equipment Qualification Not Established	<u>X</u>
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	_____

NOTE: PSR #'s on the following pages are referenced in the Unit 1 Reference List

See Conclusions on page 5j



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limitorque Motor Operated Valves

MODEL: SMB, Class B Insulation (Outside Containment)

COMPONENT NO.: 1SJ1, 1SJ2, 1SJ4, 1SJ5, 1SJ12, 1SJ13, 12SJ45, 1CV68, 1CV69,
1CV139, 1CV140, 1CV175, 1CV40, 1CV141, 11SJ113, 12SJ113,
1SJ30, 12SJ40, 11SJ134, 12SJ134, 1S 135, 11RH4, 12RH4, 11SJ49,
12SJ49, 11RH29, 12RH29, 11RH19, 12RH19, 11CS36, 12CS36, 11CS2,
1CS14, 1CS16, 1CS17, 11CC16, 11CC17, 11CC118, 1CC136, 1CC131,
1CV116, 11SJ44, 12SJ44, 11SJ45, 11SJ40

NRC IDENTIFIED DEFICIENCIES: QT, RT, CS, QM, SEN, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 63-2.

QT - These valves are only required to be operable in the initial stages of the accident. They have been qualified for 8 hours operation.

RT - The next revision of the EQ submittal will indicate need for short term operability.

CS - These valves are located outside the containment and not subject to chemical spray.

QM, SEN - During the various environmental tests that were performed on the Limitorque motor operators, certain deficiencies have come to light. Any material or component that has experienced a failure in any of the tests has been replaced with the latest qualified material or component that has successfully passed. This should preclude any failure due to any identified environmental parameter in the accident environment condition that was present in the various test environments.



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FRC Project No. C5257

FRC Assignment No. 13

FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

Checksheets 5a, 1, 2, 3 thru 5c, 1, 2, 3 have been removed due to the proprietary nature of information contained therein.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 38

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

EQUIPMENT ITEM NO. 39
 TERMINAL BLOCK LOCATED IN THE CONTAINMENT
 BUCHANAN MODEL 2B112N
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 39
 LICENSEE REFERENCE(S): 39, 3306, 3305
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN628 THRU JN635; JN661 THRU JN668; JT7)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JS168, JS170, JS682, JT57, JT525, JT578, 79)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT582, 83; JN145; JN148, 49; JN107; JN109)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN345 THRU JN349; JX94,95; JT9, 10)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN89 THRU JN92; JN94 THRU JN97; JT376, 77)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT350; JS618, 19; JN673, 74; JN610; JN613)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

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

R, (T) Q1, RT, P, H, (CS), (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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

EQUIPMENT ITEM NO. 39 (CONTINUED)

- FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JS620; JT480; 1VC1 THRU 1VC4; JT528, 29)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (1VC5, 6; 448A,B,C,D; 684A,B,C,D; 685A,B,C,D)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (686A,B,C,D; JN666; JT631; 6831A,B,C,D)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (6891A,B,C,D; 6881A,B,C,D; 691A,B,C; 690)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (215; 219; 713; 714; 317; 101; 102; 211; 224A,B,C)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (216A, B; 241; 743; 311; 208; 233 THRU 236)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (325; 218; JT558 THRU JT561)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

~~DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:~~

~~(See Section 3 of this TER for Legend)~~

~~R, T, Q1, R1, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable~~

~~LISTING OF APPLICABLE CHECKSHEETS:~~

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 39

EQUIPMENT ITEM NO. 39 (CONTINUED)

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (#11 REF.JCT.BOX, #12 REF.JCT.BOX)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN120, JN139, JT536, JT362, JT534)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT455 THRU JT459)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANEL
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (#11 REF. JCT. BOX, #12 REF. JCT. BOX)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANNELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN120, JN139, JT536, JT362, JT534)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT455 THRU JT459)
 SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANEL
 LICENSEE SUBMITTAL: SCEW(S): 64 [64]

~~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:~~

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 39

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 _____.)

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)

- | | |
|---|--------------------------------|
| <input checked="" type="checkbox"/> 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. 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 _____
- 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. 39

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Terminal Blocks
(Buchanan)

MODEL: 2B112N

COMPONENT NO. [redacted] See attachment.

NRC IDENTIFIED DEFICIENCIES: T, CS, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 64.

Subject equipment has been environmentally qualified. The above referenced page addresses all noted deficiencies. *Aging information was included in revision 2.*

Supporting data on testing and analysis is available in our file EQ-19.

PSE&G's evaluation of the NRC noted deficiencies has reaffirmed that Buchanan Terminal Block can perform safety functions in a harsh environment.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

LICENSEE RESPONSE TO NRC SER (Continued)

COMPONENT NO.: JN628, JN629, JN630, JN631, JN632, JN633, JN634, JN635, JN661,
JN662, JN663, JN664, JN665, JN667, JN668, JT7, JS168, JS170,
JS682, JT57, JT525, JT578, JT582, JT579, JT583, JN145, JN148,
JN149, JN107, JN109, JN345, JN346, JN347, JN348, JN349, JX94,
JX95, JT9, JT10, JN89, JN90, JN91, JN92, JN94, JN95, JN96, JN97,
JT376, JT377, JT350, JS618, JS619, JN673, JN674, JN610, JN613,
JS620, JT480, 1VC1, 1VC2, 1VC3, 1VC4, JT528, JT529, 1VC5, 1VC6,
448A, 448B, 448C, 448D, 684A, 684B, 684C, 684D, 685A, 685B, 685C,
685D, 686A, 686B, 686C, 686D, JN666, JT631, 6831A, 6831B, 6831C,
6831D, 6891A, 6891B, 6891C, 6891D, 6881A, 6881B, 6881C, 6881D,
691A, 691B, 691C, 690, 215, 219, 713, 714, 317, 101, 102, 211,
224A, 224B, 224C, 216A, 216B, 241, 743, 311, 208, 233, 234, 235,
236, 325, 218, JT558, JT559, JT560, JT561, #11 Ref. Jct. Box,
#12 Ref. Jct. Box

UNIT 1 ONLY

JN120, JN139, JT536, JT362, JT534, JT455, JT456, JT457, JT458, JT459

UNIT 2 ONLY

JN146, JN147, JN839, JN840, JX39, JT363, JT535, JT460, JT461,
JT462, JT463, JT464



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 39

Checksheets 5a thru 5g, 5i & 5j have been removed due to the proprietary nature of information contained therein.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

EQUIPMENT ITEM NO. 40
 ELECTRICAL CABLE SPLICE LOCATED IN THE CONTAINMENT
 RAYCHEM MODEL WCSF N
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 40
 LICENSEE REFERENCE(S): 3570, 40, 41, 42, 815
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (335; 440A, B, C, D;
 445A, B, C, D, E, F, G, H)
 SERVICE: TERMINATION/JUNCTION OF ELECTRIC CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (444A, B, C, D, E, F,
 G, H, I, J, K, L, M)
 SERVICE: TERMINATION/JUNCTION OF ELECTRIC CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (245; 238; 341; JN148;
 1V1, 2, 3, 4)
 SERVICE: TERMINATION/JUNCTION OF ELECTRICAL CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (241; 237; 797A, B)
 SERVICE: TERMINATION/JUNCTION OF ELECTRICAL CABLES
 LICENSEE SUBMITTAL: SCEW(S): 65 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 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. 40

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 _____.)
- 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)

- | | |
|------------------------------------|--------------------------------|
| <u>I.a Qualified</u> | 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. 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 _____
- 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 _____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Cable Splices
(Raychem)

MODEL: WCSF-N

COMPONENT NO.: 335, 440A, 440B, 440C, 440D, 445A, 445B, 445C, 445D, 445E, 445F, 445G,
445H, 444A, 444B, 444C, 444D, 444E, 444F, 444G, 444H, 444I, 444J, 444K,
444L, 444M, 245, 238, 341, JN-148, 1VC1, 1VC2, 1VC3, 1VC4
Unit 1 only - 241, 237
Unit 2 only - 797A, 797B

NRC IDENTIFIED DEFICIENCIES: A, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 65.

The subject splices are fully qualified and are addressed in our submittal, Volume I, Section V, page 65. All noted deficiencies have been addressed and supporting information is available in our file EQ-01. The aging information was included in Revision 2.

PSE&G's evaluation of noted deficiencies has reaffirmed that Raychem Cable Splices can perform safety functions in a harsh environment.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>Electrical Cable Splice</i>	Electrical Cable Splice	
Manufacturer's Name (5.2.2/-/-)	<i>Raychem</i>	Raychem Corporation	
Model Number (5.2.2/-/-)	<i>WCSF-N</i>	Raychem Thermofit WCSF...N	
Serial Number	<i>N/A</i>	Not Applicable	
Features/Mounting (5.2.6/-/-)	<i>N/A</i>	On Mandrel In Autoclave	
Connections/Interfaces (5.2.6/-/-)	<i>N/A</i>	Test Item Is a Cable Splice (Note 1 p 5i1&5i2)	
Location/Elevation	<i>Containment</i>	Not Applicable	
Equipment ID No.	<i>N/A</i>	Not Applicable	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	<i>F-C4033-3</i>	F-C4033-3	
Report Date	<i>Jan 1975</i>	January 1975	
Issued by	<i>FIRL</i>	Franklin Institute Research Laboratories	
Prepared for	<i>Raychem</i>	Raychem Corporation	
Referenced Reports	<i>Raychem EOR-2001</i>	Not Applicable	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	<i>N/A</i>	Simultaneous Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>N/A</i>	Insulation Resistance/ Current Carrying Capability and HiPot	
Operating Conditions (-/2.2.10/2.2.10)	<i>Varies</i>	See Note 1 p 5i1 & 5i2	
Load/Cycles/Voltage/ Current/Freq.			



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

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/-/-)	N/A	Not Applicable	
Number of Specimens	N/A	30	
Test Instruments Calibrated	N/A	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	Active..Carry current	
Test Duration (5.2.1/-/-)	N/A	30 Days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	>24 hrs	Not Applicable	
Required Function Time	120 days	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/-)	N/A	Thermal/Radiation Aging Visual Inspection Insulation Resistance	
1. Representative Sample		LOCA Simulation	
2. Baseline Data		Visual Inspection/ Insulation Resistance/	
3. Performance Extremes		HiPot	
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)		7 Days @ 150°C	
Thermal Aging/Basis	Analyses	Not Stated	N/A 1 page 5 f
Material Aging Evaluation (7.0/-/-)	yes	Visual Inspection/ Insulation Resistance	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		Not Stated	
Radiation Aging, Type	Gamma	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	<i>not stated</i>	5x10 ⁷	
Radiation Aging, Dose Rate	<i>not stated</i>	Not Stated	
Radiation Aging, Method	<i>N/A</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>not stated</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>N/A</i>	Not Stated	
Other Age Conditioning (-/4.2/-)	<i>N/A</i>	Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>>40 years</i>	Not Stated in Test Report	<i>Note 1 Page 5f</i>
Normal Ambient Temperature	<i>} not stated</i>	Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>Aslem program</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	<i>Aslem program</i>	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Stated	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	Not Stated	
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. 40

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	<i>LOCA/MSLB</i>	LOCA/ MSLB	
Radiation Type	<i>Gamma</i>	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	<i>5 x 10⁷ R</i>	197.7-209.8 Megarads	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	<i>Not stated N/A</i>	Not Stated Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	<i>Not stated</i>	Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	<i>Not stated</i>	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	<i>Not stated</i>	Not Applicable	
Plateout Dose Considered (-/1.48/1.48)	<i>Not stated</i>	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	<i>Not stated</i>	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3psi/sec	10°F; 7Psi/second	
Peak: °F/psig/RH/Time	350/43.2/100/3m	357/70/100%/10 hrs	
Decrease To: °F/psig/RH/Time	286/30/100/3h	357-275/70-31/100%/2hrs	
Decrease To: °F/psig/RH/Time	219/29/100/21h	275/31/100%/4days	
Decrease To: °F/psig/RH/Time	154/5/100/...	212/10/100%/26 days	
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not Applicable	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	boric acid & NaOH pH > 8.5	3000 ppm Boron 0.064 Molar Na ₂ S ₂ O ₃ NaOH for pH of 10.5	
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration	> 225 hrs	30 days	
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Applicable	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

NOTES:

Note 1 - Raychem Report EOR 2001 [3570]
states the following

Heat of Activation = $\Delta H_{act} = R \times b$

where t_2 = time to endpoint (100,000 hours)

t_1 = time to endpoint (1000 hours)

T_2 = $^{\circ}C + 273$ corresponding to t_2

T_1 = $^{\circ}C + 273$ corresponding to t_1

$b = \Delta H_{act}/R$

$R = 1.98 \text{ cal mole}^{-1} \text{ } ^{\circ}C^{-1}$

4. CONCLUSIONS

On the basis of the oven aging study described in this report and the use of a conventional Arrhenius analysis of the data, it is concluded that the useful service life of radiation crosslinked WCSF compound is predicted to be 40 years at a continuous operating temperature in excess of $90^{\circ}C$. The heat of activation for the thermal oxidation of WCSF compound was calculated to be 29 kcal/mole.

Licensee document EQ 01.05 states

Normal operating conditions at Salem are worst case inside containment
 $120^{\circ}F$ ambient and 15 $\mu R/hr$ and 100 $\mu R/hr$ (normal radiation
cab rating of $90^{\circ}C$)

It is concluded that the qualified life is established



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

NOTES:

2. TEST SPECIMENS

tested and also shows the energizing voltage and currents levels.

Table 1 presents a description of the specimens

Table 1 Test Specimens

Specimen Description *	Specimen		Electrical Loading	
	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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 40

NOTES:

Table 1 Test Specimens (continued)

Specimen Description*	Number†	Length (ft)‡	Electrical Loading	
			Voltage (V _{rms} - 60 Hz)	Initial Current (A)*
Raychem Thermofit® In-Containment Transition Splices Cable AWG 6 insulated with Raychem Fiamtrol™, spliced to three cables of AWG 12 insulated with Raychem Fiamtrol™ and reconnected to an AWG 6 cable insulated with Raychem Fiamtrol™ Splice Components for two splices (Note 1) Raychem Thermofit® WCSF-200-6-N Raychem Thermofit ³ 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: Burdny Hylink YS6C-L	17	23	1000	65

- * and ™ Trademarks of Raychem Corporation
 - * Description of specimens provided by Raychem
 - † Specimens 1 thru 3 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. 41

EQUIPMENT ITEM NO. 41
 ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
 CONAX MODEL CANISTER TYPE LVP MVP
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 41
 LICENSEE REFERENCE(S): 5368, 1049, 5369, 44, 45, 46
 FUNCTION (PLANT ID): NOT STATED (1-1, 1-7, 1-8, 1-14, 1-15, 1-16, 1-17, 1-19)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-21, 1-23, 1-29, 1-34, 1-35, 1-37, 1-38)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-39, 1-41, 1-43, 1-46, 1-47, 1-48, 1-49)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-50, 1-53, 1-57, 1-59, 1-60, 1-61, 1-62, 1-63)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-64, 1-65, 2-63, 1-E1, 1-E2)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 LICENSEE SUBMITTAL: SCEW(S): 66 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

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/nas 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)

- | | |
|---|--------------------------------|
| <input checked="" type="checkbox"/> 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. 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 _____ 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. 41

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Penetrations
(Conax)

MODEL: Canister Type - LVP, MVP

COMPONENT NO.: 1-1, 1-7, 1-8, 1-14, 1-15, 1-16, 1-17, 1-19, 1-21, 1-23, 1-29,
1-34, 1-35, 1-37, 1-38, 1-39, 1-41, 1-43, 1-46, 1-47, 1-48, 1-49,
1-50, 1-53, 1-57, 1-59, 1-60, 1-61, 1-62, 1-63, 1-64, 1-65, 2-63,
1-E1, 1-E2

NRC IDENTIFIED DEFICIENCIES: A, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 66.

These, NRC noted, deficiencies are addressed in our submittal on the above referenced page. *The aging information was added in revision 2.*

Documentation is available in our file EQ-02.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Conax Penetrations are capable of performing safety functions in a harsh environment.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 41

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

EQUIPMENT ITEM NO. 42
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 AMERICAN INSULATED WIRE, MODEL NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 42
 LICENSEE REFERENCE(S): 1107, 47
 FUNCTION (PLANT ID): VARIOUS, CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 69 [64]

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:

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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.
- 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 | <u>II.c Qualified Life Deficiency</u> |
| 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. 42

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. 42

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cables

MODEL: American Insulated Wire Co.

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 340°F as shown in the qualification data evaluation form. This evaluation is contained in our file EQ04.04.

A - Rev. 2 of the Environmental Qualification submittal contains aging data specifying an 11 year life for this type cable. Supporting data is available in our file EQ-04.05.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our file EQ-04.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that American Insulated Wire Co. cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

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	<i>Electrical Cable</i>	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	<i>American Insulated Wire</i>	American Insulated Wire	
Model Number (5.2.2/-/-)	<i>EPR Insulation Hypalon Jacket</i>	EPR insulation/Hypalon Jacket	See Page 5i
Serial Number	<i>N/A</i>	Not Applicable	
Features/Mounting (5.2.6/-/-)	<i>N/A</i>	Not Applicable	
Connections/Interfaces (5.2.8/-/-)	<i>Not stated</i>	Not Stated	
Location/Elevation	<i>Containment</i>	Not Applicable	
Equipment ID No.	<i>N/A</i>	Not Applicable	

QUALIFICATION REPORT

(8.0/5.0/5.0)			
Report ID Number	<i>F-C5115</i>	F-C5115	
Report Date	<i>4/79</i>	April 1979	
Issued by	<i>FI&L</i>	Franklin Institute Research Laboratories	
Prepared for	<i>AIW</i>	American Insulated Wire	
Referenced Reports	<i>Not stated</i>	Not Stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	<i>N/A</i>	Test	

QUALIFICATION TEST PROGRAM

Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>N/A</i>	Maintain Electrical Loading, Insulation Resistance, Hipot	
Operating Conditions (-/2.2.10/2.2.10)	<i>Various</i>	10Vac/1A	
Load/Cycles/Voltage/ Current/Freq.		230Vac/10A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

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	Charging Current less than 1 amp.	
Accuracy (5.2.5/-/-)	N/A	Not Applicable	
Number of Specimens	N/A	12	
Test Instruments Calibrated	N/A	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	Not Stated	
Test Duration (5.2.1/-/-)	NA.	83 Days	Note A
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	> 24 hrs	Not Applicable	
Required Function Time	120 days	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	Thermal Aging Irradiation LOCA Simulation	
Test Sequence (NUREG-0588, Cat. 1) (-/2.3.1/-)	N/A		
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	N/A	Not Applicable	
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	analysis	100 Hours @ 121°C	X Note 2
Material Aging Evaluation (7.0/-/-)	EQ 84	Not Stated	"
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	Not Stated	Not Stated	
Radiation Aging, Type	Gamma	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Dose Rate	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Method	<i>Not stated</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>Not stated</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>N/A</i>	Not Applicable	
Other Age Conditioning (-/4.2/-)	<i>N/A</i>	Not Applicable	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>40 years</i>	Not Stated	<i>X N/A 2</i>
Normal Ambient Temperature	<i>not stated</i>	Not Applicable	
Normal Ambient Radiation	<i>↓</i>	Not Applicable	
Normal Ambient Humidity	<i>↓</i>	Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>yes Salem Oregon</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	<i>Salem Oregon</i>	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Identified	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	Not Identified	
1. Temperature (+15°F)			
2. Pressure (+10%, 10 psig max)			
3. Radiation (not required)			
4. Time (+10%, +1 hour + function time minimum)			



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

Page
5d

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	<i>LOCA/MSLB</i>	LOCA	
Radiation Type	<i>Gamma</i>	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	<i>5 x 10⁷ R</i>	206 Megarads	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	<i>Not stated N/A</i>	0.66 Megarads per Hour Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	<i>Not stated</i>	Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	<i>Not stated</i>	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	<i>not stated</i>	Not Applicable	
Plateout Dose Considered (-/1.48/1.48)	<i>Not stated</i>	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	<i>Not stated</i>	Not Stated	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3 psi/sec	14°F; 4psi/second	
Peak: °F/psig/RH/Time	350/43.2/100/3m	286/40/100/2.8 Hours *	
Decrease To: °F/psig/RH/Time	286/20/100/3h	219/3/100/23 Hrs	
Decrease To: °F/psig/RH/Time	219/20/100/21h	209/0/100/82 days	
Decrease To: °F/psig/RH/Time	154/5/100/-		
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not Stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)	Boric Acid & NaOH pH > 8.5	2100 ppm Boron (1.6 wt % Boric Acid) Buffered with NaOH to pH 10	
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration		24+ hours	
Submergence Duration (4.1.3/2.2.5/2.2.5)	> 225 hrs.	Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Applicable	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	
	NA		

* During the initial rise temperature fluctuations up to 312°F occurred in the first 25 seconds.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42

NOTES: 2

Discussion:

- AIW will forward data and Arrhenius Plot to show 40 year life.
- Pre aging criteria can be ^{possibly} justified with data. Also Wyle Labs performing aging analysis at present

Conclusions:

The above information will show that cable tested in F-C5115 is qualified for 40 year life (assumed at 90°C) RJK.
 based on industry justification

[47]


No data has been provided which establishes the life of the cable.

Table 1. Identification of Test Specimens

Cable Number	Cable Description (a)	Thermal Aging (b)	Electrical Energizing (c)
C5115-1 C5115-2 C5115-3	2/C #16 AWG 7 x 0.0192-in Tinned Copper Conductor 0.025-in Ethylene Propylene Rubber (EPR) Insulation (OD = 0.108 in) 0.015-in Hypalon Jacket Over Insulation (OD = 0.138 in) 0.0015-in Aluminum/Mylar Shield	Unaged	10 Vac/1 A
C5115-4 C5115-5 C5115-6	One #18 AWG 7 x 0.0152-in Tinned Copper Drain Wire Flame Barrier Tape(s) 0.001-in Mylar Separator 0.060-in Overall Hypalon Jacket (OD = 0.435 in)	168 hours at 121°C (250°F)	10 Vac/1 A
C5115-7 C5115-8 C5115-9	2/C #14 AWG 7 x 0.0242-in Tinned Copper Conductor 0.03-in EPR Insulation (OD = 0.133 in) 0.018-in Hypalon Jacket Over Insulation (OD = 0.169 in) Neoprene Fillers	Unaged	230 Vac/10 A
C5115-10 C5115-11 C5115-12	0.001-in Mylar Separator Flame Barrier Tape(s) 0.005-in Corrugated, Bronze Shield (helically wrapped around conductor assembly) 0.06-in Overall Hypalon Jacket (OD = 0.6 in)	168 hours at 121°C (250°F)	230 Vac/10 A

- Notes:
- (a) Cable descriptions and nominal dimensions were provided by the client. Actual FRC measurements of cable dimensions may be somewhat different. The nominal dimensions were used when calculating test voltages and bend-test mandrel diameters.
 - (b) The specimens were thermally aged by the client.
 - (c) The electrical potentials were provided between conductors. The potentials between the conductors and the ground (vessel) plane were 50% of the listed potentials (i.e., the potentials of cables 1 through 6 and cables 7 through 12 were 5 ± 1.5 Vac and 115 ± 5 Vac above the ground plane, respectively).

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 42


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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468/517



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

EQUIPMENT ITEM NO. 43
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 SAMUEL MOORE, EPR INSULATION [51]
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 43
 LICENSEE REFERENCE(S): 1802, 51
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 68 [64]

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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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. 43

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 _____.)
- 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 | <u>II.c Qualified Life Deficiency</u> |
| 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. 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	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cable

MODEL: Samuel Moore

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 340°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-21.01.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-21.02.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-21.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Samuel Moore cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>Electrical Cable</i>	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	<i>Samuel Moore</i>	Samuel Moore & Company	
Model Number (5.2.2/-/-)	<i>EPR Insulation E513</i>	See page 51 for description of cables tested	
Serial Number	<i>NA</i>		
Features/Mounting (5.2.6/-/-)	<i>Not Stated</i>	Not Applicable	
Connections/Interfaces (5.2.6/-/-)	<i>Not Stated</i>	Not Stated	
Location/Elevation	<i>Containment</i>	In Autoclave	
Equipment ID No.	<i>NA</i>	Not Applicable	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	<i>No ID.</i>	Report has No I/D No.	
Report Date	<i>6/78</i>	June 1978	
Issued by	<i>Isomedix</i>	Isomedix	
Prepared for	<i>S. Moore</i>	Samuel Moore & Company DEKORON Division	
Referenced Reports	<i>no other</i>	Not Stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	<i>N/A</i>	Sequential Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>N/A</i>	Insulation Resistance HyPot	
Operating Conditions (-/2.2.10/2.2.10)	<i>Not stated</i>	600 Vac/ 0.5 Amp	
Load/Cycles/Voltage/ Current/Freq.			



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

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	Pass High ac Voltage Withstand Test(80Vac/mil)	
Accuracy (5.2.5/-/-)	N/A	Not Applicable	
Number of Specimens	N/A	12	
Test Instruments Calibrated	N/A	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	Not Applicable	
Test Duration (5.2.1/-/-)	N/A	30 days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	>24 hr	Not Applicable	
Required Function Time	120 days	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	N/A	Core Thermal Aging Irradiation	See Note A Page 5g
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)	N/A	Thermal Aging Irradiation LOCA Simulation	
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	analyze	For Core Aging See 5g Cables 11 & 16: 7D @ 150°C All Others : 7D @ 121°C	X See page 5g N/A
Material Aging Evaluation (7.0/-/-)		Basis was not Stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	Not tested	Not Stated	
Radiation Aging, Type	Gamma	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (% OR NOTE NO.)
Radiation Aging, Dose (rd)	<i>not stated</i>	25 megarads	
Radiation Aging, Dose Rate	<i>not stated</i>	0.75 Mrgarads per hour	
Radiation Aging, Method	<i>not stated</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>not stated</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>not stated</i>	Not Applicable	
Other Age Conditioning (-/4.2/-)	<i>not stated</i>	Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>40 years</i>	Not Stated	<i>X use A</i>
Normal Ambient Temperature	<i>} Not stated</i>	Not Applicable	
Normal Ambient Radiation		Not Applicable	
Normal Ambient Humidity		Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>Salem Program</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	<i>Salem Program</i>	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Stated	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	Not Stated	
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. 43

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	5 x 10 ⁷ R	25 Megarads (Samples 11,16) 175 Megarads (all Others)	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	Not Stated N/A	0.3 Megarads/hr (11 & 16) 0.75 Megarads/hr (all others)	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	Not stated	Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	Not Stated	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	Not stated	Not Stated	
Plateout Dose Considered (-/1.48/1.48)	Not stated	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	Not stated	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	205 °F/3 psig/sec	40°F/20Psi/Minute	
Peak: °F/psig/RH/Time	350/43.2/100/3m	340/105/100/3 hrs 140/-/-/2 hrs	
Decrease To: °F/psig/RH/Time	286/20/100/3h	340/105/100/3 hrs 320/75/100/3 hrs	
Decrease To: °F/psig/RH/Time	219/20/100/21h	300/55/100/4 hrs 250/15/100/4 days	
Decrease To: °F/psig/RH/Time	152/5/100/-	200/10/-/25.5 days	
Equipment Surface Temperature (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/1.3, 2.2.8)	Boric Acid Δ NaOH pH > 8.5	3000 ppm Boron as boric acid, 0.064 Molar Sodium Thiosulphate, +NaOH to Make pH 10	
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration	> 225 hrs	30 days	
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Stated	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

NOTES:

Note A. The test report states [sic]

2.2.1 Phase I - Core Thermal Aging

The cores of cable samples 2, 4, 5, 8, 9 and 10 were thermally aged at the facilities of Samuel Moore and Company Cable samples 2, 5, 8 and 10 were aged at 163°C for 7 days and cable samples 4 and 9 were aged at 150°C for 7 days.

At the conclusion of this phase, the cable samples were jacketed and forwarded to Isomedix for further tests.

The core thermal aging records were also forwarded and are available for inspection at Isomedix.

licensee states [sic]

"Cable samples were pre-aged after irradiation in air oven at 121°C for 168 hrs. Thermal Analysis and assessment of Qual. Life not provided in report. Arrhenius data available for similar construction (per vendor) - and will be provided.

Conclusions:

Data on aging to be provided by vendor - indicates 40yr life obtainable - utilizing 40-50% retention of elongation as end of life failure pt. additional age determination being performed at Wyle Labs.

Prepared: RJK 11/18/80

Verified: G. Jankens 11/21/80



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

NOTES:

The person has not provided
an analysis which establishes the
40 year qualified life claimed on
the SCW sheet



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 43

NOTES:

TABLE 1

DESCRIPTION OF CABLE SAMPLES						
Isomedix Tag No.	Samuel Moore Tag No.	(Phase I) Core Thermal Aging (°C/Days) at Samuel Moore	(Phase II) First Radiation Dose (Megarads)	(Phase III) Thermal Aging Temp./Duration (°C/Days)	(Phase IV) Second Radiation Dose (Megarads)	SAMPLE DESCRIPTION
2	1B	163/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils crosslinked polyolefin, 16 ga. drain and shield, 45 mil Hypalon jacket
4	2A	150/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils crosslinked polyolefin, 16 ga. drain and shield, 45 mil Hypalon jacket
5	2B	163/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils crosslinked polyolefin, 16 ga. drain and shield, 45 mil Hypalon jacket
7	3A	None	25	121/7	175	2/C Black and White 16 ga. 7 stranded tinned copper 20 mil EPDM primary insulation with 10 mils Hypalon primary jacket, 16 ga. drain and shield 45 mil Hypalon jacket
8	4A	163/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils FR-EPDM, 16 ga. drain and shield, 45 mil Hypalon jacket.
	5A	150/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils FR-EPDM, 16 ga. drain and shield, 45 mil Hypalon jacket.
10	5B	163/7	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 30 mils FR-EPDM, 16 ga. drain and shield, 45 mil Hypalon jacket.
11	5C	None	25	150/7	25	2/C 16 ga. 7 stranded tinned copper 30 mils FR-EPDM 16 ga. drain and shield 45 mil Hypalon jacket.
12	6A	None	25	121/7	175	2/C 10 ga. 7 stranded tinned copper, 30 mils FR-EPDM primary insulation with 15 mils Hypalon primary jacket, 10 ga. drain and shield, 45 mil Hypalon jacket.
13	7A	None	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 20 mils EPDM primary insulation with 10 mils Hypalon primary jacket, 16 ga. drain and shield, 45 mil Hypalon jacket.
14	7B	None	25	121/7	175	2/C 16 ga. 7 stranded tinned copper, 20 mils EPDM primary insulation with 10 mils Hypalon primary jacket, 16 ga. drain and shield, 45 mil Hypalon jacket.
16	30	None	25	150/7	25	1/C 16 ga. 7 stranded tinned copper, 30 mils FR-EPDM,



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 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 408

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

EQUIPMENT ITEM NO. 44
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 BOSTON INSULATED WIRE AND CABLE MODEL COAXIAL TEFZEL ETFE INSUL
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 44
 LICENSEE REFERENCE(S): 674, 1705, 1706, 48, 1770
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 69, 69A, 69B [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 |
| <u>II.a Qualification NOT Established</u> | III.b Not in Scope |
| II.b Not Qualified | 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	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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 Checklist 5j for overall conclusion



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cables

MODEL: Boston Insulated Wire Co.

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 340^oF as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-05.02.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 20 year life for this type cable. Supporting data is available in our file EQ-0504.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-05.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Boston Insulated Wire Co. cable is capable of performing safety functions in a harsh environment at Salem.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Electrical Cable

MODEL: Boston Insulated Wire Co.
Coaxial - XLPE Insulation

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 340°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-27.02.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-27.04.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-27.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Boston Insulated Wire Co. cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Electrical Cable

MODEL: Boston Insulated Wire Co.
Coaxial - Tefzel EFTE Insulation

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

I - PSE&G has performed a thermal analysis to justify the qualification temperature of 340°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-24.01.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-24.03.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-24.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Boston Insulated Wire Co. cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

Report B912 [1705] is a test summary which discusses test results on Triaxial cable. The test profile does not Envelop the Salem profile.

The report also discusses test results on a coaxial cable. The reported test duration exceeds the Salem accident duration but the reported peak temperature is 50°F below the peak temperature described by the Salem required profile

75-OHM TRIAXIAL CABLE

Conditioning - 2×10^8 rads gamma prior to LOCA cycle

Cable Construction

Conductor - #20 AWG 19/32 tinned copper
Insulation - Crosslinked polyethylene
Inner Shield - #33 AWG tinned copper braid, 90% coverage
Insulation between Shields - Crosslinked polyethylene
Outer Shield - #33 AWG tinned copper braid, 90% coverage
Jacket - Bostrad 7 CSPE chlorosulfonated polyethylene

Time (After LOCA)	Temp OF	Relative Humidity %	Press. psig Steam	IR - Cond-Shld MΩ/L	IR-Shld-Shld MΩ/l.
0	75		0	20×10^5	8×10^5
15 min.	300	100	60	$2.5 \times 10^4+$	1×10^4
1 day	252	100	16	6×10^5	3×10^4
5 days	252	100	16	$20 \times 10^5+$	1×10^3
9 days	252	100	16	$20 \times 10^5+$	2×10^4
13 days	252	100	16	$20 \times 10^5+$	2×10^4
17 days	200	100	0	$20 \times 10^5+$	$20 \times 10^5+$ (1)
51 days	200	100	0	$20 \times 10^5+$	$20 \times 10^5+$
104 days	200	100	0	$20 \times 10^5+$	$20 \times 10^5+$ (2)

62-OHM COAXIAL CABLE

Conditioning - Aged 168 hours at T2TC followed by 1×10^8 rads gamma prior to LOCA cycle

Cable Construction

Conductor - #22 AWG 19/34 tinned copper
Insulation - Crosslinked polyethylene
Shield - #34 AWG tinned copper braid, 90% coverage
Jacket - Bostrad 7 CSPE chlorosulfonated polyethylene

Time (After LOCA)	Temp OF	Relative Humidity %	Pressure psig Steam
0 to 10 sec	300	100	50
10 to 200 sec	300	100	50
200 sec to 15 min	300	100	30
15 min to 50 min	300	100	30
50 min to 240 min	300	100	30
240 min to 24 hr	230	100	30
24 hr to 4 days	230	100	30



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

Report B913 is summary report of information concerning Coaxial and triaxial cable with BIWF Fluoropolymer insulation. The Document refers to tests reported in F-C3859-1 which are discussed on pages 5h and 5i.

Report B910 is a report which provides test data on cables having EPR Insulation and Bostrad 7 CSPE jackets as follows:

LOCA SIMULATION DATA
Aged Cable

Conditioning

Aged 168 hours at 121C followed by 2×10^8 rads, gamma, prior to LOCA cycle.

Cable Construction

Conductors -- 2/C #16 AWG 7/.0192" tinned copper
 Insulation -- Ethylene propylene rubber with Bostrad 7 CSPE jacket
 Binder Tape -- Flame retardant
 Shield -- Aluminum/polyester tape with #18 AWG 7/.0152" TC drain wire
 Outer Jacket -- Bostrad 7 CSPE

Test Requirements

Environmental Simulation Cycle per Appendix A, IEEE Std. 323-1974, combined cycle for PWR/BWR

LOCA SIMULATION DATA
New Cable

Conditioning -- 2×10^8 rads, gamma

Cable Construction

Conductors -- 2/C #16 AWG 7/.0192" tinned copper
 Insulation -- Ethylene propylene rubber with Bostrad 7 CSPE jacket
 Binder Tape -- Flame retardant
 Shield -- Aluminum/polyester tape with #18 AWG 7/.0152" TC drain wire
 Jacket -- Bostrad 7 CSPE

Test Requirements

Environmental Simulation Cycle per IEEE 323-1974, Appendix A, combined cycle for PWR/BWR

The report states that the cables passed the testing and provides a summary of test data. The report also refers to F-C3859-1 for test results.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

Report F-C3859-1 is a report of testing conducted on various BIW cable constructions in accordance with IEEE 383-74 and IEEE 323-74. The cables tested and the results of the tests are reproduced on page 5i.

The report indicates that some constructions successfully passed test while other cable constructions did not.

The licensee has not provided information either on the SCEWS or in analysis EQ05 to establish that the installed cable constructions are the same as those constructions which successfully passed a test which envelopes the required Salem Parameters. Therefore Qualification has not been established. EQ05 states:

Description:

BIW to verify insulated cable tested in Report 3910 MAY, 1975 is identical to material supplied to P.S.E.&G.

Discussion:

Conclusions:

Vendor to supply -- Sample EPR tested successfully passed mandrels and hipot test.

Conclusion: This equipment is assigned to NRC category IIa because the Licensee has not demonstrated that the installed cable is the same as cable which has been successfully tested and qualified.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

2. SAMPLE DESCRIPTION

NOTES:

The seventeen cable samples tested included instrumentation, control, and thermocouple cables. After installation of the cables in the test chamber, the cable ends were cut as required for electrical connections, leaving the test lengths listed below, of which about 1 ft at each end protruded outside the test chamber.

The cable description and thermal aging data provided by BIV are given below and on the next two pages. Abbreviations and Notes appear at the end of the table on page 2-3.

Sample No.	Test Length (ft)	BIV Part No. and Type	Description
1-1	19.4	ABA37-W-002 2/C #16 AMC	Conductors - #16 AMC 7/24 TC Insulation - Neotrad 7 CSPE Shield - #36 AMC TC braid Binder - Polyester tape Fillers - Glass fiber Jacket - Neotrad 7 CSPE
1-2	17.4	L55-1828 2/C #12 AMC	Conductors - #12 AMC 7/0305 TC Insulation - EPB with Neotrad 7 CSPE Jacket - Neotrad 7 CSPE Shield - #30 AMC TC braid Binder - Flame retardant tape Fillers - Glass fiber Jacket - Neotrad 7 CSPE
1-3	18.1	L55-19428 2/C #16 AMC	Conductors - #16 AMC 7/0192 TC Insulation - EPB with Neotrad 7 CSPE Jacket - Neotrad 7 CSPE Shield - Aluminum-polyester tape with #16 AMC 7/0152 TC drain wire Binder - Flame retardant tape Jacket - Neotrad 7 CSPE
1-4		L55-18430 7/C #16 AMC	Conductors - #16 AMC 7/0242 TC Insulation - Flame retardant ELPE Binder - Flame retardant tape Jacket - Neotrad 7 CSPE
1-5	18.3	9534-B-002 2/C #16 AMC	Conductors - #16 AMC 19/29 TC Insulation - Flame retardant ELPE Shield - Aluminum-polyester tape with #16 AMC 7/24 TC drain wire Binder - Flame retardant tape Fillers - Neoprene Jacket - Neoprene
1-6	16.7	L55-17428 75-ohm coaxial cable	Conductor - #22 AMC solid silver plated copper covered steel Insulation - XLPE Shield - #36 AMC TC braid Binder - Polyester tape Jacket - Neoprene
1-8	20.0	L55-19188 75-ohm coaxial cable	Conductor - #24 AMC 7/32 silver plated copper Insulation - Teflon ETPE tape/extension Shield - #36 AMC TC braid Binder - Polyester tape Jacket - Neotrad 7 CSPE
1-9	18.0	L55-18628 2/C #12 AMC	Same as 1-2 except pre-aged for 550 hours at 168 C.
1-10	18.0	L55-1935A 2/C #20 AMC	Conductors - #20 AMC solid copper and constantan thermocouple extension grade Insulation - Heat sealable Kapton polyimide tape Shield - Aluminum-polyester tape with #16 AMC 7/0152 TC drain wire Jacket - Heat sealable Kapton polyimide tape
7-11	17.2	L55-19470 2/C #16 AMC	Same as 1-3 except pre-aged for 550 hours at 168 C.
11-1	16.2	L55-1843E 2/C #16 AMC	Conductors - #16 AMC 7/0192 TC Insulation - Flame retardant ELPE Binder - Flame retardant tape Fillers - Glass fiber Jacket - Neotrad 7 CSPE
11-2	20.0	L55-1947 3/C #16 AMC Pre-aged for 240 hrs at 168 C	Conductors - #16 AMC 19/29 TC Insulation - Flame retardant ELPE Shield - #36 AMC TC braid Binder - Flame retardant tape Jacket - Neoprene
11-3	20.0	9418-B-005 Lead 2/C #16 AMC	Conductor - #12 AMC 0305 TC Insulation - EPB with Neotrad 7 CSPE Jacket - Neotrad 7 CSPE
11-4	17.0	L55-1936A 2/C #16 AMC	Conductor - #16 AMC 7/0192 TC Insulation - EPB with Neotrad 7 CSPE Jacket - Neotrad 7 CSPE
11-5	18.3	8767-B-014 2/C #16 AMC	Conductor - #16 AMC 7/0242 TC Insulation - Neotrad 7 CSPE
11-6	16.7	L55-1947 2/C #16 AMC	Conductor - #16 AMC 19/29 TC Insulation - Flame retardant ELPE
11-7	17.4	L55-1867E 2/C #16 AMC	Conductor - #16 AMC 7/0242 TC Insulation - Teflon ETPE

Abbreviations

- CSPE - chlorosulfonated polyethylene
- EPB - ethylene propylene rubber
- TC - tinned copper
- NC - bare copper
- ELPE - crosslinked polyethylene
- ETPE - ethylene tetrafluoroethylene

Notes

- All cables were pre-aged for 168 hours at 121 C at BIV prior to shipping per contract, except 1-9, 1-11 and 11-2 as noted above.
- All Neotrad 7 CSPE and neoprene jackets are flame retardant grades.

7-C3859-1

3. Insulation Resistances Before Start of Test Program

Samples on Manurel in Chamber-Room Conditions

Sample No.	Cond. (-)	Insulation Resistance (megohms)
1	1	2.8 x 10 ⁵
1-1	2	3.4 x 10 ⁵
	Shield	8.0 x 10 ⁵
1	1	11 x 10 ⁵
1-2	2	14 x 10 ⁵
	Shield	2.08 x 10 ⁵
1	1	10 x 10 ⁵
1-3	2	10 x 10 ⁵
	Shield	1.4 x 10 ⁵
1	1	>100 x 10 ⁵
1-4	2	25 x 10 ⁵
	Shield	30 x 10 ⁵
1	1	30 x 10 ⁵
1-5	2	25 x 10 ⁵
	Shield	8.5 x 10 ⁵ (1)

Sample No.	Cond. (-)	Insulation Resistance (megohms)
1-6	Cond. (1)	>100 x 10 ⁵
	Shield	1.20 x 10 ⁵
1-8	Cond. >100 x 10 ⁵	
1	1	8.8 x 10 ⁵
1-9	2	2.8 x 10 ⁵
	Shield	9.0 x 10 ⁵
1	1	>100 x 10 ⁵
1-10	2	>100 x 10 ⁵
	Shield	25 x 10 ⁵
11-1	1	20 x 10 ⁵
1	1	8.8 x 10 ⁵
11-2	2	8.75 x 10 ⁵
	Shield	3.76 x 10 ⁵
11-3	Cond.	3.8 x 10 ⁵
11-4	Cond.	>100 x 10 ⁵
11-5	Cond.	>100 x 10 ⁵
11-6	Cond.	25 x 10 ⁵
11-7	Cond.	>100 x 10 ⁵

Table 7. Insulation Resistances at Conclusion of Test Program

Samples on Manurel in Test Chamber, Out of Hot Cell

Sample No.	Cond. (-)	Insulation Resistance (megohms)
1	1	>1 x 0.1 (2)
1-1	2	>1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
1-2	2	>1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
1-2	2	2.7 x 10 ⁵
	Shield	2.8 x 10 ⁵
1-2	2	2.8 x 10 ⁵
	Shield	1.20 x 10 ⁵
1	1	>1 x 0.1 (2)
1-3	2	6.1 x 0.1 (1)
	Shield	>1 x 0.1 (2)
1	1	1.3 x 10 ⁵
1-4	2	2.8 x 10 ⁵
	Shield	8.8 x 10 ⁵
1-4	2	1.20 x 10 ⁵
	Shield	1.1 x 10 ⁵
1	1	8.8 x 10 ⁵
1-6	2	6.5 x 10 ⁵
	Shield	>1 x 0.1 (2)
1-6	2	2.1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
1-6	Cond. (1)	1.3 x 10 ⁵
1-6	Cond. (4)	1.8 x 10 ⁵
	Shield	>1 x 0.1 (2)
1-6	Cond.	7.5 x 10 ⁵
1-8	1	1.2 x 10 ⁵
1-8	2	>1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
1-10	2	>1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
11-1	1	2.8 x 10 ⁵
1	1	>1 x 0.1 (2)
11-2	2	>1 x 0.1 (2)
	Shield	>1 x 0.1 (2)
11-3	Cond.	8.8 x 10 ⁵
11-4	Cond.	16 x 0.1 (1)
11-5	Cond.	>1 x 0.1 (2)
11-6	Cond.	>1 x 0.1 (2)
11-7	Cond.	>1 x 0.1 (2)

All readings taken after 500 Vdc potential applied for 1 minute, unless noted otherwise. Conductor listed in table was connected to negative (-500V) terminal of megohmmeter; all other conductors were connected to the ground terminal unless indicated otherwise.

- (1) After application of 100 Vdc.
- (2) After application of 50 Vdc.
- (3) With shield connected to ground terminal of megohmmeter.
- (4) With shield unconnected, and cable tray connected to ground terminal of megohmmeter.

Table 8. High-Potential Withstand Test Results (1)

Sample No.	Test Lead	Ground Connection	Applied Voltage (AC)	Charging and Leakage Current (mA)
1-2	1	2	1200/2200	<1/1.2
	2	1	1200/2200	<1/1.2
1-4	1	2,3,4,5,6,7	1200/2200	3.7/5.1
	2	1,3,4,5,6,7	1200/1900	1.8/8.8
	3	1,2,4,5,6,7	1200/2000	2.4/8.8
	4	1,2,3,5,6,7	1200/1600	5.5/9.0
	5	1,2,3,6,6,7	1200/1500	5.7/9.0
	6	1,2,3,4,5,7	1200/1600	6.1/9.0
	7	1,2,3,4,5,6	1200/1800	3.2/8.9
1-6	Cond.	Shield	1200/1500	<1/4.1
1-8	Cond.	Shield	1200/1500	<1/4.1
11-1	1	2	600/—	9.5/—
	2	1	1200/600	1.4/9.5
11-3	Cond. to Ground		1200/1500	3.2/3.9
11-4	Cond. to Ground		300/—	9.8/—

(1) Specification required application of 1200 Vdc for 5 minutes, followed by an increase to 2200 Vdc for 1 minute until no cables that withstand the entire environmental exposure had an ink of at least 1 megohm, or less.

(2) When applied voltage is less than either 1200 or 2200 the dwell time is less than that specified and insulation breakdown is implied.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 44

NOTES:

Overall Evaluation and conclusions:

1. The licensee has referenced several reports which describe results of qualification tests on Cables manufactured by Boston Insulated Wire.
2. Some of the tests envelope the Salem environmental profile while other tests do not.
3. Descriptions of cable constructions contained in the referenced test reports do not correspond to descriptions provided by the licensee on the SCEW sheets or in Analysis EQ05.
4. The Licensee has stated (See page 5h) that correlation between the installed cables and the applicable test reports has been requested.

Therefore Documented evidence that the installed cables are qualified has not yet been provided, relationship between tested and installed cables has not been established, and for some of the cables it has not been established that a test enveloping the Salem environmental parameters has been performed.

TECHNICAL EVALUATION REPORT

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

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
SALEM NUCLEAR GENERATING STATION UNIT 1

VOL. 2 OF 2

NRC DOCKET NO. 50-272

FRC PROJECT C5257

NRC TAC NO. 42467

FRC ASSIGNMENT 13

NRC CONTRACT NO. NRC-03-79-118

FRC TASK 468

Prepared by

Franklin Research Center
20th and Race Streets
Philadelphia, PA 19103

FRC Group Leader: C. J. Crane

Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

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

July 15, 1982

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Franklin Research Center

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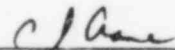
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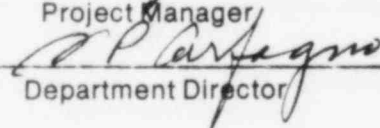
Reviewed by:



Group Leader

Approved by:



Project Manager


Department Director



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

EQUIPMENT ITEM NO. 45
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 TRIANGLE MODEL, NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 45
 LICENSEE REFERENCE(S): 52, 5365
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 70 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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)

- | | |
|------------------------------------|--------------------------------|
| <u>I.a Qualified</u> | 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 |



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468/517

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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 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. 45

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cable

MODEL: Triangle - PWC, Inc.

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 346°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-06.04.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-06.05.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-06.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Triangle - PWC, Inc., cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	Electrical Cable	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	TRIANGLE PWC	Triangle PWC	
Model Number (5.2.2/-/-)	IC #14	IC #14	
Serial Number	EPR PS-2-1	EPR 2722 Corycound	(Note 2) p-5+
Features/Mounting (5.2.6/-/-)	N/A.	N/A	
Connections/Interfaces (5.2.6/-/-)	Not stated	Not stated	
Location/Elevation	Containment	N/A.	
Equipment ID No.	N/A	N/A	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	No I/D Number	No I/D Number.	
Report Date	Feb 1977	February 1977	
Issued by	Isomedix	Isomedix	
Prepared for	TRIANGLE	TRIANGLE	
Referenced Reports	Not stated	Not stated	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	N/A	Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	N/A	Corey current Insulation Resistance Hypid.	
Operating Conditions (-/2.2.10/2.2.10)	Not stated	600 Vac 14 amps.	
Load/Cycles/Voltage/ Current/Freq.			



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

NRC REQUIREMENTS WITH SECTION REFERENCE (IQR/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/-/-)	N/A	not applicable	
Number of Specimens	N/A	1	
Test Instruments Calibrated	N/A	yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	not stated	
Test Duration (5.2.1/-/-)	N/A	30 days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	> 24 hrs	N/A	
Required Function Time	120 days	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		Thermal Aging Irradiation	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)		LOCA Simulation	
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)	N/A	150° for 168 hrs	Note 1
Thermal Aging/Basis			p-5+
Material Aging Evaluation (7.0/-/-)	N/A	Not stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	N/A	Not stated	
Radiation Aging, Type	N/A	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 95

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	See Accident	
Radiation Aging, Dose Rate	N/A	Dose	
Radiation Aging, Method	N/A	↓	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	Not stated	↓	
Operational Aging (-/4.2/-)	N/A	N/A	
Other Age Conditioning (-/4.2/-)	N/A	N/A	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	40 years	N/A	
Normal Ambient Temperature	} No studies	N/A	
Normal Ambient Radiation			
Normal Ambient Humidity			
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	Yes Salem Program	N/A	
On-Going Analysis of Failures and Degradation (7.0/-/-)	Salem Program	N/A	
Margin (General) (6.0/3.0/3.0)	Not stated	N/A	
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. 45

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/C588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	5x10 ⁷ R	20 megareads	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	Not stated N/A	0.75 megareads/hr Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	Not stated	NA	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	Not stated	NA	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	Not stated	NA	
Plateout Dose Considered (-/1.48/1.48)	Not stated	NA	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	Not stated	NA	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

NFC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3psig/sec	7 °F; 3.5 psig per	
Peak: °F/psig/RH/Time	350/43.2/100/3m	346/113/100/6 hrs	Note *
Decrease To: °F/psig/RH/Time	286/20/100/3h	337/95/100/3 hrs	
Decrease To: °F/psig/RH/Time	219/20/100/21h	315/69/100/3 hrs	
Decrease To: °F/psig/RH/Time	154/5/100/-	265/28/100/3.5 days 215/12/100/30 days	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	N/A		
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)	Basic Acid & NaOH pH > 8.5	3000 ppm Boron 0.064 M - Sodium thiosulfate, NaOH	
Spray Density (gpm/ft ²)	Not stated	for pH 9 to 11	
Spray Duration	> 225 hrs	30 days	0.15 gm/ft ² s
Submergence Duration (4.1.3/2.2.5/2.2.5)	N/A	N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	N/A	N/A	
Time to Submergence	N/A	N/A	
Dust Environment (-/2.2.11/2.2.11)	N/A	N/A	

Note * two peaks each 3 hrs duration
the 4 °F difference in peak temperature
is not significant



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 45

NOTES:

Note 1 the licensee stated

- "Preaging was addressed at 168 hrs / 150°C
- This preaging based on Arrhenius plot
- is equivalent to approximately 40 years
- at 70°C" [52]

Note 2:

the Licensee stated

- 3. Rgk_{sp} Evaluation EPR insulated
- cable tested employs same
- compound as those for Salem
- (11G #14) EQ06.01, EQ06.02
- [52]



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

EQUIPMENT ITEM NO. 46
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 ANACONDA WIRE AND CABLE, EPR INSULATION
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 46
 LICENSEE REFERENCE(S): 54, 1347
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 71 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 5i 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 _____.)
- 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)

- | | |
|---|--------------------------------|
| <input checked="" type="checkbox"/> 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. 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 _____ 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. 46

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cables

MODEL: Anaconda

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, A, S

PSE&G EVALUATION OF DEFICIENCIES:

- T - PSE&G has performed a thermal analysis to justify the qualification temperature of 346°F as shown in the qualification data evaluation form. This evaluation is contained in our file EQ-03.04.
- A - Rev. 2 of the Environmental Qualification submittal contains aging data specifying a 40 year life for this cable. Supporting data is contained in our file EQ-03.05.
- CS - These items have been addressed in our submittal. Supporting data is contained in our file EQ-03.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Anaconda cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>Electrical Cable</i>	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	<i>Anaconda</i>	Anaconda	
Model Number (5.2.2/-/-)	<i>EPR Insulation</i>	See Page 5i	<i>Anaconda Company Identify [52]</i>
Serial Number	<i>N/A</i>	Not Applicable	
Features/Mounting (5.2.6/-/-)	<i>Not Stated</i>	Not Applicable	
Connections/Interfaces (5.2.6/-/-)	<i>Not stated</i>	Not Stated	
Location/Elevation	<i>Containment</i>	Not Stated	
Equipment ID No.	<i>N/A</i>	Not Applicable	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	<i>F-C4350-3</i>	F-C4350-3	
Report Date	<i>7/76</i>	July 1976	
Issued by	<i>FIRL</i>	Franklin Institute Research Laboratories	
Prepared for	<i>Anaconda</i>	Anaconda	
Referenced Reports	<i>N/A</i>	Not Applicable	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)	<i>N/A</i>	Sequential Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>N/A</i>	Carry Current/ Insulation resistance/Hipot	
Operating Conditions (-/2.2.10/2.2.10)	<i>Various</i>	480Vac/25 amps	
Load/Cycles/Voltage/ Current/Freq.		2900Vac/170 amps 480Vac/17.5 amps	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OF NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	<i>Not stated</i>	Not Provided	
Accuracy (5.2.5/-/-)	<i>N/A.</i>	Not Applicable	
Number of Specimens	<i>N/A</i>	5	
Test Instruments Calibrated	<i>N/A</i>	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	<i>active</i>	Not Stated	
Test Duration (5.2.1/-/-)	<i>NA</i>	30 days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	<i>> 24 hrs</i>	Not Applicable	
Required Function Time	<i>20 days</i>	Not Applicable	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	<i>NA</i>	Thermal Aging Irradiation LOCA Simulation	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)	<i>NA</i>		
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	<i>analysis of data</i>	7 days @ 150°C	<i>See page 5f</i>
Material Aging Evaluation (7.0/-/-)	<i>Arrhenius</i>	Arrhenius Evaluation	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	<i>NA</i>	Not Applicable	
Radiation Aging, Type	<i>Gamma</i>	Gamma	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Dose Rate	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Method	<i>N/A</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>Not stated</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>Not stated</i>	Not Applicable	
Other Age Conditioning (-/4.2/-)	<i>Not stated</i>	Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>> 40 years</i>	40 Years	See Page 5f
Normal Ambient Temperature	<i>Not stated</i>	Not Applicable	
Normal Ambient Radiation	↓	Not Applicable	
Normal Ambient Humidity	↓	Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>yes</i> <i>Salem</i> <i>Program</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	↓	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Stated	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	Not Stated	
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. 46

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	5x10 ⁷ R	2x10 ⁸	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	Not stated N/A	0.35x10 ⁸ /hr Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	Not stated	Not applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	Not Stated	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	Not stated	Not Applicable	
Plateout Dose Considered (-/1.48/1.48)	Not stated	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	Not stated	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3 psi/sec	14°F, 7 psi/ second	
Peak: °F/psig/RH/Time	350/43.2/100/3m	346/113/100/8 hours 335/96/100/3 hours	
Decrease To: °F/psig/RH/Time	286/20/100/3h	315/69/100/3.5 hrs 265/28/100/3.33 days	
Decrease To: °F/psig/RH/Time	219/20/100/21h	212/0-5/100/26 days	
Decrease To: °F/psig/RH/Time	154/5/100/-		
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not applicable	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)	Basic Acid & NaOH pH > 8.5	3000ppm Boron 0.064 Molar Sodium Thiosulfate pH 10.5 using NaOH	
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration	> 225 hrs.	30 Days	
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	Not Applicable	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Stated	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. _____

NOTES:

Attachment 1 to the referenced test report states

B. Arrhenius Plot

- The temperature & time relationship is plotted as shown in "Line a" Figure 4. The line obtained shows that the insulation possesses 40 years life, if the insulation is continuously aged around 98°C.
- A straight line (Figure 4, "Line b") is drawn passing the point i.e. 150°C with 168 hours, utilizing the slope of the straight line obtained from "Line a". It is shown in Figure 4, "Line b" that the straight line also passes the point 40 years at 90°C.

C. Conclusion (Qualified Cable Life)

Based on Arrhenius technique, Anaconda EPR insulated cable possesses more than 40 years qualified life, provided the cable is operated at 90°C.

Furthermore, also based on Arrhenius Plot, the aging at 150°C with 168 hours, is equivalent to the life of 90°C for 40 years. This is the basis to use 150°C with 168 hours, as aging condition for qualified life simulation as shown in FIRC Technical Report F-C4350-3.

D. Remarks:

1. As stated in IEEE 383-1974, Section 2.3.2, "Aging data should be submitted to establish long term performance of the insulation". This is the reason that dumbbell form of insulation procured from EPR insulated cable was used in the aging test.
2. The method adopted by IEEE Standard 383-1974 to determine the end-point of cable life is 1) bending the aged sample around a mandrel with 20 times the cable O.D., then 2) immersing in water at room temperature 3) applying ac stress of 80 VPM for 5 minutes. The method was utilized in our LOCA qualification test as reported in FIRC Technical Report F-C4350-3. However, the life influenced not only by status of aging, also it will be effected by other factors involved in the testing. Based on these reasons, we trust that the slope developed based on elongation is a better and reproducible method for the prediction of cable life."



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 46

NOTES:

2. TEST SPECIMENS

A description of the cable specimens is presented below. The descriptions were provided by The Anaconda Company. Table 1 lists the cable specimens tested and shows their energizing voltage and current levels.

- A. Low Voltage Power Cable (Durasheath^R EP)*
Specimens: 18.11, 18.12
1/C, No. 12 AWG 7/W Tinned Copper Conductor, 30 mil Ethylene Propylene Rubber Insulation, 15 mil Chlorosulfonated Polyethylene Jacket
- B. Control Cable (Flameguard^R EP)*
Specimen: 20.11
7/C No. 12 AWG 7/W Tinned Copper Conductor, 30 mil Ethylene Propylene Rubber Insulation, 15 mil Chlorosulfonated Polyethylene Jacket, Cabled, Asbestos Tape, 60 mil Chlorosulfonated Polyethylene Overall Jacket
- C. Medium Voltage Power Cable (Uniblend^R EP)*
Specimen: 19.21
1/C No. 2 AWG 7/W Copper Conductor, Extruded Semi-Conducting Strand Shield, 90 mil Ethylene Propylene Rubber Insulation, 30 mil Extruded Semi-Conducting Chlorosulfonated Polyethylene Insulation Shield, Copper Tape, 60 mil Chlorosulfonated Polyethylene Jacket
- D. Medium Voltage Power Cable (Unishield^R EP)*
Specimen: 19.11
1/C No. 2 AWG 7/W 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. 47

EQUIPMENT ITEM NO. 47
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 ROCKBESTOS, MODEL NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 47
 LICENSEE REFERENCE(S): 55, 676
 FUNCTION (PLANT ID): CARRY CURRENT
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 72 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 |
| <input checked="" type="checkbox"/> 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. 47

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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	_____



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NRC Contract No. NRC-03-79-118
FRC Project No: C5257
FRC Assignment No. 13
FRC Task No. 468/517

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3a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 17

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cable

MODEL: Rockbestos/Cerro

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, A, S,

PSE&G EVALUATION OF DEFICIENCIES:

I - PSE&G has performed a thermal analysis to justify the qualification temperature of 340°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-08.01.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-08.02.

CS, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-08.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Rockbestos/Cerro cable is capable of performing safety functions in a harsh environment at Salem.



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 47

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

EQUIPMENT ITEM NO. 48
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 OKONITE, MODEL NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 48
 LICENSEE REFERENCE(S): 56, 2103, 65
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 73 [64]

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:

(See Section 3 of this TER for Legend)

R, T, Q1, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 48

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 _____.)
- 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)

- | | |
|---|--------------------------------|
| <input checked="" type="checkbox"/> 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. 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 _____
- 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. 48

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Electrical Cable

MODEL: Okonite

COMPONENT NO.:

NRC IDENTIFIED DEFICIENCIES: T, CS, A, S

PSE&G EVALUATION OF DEFICIENCIES:

I - PSE&G has performed a thermal analysis to justify the qualification temperature of 345°F as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-09.03.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-09.04.

CS, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-09.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Okonite cable is capable of performing safety functions in a harsh environment at Salem.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>Electrical Cable</i>	Electrical Cable	
Manufacturer's Name (5.2.2/-/-)	<i>Okonite</i>	Okonite Company	
Model Number (5.2.2/-/-)	<i>#12846 EPR Insulated</i>	See page 5f (Note A)	
Serial Number	<i>N/A</i>	Not Applicable	
Features/Mounting (5.2.6/-/-)	<i>N/A</i>	Not Applicable	
Connections/Interfaces (5.2.6/-/-)	<i>Not stated</i>	Cable Splice (Note A)	
Location/Elevation	<i>Containment</i>	Not Applicable	
Equipment ID No.	<i>Not stated</i>	Not Applicable	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	<i>E R 141</i>	E.R.141	
Report Date	<i>2/72</i>	February 29, 1972	
Issued by	<i>Okonite</i>	Okonite	
Prepared for	<i>Okonite</i>	Okonite	
Referenced Reports	<i>Okonite Test Report 11/74</i>	F-C3094/F-C3171	
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		Test	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	<i>NA</i>	Maintain electrical Loading @ rated Voltage, Insulation Resistance & Hypot	
Operating Conditions (-/2.2.10/2.2.10)	<i>Various</i>		
Load/Cycles/Voltage/ Current/Freq.		Not Applicable	



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)	N/A	Not Stated	
Accuracy (5.2.5/-/-)	N/A	Not Applicable	
Number of Specimens	N/A	6	
Test Instruments Calibrated	N/A	Yes	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	active	Not Applicable	
Test Duration (5.2.1/-/-)	NA	100+ days	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	>24hr	Not Applicable	
Required Function Time	120 days	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/-)	N/A		
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		Not Applicable	
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis	Not stated	168 hrs @ 121°C Basis Not Stated	Note 1
Material Aging Evaluation (7.0/-/-)	Yes	Not Stated	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	Not Stated	Not Stated	
Radiation Aging, Type	Gamma	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)	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Dose Rate	<i>Not stated</i>	See Accident Dose	
Radiation Aging, Method	<i>N/A</i>	Test	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	<i>N/A</i>	Not Stated	
Operational Aging (-/4.2/-)	<i>N/A</i>	Not Applicable	
Other Age Conditioning (-/4.2/-)	<i>N/A</i>	Not Stated	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	<i>40 years</i>	Not Stated	<i>Note 1</i>
Normal Ambient Temperature	<i>Not stated</i>	Not Applicable	
Normal Ambient Radiation	<i>"</i>	Not Applicable	
Normal Ambient Humidity	<i>"</i>	Not Applicable	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	<i>yes Salem Program</i>	Not Applicable	
On-Going Analysis of Failures and Degradation (7.0/-/-)	<i>Salem Program</i>	Not Applicable	
Margin (General) (6.0/3.0/3.0)	<i>N/A</i>	Not Applicable	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	<i>N/A</i>	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. 48

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0538-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	<i>LOCA/MSLB</i>	LOCA	
Radiation Type	<i>Gamma</i>	Gamma	
Radiation Dose (rd) (4.1.2/1.4/1.4)	<i>5x10⁷R</i>	2x10 ⁸	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	<i>Not stated N/A</i>	300,000 rd/hr Test	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	<i>Not stated</i>	Not Applicable	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	<i>Not stated</i>	Not Stated	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	<i>Not stated</i>	Not Applicable	
Plateout Dose Considered (-/1.48/1.48)	<i>Not stated</i>	Not Applicable	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	<i>Not stated</i>	Not Applicable	



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.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase	2.5 °F/3psi/sec	25°F, 8Psi/ second	
Peak: °F/psig/RH/Time	350/43.2/100/3m	324/80/100/3.3 hrs 252/16/100/7 days	*
Decrease To: °F/psig/RH/Time	286/20/100/3h	345/104/100/4 hrs 320/75/100/4.5 hrs	
Decrease To: °F/psig/RH/Time	219/20/100/21h	256/15/100/20 hrs 272/25/100/3.5 hrs	
Decrease To: °F/psig/RH/Time	154/5/100/-	212/0/100/100 days	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	Not Stated	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	Test	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)	Boric Acid & NaOH pH > 8.5	10000 ppm Boric Acid buffered with NaOH to a pH of 10.5	
Spray Density (gpm/ft ²)	Not stated	0.15	
Spray Duration	> 225 hrs	7 days	
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	Not Stated	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	Not Applicable	
Time to Submergence	NA	Not Applicable	
Dust Environment (-/2.2.11/2.2.11)	NA	Not Applicable	

* the 5° F difference in peak is not significant and is enveloped because the test duration is significantly longer.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NOTES: 4.

CABLE SAMPLES TESTED:

One sample of each of the following types of cable and splice was tested. The samples were designated as shown in Table I.

Table I

<u>Sample No.</u>	<u>Cable Designation</u>
A-4	1/C #14 0.030" Okonite, 0.015" Okoprene
D-4	4/C #14 0.030" Okonite, 0.015" Okoprene, 0.045" Okoprene
E-4	7/C #14 0.030" Okonite, 0.015" Okoprene, 0.045" Okoprene
B-4	1/C 4/0 0.055" Okonite, 0.045" Okoprene
F-4	4/C #12 0.047" Okonite, 0.015" Okolon, 0.045" Okolon
C-4	1/C 4/0 0.140" Okoguard, 0.065" Okolon with T-95 splice and T-35 jacketing tape

The Manual submitted States

OKONITE'S two EPR insulated cable constructions are Okonite - Okoprene (Neoprene jacket) and Okonite - Okolon (Hypalon jacket). Both systems utilized EPR for insulation and the results in Report 0379-1^(EQ09.00) can be assumed identical to Report 141^(EQ09.01) (for Neoprene jacketed cable) the basic difference being the choice for flame retardant jacket.

(Continued page 5g)



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 48

NOTES:

Note A Continued

PUBLIC SERVICE ELECTRIC & GAS COMPANY

SALEM CABLE LOCA QUALIFICATION

600 VOLT POWER AND CONTROL CABLE

NUCLEAR QUALIFICATION REPORT
 for
OKONITE INSULATED CABLES

This report is The Okonite Company's nuclear qualification document for Okonite insulated cables. It complies literally with IEEE Standard 383-1974, Section 1.4 "Documentation". Section 1.4 documents the parameters specified in Section 1.3.

Included in this report are nine Appendices which serve to further clarify Okonite's test procedures and results. These Appendices are as follows:

It is concluded that the installed and tested cables are the same type.

Note 1 - The aging section of the Salem test report establishes a 40 year life @ 90°C as required by the Salem specification.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

EQUIPMENT ITEM NO. 49
 MOTOR CONTROL CENTER LOCATED IN THE ELECTRICAL PENETRATION AREA IN THE
 AUXILIARY BLDG. 84' ELEVATION
 GENERAL ELECTRIC MODEL 7700
 REQUIRED OPERATING TIME: RECIRC. 120 DAYS
 TER CHECKSHEET NO. 49
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): POWER TO VARIOUS MOTOR OPERATED VALVES (A,B,C EAST/WEST
 VITAL VALVE CONTROL CENTERS)
 LICENSEE SUBMITTAL: SCEW(S): 74 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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. 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 _____
- 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. 49

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Motor Control Centers - 230V
 (General Electric Co.)

MODEL: 7700 Line

COMPONENT NO.:	<u>1A East</u>	<u>1A West</u>
	<u>1B East</u>	<u>1B West</u>
	<u>1C East</u>	<u>1C West</u>

NRC IDENTIFIED DEFICIENCIES: RT, R, QI

PSE&G EVALUATION OF DEFICIENCIES:

These units will only see a radiation environment. We were confident that the units were capable of withstanding radiation and we did not see any problems in the short term. Our confidence was based on the fact that these type MCC's had been tested to 1×10^6 rads and had passed. However, the manufacturer could not guarantee that the units tested were composed of the same identical materials in the Salem Units.

Since our previous submittal, actual components from the Salem Motor Control Centers were subjected to a radiation test of 1×10^6 rads by Isomedix, Inc. and passed. This dosage is equivalent to accident dosage at the end of 40 years. Detailed test data will be included in our file EQ-14 when received from Isomedix, Inc. The EQ submittal will be updated with the new test information.

Therefore, NRC's identified deficiencies RT, R, QI have been addressed.

NOTE: Underlined items are correction to NRC SER.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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3b

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

LICENSEE RESPONSE TO FRC RAI

The attached information is in response to the NRC request for additional environmental qualification data for a Franklin Research Center review. This information has been taken from PSE&G's Central File of Salem Environmental Qualification Data. Copies of the requested information have been furnished where possible. Some information has been classified by manufacturers/suppliers as proprietary and may not be released to third parties by us. The data is available in our files and may be reviewed in our office.

Note 1 - Basis 7 of Section VII of the Environmental Qualification Review Report indicates that the referenced test report is not directly applicable to the Salem motor control centers due to non certification of materials. A radiation test of the motor control centers at Salem has been performed and the results indicate that the equipment at Salem will perform under its particular harsh environment conditions. A review of non-applicable GE data serves no useful purpose. It was used to provide a justification for continued operation until our tests were completed. The results of the Salem motor control center test will be added to the report in the next revision.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 49

NOTES:

The licensee referenced the following documents:

Wyle labs report no. 43757-2 dated 9/78

G.E. letter to PSE+G dated 11/17/80

PSE+G Documentation Evaluation - EQ 14.00

These documents were requested in reference 17, 72

As reference 17 the licensee stated that these documents were proprietary and not specifically applicable. (see page 38)



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

EQUIPMENT ITEM NO. 50
 MOTOR LOCATED IN THE CONTAINMENT EL. 130'
 WESTINGHOUSE SPIN NO. PSE RCADCF
 REQUIRED OPERATING TIME: LOCA/MSLB, 1 YEAR
 TER CHECKSHEET NO. 50
 LICENSEE REFERENCE(S): 553, 604, 640
 FUNCTION (PLANT ID): DRIVES CONTAINMENT FAN COOLER MOTOR (11, 12, 13, 14, 15)
 LICENSEE SUBMITTAL: SCEW(S): 75 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

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 |
| <input checked="" type="checkbox"/> II.a Qualification Not Established | III.b Not in Scope |
| II.b Not Qualified | IV Documentation Not Available |



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
 X = DEFICIENCY

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

NRC QUALIFICATION CATEGORY

DESIGNATION:
 X = CATEGORY

I.a	Equipment Qualified	<u> </u>
I.b	Equipment Qualification Pending Modification	<u> </u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u> </u>
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	<u> </u>
III.a	Equipment Exempt From Qualification	<u> </u>
III.b	Equipment Not in the Scope of the Qualification Review	<u> </u>
IV	Documentation Not Made Available	<u> </u>



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Motor
(Westinghouse)

MODEL: Spin #PSE-RCADCF (Unit 1)
PNJ-RCADCF (Unit 2)

COMPONENT NO.: 11, 12, 13, 14, 15

NRC IDENTIFIED DEFICIENCIES: A, CS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 75.

Environmental Qualification of these motors has been demonstrated. Our submittal addresses the noted deficiencies. The Aging and Chemical Spray data was arrived at based on Westinghouse test data which envelopes our plant profile. ~~The aging information was added in revision 2.~~

Supporting data is available in our file EQ-15.

PSE&G's evaluation of these noted deficiencies has reaffirmed that these motors are capable of performing their safety function in a harsh environment.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 50

MAINTENANCE AND REPLACEMENT SCHEDULE SUMMARY

The following information regarding the maintenance and replacement schedule(s) for components, sub-components, and materials has been provided by the Licensee.

Replace bearing lubricant every refueling outage.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

EQUIPMENT ITEM NO. 51
 HYDROGEN RECOMBINER LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL NOT STATED
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 51
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): LIMIT COMBUSTIBLE GAS BUILD-UP INSIDE CONTAINMENT
 (WESTINGHOUSE/STURTEVANT 11,12)
 SERVICE: POST LOCA
 LICENSEE SUBMITTAL: SCEW(S): 76 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, X, X, X
System Consideration Review	X, X, X, X, X, X
Equipment Environmental Qualification Review	X, X, X, X, X, 5f, X, X, X, X
Installed TMI Lessons Learned Implementation Equipment Summary	X, X
Maintenance and Replacement Schedule Summary	X, X, X



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

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 _____.)
- 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 | <input checked="" type="checkbox"/> 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 _____
- 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. 51

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Hydrogen Recombiners
(Westinghouse/Sturtevant)

MODEL: None

COMPONENT NO.: 11, 12

NRC IDENTIFIED DEFICIENCIES: QT, T, CS, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 76.

The above referenced page located in Section V of our submittal address the above noted deficiencies. The aging deficiency is supported by basis 1 of the submittal. PSE&G is still awaiting results from Westinghouse on aging specs. of this equipment. Qualification prior to 6/30/82 is expected.

PSE&G's evaluation of the noted deficiencies has reaffirmed that plant safety is not jeopardized pending qualification for aging.

The attached information is in response to the NRC request for additional environmental qualification data for a Franklin Research Center review. This information has been taken from PSE&G's Central File of Salem Environmental Qualification Data. Copies of the requested information have been furnished where possible. Some information has been classified by manufacturers/suppliers as proprietary and may not be released to third parties by us. The data is available in our files and may be reviewed in our office.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 51

NOTES:

Although the licensee referenced Westinghouse -
BURL-3851 dated 7/21/80 the document was not
made available for the review. With respect to this
report the licensee stated that it was considered proprietary
by Westinghouse and was available for audit at the
location of their Central Files.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

EQUIPMENT ITEM NO. 52
 ELECTRICAL CONNECTOR LOCATED IN THE PENETRATION AREA
 BURNDY MODEL HY LUG
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 52
 LICENSEE REFERENCE(S): 3305, 39
 FUNCTION (PLANT ID): CONNECTION OF ELECTRICAL CABLES AT EQUIPMENT TERMINAL
 BLOCKS
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 78 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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Licensee Response to NRC SER	3a, 3b, 3e, 3d
System Consideration Review	4a, 4b, 4e, 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:

- 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 | <u>II.c</u> 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. 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	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
Program Established to Identify Aging Degradation	_____
Criteria Regarding Aging Simulation Satisfied (If Required)	<u>X</u>
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	<u>X</u>
III.a	Equipment Exempt From Qualification	_____
III.b	Equipment Not in the Scope of the Qualification Review	_____
IV	Documentation Not Made Available	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 52

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

EQUIPMENT ITEM NO. 53
 THERMOCOUPLE LOCATED IN THE CONTAINMENT
 TEM TEX MODEL 304 250 TG 12 SA2 1H CC TC
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 53
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): CONTAINMENT AIR TEMPERATURE (TA4312 THRU 4321; TA4348)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 80 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 53

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 _____.)
- 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 | <u>III.a Exempt</u> |
| 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. 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 _____
- 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. 53

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Thermocouples
(Tem Tex Co.)

MODEL: 304-250-T-G-12-SA2-1H-CC-TC

COMPONENT NO.: TA4312, TA4313, TA4314, TA4315, TA4316, TA4317,
TA4318, TA4319, TA4320, TA4321, TA4348

NRC IDENTIFIED DEFICIENCIES: EXN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 80.

These particular instruments provide backup information for the operator on containment accident conditions. Since there are other parameters which provide the required information for diagnosis, the operators can maintain plant safety.

A procedural change has been made to alert the operators of potential inaccuracy of temperature indication.

This issue is addressed in our submittal, Volume I, Section VII, Basis 32.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not jeopardized by the potential loss of this temperature indication.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

LICENSEE RESPONSE TO NRC SER (Continued)

Basis No. 32

Deficiency: Documentation Unavailable (Containment Temperature)

Justification:

Current procedures instruct the operator to monitor containment temperature as a guide in determining the type of accident which has occurred. The thermocouples have been specified for suitable operation up to 400°F with a maximum expected containment temperature of 350°F. It is anticipated that the thermocouples will operate properly even though environmental documentation is not available to verify this.

Since backup parameters are available to determine the type of accident, the operators will be advised of the potential for incorrect temperature information and the procedures will be suitably modified. This procedural change will be sufficient to ensure proper diagnosis of the accident.

Accident diagnosis will be based upon containment pressure (qualified for this function), reactor coolant system pressure, steamflow, steamline pressure, and narrow-range steam generator level.

This case has been classified as a Group I.2 item (I.2.B).

Corrective Action:

Procedure EI-I-4.4 will be revised prior to exceeding 5% power (Unit #2) to reflect potential inaccuracy of the temperature indication. The indication may be used as backup information to determine the occurrence of an inside-containment accident. This change will be made on Unit #1 prior to December 15, 1980.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 53

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. 54

EQUIPMENT ITEM NO. 54
 LEVEL SWITCH LOCATED IN THE CONTAINMENT
 GEMS MODEL LS 800
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 54
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (LA0223 & LA0224)
 SERVICE: CONTAINMENT SUMP LEVEL
 LICENSEE SUBMITTAL: SCEW(S): 81 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 |
| <u>I.b Modification</u> | 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. 54

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 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 _____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 54

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Level Switch
(GEM)

MODEL:

COMPONENT NO.: LA0223, LA0224
(Replaced LT-938 and LT-939)

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 81, 109, 110

A new level indication system has been installed. As of date it is not environmentally qualified. The manufacturer is in the process of qualification. This new system is listed on pages 109 and 110 of our submittal, Rev. 3. Our basis for continued operation is detailed in Volume I, Section VII, basis 31 and in Section XI.

PSE&G is confident that plant safety will not be jeopardized pending qualification.



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 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

EQUIPMENT ITEM NO. 55
 THERMOCOUPLE LOCATED IN THE CONTAINMENT
 WESTINGHOUSE SPIN NO. RCRIUI 583 F014
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 55
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED
 SERVICE: INCORE TEMPERATURE
 LICENSEE SUBMITTAL: SCEW(S): 82 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 55

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 _____.)
- 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 | <u>III.a Exempt</u> |
| 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. 55

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. 55

LICENSEE (SCREWIS) REFER TO BASIS No. 33

Basis No. 33

Deficiency: Documentation Unavailable (Incore Thermo-couples)

Justification:

Current procedures instruct the operator to monitor the in-core thermocouples as a guide to determining the existence of adequate core cooling. Despite a lack of available documentation in our possession, Westinghouse information and operating history of these devices indicate that they would function. If these devices were to fail, backup parameters, such as, RCS pressure and temperature, steam generator level, and auxiliary feedwater flow are available to enable determination of adequate core cooling. These backup devices are qualified and are described in the procedure which also alerts the operator to potential errors in the incore temperature readings.

The existing procedure and availability of alternate indications is sufficient to ensure proper determination of core-cooling adequacy.

This case has been classified as a Group I.2 item (I.2.C).

Corrective Actions:

None required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 55

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

Reason for Non-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. (NPC Qualification Evaluation Category IIIa)

___ 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.

___ 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 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.

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)

___ 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. 56

EQUIPMENT ITEM NO. 56
 HUMIDITY DETECTOR LOCATED IN THE CONTAINMENT
 FOXBORO MODEL 2711AG
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 56
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): MEASURES HUMIDITY IN CONTAINMENT (TA6356 THRU 6360Z)
 LICENSEE SUBMITTAL: SCEW(S): 83 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 56

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 _____.)
- 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. 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 _____
- 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 _____



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FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 56

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Containment Humidity Detectors
(Foxboro)

MODEL: 2711 AG

COMPONENT NO.: TA357-Z, TA358-Z, TA359-Z, TA360-Z, TA356-Z

NRC IDENTIFIED DEFICIENCIES: EXN

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 83.

These devices are not required for any safety function. Accident diagnosis is based on containment pressure, reactor coolant system pressure, steamflow, steamline pressure and narrow range steam generator level. Therefore, these devices do not require qualification.

Our submittal, Volume I, Section VII, basis 37 details our position.

PSE&G's evaluation of the noted deficiency has reaffirmed that plant safety is not jeopardized upon failure of detectors.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 56

LICENSEE RESPONSE REFERS TO BASIS NO. 37

Basis No. 37

Deficiency: Documentation Unavailable (Containment Humidity Detectors)

Justification:

These devices are not required for any safety actions. Current procedures instruct the operator to monitor humidity as a guide to determining the occurrence of an inside-containment accident. As discussed under Basis 32, other direct indications are available to readily identify an inside-containment accident. Accident diagnosis will be based upon containment pressure, reactor coolant system pressure, steamflow, steamline pressure, and narrow-range steam generator level. This negates a need for qualified humidity detectors.

This case has been classified as a Group I.2 item (I.2.D).

Corrective Action:

Procedure EI-I-4.4 will be modified prior to exceeding 5% power (Unit #2) to reflect potential inaccuracy of the humidity indication. It may be used as backup information to determine the occurrence of an inside-containment accident. The same change will be made for Unit #1 prior to December 15, 1980.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 56

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

Reason for Non-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)

____ 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.

____ 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 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.

____ 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)

____ 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. 57

EQUIPMENT ITEM NO. 57
 RADIATION MONITOR LOCATED IN THE CONTAINMENT
 TRAPELO MODEL TA 63A
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 57
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): (RA-4314)
 SERVICE: CONTAINMENT RADIATION DETECTOR HIGH RANGE
 LICENSEE SUBMITTAL: SCEW(S): 84 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 57

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 _____.)
- 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)

- | | |
|------------------------------------|--------------------------------|
| <u>I.a Qualified</u> | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 57

LICENSEE RESPONSE TO NRC SER

SALEM UNITS 1 AND 2

PSE&G RESPONSE TO NRC SAFETY EVALUATION REPORT

EQUIPMENT: Radiation Monitors
(Trapelo)

MODEL: TA-63A

COMPONENT NO.: (RA-4314, 1R21)
(Unit 1)

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 84.

Per our submittal this device was to be replaced in Spring, 1981. Due to qualification and delivery problems installation at that time was not accomplished. At this time qualification has been established and the units will be installed once delivered. Our submittal, Volume I, Section VII, basis 35 details our intentions and justification for continued operation. Installation will be accomplished in accordance with TMI requirement schedule.

PSE&G's evaluation of noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement of these units.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 57

LICENSEE RESPONSE REFERS TO BASIS No. 35

Basis No. 35

Deficiency: Documentation Unavailable (Containment
Radiation Monitor Unit 1)

Justification:

The analysis for continued plant operation described in Basis No. 34 is also applicable to Unit 1. There is no documentation to support operation of this monitor during the initial stages of the transient but the alternate indications and methods are available.

This case has been classified as a Group II.2 item (II.2.G).

Corrective Action:

As an interim solution, Procedure EI-I-4.4 will be modified prior to December 15, 1980 to eliminate its use for long-term, post-LOCA conditions. This procedure modification will instruct the operator to use sampling methods to determine radiation levels during long-term, post-LOCA conditions. The final resolution of this item will be to install new monitors in the Spring of 1981 to meet the requirements for long-term use.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

EQUIPMENT ITEM NO. 58
 REED SWITCH LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL KD 8805 12
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 58
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VARIOUS
 SERVICE: ROD POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 86 [64]

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

R, T, Q1, RT, P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 | <u>III.a Exempt</u> |
| 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. 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 _____
- 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. 58

LICENSEE SCREW(S) REFERS TO BASIS NO. 38

Basis No. 38

Deficiency: Documentation Unavailable (Rod Position
Indication)

Justification:

The existing Salem emergency operating procedures require the operator to verify reactor trip by monitoring the rod bottom lights.

If a successful trip is not indicated, a manual reactor trip is initiated in accordance with procedures.

This case has been classified as a Group II.2 item (II.2.F).

Corrective Action:

None required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 58

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. 59

EQUIPMENT ITEM NO. 59
 RADIATION DETECTOR LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL SR WL23706 IR WL23707 PR WL23708
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 59
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED
 SERVICE: NEUTRON DETECTION
 LICENSEE SUBMITTAL: SCEW(S): 87 [64]

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:

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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. 59

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 _____.)
- 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 | <u>III.a Exempt</u> |
| 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. 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 _____
- 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 _____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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3a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 59

LICENSEE (SHEW) REFER TO BASIS NO. 13

Basis No. 13

Deficiency: Documentation Insufficient (Ex-core neutron detectors)

Justification:

This item is no longer considered applicable since analysis shows that the devices do not perform a safety function as described in LER 79-58. This case had previously been classified as a Group I.1 item (I.1.H). This classification is no longer appropriate.

Corrective Action:

None required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 59

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

Reason for Non-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)

- 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. 60

EQUIPMENT ITEM NO. 60
 ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL TBFC
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 60
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): MOTIVE POWER TO FAN (NOZZLE SUPPORT FANS)
 SERVICE: NOZZLE SUPPORT COOLING
 LICENSEE SUBMITTAL: SCEW(S): 88 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 60

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 _____.)
- 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 | <u>III.a Exempt</u> |
| 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. 60

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 _____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Fan Motor
(Westinghouse)

MODEL: TBFC

COMPONENT NO.: None

NRC IDENTIFIED DEFICIENCIES: S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 88.

Subject motors do not require environmental qualification. They do not perform a safety function. Failure of these motors does not affect the course of action in response to a design basis accident. Therefore, submergence is not a consideration.

This item is addressed in our submittal, volume 1, section VII, basis 36.

PSE&G's evaluation of the noted deficiency has reaffirmed that plant safety is not jeopardized due to motor failures.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

LICENSEE RESPONSE REFERS TO BASIS NO. 60

Basis No. 36

Deficiency: Documentation Unavailable (Nozzle Support Fans, Reactor Shield Vent Fans and Control Rod Drive Fans)

Justification:

The nozzle support fans, reactor shield vent fans and the control rod drive vent fans were listed only because they are mentioned in the emergency procedures. They are not required to perform a safety function, and inadvertent operation (on or off) of these devices does not affect the proper course of actions in response to design basis accidents. The equipment does not require environmental qualification.

This case has been classified as a Group II.1 item (II.1.B).

Corrective Action:

None required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 60

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. 61

EQUIPMENT ITEM NO. 61
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL NT 344A75
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 61
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0928)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOLATION VALVE
 LICENSEE SUBMITTAL: SCEW(S): 94 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 61

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 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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	<u>X</u>
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	<u>X</u>
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. 61

PLEASE SEE SCHEWS REFER TO BASIS No 17

Basis No. 17

Deficiency: Documentation Insufficient (Containment Isolation Solenoids Outside the Containment)

Justification:

The solenoid valves must only operate for a very short period of time. They deenergize in order to close their respective containment isolation valve. Operability is based on a failure analysis performed by Westinghouse (NS-CE-755) which indicates that the failure mode of this type of solenoid valve is in the closed (fail safe) position thereby assuring isolation valve closure. These solenoids are located in enclosures which provide thermal protection and minimize thermal rise transients.

The outside containment isolation valves' solenoids function to provide control for closing the redundant isolation valves during accidents inside containment. The outside isolation valves' solenoids are not subjected to the containment environment. The valves could be exposed to harsh environments caused by high energy line breaks in the penetration area. These breaks, however, do not require complete containment isolation.

The postulated breaks in question are small steam breaks; steam generator blowdown and steam feed to auxiliary feed-water pump turbine. Following the postulated break, temperatures do not exceed 200°F until after ten minutes. Selected lines for isolation may be required and operability should occur within this time span.

Existing information indicates that these valves would close in the environment caused by high-energy line breaks, and that any subsequent failure would tend to keep the valve closed. Because of this, and the protection afforded by the solenoid valve enclosures, we conclude that the valves would remain in the safe position.

This case has been classified as a Group II.3 item (II.3.A).

Corrective Action:

These solenoid valves will be replaced with qualified devices prior to June 30, 1982. The installation schedule will be accelerated as equipment becomes available and plant operating conditions permit installation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 62

EQUIPMENT ITEM NO. 62
 HYDROGEN-OXYGEN ANALYZER LOCATED IN THE CONTAINMENT
 BACHARACH MODEL ND
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 62
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (XA8650, XA8651)
 SERVICE: COMBUSTABLE GAS DETECTOR
 LICENSEE SUBMITTAL: SCEW(S): 98 [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), (PAH), (CS), (A) S, (R), M, I, (QM), RPN, EXN, SEN, (QI) RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 (~~was~~/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)

- | | |
|------------------------------------|--------------------------------|
| <u>I.a</u> Qualified | II.c Qualified Life Deficiency |
| <u>I.b</u> 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 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

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: H₂ Analyzers

MODEL: Bacharack

COMPONENT NO.: XA8650, XA8651

NRC IDENTIFIED DEFICIENCIES: RT, QI, QT, T, P, H, CS, R, A

PSEG EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 98.

This equipment is not qualified and it is the intention of PSE&G to replace with qualified units in accordance with the TMI requirements time frame. At this time the H₂ Analyzers are not being used as a guide for actuating the hydrogen recombiners. They will be operated during the recirculation phase, independent of H₂ Analyzer readings. This position is stated in our submittal, Volume I Section VII, basis 30.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 63

EQUIPMENT ITEM NO. 63
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL EA 170 11302
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 63
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE POSITION (SJ78, SJ79,
 SJ108)
 SERVICE: VALVE POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 90 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 63

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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 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. 63

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switches
(Namco)

MODEL: EA-170, D2400X

COMPONENT NO.: SJ78, SJ79, SJ108

NRC IDENTIFIED DEFICIENCIES: RT, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form pages 56 and 90.

These limit switches will be replaced with qualified switches prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 26
states our intentions and reasoning for continued operation.

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

EQUIPMENT ITEM NO. 64
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 NAMCO MODEL D 2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 64
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (SS110, SS107,
 SS104, SS103)
 SERVICE: POSITION INDICATION FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 99 [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. 64

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 _____.)
- 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 |
| <u>I.b</u> 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. 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 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. 6A

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Namco)

MODEL: D-2400X

COMPONENT NO.: SS110, SS107, SS104, SS103

NRC IDENTIFIED DEFICIENCIES: EXN, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 99

These switches do not require qualification. This situation was resolved in our response to FSAR Question 7.35 and 6.28.

Our submittal, Volume I, Section VII, basis 188 states our position.

PSE&G is confident that plant safety will not be jeopardized by failure of these switches, however, to enhance reliability we will replace these switches with qualified ones.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

LICENSEE RESPONSE REFERS TO BASIS NO. 18B
Basis No. 18B

Deficiency: Documentation Unavailable (Limit Switches for
Some Inside Containment Isolation Valves)

Justification:

Current procedures instruct the operator to verify the closed position of isolation valves. The limit switches provide this indication. Loss of indication will not cause the operator to take any action contrary to safety of the plant.

This situation has been analyzed in the response to FSAR Question 7.35 and has been accepted by the NRC staff in Supplement 4 to the Salem #2 Safety Evaluation Report, Section 3.11(5). Qualification of these switches is not required.

This case has been identified as a Group II.2 item (II.2.D).

Corrective Action:

None Required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 64

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 ~~concurrency~~/non-concurrency with the technical basis of the Licensee's position are presented below.

Reason for Concurrence

Reason for Non-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)

- 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. 6Y

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

— 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 4b)

LICENSEE STATEMENT

See page 3a of this checksheet.

EVALUATION OF LICENSEE STATEMENT

Question 7.35 to the Salem FSAR was not available for purposes of this review. However, it has previously been determined for other units that containment isolation valve limit switches should be qualified for their post-accident environment so that the operator is continuously informed as to the status of containment isolation and the functioning of certain ESF systems.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

EQUIPMENT ITEM NO. 65
 PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION NOT STATED)
 FISCHER AND PORTER MODEL 50EP1041 AC
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 65
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): BORON INJECTION TANK, SAFETY INJECTION PUMP DISCHARGE
 PRESSURE (PA0227, PA7461, PT0942)
 LICENSEE SUBMITTAL: SCEW(S): 51 [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, EPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 65

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 _____.)
- 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 |
| <input checked="" type="checkbox"/> I.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	_____
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	<u>X</u>
Criteria Regarding Functional Testing Satisfied	_____
Criteria Regarding Instrument Accuracy Satisfied	<u>X</u>
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	<u>X</u>
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 15 for full evaluation details. It is noted that accident conditions as noted on the SCEWS are presented on page 5 E herein. For conclusion see page 5 f herein



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Fischer & Porter)

MODEL: 50 EP1041

COMPONENT NO.: PA0227, PA7461, PT0942

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 51.

Replacement of these transmitters is not anticipated. Inoperability of these devices would not result in termination of safety injection, *or affect plant safety.*

Our justification for accepting these devices as they now exist is detailed in our submittal, Volume I, Section VII, basis 21.

PSE&G's evaluation of noted deficiencies has reaffirmed that these transmitters will perform their function.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

LICENSEE RESPONSE REFERS TO BASIS NO. 21

Basis No. 21

Deficiency: Qualification Test Method (Pressure Measurements; Boron Injection Tank, SI Pumps)

Justification:

Current procedures instruct the operator to check ECCS operation by observing boron injection tank and safety injection pump discharge pressures during the initial phase of an accident. Inoperability of these devices would not result in termination of safety injection. Alternate indications are also available to verify ECCS status (e.g. pumps running, open valves, etc.)

Existing qualification is based on separate effects testing in lieu of sequential effects testing. Due to the type of service required of these devices, the separate effects test method is acceptable to qualify the devices. Additional qualification is not required.

This case has classified as a Group II.2 item (II.2.E.1).

Corrective Action:

None required.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 65

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

EQUIPMENT ITEM NO. 66
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN THE MECHANICAL PENETRATION
 AREA - 78
 FISCHER AND PORTER MODEL 10B2495
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 66
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW #13SG, POST ACCIDENT MONITORING
 (FA1095)
 LICENSEE SUBMITTAL: SCEW(S): 24 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 66

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 66

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	_____
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u> _____
Aging Degradation Evaluated Adequately	<u>X</u> _____
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u> _____
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	<u>X</u> _____
Criteria Regarding Functional Testing Satisfied	_____
Criteria Regarding Instrument Accuracy Satisfied	<u>X</u> _____
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	<u>X</u> _____
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 15 for full evaluation details. It is noted that accident conditions in this case are less harsh than in item 15 and therefore the accident conditions are enveloped by the test.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Fischer & Porter)

MODEL: 10B2495

COMPONENT NO.: FA1095

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES

Ref. Qualification Data Evaluation Form page 24.

These pressure transmitters will be replaced with qualified units prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 12 gives
this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety
is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 66

Checksheets 5e have been removed due to the
proprietary nature of information contained therein.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 67

EQUIPMENT ITEM NO. 67
 SQUARE ROOT EXTRACTOR LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISCHER AND PORTER MODEL 50E53212
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 67
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): POST ACCIDENT MONITORING (FA3971)
 SERVICE: #13SG AUXILIARY FW. FLOW
 LICENSEE SUBMITTAL: SCEW(S): 26 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 67

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 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 67

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 67

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Square Root Extractor
(Fischer & Porter)

MODEL: 50ES3212

COMPONENT NO.: FA3971

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 26.

These instruments will be relocated prior to 6/30/82, as they become available. Our submittal, Volume I, Section VII, basis 12 gives this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not jeopardized pending equipment relocation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

EQUIPMENT ITEM NO. 68

DIFFERENTIAL PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION NOT STATED)

FISCHER AND PORTER MODEL 10B2496 A C

REQUIRED OPERATING TIME: NOT STATED

TER CHECKSHEET NO. 68

LICENSEE REFERENCE(S): 639

FUNCTION (PLANT ID): CHARGING FLOW TO BORON INJECTION TANK, SAFETY INJECTION PUMP DISCHARGE (FA7464, FA0226, FA7462)

FUNCTION (PLANT ID): RHR PUMP DISCHARGE FLOW (FA1422, FA1423)

LICENSEE SUBMITTAL: SCEW(S): 59 [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 68

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

- The Licensee (~~was/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 June 30, 1984.)
 - 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 |
| <u>I.b Modification</u> | 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. 68

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	_____
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Fischer & Porter)

MODEL: 1082496

COMPONENT NO.: FA7464, FA0226, FA1422, FA1423, FA7462

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 59.

These pressure transmitters will be replaced with qualified units prior to 6/30/82, as they become available. Our submittal, Volume I, Section VII, basis 27 gives this schedule and our justification for continued operation.

PSE&G's evaluation of this NRC noted deficiency has reaffirmed that plant safety is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

EQUIPMENT ITEM NO. 69
 PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE INBOARD/OUTBOARD
 PENETRATION AREAS
 ROSEMCUNT MODEL 1153AGA
 REQUIRED OPERATING TIME: 14 DAYS
 TER CHECKSHEET NO. 69
 LICENSEE REFERENCE(S): 29, 30, 31, 32, 1764, 3297
 FUNCTION (PLANT ID): STEAM PRESSURE TRIP INPUT FOR REACTOR PROTECTION SYSTEM
 & POST ACCIDENT MONITORING (PA0667 THRU 674; PA0734;
 PA0736; PA0738; PA0740)
 LICENSEE SUBMITTAL: SCEW(S): 16 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 5a, 5b, 5e, 5f, 5g, 5h, 5i, 5a, 5b 5l, 5m, 5n
Installed TMI Lessons Learned Implementation Equipment Summary	
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:

- 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 (established qualified life or replace)
 - 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 June 30, 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)

- | | |
|---|---|
| <input checked="" type="checkbox"/> I.a Qualified | <input type="checkbox"/> II.c Qualified Life Deficiency |
| <input checked="" type="checkbox"/> I.b Modification | <input type="checkbox"/> III.a Exempt |
| <input type="checkbox"/> II.a Qualification Not Established | <input type="checkbox"/> III.b Not in Scope |
| <input type="checkbox"/> II.b Not Qualified | <input type="checkbox"/> 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	_____
Adequate Similarity Between Equipment and Test Specimen Established	<u> X </u>
Aging Degradation Evaluated Adequately	<u> X </u>
Qualified Life or Replacement Schedule Established (If Required)	<u> X </u>
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	<u> X </u>
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. 69

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Rosemount)

MODEL: 1153AGA

COMPONENT NO.: PA0667, PA0671, PA0734, PA0670, PA0674, PA0736, PA0668,
PA0672, PA0738, PA0669, PA0673, PA0740

NRC IDENTIFIED DEFICIENCIES: QT, RT, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 16.

QT, RT - The data in our submittal states a time of (10 days). This doesn't meet the 14 days requirement. This value is based on a MSLB in the inboard/outboard penetration. The break will affect transmitters in that area alone (inboard or outboard). Therefore, two steam generator pressures will always be available. Furthermore, after 10 days, any failures can be repaired.

A - Regarding aging; these items are considered to have little safety significance for the time frame in question until replacement or evaluation.

PSE&G will either determine the qualified life of these transmitters or replace them with qualified ones prior to 6/30/82.

Further supporting data is available in our file EQ-11.

Our evaluation of the NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending completion of the aging review.

NOTE: Underlined item is a correction to NRC SER



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

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.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	Pressure Transmitter	DIFFERENTIAL PRESSURE TRANSMITTER	
Manufacturer's Name (5.2.2/-/-)	ROSEMOUNT	ROSEMOUNT	
Model Number (5.2.2/-/-)	1153AGA	1153DAS	X see note 1 and note 4
Serial Number	—	106186 THRU 106188	
Features/Mounting (5.2.6/-/-)	Rosemount bracket	1153 SERIES A	
Connections/Interfaces (5.2.6/-/-)	—	ROSEMOUNT MOUNTING BRACKET LOW SIDE PLUMBED TO ATMOSPHERIC.	
Location/Elevation	—		
Equipment ID No.	—	N/A	
<u>QUALIFICATION REPORT</u> (8.0/5.0/5.0)			
Report ID Number	RMT3788	RMT 3788	[1764]
Report Date	—	March 23, 1978	
Issued by	—	Rosemount	
Prepared for	—	Rosemount	
Referenced Reports	—	RMT 37821	[4423]
Qualification Method (5.1, 5.3/2.1, 5.4/2.1, 2.4)	TEST	TYPE TEST	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)	—	UNIT POWERED AND PRESSURIZED	
Operating Conditions (-/2.2.10/2.2.10)	—	0 - 750" H ₂ O Range	
Load/Cycles/Voltage/ Current/Freq.	—	4 - 20 ma.	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

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)	NA	+ 5% @ 0.5 MPa/h, 40 MPa ± 8% DURING STM TEST	
Accuracy (5.2.5/-/-)	NA	MAX. OUTPUT SIGNAL DEVIATION +3.7% OF SPAN DURING RADIATION, +6.95% STEAM	NOTE 2
Number of Specimens		3	
Test Instruments Calibrated	NA	YES / NBS	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)	ACTIVE	N/A	
Test Duration (5.2.1/-/-)	NA	64 HR 20 MIN	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)	> 6 hours	N/A	see note 6
Required Function Time	14 days	N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)	NA	RADIATION / SEISMIC / STEAM - PRESSURE / SPRAY	
Test Sequence (NUREG-0588, Cat. I) (-/2.3.1/-)	NA	N/A	
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)		NONE	X - see note 5
Thermal Aging/Basis	[PSR-30] Unit 1		
Material Aging Evaluation (7.0/-/-)	[PSR-28] Unit 2	NONE	X - see note 5
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)	10°C max	NONE	X - see note 5
Radiation Aging, Type		GAMMA Co ⁶⁰	



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NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Radiation Aging, Dose (rd)	NA	SEE ACCIDENT DOSE	
Radiation Aging, Dose Rate	NA	SEE ACCIDENT DOSE	
Radiation Aging, Method	NA	TEST	
Materials Susceptible (Radiation) (5.2.4, 7.0/-/-)	NOT STATED	NO	
Operational Aging (-/4.2/-)	NA	N/A	
Other Age Conditioning (-/4.2/-)	NA	N/A	
Qualified Life Claimed/ Established (5.2.4/4.10/-)	PSR-30 Unit 1	NOT STATED	X - see note 5
Normal Ambient Temperature Normal Ambient Radiation Normal Ambient Humidity	PSR-30 Unit 2	N/A	
On-Going Surveillance and Preventive Maintenance (7.0/-/-)	NA	NOT STATED	X
On-Going Analysis of Failures and Degradation (7.0/-/-)	NA	NOT STATED	
Margin (General) (6.0/3.0/3.0)	NA	10% ON RADIATION	
Margin (NUREG-0588, Cat. I) (-/3.2/-)	NA	N/A	
1. Temperature (+15°F)			
2. Pressure (+10%, 10 psig max)			
3. Radiation (not required)			
4. Time (+10%, +1 hour + function time minimum)			



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NRC Contract No. NRC-03-79-118
 FRC Project No. C5257
 FRC Assignment No. 13
 FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
<u>ACCIDENT CONDITIONS</u>			
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)	MSLB	N/A	
Radiation Type	GAMMA	GAMMA C ⁶⁰	
Radiation Dose (rd) (4.1.2/1.4/1.4)	—	44 X 10 ⁶ RAD	
Radiation Dose Rate (rd/hr) Radiation Qual. Method (5.3.1/-/-)	—	0.5 X 10 ⁶ R/HR TEST	
Proximity to Concentrated Radiation (4.1.2/1.4.6/1.4.6)	—	N/A	
Equipment Susceptible to Beta Radiation (4.1.2/-/-)	—	N/A	
Radiation Dose (Normal + Accident) (4.1.2/-/-)	<10 ⁵ rad	44 X 10 ⁶ RAD	
Plateout Dose Considered (-/1.48/1.48)	—	N/A	
Gamma + Beta Dose (rd) (4.1.2/1.4.7/1.4.7)	—	N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase		1.5 %s / 0.67 Psig/s	
Peak: °F/psig/RH/Time	320/58/100/25	* 350/120/100/0-10M	* 2 CYCLES in 3 hour INTERVAL
Decrease To: °F/psig/RH/Time	224/47/100/2-0.5	303/55/100/ 8 hr	
Decrease To: °F/psig/RH/Time	212/45/100/6h	250/15/100/56 hr	see note 6
Decrease To: °F/psig/RH/Time		ROOM TEMP.	
Equipment Surface Tempera- ture (MSLB) (-/1.2.5.C, 2.2.6/1.2.5.C, 2.2.6)	NA	NONE	
Spray Qualification Method (5.3.2/1.3, 2.2.8/1.3, 2.2.8)	NA	TEST	
Spray Composition (4.1.4/1.3, 2.2.8/ 1.3, 2.2.8)	NA	H ₃ BO ₃ 15000 PPM NAOH PH 10.5 @ 77°F	
Spray Density (gpm/ft ²)	NA	0.15 gpm/ft ²	
Spray Duration		10 - 24 hours	see note 3
Submergence Duration (4.1.3/2.2.5/2.2.5)	NA	NONE	
In-Leakage Considered (5.2.6, 5.3.2/-/-)	NA	NO LEAKAGE DETECTED	
Time to Submergence	NA	N/A	
Dust Environment (-/2.2.11/2.2.11)	NA	N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

Note 1. The test report stated the following:

These test units are representative of the whole 1153 Series A model line. The remainder of the model line differ by the spring constant (thickness) of the sensing diaphragm and by the process pressure level. The stiffness of the metal sensing diaphragm, whose movement is minute - .004 inches, does not constitute a significant design difference. Radiation, vibration, and steam temperatures would not effect diaphragm stiffness to the extent that performance would exceed the specified acceptance criteria limits. Also, all transmitters within the model line have a design capability of withstanding a process pressure proof load of 10,000 psi. This is more than twice the maximum operating pressure range of any transmitter. Hence, process pressure is a static load which is well below the design proof load and the effects of this static loading would not be significantly enhanced by exposure to the qualification testing.

Thus, the entire 1153 Series A model line is qualified to the acceptance levels specified in this document by virtue of similarity to the test units.

Model No.	Type	Span		Maximum Working or Maximum Static
		Min.	Max.	
1153DA3	Differential	0-5" H ₂ O	0-30" H ₂ O	2000 psig
1153DA4	"	0-25" H ₂ O	0-150" H ₂ O	"
1153DA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153DA6	"	0-17 psid	0-100 psid	"
1153DA7	"	0-50 psid	0-300 psid	"
<u>1153DA8</u>	"	0-170 psid	0-1000 psid	"



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

1153HA4	Differential	0-25" H ₂ O	0-150" H ₂ O	4500 psig
1153HA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153HA6	"	0-17 psid	0-100 psid	"
1153HA7	"	0-50 psid	0-300 psid	"
1153AA5	Absolute	0-10" HgA	0-55" HgA	2000 psig
1153AA6	"	0-17 psia	0-100 psia	"
1153AA7	"	0-50 psia	0-300 psia	"
1153AA8	"	0-170 psia	0-1000 psia	"
1153AA9	"	0-500 psia	0-3000 psia	4500 psig
11536A3	Gauge	0-5" H ₂ O	0-30" H ₂ O	2000 psig
1153GA4	"	0-25" H ₂ O	0-150" H ₂ O	"
1153GA5	"	0-125" H ₂ O	0-750" H ₂ O	"
1153GA6	"	0-17 psig	0-100 psig	"
1153GA7	"	0-50 psig	0-300 psig	"
1153GA8	"	0-170 psig	0-1000 psig	"
1153GA9	"	0-500 psig	0-3000 psig	4500 psig

It is concluded that the installed equipment (model 1153AGA) differs in model designation from the units tested or analyzed. No analysis was provided by the licensee to resolve the discrepancy. We believe that the discrepancy can be easily resolved.

Note 2: The test report stated:

Summary of Radiation Results

During the exposure period, the following worst case output signal deviations were noted: -.6%, +3.7%, and +1.5% of span for serial numbers 106186, 106187, and 106188; respectively. These results are well within the expected error band of ±5% upper range limit. The post-test calibration check indicates that all transmitters returned to near normal performance; all transmitters were within 0.5% of the pre-test data. No changes worthy of noting were seen in liftoff voltage or time constant parameters in the before to after comparison. The temperature coefficient data do indicate that radiation does have an effect on this parameter; however, the magnitude of this effect is small. The largest difference between the pre-to-post test data at the hot temperature (200°F) was only 1.3% of span.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES: Note 3 - the report stated:

The deviation from procedure resulted from a problem with the filtration system for the chemical spray. The plumbing for the spray became clogged such that units 106186, 106187, and 106188 were sprayed for 10, 21, and 24 hours; respectively. The procedure originally specified 24 hours of chemical spray. This deviation does not impact the results of the test for three reasons. First, the transmitter design is one in which all exposed surfaces are of ferrous material and are chemically compactable with the spray. Second, the strip chart data for signal output and past development testing indicate that the output signal is unaffected by the spray introduced into the chamber. Third, unit 106188 did experience the required amount of spray and, therefore, demonstrates the design compactability with the 24 hours of spray.

It is concluded from the results present that all three units met the requirements of the steam/chemical test.

Note 4 - the report stated:

CONCLUSIONS

It is concluded from the data obtained from this type-test program, a summary of which is document in this report, that all three test units have successfully demonstrated the Rosemount Model 1153 Series A pressure transmitter to be qualified for Class 1E service in those applications requiring compliance with the 1971 IEEE standards.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

(5.) Reference 30 (Salom 1) and 28 (Salom 2)
EQ 11.01 uses the 10° Rule to
extrapolate the equivalent time of expected
life. The result is ≈ 78 days.

It is concluded that the 10° C rule is
an empirical relationship applicable to
some simple aging (chemical) reactions.
Application of the 10° C rule to complex
structures (components, materials) without
analysis or justification is inappropriate
and yields invalid data.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 61

NOTES:

6. The required operating time is 14 days; the test was run for 64 hours. The license states:

" ET = 246.23 hours = 10 days

This does not meet 14 day requirement. However this value is based on a HSLB directly in the inboard/outboard penetration. The break will only affect transmitters in that area and not transmitters measuring same parameter in the other penetration areas (inboard vs outboard). Therefore measurements of at least 2 str. Hen. pressures are available. Furthermore any failures after 10 days can be repaired - access available and the ambient condition is quite conservative and once slowdown of steam ceases a cooling down process will occur. Also for breaks inside the containment, the transmitters will operate for > 2 weeks since only radiation is of concern (not thermal) and qualified exceeds > 100 day dose

[30] unit 1

[28] unit 2

It is not clear how long the profile (temperature) extends beyond 6 hours - see appendix A figure A-3. It is our judgment that the test duration is not a problem since the ambient temperature post-accident shall not remain at 212°F for any great length of time.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

CONCLUSION BASED ON REVIEW OF REPORT

Three differential range 1153DA5 transmitters were sequentially tested. These units are representative of the entire 1153 Series A model line. The remainder of the model line differs by the sensing diaphragm, spring thickness, and the process pressure rating. These differences are not significant with respect to qualification testing. Thus, the following model line is qualified by virtue of similarity:

1153.A3 through 8
1153HA4 through 7
1153AA5 through 9
1154GA3 through 9

However, the installed unit is a Rosemount model 1153AGA

The transmitters were exposed to a radiation exposure rate of 0.5 Mrd per hour for a total integrated dose of 44 Mrd. The maximum output signal deviation noted was +3.7% of span.

The three transmitters were LOCA tested in a steam temperature/pressure/chemical-spray environment for 64 hours. The maximum error exhibited was +6.95% of span.

all units successfully passed test in accordance with acceptance criteria. Testing was under IEEE-323(71) standard. Qualification program satisfies all applicable criteria of the DOR Guidelines except that aging degradation and qualified life or replacement schedule has not been addressed.

In addition, adequate similarity between equipment installed and test specimens has not been established, however this could be easily resolved by the licensee.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW

Criteria: DOR Guidelines ___; NUREG-0588, Cat. I ___; NUREG-0588, Cat. II ___.

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (# OR NOTE NO.)
<u>EQUIPMENT DESCRIPTION</u>			
Equipment Type	<i>In check 5a</i>	GAUGE PRESSURE TRANSMITTER	
Manufacturer's Name (5.2.2/-/-)	↓	ROSEMOUNT	
Model Number (5.2.2/-/-)		1153GA9	
Serial Number		108584	
Features/Mounting (5.2.6/-/-)		NOT STATED	<i>see note 1</i>
Connections/Interfaces (5.2.6/-/-)		NOT STATED	
Location/Elevation		N/A	
Equipment ID No.		N/A	
<u>QUALIFICATION REPORT</u>			
(8.0/5.0/5.0)			
Report ID Number		RMT NO. 37821 REV.B	[4423]
Report Date		24 AUG-78	
Issued by		ROSEMOUNT	
Prepared for		ROSEMOUNT	
Referenced Reports		RMT NO. 3788	[1764]
Qualification Method (5.1, 5.3/2.1, 2.4/2.1, 2.4)		TEST	
<u>QUALIFICATION TEST PROGRAM</u>			
Functional Test Description (5.2.5/2.2.9/2.2.9)		UNIT POWERED AND PRESSURIZED	<i>see note 2 and note 3 and note 7</i>
Operating Conditions (-/2.2.10/2.2.10)		0-3000 PSIG	
Load/Cycles/Voltage/ Current/Freq.		NOT STATED	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0586-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE NO.)
Acceptance Criteria (5.2.5/2.2.1/2.2.1)	<i>In Checklist</i>	$\pm 8\%$ of upper range	<i>see note 5 and note 7</i>
Accuracy (5.2.5/-/-)	<i>SB</i> ↓	-3.25% of SPAN 50% scale -2.60% of SPAN 20% scale	<i>see note 5 and note 7</i>
Number of Specimens		ONE	
Test Instruments Calibrated		YES	
Safety Function (Active/ Passive) (-/2.1.3/2.1.3)		N/A	
Test Duration (5.2.1/-/-)		3hr 20min.	
Accident Duration (Envir. Above Normal) (5.2.1/-/-)		N/A	
Required Function Time		N/A	
Test Sequence (General) (5.2.3/2.3.1/2.3.1)		STEAM/CHEMICAL SPRAY	
Test Sequence (NUREG-0588, Cat. 1) (-/2.3.1/-)		N/A	
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		NONE	
Aging (5.2.4, 7.0/4.0/4.0) Thermal Aging/Basis		NONE	
Material Aging Evaluation (7.0/-/-)		NOT STATED	
Materials Susceptible (Thermal) (5.2.4, 7.0/-/-)		N/A	
Radiation Aging, Type		N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NRC REQUIREMENTS WITH SECTION REFERENCE (DOR/0588-I/0588-II)	LICENSEE SUBMITTAL	QUALIFICATION DOCUMENTATION	DEFICIENCY (X OR NOTE No.)
<u>ENVIRONMENTAL PROFILE OF ACCIDENT CONDITIONS</u>			
Rate of Temp./Press. Increase			
Peak: °F/psig/RH/Time	<i>See checklist</i>	1.5%/s / 0.67 psig/s	
Decrease To: °F/psig/RH/Time	<i>See ↓</i>	*350/120/100/0-10M	<i>see note 4</i>
Decrease To: °F/psig/RH/Time		303/55/100/2 hr	<i>*2 CYCLES</i>
Decrease To: °F/psig/RH/Time		250/15/100/1.5 hr	<i>IN 3 hour INTERVAL</i>
Equipment Surface Tempera- ture (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)		BORIC ACID 15000 PPM	
Spray Density (gpm/ft ²)		0.15 GPM/FT ²	
Spray Duration		NOT STATED	
Submergence Duration (4.1.3/2.2.5/2.2.5)		N/A	
In-Leakage Considered (5.2.6, 5.3.2/-/-)		YES	<i>see note 6</i>
Time to Submergence		N/A	
Dust Environment (-/2.2.11/2.2.11)		N/A	



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

1. Report states that "new electronic circuit boards were used in each test". Also "new O-rings were installed between the electronic housing and cover for the second test". Assume "new" means "fresh" components.
2. Report states that "two tests were run - one with unit powered and pressurized at 50% full scale (1500 PSIG), and the second with the unit powered and pressurized at 20% full scale (600 PSIG)."
3. The report states that the goal of the testing was to assess the accuracy of the test specimen at the temperature level of 350, 303, 250 °F.
4. Report states that hold periods were terminated after transmitter signal had stabilized at a steady-state value. Hold periods: 350°F for 10M / 303°F for 2 hours, 250°F for 1.5 hours



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

5. *The report stated the following regarding accuracy.*

//

TEST RESULTS

Accuracy deviations at the input pressures of 50 and 20% full scale (F.S.) are plotted versus time in Figures 2 and 3. These data indicate the maximum output signal deviation occurs during the 10 minute hold period at 350°F. The worst errors from the 50% and 20% full scale pressure tests during this period were -3.25 and -2.60 percent of span, respectively. At the 303°F temperature, the accuracy deviations were less than +1.5 and -0.8% of span for the 50% and 20% F.S. tests. At the 250°F temperature, the deviations were less than +1.8 and -0.6% of span. //

6. *Concerning leakage, the report stated:*

//

Two anomalies developed during the testing. The first was a minor leak developed at the threads between the process fluid bleed valve body and the process flange. This joint is sealed using a Loctite thread sealant. The leak was minimal, only a few drops of fluid per minute. The bleed valve assembly was removed and re-installed using a tape thread sealant in order to expeditiously finish the performance testing. Subsequent to the steam testing, an evaluation was made to reaffirm the design adequacy of the Loctite thread sealant at 350°F and 3000 psig



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

fluid pressure. A set of four flanges were assembled with bleed valves by the Production Department per procedures for the Model 1153. These were then heated in an oven to 350°F for four hours. They were removed from the oven and immediately pressurized to 3000 psig for a period of 20 minutes. During the twenty minutes, they were visually checked for leakage; none was detected. It was concluded that Loctite is an adequate thread sealant for these conditions. "

7. *Test report stated the following regarding anomalous behavior during calibration check after cooldown:*

" The second anomaly involved the output signal at the 100% full scale pressure, i.e. 3000 psig. After the first test had been completed and the unit had cooled to room temperature, a calibration check was made at 20% F.S. intervals. The 100% F.S. signal exhibited anomalous behavior characterized by an erratic output to a level 1.25% of span below the expected reading. Immediate cycling between zero and full scale, 3 cycles, indicated the 100% F.S. output signal to be a normal steady value each time. The transmitter was then reworked for the second phase of testing; new electronics and new O-rings were installed.

A calibration check prior to subjecting the transmitter to the second steam test showed normal operation. Also, during the steam test the unit exhibited expected performance characteristics. However, after cooling at room temperature, the 100% F.S. reading again showed abnormal behavior after pressure cycling.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

ADDENDUM 1
INVESTIGATION INTO THE CAUSE OF
THE PERFORMANCE ABNORMALITIES

Due to the abnormalities of the 100% output after the original steam test, an attempt was made to determine if the abnormalities were caused by the transmitter or by some other part of the test.

In an effort to determine what part of the transmitter wasn't working properly, the capacitance module was disconnected from the transmitter and its capacitance checked. While at room temperature, it was cycled at 80% F.S. pressure, 100% F.S. pressure, 110% F.S. pressure and 120% F.S. pressure; the cell acted erratically, changing its capacitance readings by up to 7.5% of the nominal readings. At the same time, a new capacitance module was subjected to the same test and performed perfectly. Thus, the abnormality can be traced to some problem with the original capacitance module used in the steam test.

After the electronics were replaced, the unit gave very smooth readings. The largest error seen was -3.13% of F.S. during the 350° temperature spike. The errors were -.95% of span during the 303°F phase of the test and -.44% of span during the 250°F portion.

CONCLUSION

The abnormalities that appeared in the original steam test were apparently caused by a defective capacitance module. An investigation was made to try to pinpoint the exact cause of the problem, but no conclusive results were ever obtained. However, due to the good performance of the new capacitance module when subjected to a steam test, it can be concluded that the problems with the original cell were of a random nature and that the transmitter will operate within the ±8% of upper range limit specification. //



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

Conclusion: The Model 1153 Series A (1153GA9)
Gauge Pressure transmitter has been
shown that it can operate within
the acceptance criteria $\pm 8\%$ of
upper range during and after
exposure to the environment noted herein.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 69

NOTES:

Overall Conclusion based on review of 4423 and 1764 in addition to the licensee's response:

• reference 1764 establishes the fact that all three 1153DA5 units represent the 1153 series A model line and the qualification program satisfies the applicable criteria of the DOR Guidelines except for the assessment of aging degradation and qualified life. The testing was under IEEE-323 (71) standards. The report established:

- Three differential range 1153DA5 transmitters were sequentially tested. These units are representative of the entire 1153 Series A model line. The remainder of the model line differs by the sensing diaphragm, spring thickness, and the process pressure rating. These differences are not significant with respect to qualification testing. Thus, the following model line is qualified by virtue of similarity:

- 1153DA3 through 8
- 1153HA4 through 7
- 1153AA5 through 9
- 1154GA3 through 9

However, the installed unit is a model 1153AGA. The licensee should provide an analysis of the deviation.

• The transmitters were exposed to a radiation exposure rate of 0.5 Mrd per hour for a total integrated dose of 44 Mrd. The maximum output signal deviation noted was +3.7% of span.

- The three transmitters were LOCA tested in a steam temperature/pressure/chemical-spray environment for 64 hours. The maximum error exhibited was +6.95% of span.

• Reference 4423 established that model 1153GA9 demonstrated accuracy within the $\pm 8\%$ upper range acceptance criteria for given test conditions. Anomalies were traced to a random failure.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 68

NOTES:

- We note the following information abstracted from applicable and available qualification documentation associated with the overall NRC equipment environmental qualification review program:

"Rosemount testing to qualify a transmitter to meet IEEE 323-1974 requirements has resulted in failure. A combination of thermal aging, irradiation and chemical spray test specification parameters has resulted in failed components. The initial failed element was an O-ring comprised of sulphur cured polyethylene rubber. This allowed steam/chemical spray to affect electronic components. The O-ring mode of failure is attributed to high temperature vs. time necessary for the Arrhenius curve time compression to satisfy aging test requirements."

Based on these considerations, it is concluded that the licensee should contact Rosemount for details of the current testing. In addition, since FRC has not evaluated or seen the results of the current Rosemount testing, an assessment of the current Rosemount test program should be conducted by NRC.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 70

EQUIPMENT ITEM NO. 70
 LIMIT SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 NAMCO MODEL D2400X2
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 70
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (11MS167, 12MS167, 13MS167, 14MS167)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 20A [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 70

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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. 70

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Namco)

MODEL: D-2400X-2

COMPONENT NO.: 11MS167, 12MS167, 13MS167, 14MS167

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 20A.

These limit switches are used for position indication only. Verification of steamline isolation can be made using information such as steamline pressure and flow measurements. Our submittal, Volume 1, Section VII, basis 108 details our reasoning for continued operation and our intentions to replace these switches with qualified ones by 6/30/82.

PSE&G's evaluation of the NRC noted deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

EQUIPMENT ITEM NO. 71
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL LB831654
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 71
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1078, SV1080, SV1082, SV1084, SV0114)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 32 AND 89 [12]

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

R, T, Q1, (R), P, H, CS, A, S, (R), M, I, QM, RPN, EXN, SEN, Q1, (RPS) None,
 I.D. # SV1078, SV1080, SV1082, SV1084
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 71

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 71

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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. 71

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: LB831654 (Unit 1)
X 8342B3 (Unit 2)

COMPONENT NO.: SV1078, SV1080, SV1082, SV1084

NRC IDENTIFIED DEFICIENCIES: RPS, RT

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 32, 89

These solenoids will be replaced with qualified valves prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 71

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: LB831654

COMPONENT NO.: SV0114, SV0575, SV0425
[Unit 2]
[Only]

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 32.

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

EQUIPMENT ITEM NO. 72
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL HTX8344A75
 REQUIRED OPERATING TIME : LESS THAN 10 SEC
 TER CHECKSHEET NO. 72
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1023)
 SERVICE: PILOT VALVE CONTROL FOR PURGE AIR INLET OUTSIDE ISOLATION
 LICENSEE SUBMITTAL: SCEW(S): 34A [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 72

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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 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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 72

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: HTX 8344A75 (Unit 1)
HT8344A77 (Unit 2)

COMPONENT NO.: SV1023

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 34A, 93

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



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 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

EQUIPMENT ITEM NO. 73
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL HTX834475
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 73
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1025)
 SERVICE: PILOT VALVE CONTROL FOR PRESSURE-VACUUM RELIEF DAMPER
 LICENSEE SUBMITTAL: SCEW(S): 35A [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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Licensee Response to NRC SER	3a, 3b, 3e, 3d
System Consideration Review	4a, 4b, 4c, 4d, 4e, 4f
Equipment Environmental Qualification Review	5a, 5b, 5e, 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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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 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 _____



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 73

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: HT834475

COMPONENT NO.: SV1025
(Unit 1)

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 35A.

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 74

EQUIPMENT ITEM NO. 74
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL X8342B22
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 74
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0558, SV0559)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 33 [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, CE, A, S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,
 Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 74

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 74

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
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	<u>X</u>
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	_____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 74

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: X8342B22

COMPONENT NO.: SV0558, SV0559

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 33.

These solenoids will be replaced with qualified valves prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 75

EQUIPMENT ITEM NO. 75
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL HTX834477
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 75
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0804)
 SERVICE: PILOT VALVE CONTROL FOR PURGE AIR INLET OUTSIDE ISOLATION
 LICENSEE SUBMITTAL: SCEW(S): 35B [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 75

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 75

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

- Documented Evidence of Qualification Adequacy _____ 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 _____ _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 75

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: HT834477

COMPONENT NO.: SV0804 (Unit 1)

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 35B.

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



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 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 76

EQUIPMENT ITEM NO. 76
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL HTB34477
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 76
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1024)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 35 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 76

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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 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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 76

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: HT834477

COMPONENT NO.: SV1024

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 35.

These solenoids will be replaced with qualified valves prior to 6/30/82. -----
Our submittal, Volume I, Section VII, basis 17, gives this -----
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

EQUIPMENT ITEM NO. 77
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL HT834475
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 77
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0805)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 36 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 77

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 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 <u>Qualified</u> | II.c Qualified Life Deficiency |
| <u>II.b Modification</u> | 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. 77

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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 77

LICENSEE RESPONSE TO NRC SER

SALEM UNITS 1 AND 2

PSE&G RESPONSE TO NRC SAFETY EVALUATION REPORT

EQUIPMENT: Solenoid Valves
(ASC)

MODEL: HT834475

COMPONENT NO.: SV0805

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 36.

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 78

EQUIPMENT ITEM NO. 78
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL LBX83146
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 78
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0505, SV0514, SV0515, SV0516, SV0517)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 37 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 78

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 78

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 _____



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 78

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: LBX83146

COMPONENT NO.: SV0514, SV0515, SV0516, SV0517, SV0505
[Unit 1]
[Only]

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 37.

These solenoids will be replaced with qualified valves prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

EQUIPMENT ITEM NO. 79
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT8320A101
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 79
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0510, SV0511, SV0512, SV0513)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 38 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 79

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 _____



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FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 79

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT8320A101

COMPONENT NO.: SV0510, SV0511, SV0512, SV0513

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 38.

These solenoids will be replaced with qualified valves prior to 6/30/82, Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 80

EQUIPMENT ITEM NO. 80
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT8321A2
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 80
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (VARIOUS ID NUMBERS)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 39 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 30

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 July 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)

- | | |
|------------------------------------|--------------------------------|
| <u>I.a Qualified</u> | II.c Qualified Life Deficiency |
| <u>II.b Modification</u> | 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. 80

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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 80

LICENSEE RESPONSE TO NRC SER

SALEM UNITS 1 AND 2

PSE&G RESPONSE TO NRC SAFETY EVALUATION REPORT

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT8321A2

COMPONENT NO.: SV0706, SV0707, SV0708, SV0709, SV0402, SV0398, SV0396
[units only]

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 39.

These solenoids will be replaced with qualified valves prior to 6/30/82. Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

EQUIPMENT ITEM NO. 81
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL 831654
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 81
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0249, SV164)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 91 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, 2b, 3e, 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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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 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 _____



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 81

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: 831654

COMPONENT NO.: SV0249, SV0164
[Unit 1]
[Only]

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 91.

These solenoids will be replaced with qualified valves prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 82

EQUIPMENT ITEM NO. 82
 SOLENOID VALVE LOCATED IN THE CONTAINMENT
 ASCO MODEL X8342822
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 82
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1120 THRU SV1124: SV1115 THRU SV1119)
 FUNCTION (PLANT ID): VALVE OPERATION (SV0621, 0624, 0627, 0630, 0633)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 92 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
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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. 82

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 82

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. 82

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
 (ASCO)

MODEL: X8342B22

COMPONENT NO.:	SV1120	SV1115	SV0621
	SV1121	SV1116	SV0624
	SV1122	SV1117	SV0627
	SV1123	SV1118	SV0630
	SV1124	SV1119	SV0633

NRC IDENTIFIED DEFICIENCIES: RT, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form, page 92.

These solenoid valves will be replaced with qualified valves prior to 6/30/82.
 Our submittal, Volume 1, Section VII, basis 19
 gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

EQUIPMENT ITEM NO. 83
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT831654
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 83
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0688)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 96 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 3e, 3d
System Consideration Review	4a, 4b, 4e, 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:

- 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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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 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



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 83

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT831654

COMPONENT NO.: SV0688

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 96.

These solenoids will be replaced with qualified valves prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 17, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 84

EQUIPMENT ITEM NO. 84
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT8314B6
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 84
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0400, SV0423)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 97 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 89

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 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



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 84

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
(ASCO)

MODEL: FT8314B6

COMPONENT NO.: SV0400, SV0423

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 97.

These solenoids will be replaced with qualified valves prior to 6/30/82. _____
Our submittal, Volume I, Section VII, basis 17, gives this _____
schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

EQUIPMENT ITEM NO. 85
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT831654
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 85
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0117, 118, 119)
 FUNCTION (PLANT ID): VALVE OPERATION (SV0575)
 SERVICE: PILOT VALVE
 LICENSEE SUBMITTAL: SCEW(S): 57 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, 2b, 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. 85

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 85

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 85

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
 (ASCO)

MODEL: FT831654

COMPONENT NO.: SV0117, SV0118, SV0119, SV0164, SV0575
 Both [Unit 2] [Unit 1]
 Units [Only] [Only]

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 57.

These solenoids will be replaced with qualified valves prior to 6/30/82. Our submittal, Volume I, Section VII, basis 25, gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



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 FRC Assignment No. 13
 FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

EQUIPMENT ITEM NO. 86
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 MICRO SWITCH MODEL LSQ051
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 86
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): LIMIT SWITCH FOR 1PR18
 SERVICE: POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 102 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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	<u>7a, 7b, 7c</u>



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 86

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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 86

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Microswitch)

MODEL: LSQ051

COMPONENT NO.: 1PR18

NRC IDENTIFIED DEFICIENCIES: EXN, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 102

This limit switch will be replaced with a qualified switch prior to 6/30/82.
Our submittal, Volume I, Section VII, basis 18A
states our intentions and reasoning for continued operation. Further sup-

PSE&G's evaluation of these NRC noted deficiencies has reaffirmed that
plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 87

EQUIPMENT ITEM NO. 87
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 MASONEILAN MODEL 496 2
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 87
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (LIMIT SWITCH FOR WL16 VC2 VC3 VC6)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 77 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 87

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 (replace limit switches for WL16, IV C6 only)
- 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 JUNE 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b Modification</u> | 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. 87

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



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FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468/517

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 87

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Masoneilan)

MODEL: 496-2

COMPONENT NO.: WL16

NRC IDENTIFIED DEFICIENCIES: EXN, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 77.

These switches do not require qualification. This situation was resolved in our response to FSAR Question 7.35 and 6.28.

Our submittal, Volume I, Section VII, basis 18B states our position.

PSE&G is confident that plant safety will not be jeopardized by failure of these switches, however, to enhance reliability we will replace these switches with qualified ones.

Note: underlined item is a correction to NRC SER.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 87

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Limit Switch

MODEL: Masoneilan 496-2

COMPONENT NO.: 1VC2, 1VC3, 1VC6

NRC IDENTIFIED DEFICIENCIES: EXN, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 77.

S - The limit switches for the VC2, VC3 and VC6 are not below the flood level as noted in the Evaluation Form. This will be corrected in the next revision to the report.

EXN - The limit switches for these valves are inside the containment. VC2 and VC3 valves are the containment isolation valves for the Containment Purge System. These valves by license requirements (Tech Specs) are required to be closed and under administrative control during power operation. The valve is known by the operator to be closed by procedure and it cannot reopen due to the effects of the accident or failure of the limit switch. Therefore, the limit switches do not perform a safety function for the operator during accident conditions and do not require environmental qualification. The replacement of these switches does not result in any direct increase in safety.

The VC6 valve is the containment isolation valve for the Containment Pressure - Vacuum Relief System. This system is used minimally during power operation. The limit switches do not perform a control function but only provide position indication to the operator. Upon an accident, the VC6 valves will close. A redundant outside isolation valve will also close. A redundant outside isolation valve will also close. The potential failure of the limit switch will not result in the operator taking action contrary to safety. This limit switch will be replaced with a fully qualified limit switch as available by 6/30/82.

Our evaluation of this item indicates that plant safety is not jeopardized pending installation of the new limit switch.

The SER indicates NAMCO limit switches for these valves although they are Masoneilan 496-2 as indicated in the Salem EQ Report.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 88

EQUIPMENT ITEM NO. 88
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 MICRO SWITCH MODEL LSQ051
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 88
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (LIMIT SWITCH FOR 1PR17)
 SERVICE: POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 101 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 88

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 (~~was~~/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 | <u>III.a Exempt</u> |
| 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. 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) _____
- 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. 88

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limit Switch
(Microswitch)

MODEL: LSQ-051

COMPONENT NO.: 1PR17

NRC IDENTIFIED DEFICIENCIES: EXN, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 101.

These switches do not require qualification. This situation was resolved in our response to FSAR Question 7.35 and 6.28.

Our submittal, Volume I, Section VII, basis 18B states our position.

PSE&G is confident that plant safety will not be jeopardized by failure of these switches, however, to enhance reliability we will replace these switches with qualified ones.



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FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. EF

LICENSEE RESPONSE REFERS TO BASIS NO. 18B

Basis No. 18B

Deficiency: Documentation Unavailable (Limit Switches for
Some Inside Containment Isolation Valves)

Justification:

Current procedures instruct the operator to verify the closed position of isolation valves. The limit switches provide this indication. Loss of indication will not cause the operator to take any action contrary to safety of the plant.

This situation has been analyzed in the response to FSAR Question 7.35 and has been accepted by the NRC staff in Supplement 4 to the Salem #2 Safety Evaluation Report, Section 3.11(5). Qualification of these switches is not required.

This case has been identified as a Group II.2 item (II.2.D).

Corrective Action:

None Required.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. Ed

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

Reason for Non-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)

___ 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.

___ 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 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.

___ 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)

___ 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. 89

EQUIPMENT ITEM NO. 89
 PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
 FISCHER AND PORTER MODEL 50EP1031BCXA NS
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 89
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): ACCUMULATOR INSTRUMENTATION (PA230, PA231, PA235, PA236,
 PA239, PA240, PA243, PA244)
 SERVICE: ACCUMULATOR PRESSURE
 LICENSEE SUBMITTAL: SCEW(S): 14B [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 89

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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b</u> 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. 89

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
o Required Profile Enveloped Adequately	<u>X</u>
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	<u>X</u>
Criteria Regarding Functional Testing Satisfied	_____
Criteria Regarding Instrument Accuracy Satisfied	<u>X</u>
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	<u>X</u>
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	_____

The licensee states that adequate qualification documentation is unavailable. This is a correct assessment. See equipment item 15 for full details of the Fischer & Porter evaluation.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitter
(Fischer & Porter)

MODEL: 50EP1031

COMPONENT NO.: PA0230, PA0231, PA0236

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 14B.

These devices will be replaced by 6/30/82, in order to comply with NUREG 1.97.

Our submittal Volume I, Section VII, basis 24 details our position and justification for continued operation.

PSE&G Evaluation of noted deficiency has reaffirmed that plant safety is not jeopardized pending replacement.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 89

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Pressure Transmitter
(Fischer & Porter)

MODEL: 50EP1031BCXA-NS

COMPONENT NO.: PA0244, PA0243, PA0239, PA0240, PA0235

NRC IDENTIFIED DEFICIENCIES: RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 148.

These pressure transmitters will be replaced with qualified units prior to 6/30/82
Our submittal, Volume I, Section VII, basis 24, gives
this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not
jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

EQUIPMENT ITEM NO. 90
 MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
 LIMITORQUE MODEL SMB, CLASS B INSULATION, RELIANCE MOTOR
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 90
 LICENSEE REFERENCE(S): 59, 635, 639, 1590, 19
 FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1PR6; 1PR7;
 11-14SJ54)
 LICENSEE SUBMITTAL: SCEW(S): 63-2 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
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Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, 3b, 3e, 3d
System Consideration Review	4a, 4b, 4c, 4d, 4e, 4f
Equipment Environmental Qualification Review	5a ₁ -5e ₁ ; 5a ₂ -5e ₂ ; 5a ₃ -5e ₃ ; 5f-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. 90

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 _____.)
- 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 |
| <input checked="" type="checkbox"/> 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. 90

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

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

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	<u>---</u>
I.b	Equipment Qualification Pending Modification	<u>---</u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u>---</u>
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	<u>---</u>
III.a	Equipment Exempt From Qualification	<u>---</u>
III.b	Equipment Not in the Scope of the Qualification Review	<u>---</u>
IV	Documentation Not Made Available	<u>---</u>

NOTE: PSR #'s on the following pages
 are referenced in the Unit 1
 Reference List.

See Conclusions on Page 5j



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limitorque Motor Operated Valves

MODEL: SMB - Class B Insulation (Inside Containment)

COMPONENT NO.: 1PR6, 1PR7, 11 14 SJ54

NRC IDENTIFIED DEFICIENCIES: QT, RT, CS, QM, SEN, A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 63-2.

QT - These valves are only required to be operable in the initial stages of the accident (<1 hour). They have been qualified for 4 hours operation.

RT - The next revision of the EQ submittal will indicate need for short term operability. Additional information regarding these valves for cold shut down purposes was provided in Revision 3, Section XII.

CS - In the Franklin Institute Research Laboratories Final Report F-C2232-01, the chemical environment was obtained by spraying 1.5% wt. boric acid buffered with sodium hydroxide to a pH of 7.67 at a rate of 10 gallons per hour for four hours. At the conclusion of the test a sample of condensate was drawn and found to have a pH of 8.2.

After 144 hours of environmental testing, the geared limit switch failed. The geared limit switch aluminum frame had been attacked by the chemicals in the steam atmosphere. This caused the gear frame to corrode and resulted in the binding of the shaft. Since the results of this test were known, the geared limit switch and the limit switch housing material at Salem Generating Station has been changed to bronze. An operator equipped with a bronze limit switch housing was retested and passed. The bronze geared limit switch showed no signs of deterioration due to the chemical spray.

QM,SEN - During the various environmental tests that were performed on the Limitorque motor operators, certain deficiencies have come to light. Any material or component that has experienced a failure in any of the tests has been replaced with the latest qualified material or component that has successfully passed. This should preclude any failure due to any identified environmental parameter in the accident environment condition that was present in the various test environments.

A - An aging test was performed by baking the motors at a temperature of 180°C for a total of 100 hours to simulate aging the motor. An aging analysis was also performed (results will be included in next revision to EQ submittal). There has not been any tests that have taken the operator to its ultimate failure, but our calculations show that a minimum life of 3.67 years can be expected.

Further supporting data is included in our file EQ-29.

PSE&G's evaluation has determined that Limitorque motor operators should perform their safety function. We will be pursuing our review effort to further clarify the Limitorque testing results.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

Checksheets 5a, 23 thru 5c, 23 have been removed due to the
proprietary nature of information contained therein.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 90

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



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 1a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

EQUIPMENT ITEM NO. 91
 MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
 LIMITORQUE MODEL SMB, CLASS H INSULATION, RELIANCE MOTOR
 REQUIRED OPERATING TIME: 120 DAYS
 TER CHECKSHEET NO. 91
 LICENSEE REFERENCE(S): 19, 60, 1590, 695
 FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1RH1, 2;
 1RH26; CC187; CC190; CV284)
 LICENSEE SUBMITTAL: SCEW(S): 63-1 [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 *On ID Nbs, CC187, CC190, CV284*

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
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, 5a ₂ , 5b ₂ , 5c ₂ , 5d ₂ , 5e ₂ 5f, 5g, 5h, 5i, 5j, 5k 6a, 6b
Installed TMI Lessons Learned Implementation Equipment Summary	
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:

- 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 |
| <input checked="" type="checkbox"/> 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. 91

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

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

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	<u> </u>
I.b	Equipment Qualification Pending Modification	<u> </u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u> </u>
II.c	Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified	<u> </u>
III.a	Equipment Exempt From Qualification	<u> </u>
III.b	Equipment Not in the Scope of the Qualification Review	<u> </u>
IV	Documentation Not Made Available	<u> </u>

See Conclusions on Page 5j



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Limitorque Motor Operated Valves

MODEL: SMB - Class H Insulation (Inside Containment)

COMPONENT NO.: 1RH1, 1RH2, 1RH26,

NRC IDENTIFIED DEFICIENCIES: QT, RT, CS, QM, SEN, A,

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 63-1

QT - These valves are only required to be operable in the initial stages of the accident. They have been qualified.

RT - The next revision of the EQ submittal will indicate need for short term operability.

CS - In the Franklin Institute Research Laboratories Final Report F-C2202-01, the chemical environment was obtained by spraying 1.5% wt. boric acid buffered with sodium hydroxide to a pH of 7.67 at a rate of 10 gallons per hour for four hours. At the conclusion of the test a sample of condensate was drawn and found to have a pH of 8.2.

After 144 hours of environmental testing, the geared limit switch failed. The geared limit switch aluminum frame had been attacked by the chemicals in the steam atmosphere. This caused the gear frame to corrode and resulted in the binding of the shaft. Since the results of this test were known, the geared limit switch and the limit switch housing material at Salem Generating Station has been changed to bronze. An operator equipped with a bronze limit switch housing was retested and passed. The bronze geared limit switch showed no signs of deterioration due to the chemical spray.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Limitorque Motor Operated Valves

MODEL: SMB - Class H Insulation (inside containment)

COMPONENT NO.: CC187, CC190, CV284

NRC IDENTIFIED DEFICIENCIES: QT, RT, CS, QM, SEN, A, S

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 63-f

QT - These valves are only required to be operable in the initial stages of the accident. They have been qualified.

RT - The next revision of the EQ submittal will indicate need for short term operability.

CS - In the Franklin Institute Research Laboratories Final Report F-C2232-01, the chemical environment was obtained by spraying 1.5% wt. boric acid buffered with sodium hydroxide to a pH of 7.67 at a rate of 10 gallons per hour for four hours. At the conclusion of the test a sample of condensate was drawn and found to have a pH of 8.2.

After 144 hours of environmental testing, the geared limit switch failed. The geared limit switch aluminum frame had been attacked by the chemicals in the steam atmosphere. This caused the gear frame to corrode and resulted in the binding of the shaft. Since the results of this test were known, the geared limit switch and the limit switch housing material at Salem Generating Station has been changed to bronze. An operator equipped with a bronze limit switch housing was retested and passed. The bronze geared limit switch showed no signs of deterioration due to the chemical spray.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

Checksheets 5a, 2 thru 5e, 2 have been removed due to the proprietary nature of information contained therein.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 91

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



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

EQUIPMENT ITEM NO. 92
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL XB342822
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 92
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1120 THRU SV1124; SV1115 THRU SV1119)
 FUNCTION (PLANT ID): VALVE OPERATION (SV0621, 624, 627, 630, 633)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 92 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 92

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 prior to 6/30/82.)
- 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 |
| <u>I.b Modification</u> | 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. 92

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 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



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 92

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Solenoid Valves
 (ASCO)

MODEL: X8342B22

COMPONENT NO.:	SV1120	SV1115	SV0621
	SV1121	SV1116	SV0624
	SV1122	SV1117	SV0627
	SV1123	SV1118	SV0630
	SV1124	SV1119	SV0633

NRC IDENTIFIED DEFICIENCIES: RT, RPS

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form, page 92.

These solenoid valves will be replaced with qualified valves prior to 6/30/82. Our submittal, Volume 1, Section VII, basis 19 gives this schedule and our justification for continued operation.

PSE&G's evaluation of these deficiencies has reaffirmed that plant safety is not jeopardized pending replacement.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 93

EQUIPMENT ITEM NO. 93
 PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT
 ROSEMOUNT MODEL 1153AHA
 REQUIRED OPERATING TIME: MSLB, LESS THAN 1 HOUR, POST ACCIDENT MONITORING
 TER CHECKSHEET NO. 93
 LICENSEE REFERENCE(S): 29, 30, 31, 3297, 1764
 FUNCTION (PLANT ID): STEAM FLOW TRIP INPUT TO REACTOR PROTECTION SYSTEM
 (FA101, FA102, FA103, FA104, FA0688, FA0689, FA0690)
 LICENSEE SUBMITTAL: SCEW(S) 11 [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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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. 93

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 (establish qualified life or replace)
- 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 June 30, 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 | II.c Qualified Life Deficiency |
| <u>I.b</u> 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. 93

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	_____
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
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	<u>X</u>
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	_____

This series transmitter has been fully evaluated in item 5, see item 5 checksheet for details. In this particular case, it is concluded that the installed model (1153AHA) differs in model designation from the units tested or analyzed. The licensee has not provided an analysis, however we believe that this could be done easily.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 93

LICENSEE RESPONSE TO NRC SER

EQUIPMENT: Pressure Transmitters
(Rosemount)

MODEL: 1153AHA

COMPONENT NO.: FA101, FA102, FA103, FA104, FA0688, FA0689, FA0690

NRC IDENTIFIED DEFICIENCIES: A

PSE&G EVALUATION OF DEFICIENCIES:

Ref. Qualification Data Evaluation Form page 11.

An aging review is being conducted for these devices. As of date, a qualified life has not been established. These transmitters will either be qualified or replaced prior to 6/30/82.

Our submittal, Volume I, Section VII, basis 2 details our position and Justification for continued operation.

PSE&G's evaluation of noted deficiency has reaffirmed that plant safety is not jeopardized pending qualification.



EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 23

NOTES:

We believe that the license has cited in
error Volume 1, Section VII Basis 2 in Reference 12
as justification for interim operation. It
is most likely Basis 1 of Reference 12.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

EQUIPMENT ITEM NO. 94
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 ROCKBESTOS/SILICONE
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 94
 LICENSEE REFERENCE(S): 57, 1327
 FUNCTION (PLANT ID): CARRY CURRENT
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S) 72A [64]

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:

<u>Contents</u>	<u>Checksheet Page No.</u>
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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. 94

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 _____.)
- 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 |
| <input checked="" type="checkbox"/> 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. 94

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 Evaluate 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. 94

LICENSEE RESPONSE TO NRC SER (Continued)

EQUIPMENT: Electrical Cable

MODEL: Rockbestos/Silicone

COMPONENT NO.: _____

NRC IDENTIFIED DEFICIENCIES: T, CS, QT, A, S

PSE&G EVALUATION OF DEFICIENCIES:

T - PSE&G has performed a thermal analysis to justify the qualification temperature of 340^oF as shown on the qualification data evaluation form. This evaluation is contained in our file EQ-07.01.

A - Rev. 2 of the E.Q. submittal contains aging data specifying a 40 year life for this type cable. Supporting data is available in our file EQ-07.02.

CS, QT, S - These items are addressed in our submittal. Supporting data is contained in our equipment qualification file EQ-07.

PSE&G's evaluation of NRC noted deficiencies has reaffirmed that Rockbestos/Silicone cable is capable of performing safety functions in a harsh environment at Salem.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 94

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

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.

- o The Licensee has not resolved the NRC concern regarding submergence of equipment inside containment (see Section 4.3.4).
- o The Licensee has not resolved the NRC concern regarding containment environmental service conditions (see Section 4.3.3).
- o The Licensee response regarding chemical spray does not identify boric acid and sodium hydroxide concentrations (see Section 4.3.5).

The Licensee has provided the following information with respect to TMI Action Plan items [64]:

"TMI ACTION PLAN ITEMS

TMI items which are applicable to Salem Units 1 and 2, have previously been incorporated in the PSE&G Environmental Qualification Review Report, Volumes 1 and 2. The following is a correlation and explanation of TMI items as applicable to environmental qualification for both Salem Units. Page numbers in the following text are applicable to Volume 2 of the

report which can be readily cross referenced to the SCEW sheets in Volume 1.

Item IIE1.2

Auxiliary Feedwater System Initiation instruments are not located in a harsh environment and are therefore exempt from qualification.

Flow indication instrumentation is identified for environmental qualification. This equipment is identified on pages 112 thru 117 of Volume 2. With the exception of transmitters, all identified equipment was installed prior to January 1, 1981.

Item IIE4.2

Containment Isolation has previously been addressed in our E. Q. Report. An entire section is devoted to this subject on pages 204 thru 299R of Volume 2. With the exception of solenoid valves and limit switches, all identified equipment was installed prior to January 1, 1981.

Item IIE3.1

Emergency Power for pressurizer heaters is not a consideration for environmental qualification purposes. Pressurizer heaters are non-class 1E. Emergency power is in a non-harsh environment.

Item IIG1

Equipment needed to assure operation of the Pressurizer Power Operated Relief Valves and PORV Block Valves has been previously identified in our E. Q. Report. Pages 22 thru 32 of Volume 2 identify all required equipment. With the exception of solenoid valves and limit switches, all equipment was installed prior to January 1, 1981.

Item IID3

Equipment associated with position indication for the Power Operated Relief Valves and Pressurizer Safety Relief Valves has previously been identified in our E. Q. Report. Pages 28, 29, 31 and 32 of Volume 2 identify all required equipment. With the exception of limit switches all identified equipment was installed prior to January 1, 1981.

Item IIK3.12

The Reactor Trip on Turbine Trip function is provided at both Salem Units. The instrumentation and supporting equipment used to perform this function is located in non-harsh environment. Therefore, qualification was not established.

Item IIK3.9

This item is not applicable to Salem. All equipment associated with the Proportional Integral Controller is located in a non-harsh environment.

Item IIB3

Post Accident Sampling System at Salem is non-safety related. All instrumentation and supporting equipment used is located in a non-harsh environment. Therefore, qualification was not established.

Item IIE4.1

This item is not applicable to the Salem Units. Recombiners are located inside containment and, therefore, require no dedicated penetrations. The recombiners themselves are discussed in our E. Q. Report. Pages 330 thru 332 of Volume 2 identifies the recombiners and associated equipment. All equipment identified was installed prior to January 1, 1981.

Item IIF.2

Environmental qualification data for instrumentation in the Westinghouse Reactor Vessel Level Instrumentation System is not yet available. Upon obtaining this data PSE&G will perform a review and establish a qualification record. Submittal of the qualification data occur upon completion of our review and update of the PSE&G Environmental Qualification Review Report.

XI TMI ACTION ITEMS

Bulletin 79-01B, Supplement 3, 'Environmental Qualification of Class IE Equipment' requires that the Environmental Qualification Review Report for Salem include qualification information on installed TMI Action Plan equipment. Qualification information on future TMI Action Plan equipment will be submitted by the pre-implementation review data. The following items have been installed under the TMI category which must be operable under harsh environment conditions:

<u>Item</u>	<u>Devices</u>	<u>Master List</u>	<u>Remarks</u>
1. Pressurizer Power Operated Relief Valve (PORV) Indication	NAMCO EA-180 limit switches for valves PR1, PR2	pgs. 28, 29, 31, 32	Qualified
2. Pressurizer Safety Relief Valve Indication	NAMCO EA-180 limit switches for valves PR3, PR4, PR5	pgs. 28, 29, 31, 32	Qualified

3. Containment	GEMS Model Number	pgs. 475-483	Undergoing
Water Level	XM60175, XM60174,		Qualification
Indication	XM60173, RE60172		Testing

The GEMS water level indication system has been installed to replace the previous sump level indication system which was included in our master list on pages 342-345. The containment water level indication is not required by the operator to take safety actions during the course of an accident. The new system was installed to provide direct indication of water level instead of alarm levels. It has been designed so as to be operable during accident conditions and provide the operator with additional information on containment conditions. The GEMS system will be tested to assure its qualification for accident use. Plant safety is not compromised while this qualification testing is performed to provide adequate documentation to verify the design capabilities. The testing is planned to be complete by the end of 1981 and the documentation will be submitted when available."

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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B912
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Conax Corp., 08-May-80
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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 (see Table A-1), based upon the information presented in the Licensee's submittal [1].

With respect to non-HELB areas, the Licensee stated [1]:

"The Control Room, Equipment Rooms, Relay Room and Switchgear Rooms do not have a harsh environment caused by a HEBA, MSLB, LOCA or recirculated fluids. These are served by Class 1E redundant ventilation equipment which are also not subject to harsh environments and are located in benign areas for radiation doses following an accident (approximately 10R). Furthermore, these areas are accessible to personnel should any equipment malfunction."

Accident Conditions Inside the Reactor Containment

For pressurized water reactor (PWR) plants, the DOR Guidelines state that the environmental service conditions inside containment for the most severe loss-of-coolant accident (LOCA) must be established by the Licensee, based on the Final Safety Analysis Report (FSAR) analysis. In addition, for plants equipped with automatic containment spray systems not subject to single failure or delayed initiation, the Guidelines state that equipment qualified for the most severe LOCA environment is also considered qualified for postulated main steam line break (MSLB) accidents.

With respect to containment spray, the Licensee stated [16]:

"The Salem containment spray system has been designed such that a single failure will not result in loss of spray capability. The containment spray system design bases are described in FSAR Section 6.4.1. The system has been designed in accordance with ECCS criteria of redundancy, single failure, etc. This item was addressed in Section VIII of our report."

With respect to LOCA and MSLB profiles, the Licensee stated [1]:

"Item 1.1 - LOCA Qualification Profile

NUREG-0588 states that the LOCA parameters used in the design of the containment structure and found acceptable by the NRC, are appropriate for environmental qualification purposes. The values used in the Salem review came from the FSAR, Figures 7.5-5, 14.3-25 and page 14.3-56 and are based on the Salem LOCA analysis. The NRC has reviewed the methodology and values used in this analysis and has found it acceptable (SER for Salem dated 10/11/74 pages 6-2 through 6-6 and supplemented in SER dated 4/80 page 6-3).

The Salem LOCA profile was calculated by Westinghouse utilizing the methodology described in WCAP-8312A for calculating LOCA mass and energy release. Appendix A to NUREG-0588 indicates that this is acceptable to the Staff. The COCO model described in WCAP's 8327 and 8936 was used to establish the containment pressure and temperature time-dependent variations following a LOCA. Although this model has not received generic approval from the Staff, the NRC has found it acceptable on a number of plants including Salem as indicated in the Safety Evaluation Reports. We believe that this is an acceptable approach in meeting the NUREG-0588 LOCA guidelines.

Item 1.2 - MSLB Qualification Profile

The document states that the MSLB parameters should be calculated using a plant specific model or other model based on staff approved assumptions. An MSLB analysis was performed specifically for Salem. The results were presented in response to question 5.82 in the Salem FSAR. This analysis has been reviewed and approved by the NRC Staff (SER for Salem 4/80 pages 6-2 and 6-3).

The Salem MSLB profile was calculated by Westinghouse utilizing the methodology described in WCAP 8822 for calculating the MSLB mass and energy release. The COCO model described in WCAP's 8327 and 8936 was used to establish the containment pressure and temperature time-dependent variations following an MSLB. Although this model has not received generic approval from the Staff, the NRC has found it acceptable on a number of plants including Salem as indicated in the Safety Evaluation Reports. The Salem information and methods were described in FSAR responses to Questions 5.62, 5.63, 5.82, 5.83, 5.84, 5.85.

In addition, the NRC Staff themselves performed a confirmatory MSLB analysis utilizing their assumptions and the Contemp code for Salem. The review of equipment qualification was done in accord with the values determined by the NRC and indicated the Safety Evaluation Report. We believe this is an acceptable approach in meeting the NUREG-0588 requirements."

In addition, the Licensee has responded to the NRC concern regarding margins [16]:

"Wyle Labs Report 44439-2 for Salem Generating Station instrument panel testing has already been submitted to the NRC Staff. Ten (10) copies of the original issue of 44439-2 were sent by letter, Mr. R. L. Mittl, PSE&G to Mr. Olan D. Parr, NRC on April 12, 1979 and ten (10) copies of Revision A of 44439-2 were sent by letter, Mr. R. L. Mittl, PSE&G to Mr. Olan D. Parr, NRC on October 23, 1979.

A lower temperature profile for some items was established due to their location within instrument panel enclosures inside the containment. The peak containment temperature for exposed equipment is 350°F. The instrument panel testing demonstrates that when the containment temperature is 350°F, equipment within the panels see temperatures less than 300°F. This is due to the thermal protection afforded by the instrument panel during the initial temperature rise transient."

Table A-1. Environmental Conditions Following a Postulated Accident*

<u>Zone</u>	<u>Cause</u>	<u>Conditions</u>
Containment	LOCA/MSLB	271/350°F (See Figure A-1) 43.2/42.8 psig (See Figure A-2) 100% humidity chemical spray 5×10^7 rd Flood Elevation 83'1"
Inboard Penetration	MSLB	320°F (See Figure A-3) 5.8 psig (See Figure A-4) 100% humidity 10^3 to 10^5 rd
Outboard Penetration	MSLB	320°F (See Figure A-3) 5.8 psig (See Figure A-4) 100% humidity 10^3 to 10^5 rd
Mechanical Penetration-78	HEBA	212°F (See Figure A-5) 1 psig 100% humidity 10^5 to 5×10^7 rd
Mechanical Penetration-100	HEBA	285°F (See Figure A-1) 1 psig 100% humidity 10^5 to 5×10^7 rd
Electrical Penetration	Recirc	10^3 to 10^5 rd
SW Valve Room	Recirc	10^5 to 10^7 rd
Aux. Bldg. 45/55	Recirc	10^6 rd
Aux. Bldg. 84	Recirc	10^3 to 10^5 rd 10^5 to 5×10^7 rd

*Radiation exposures are based on 40-year life and 120 days following an accident.

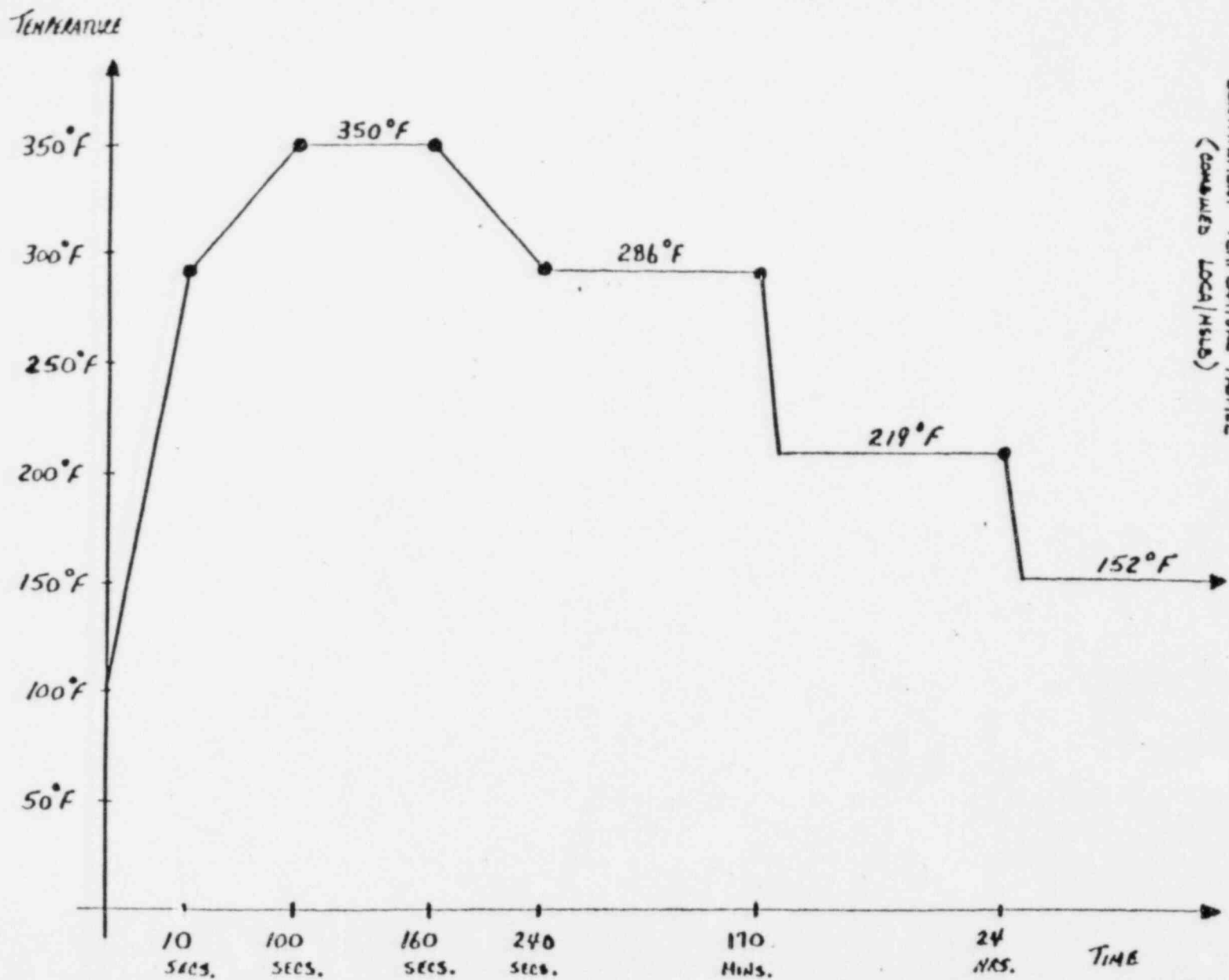


FIGURE 1
CONTAINMENT TEMPERATURE PROFILE
(COMBINED LOCA/MSLB)

Figure A-1. Containment Temperature Profile
(Combined LOCA/MSLB) [12]

FIGURE SUPPLIED
BY THE LICENSEE

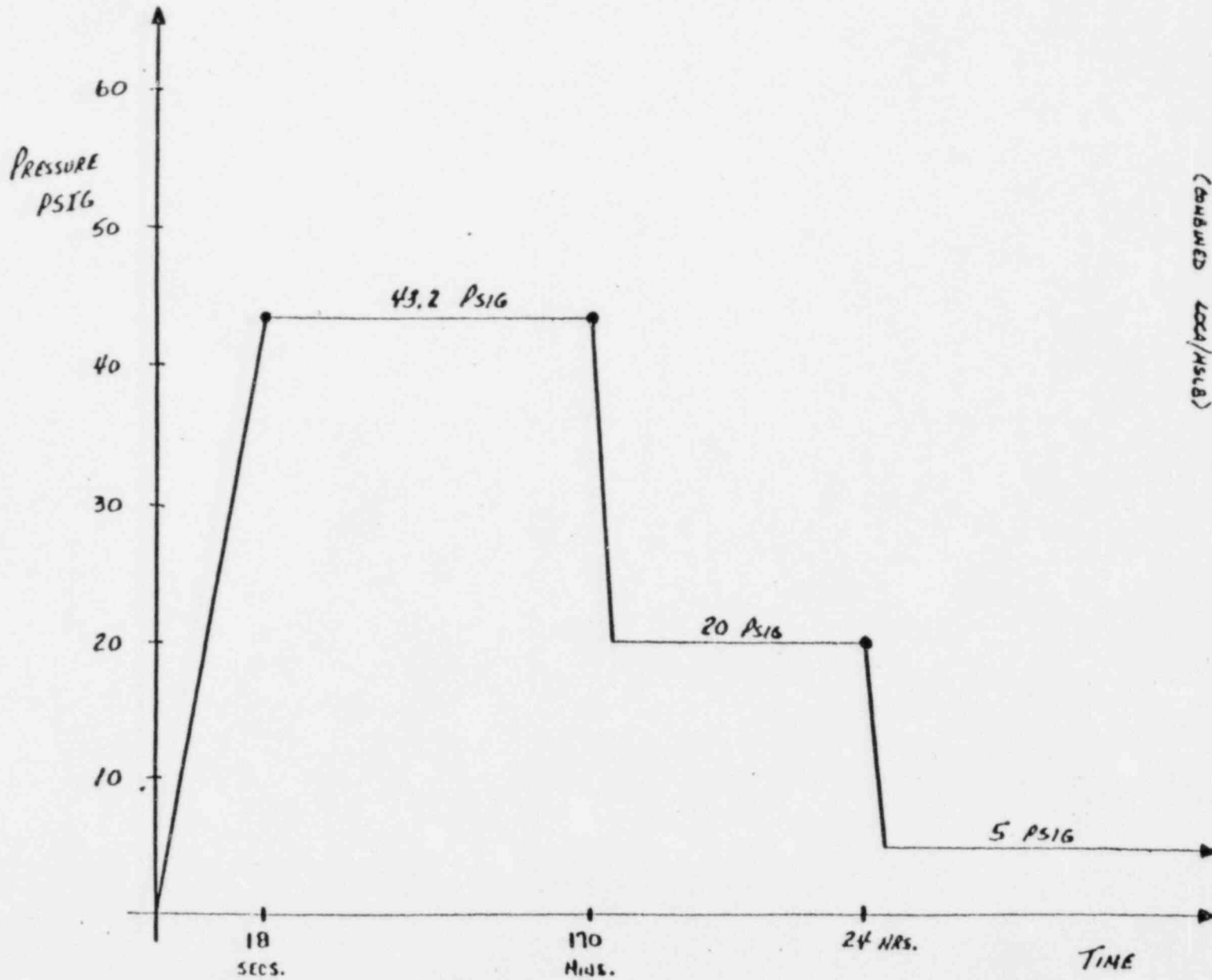


Figure A-2. Containment Pressure Profile
(Combined LOCA/MSLB)

FIGURE SUPPLIED
BY THE LICENSEE

2.9

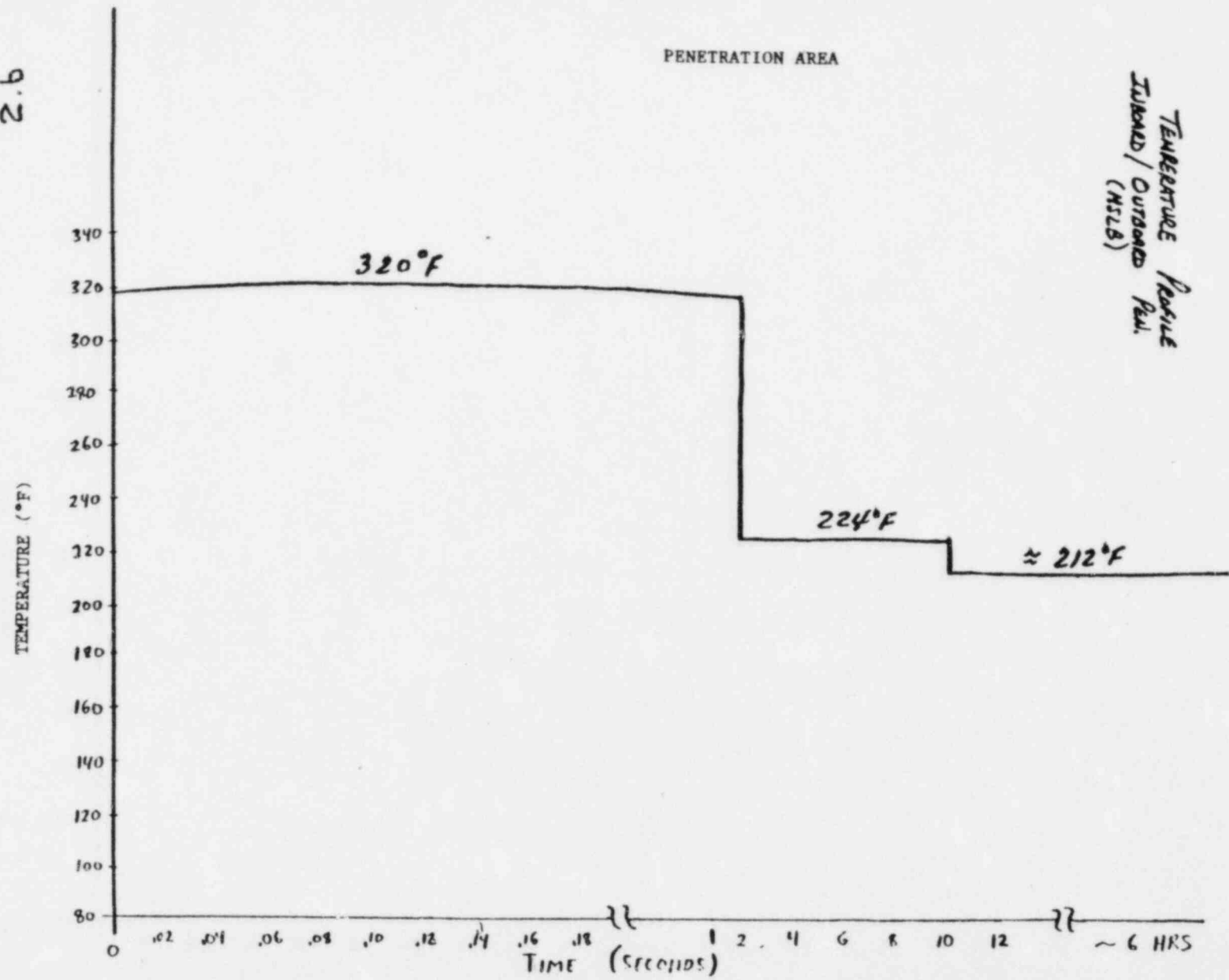


Figure A-3. Post-Accident Temperature Profile (Inboard/Outboard Penetration Area (MSLB)) [64]

FIGURE SUPPLIED BY THE LICENSEE

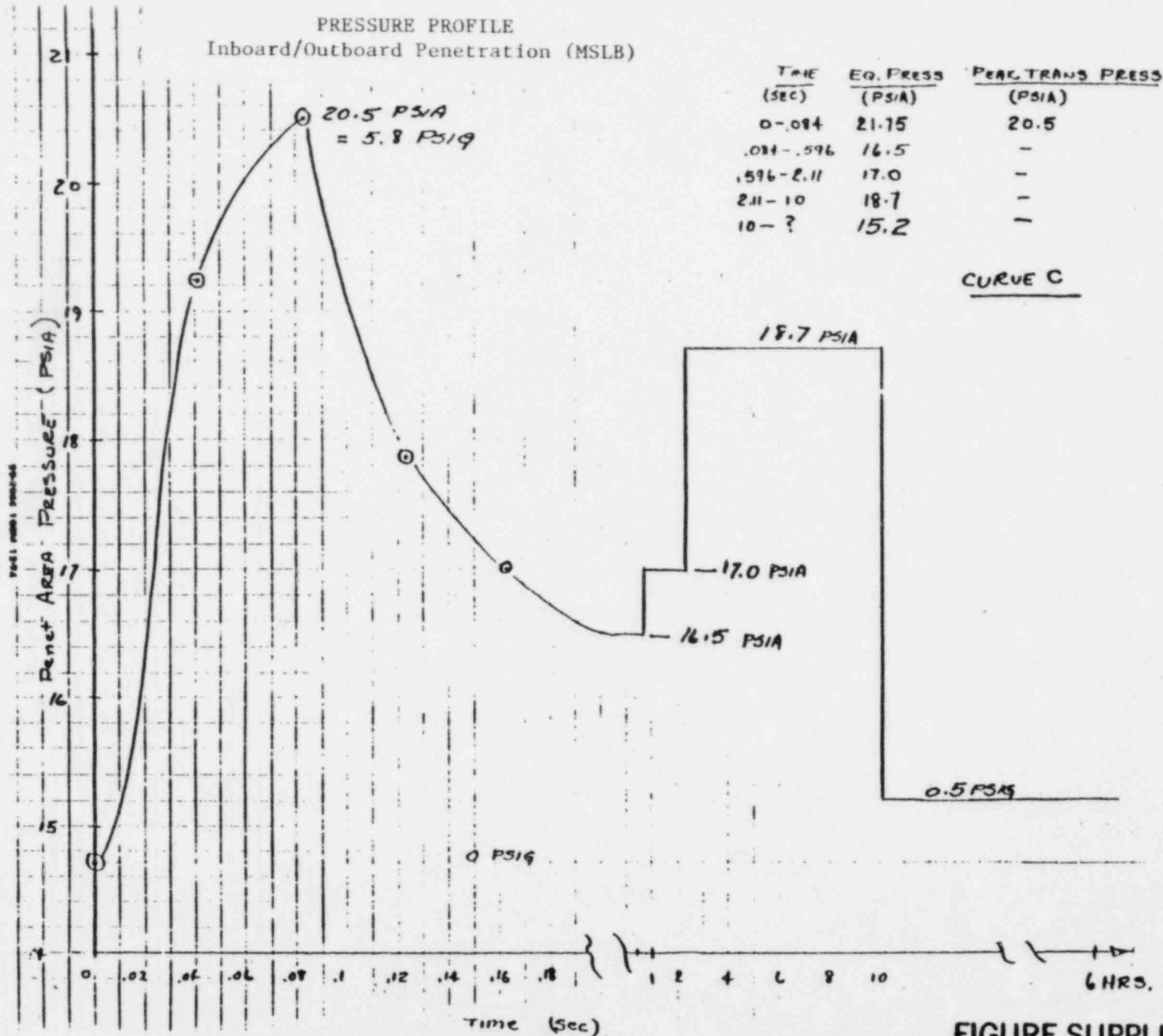


Figure A-4. Post-Accident Pressure Profile (Inboard/Outboard Penetration Area (MSLB)) [64]

FIGURE SUPPLIED BY THE LICENSEE

AUXILIARY BUILDING - 78'

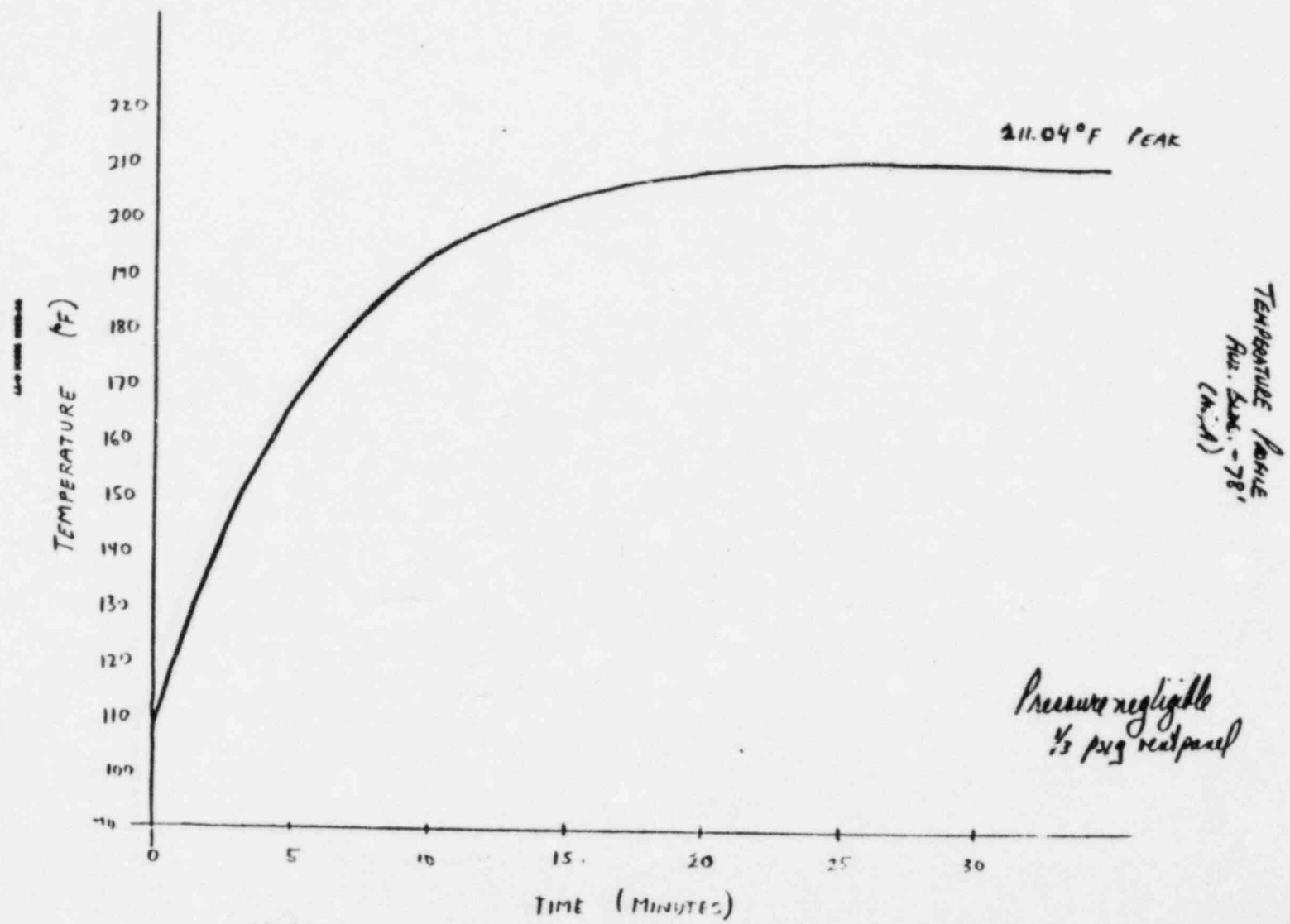


Figure A-5. Post-Accident Temperature Profile (HELB)
(Auxiliary Building - 78' Elevation) [64]

FIGURE SUPPLIED
BY THE LICENSEE

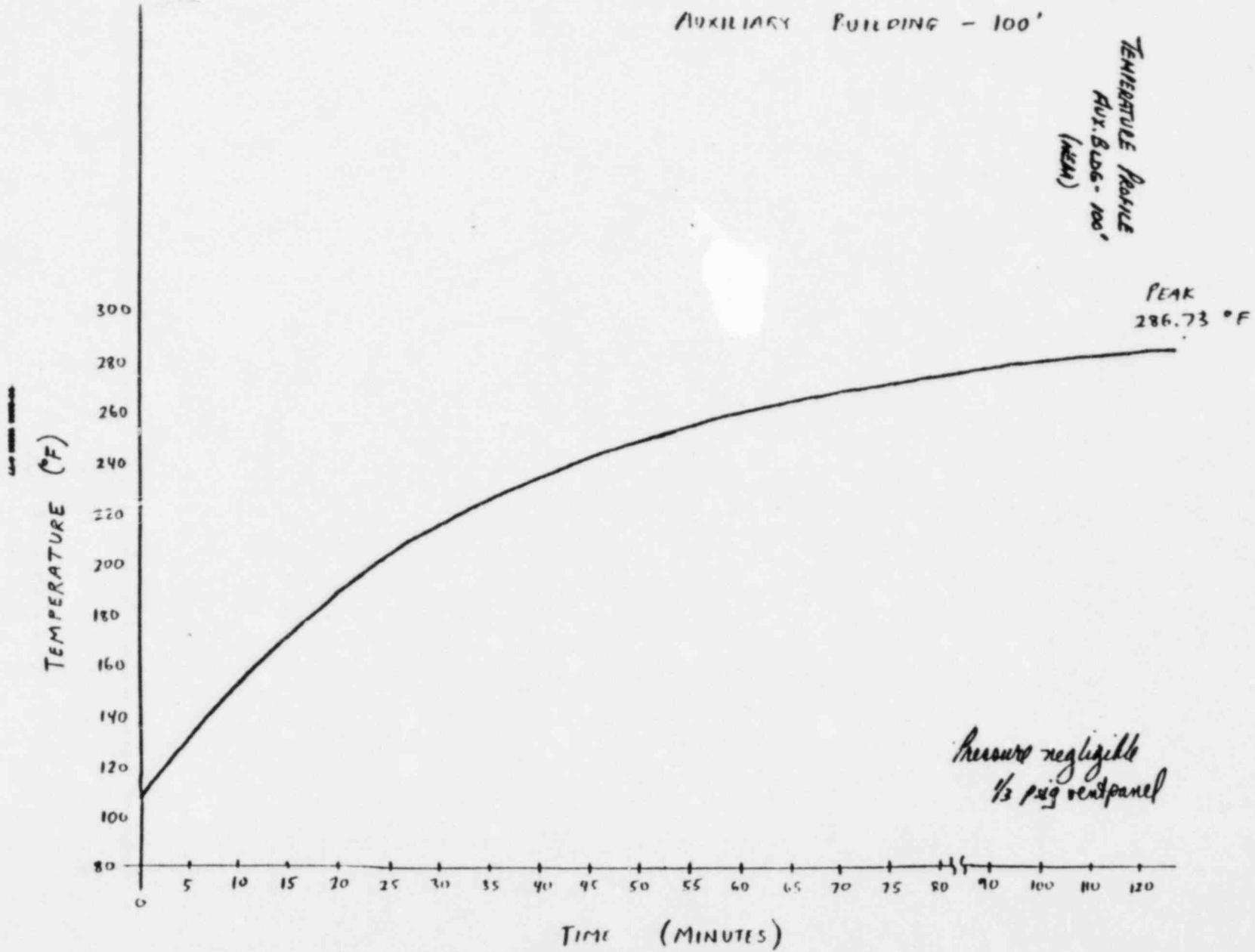


Figure A-6. Post-Accident Temperature Profile (HELB)
(Auxiliary Building - 100' Elevation) [64]

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 Salem 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, 64].

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

RESISTANCE TEMPERATURE DETECTOR LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176KF AC

REQUIRED OPERATING TIME: MSLB, LESS THAN 30 SECS

TER CHECKSHEET NO. 1

LICENSEE REFERENCE(S): 687, 25, 26, 27

FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYSTEM (TA0040, 41, 50, 51,
60, 61, 70, 71)

SERVICE: RC HOT/COLD LEG NARROW RANGE TEMPERATURE

LICENSEE SUBMITTAL: SCEW(S): 1

FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYSTEM (TA2437, 38, 40, 41,
43, 44, 46, 47)

SERVICE: RC HOT/COLD LEG NARROW RANGE TEMPERATURE

LICENSEE SUBMITTAL: SCEW(S): 1 [12]

EQUIPMENT ITEM NO. 2

RESISTANCE TEMPERATURE DETECTOR LOCATED IN THE CONTAINMENT
ROSEMOUNT MODEL 176 KS

REQUIRED OPERATING TIME: LOCA/MSLB

TER CHECKSHEET NO. 2

LICENSEE REFERENCE(S): 687, 25, 26, 27

FUNCTION (PLANT ID): POST-ACCIDENT MONITORING (T0043, 53, 63, 73; TA2757, 58,
59, 60)

SERVICE: RC HOT/COLD LEG WIDE RANGE TEMPERATURE

LICENSEE SUBMITTAL: SCEW(S): 2 [64]

EQUIPMENT ITEM NO. 3

PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT
BARTON MODEL 763 PROD LOT 2

REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS

TER CHECKSHEET NO. 3

LICENSEE REFERENCE(S): 28, 1570

FUNCTION (PLANT ID): REACTOR COOLANT SYSTEM PRESSURE POST ACCIDENT MONITORING
(PA0039 & PA8088)

LICENSEE SUBMITTAL: SCEW(S): 3 [64]

EQUIPMENT ITEM NO. 4

DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE
CONTAINMENT

BARTON MODEL 764 PROD LOT 2

REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS

TER CHECKSHEET NO. 4

LICENSEE REFERENCE(S): 28, 1570

FUNCTION (PLANT ID): PRESSURIZER LEVEL POST-ACCIDENT MONITORING (LA0086,
LA0087, LA0088)

FUNCTION (PLANT ID): TRIP INPUT FOR PROTECTION SYS. AND POST ACCIDENT
MONITORING

LICENSEE SUBMITTAL: SCEW(S): 5 [64]

SERVICE: STEAM GENERATOR NARROW RANGE WATER LEVEL TRIP INPUT FOR REACTOR
PROTECTION SYSTEM AND POST ACCIDENT MONITORING (LA0005, LA0006,
LA0007)

LICENSEE SUBMITTAL: SCEW(S): 12 [64]

EQUIPMENT ITEM NO. 5

PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT

ROSEMOUNT MODEL 1153AGA

REQUIRED OPERATING TIME: LOCA/MSLB, LESS THAN 5 MIN [12]; POST-ACCIDENT
MONITORING [29]

TER CHECKSHEET NO. 5

LICENSEE REFERENCE(S): 29, 30, 31, 32, 1764, 3297

FUNCTION (PLANT ID): PRESSURIZER PRESSURE TRIP INPUT TO REACTOR PROTECTION
SYSTEM (PA0082, PA0083, PA0084 & PA0087)

LICENSEE SUBMITTAL: SCEW(S): 7 [12]

EQUIPMENT ITEM NO. 6

SOLENOID VALVE LOCATED IN THE CONTAINMENT

ASCO MODEL 821002

REQUIRED OPERATING TIME: LOCA/MSLB

TER CHECKSHEET NO. 6

LICENSEE REFERENCE(S): NOT CITED

FUNCTION(PLANT ID): CONTROL (SV1198, SV1199)

SERVICE: AIR SUPPLY VALVE FOR PRESSURIZER PORV'S

LICENSEE SUBMITTAL: SCEW(S): 8 [12]

EQUIPMENT ITEM NO. 7

LIMIT SWITCH LOCATED IN THE CONTAINMENT

NAMCO MODEL EA 180

REQUIRED OPERATING TIME: LOCA/MSLB

TER CHECKSHEET NO. 7

LICENSEE REFERENCE(S): 898, 33, 34

FUNCTION (PLANT ID): POSITION INDICATION OF PORV'S PR1, PR2

SERVICE: POSITION INDICATION FOR VALVES

LICENSEE SUBMITTAL: SCEW(S): 10 [64]

EQUIPMENT ITEM NO. 8
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE
 CONTAINMENT
 BARTON MODEL 384
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 8
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): STEAM GENERATOR WIDE RANGE WATER LEVEL POST ACCIDENT
 MONITORING (LA0009, LA0015, LA0021, LA0027)
 LICENSEE SUBMITTAL: SCEW(S): 14 [12]
 FUNCTION (PLANT ID): ACCUMULATOR LEVEL INDICATION (LA0228, LA0229, LA0233,
 LA0234, LA0237, LA0238, LA0241, LA0242)
 LICENSEE SUBMITTAL: SCEW(S): 14A [12]

EQUIPMENT ITEM NO. 9
 TRANSDUCER, E/P LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISHER GOVERNOR MODEL 546
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 9
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): CONTROL
 SERVICE: CONTROL FOR ATMOSPHERIC RELIEF VALVES MS10'S
 LICENSEE SUBMITTAL: SCEW(S): 15 [12]

EQUIPMENT ITEM NO. 10
 PRESSURE TRANSMITTER LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISCHER AND PORTER MODEL 50EP1041
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 10
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): STEAM PRESSURE CONTROL FOR ATMOSPHERIC RELIEF VALVES
 MS10'S (PA8593, PA8596, PA8594, PA8595)
 LICENSEE SUBMITTAL: SCEW(S): 17 [12]

EQUIPMENT ITEM NO. 11
 ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL 77C27257
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 11
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): MOTIVE POWER FOR FAN (CONTROL ROD DRIVE VENT FANS)
 SERVICE: COOLING TO ROD DRIVE MECHANISMS
 LICENSEE SUBMITTAL: SCEW(S): 88B [64]

EQUIPMENT ITEM NO. 12
 LIMIT SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 MASONEILAN MODEL 4962
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 12
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (11, 12, 13MS7; 11,
 12, 13, 14 GB4)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 20 [12]

EQUIPMENT ITEM NO. 13
 CONTROL SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 MICRO SWITCH MODEL 910 PGD533
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 13
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPEN VALVE CONTROL (CMC-MS167'S)
 SERVICE: LOCAL CONTROL OF MS167 HYDRAULIC PUMP
 LICENSEE SUBMITTAL: SCEW(S): 21 [12]

EQUIPMENT ITEM NO. 14
 TERMINAL BLOCK LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 CINCH JONES, MODEL NOT STATED
 REQUIRED OPERATING TIME: MSLB
 TER CHECKSHEET NO. 14
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): CMC (MS167'S) CONTROL
 SERVICE: ELECTRICAL CONNECTION
 LICENSEE SUBMITTAL: SCEW(S): 22 [12]

EQUIPMENT ITEM NO. 15
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN THE INBOARD/OUTBOARD PENETRATION
 AREAS
 FISCHER AND PORTER MODEL 10B2495
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 15
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW #11, #12, #14 SG, POST ACCIDENT
 MONITORING (FA1087, FA1091 & FA1097)
 LICENSEE SUBMITTAL: SCEW(S): 23 [64]

EQUIPMENT ITEM NO. 16

DIFFERENTIAL PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION NOT STATED)

FISCHER AND PORTER MODEL 10B2495

REQUIRED OPERATING TIME: NOT STATED

TER CHECKSHEET NO. 16

LICENSEE REFERENCE(S): 639

FUNCTION (PLANT ID): MONITORS RHR PUMP DISCHARGE (FA1416, FA1419, FA0432)

FUNCTION (PLANT ID): MONITORS CONTAINMENT SPRAY ADDITIVE TANK HEADER (FA0218)

FUNCTION (PLANT ID): FLOW CONTROL FOR SERVICE WATER VALVES (FA3160Z-1, FA3165Z-1, FA3169Z-1, FA3172Z-1, FA3176Z-1)

LICENSEE SUBMITTAL: SCEW(S): 58 [64]

EQUIPMENT ITEM NO. 17

CONTROLLER LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS

FISCHER AND PORTER MODEL 50ES3212

REQUIRED OPERATING TIME: NOT STATED

TER CHECKSHEET NO. 17

LICENSEE REFERENCE(S): NOT CITED

FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW #11, #12, #14SG, POST ACCIDENT MONITORING (FA3969, FA3970 & FA3972)

LICENSEE SUBMITTAL: SCEW(S): 25 [12]

EQUIPMENT ITEM NO. 18

PUMP MOTORS LOCATED IN THE AUXILIARY BUILDING

WESTINGHOUSE, MODEL NOT STATED

REQUIRED OPERATING TIME: RECIRC., 120 DAYS

TER CHECKSHEET NO. 18

LICENSEE REFERENCE(S): 604, 639, 35

FUNCTION (PLANT ID): DRIVES CHARGING/SAFETY INJECTION PUMP (11C/L, 12C/L)

LICENSEE SUBMITTAL: SCEW(S): 27 [64]

FUNCTION (PLANT ID): DRIVES SAFETY INJECTION PUMP (11SI, 12SI)

LICENSEE SUBMITTAL: SCEW(S): 28 [64]

EQUIPMENT ITEM NO. 19

PUMP MOTORS LOCATED IN THE AUXILIARY BUILDING

WESTINGHOUSE, MODEL NOT STATED

REQUIRED OPERATING TIME: RECIRC., 120 DAYS

TER CHECKSHEET NO. 19

LICENSEE REFERENCE(S): 604, 639, 35

FUNCTION (PLANT ID): DRIVES RHR PUMP (11RHR, 12RHR)

LICENSEE SUBMITTAL: SCEW(S): 29 [64]

EQUIPMENT ITEM NO. 20
 TRANSDUCER, E/P LOCATED IN THE AUXILIARY BLDG.
 FISHER CONTROLS MODEL 546
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 20
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE CONTROL (11RH20, 11RH18, 12RH18)
 SERVICE: CONTROL FOR VALVES 1RH20, 11RH18, 12RH18
 LICENSEE SUBMITTAL: SCEW(S): 30 [12]

EQUIPMENT ITEM NO. 21
 FLOW TRANSMITTER LOCATED IN THE AUXILIARY BLDG.
 BARTON MODEL 289A
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 21
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): RHR PUMP RECIRC. FLOW CONTROL (FA2569, FA2481)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 31 [12]

EQUIPMENT ITEM NO. 22
 SOLENOID VALVE LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 ASCO MODEL FT8321A2
 REQUIRED OPERATING TIME: MSLB LESS THAN 5 SEC.
 TER CHECKSHEET NO. 22
 LICENSEE REFERENCE(S): 1849
 FUNCTION (PLANT ID): VALVE OPERATION (SV0269, 78, 79, 88; SV0581, 83, 85, 87)
 SERVICE: PILOT VALVES FOR MAIN STEAM DRAIN & WARM UP
 LICENSEE SUBMITTAL: SCEW(S): 18A [12]

EQUIPMENT ITEM NO. 23
 LEVEL TRANSMITTER LOCATED IN THE AUXILIARY BLDG., 84' ELEVATION
 BARTON MODEL 332/352
 REQUIRED OPERATING TIME: RECIRC.
 TER CHECKSHEET NO. 23
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (LA-0217)
 SERVICE: CONTAINMENT SPRAY ADDITIVE TANK LEVEL INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 53 [12]

EQUIPMENT ITEM NO. 24
 ELECTRICAL CONNECTOR LOCATED IN THE CONTAINMENT
 AMP MODEL 4806R147S 4800R147P
 REQUIRED OPERATING TIME: LOCA/MSLB
 TER CHECKSHEET NO. 24
 LICENSEE REFERENCE(S): NOT CITED
 SERVICE: ROD POSITION INDICATION WIRE CONNECTORS
 LICENSEE SUBMITTAL: SCEW(S): 100 [12]

EQUIPMENT ITEM NO. 25
 SOLENOID VALVE LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 ASCO MODEL FT8321A4
 REQUIRED OPERATING TIME: MSLB LESS THAN 5 SEC
 TER CHECKSHEET NO. 25
 LICENSEE REFERENCE(S): 1849
 FUNCTION (PLANT ID): CONTROL (SV0270, 71, 74, 75, 80, 81, 84, 85)
 SERVICE: CONTROL FOR MAIN STEAM ISOLATION VALVES
 LICENSEE SUBMITTAL: SCEW(S): 41 [64]

EQUIPMENT ITEM NO. 26
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D2400XST
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 26
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATION INDICATION & VALVE CONTROL (WL108, 13, 97, 99;
 NT25; WR80)
 SERVICE: POSITION INDICATION FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 42 AND 43 [12]

EQUIPMENT ITEM NO. 27
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 MASONEILAN MODEL 4962
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 27
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (11GB4, 12GB4,
 13GB4, 14GB4)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 44 [12]

EQUIPMENT ITEM NO. 28
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 28
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (1CC215, 1CC113,
 1SJ53, 1SJ60, 1NT32, 1SS49)
 SERVICE: POSITION INDICATOR & VALVE CONTROL
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (1SS64, 1SS33,
 1SS27, 1VC8, 1VC10, 1VC12, 1VC14)
 SERVICE: POSITION INDICATOR & VALVE CONTROL
 LICENSEE SUBMITTAL: SCEW(S): 45 [12]

EQUIPMENT ITEM NO. 29
 SQUARE ROOT EXTRACTOR LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 50ES3212
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 29
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW/PRESSURE CONTROL (FA3165Z-2, 69Z-2, 72Z-2, 76Z-2;
 FA3160Z-2)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 47 [12]

EQUIPMENT ITEM NO. 30
 FLOW CONTROLLER LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 53EG3000
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 30
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW CONTROLLER (FA3160C1, 2, 3; FA3165C1, 2, 3;
 FA3169C1, 2, 3)
 SERVICE: NOT STATED
 FUNCTION (PLANT ID): FLOW CONTROLLER (FA3172-1, 2, 3; FA3176-1, 2, 3)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 48 [12]

EQUIPMENT ITEM NO. 31
 TRANSDUCER, E/P LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 53EI3000
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 31
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): FLOW/PRESSURE CONTROL (FA3160, 65, 69, 72, 76; SW223)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 49 [12]

EQUIPMENT ITEM NO. 32
 PRESSURE TRANSMITTER LOCATED IN THE MECHANICAL PENETRATION AREA
 BARTON MODEL 332 351
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 32
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (PA2344, PA2345, PA2346, PA2568)
 SERVICE: NOT STATED
 LICENSEE SUBMITTAL: SCEW(S): 52 [12]

EQUIPMENT ITEM NO. 33
 PRESSURE BELLOWS LOCATED IN THE CONTAINMENT
 BARTON MODEL 351
 REQUIRED OPERATING TIME: 120 DAYS
 TER CHECKSHEET NO. 33
 LICENSEE REFERENCE(S): 687, 37
 FUNCTION (PLANT ID): CONTAINMENT PRESSURE TRIP FUNCTION FOR REACTOR
 PROTECTION SYSTEM (PA2344-46, 2568)
 LICENSEE SUBMITTAL: SCEW(S): 54 [12]

EQUIPMENT ITEM NO. 34
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 NAMCO MODEL D 2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 34
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (SJ78, SJ79, SJ108)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 56 [12]

EQUIPMENT ITEM NO. 35
 SOLENOID VALVE LOCATED IN THE CONTAINMENT
 ASCO MODEL NP SERIES
 REQUIRED OPERATING TIME: LOCA/MSLB AS NECESSARY
 TER CHECKSHEET NO. 35
 LICENSEE REFERENCE(S): 712, 1849, 36
 FUNCTION (PLANT ID): VALVE OPERATION (SV0491, 492, 493, 427, 518, 521, 399,
 397, 519)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0401, 802, 803, 927, 759, 760, 920,
 921, 922)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0923, 924, SV1022, 026, 077, 079,
 081, 083)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 FUNCTION (PLANT ID): VALVE OPERATION (SV0506, 520)
 SERVICE: PILOT VALVE FOR SAFETY-RELATED CONTROL VALVES
 LICENSEE SUBMITTAL: SCEW(S): 60 [64]

EQUIPMENT ITEM NO. 36
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 NAMCO MODEL EA 180
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 36
 LICENSEE REFERENCE(S): 33, 34, 898
 FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE CONTROL (1PR3, 4, 5;
 1WL12; 1VC7, 9, 11, 13)
 SERVICE: VALVE POSITION INDICATOR
 FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE CONTROL (1CV3, 1CV4, 1CV5,
 1SJ123, 1WL98)
 SERVICE: VALVE POSITION INDICATOR
 LICENSEE SUBMITTAL: SCEW(S): 61 [64]

EQUIPMENT ITEM NO. 37
 INSTRUMENTATION AND CONTROL PANEL LOCATED OUTSIDE CONTAINMENT
 PSE&G MODEL 1,2,3,4BAY; VERTICAL NEMA 12 ENCLOSURES
 REQUIRED OPERATING TIME: LOCA/MSLB PROVIDE SUITABLE PROTECTION FOR EQUIPT.
 TER CHECKSHEET NO. 37
 LICENSEE REFERENCE(S): 38, 3297
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTS (335, 445A-H, 444A-M, 684A-D,
 685A-D, 686A-D)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTS (241, 245, 238, 6831A-D,
 6681A-D, 6891A-D)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (687A-D, 691A-C, 215,
 219, 202, 101, 102, 743)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (311, 233, 234, 235, 236,
 208, 325, 318, 713, 714)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (317, 440A-F, 224A-C,
 316A, 316B, RPI RACK, 690)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 FUNCTION (PLANT ID): PROTECTION FOR INSTRUMENTATION (237)
 SERVICE: ENCLOSURE FOR INSTRUMENTATION
 LICENSEE SUBMITTAL: SCEW(S): 64 [12]

EQUIPMENT ITEM NO. 38

MOTORIZED VALVE ACTUATOR LOCATED OUTSIDE CONTAINMENT

LIMITORQUE MODEL SMB, CLASS B INSULATION

REQUIRED OPERATING TIME: NOT STATED

TER CHECKSHEET NO. 38

LICENSEE REFERENCE(S): 639, 635, 1590, 59, 19

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1SJ1, 1SJ2, 1SJ4, 1SJ5, 1SJ12, 1SJ13, 12SJ45)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CV68, 1CV69, 1CV139, 1CV140, 1CV175, 1CV40)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11SJ113, 12SJ113, 1SJ30, 12SJ40, 11SJ134)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (12SJ134, 1S135, 11RH4, 12RH4, 11SJ49)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (12SJ49, 11RH29, 12RH29, 11RH19, 12RH19)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11CS36, 12CS36, 12CS36, 11CS2, 1CS14)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CS16, 1CS17, 11CC16, 11CC17, 11CC18)

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1CC136, 1CC131, 1CV116, 11SJ44, 12SJ44)

SERVICE: REFERENCE SPECIFIC SYSTEM

FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (11SJ45, 11SJ40)

LICENSEE SUBMITTAL: SCEW(S): 63-2 [12]

EQUIPMENT ITEM NO. 39

TERMINAL BLOCK LOCATED IN THE CONTAINMENT

BUCHANAN MODEL 2B112N

REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS

TER CHECKSHEET NO. 39

LICENSEE REFERENCE(S): 39, 3306, 3305

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JN628 THRU JN635; JN661 THRU JN668; JT7)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JS168, JS170, JS682, JT57, JT525, JT578, 79)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JT582, 83; JN145; JN148, 49; JN1C7; JN109)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JN345 THRU JN349; JX94,95; JT9, 10)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JN89 THRU JN92; JN94 THRU JN97; JT376, 77)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS

FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT (JT350; JS618, 19; JN673, 74; JN610; JN613)

EQUIPMENT ITEM NO. 39 (CONTINUED)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JS620; JT480; 1VC1 THRU 1VC4; JT528, 29)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (1VC5, 6; 448A,B,C,D; 684A,B,C,D; 685A,B,C,D)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (686A,B,C,D; JN666; JT631; 6831A,B,C,D)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (6891A,B,C,D; 6881A,B,C,D; 691A,B,C; 690)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (215; 219; 713; 714; 317; 101; 102; 211; 224A,B,C)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (216A, B; 241; 743; 3.1; 208; 233 THRU 236)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (325; 218; JT558 THRU JT561)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (#11 REF.JCT.BOX, #12 REF.JCT.BOX)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN120, JN139, JT536, JT362, JT534)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT455 THRU JT459)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANEL
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (#11 REF. JCT. BOX, #12 REF. JCT. BOX)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANNELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JN120, JN139, JT536, JT362, JT534)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANELS
 FUNCTION (PLANT ID): PROVIDE ELECTRICAL TERMINATION AND/OR JUNCTION POINT
 (JT455 THRU JT459)

SERVICE: CONNECTION POINT WITHIN PSE&G TERMINAL BOX/PANEL
 LICENSEE SUBMITTAL: SCEW(S): 64 [64]

EQUIPMENT ITEM NO. 40
 ELECTRICAL CABLE SPLICE LOCATED IN THE CONTAINMENT
 RAYCHEM MODEL WCSF N
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 40
 LICENSEE REFERENCE(S): 3570, 40, 41, 42, 815
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (335; 440A, B, C, D;
 445A, B, C, D, E, F, G, H)
 SERVICE: TERMINATION/JUNCTION OF ELECTRIC CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (444A, B, C, D, E, F,
 G, H, I, J, K, L, M)
 SERVICE: TERMINATION/JUNCTION OF ELECTRIC CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (245; 238; 341; JN148;
 1VCI, 2, 3, 4)
 SERVICE: TERMINATION/JUNCTION OF ELECTRICAL CABLES
 FUNCTION (PLANT ID): ELECTRICAL INSULATION AND SEALING (241; 237; 797A, B)
 SERVICE: TERMINATION/JUNCTION OF ELECTRICAL CABLES
 LICENSEE SUBMITTAL: SCEW(S): 65 [64]

EQUIPMENT ITEM NO. 41
 ELECTRICAL PENETRATION LOCATED IN THE CONTAINMENT
 CONAX MODEL CANISTER TYPE LVP MVP
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 41
 LICENSEE REFERENCE(S): 5368, 1049, 5369, 44, 45, 46
 FUNCTION (PLANT ID): NOT STATED (1-1, 1-7, 1-8, 1-14, 1-15, 1-16, 1-17, 1-19)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-21, 1-23, 1-29, 1-34, 1-35, 1-37, 1-38)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-39, 1-41, 1-43, 1-46, 1-47, 1-48, 1-49)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-50, 1-53, 1-57, 1-59, 1-60, 1-61, 1-62,
 1-63)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 FUNCTION (PLANT ID): NOT STATED (1-64, 1-65, 2-63, 1-E1, 1-E2)
 SERVICE: PROVIDE ELECTRICAL FEEDS THRU CONTAINMENT BOUNDARY
 LICENSEE SUBMITTAL: SCEW(S): 66 [64]

EQUIPMENT ITEM NO. 42
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 AMERICAN INSULATED WIRE, MODEL NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 42
 LICENSEE REFERENCE(S): 1107, 47
 FUNCTION (PLANT ID): VARIOUS, CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 69 [64]

EQUIPMENT ITEM NO. 43
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
SAMUEL MOORE, EPR INSULATION [51]
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 43
LICENSEE REFERENCE(S): 1802, 51
FUNCTION (PLANT ID): CARRY CURRENT
LICENSEE SUBMITTAL: SCEW(S): 68 [64]

EQUIPMENT ITEM NO. 44
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
BOSTON INSULATED WIRE AND CABLE MODEL COAXIAL TEFZEL ETFE INSUL
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 44
LICENSEE REFERENCE(S): 674, 1705, 1706, 48, 1770
FUNCTION (PLANT ID): CARRY CURRENT
LICENSEE SUBMITTAL: SCEW(S): 69, 69A, 69B [64]

EQUIPMENT ITEM NO. 45
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
TRIANGLE MODEL, NOT STATED
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 45
LICENSEE REFERENCE(S): 52, 5365
FUNCTION (PLANT ID): CARRY CURRENT
LICENSEE SUBMITTAL: SCEW(S): 70 [64]

EQUIPMENT ITEM NO. 46
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
ANACONDA WIRE AND CABLE, EPR INSULATION
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 46
LICENSEE REFERENCE(S): 54, 1347
FUNCTION (PLANT ID): CARRY CURRENT
LICENSEE SUBMITTAL: SCEW(S): 71 [64]

EQUIPMENT ITEM NO. 47
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
ROCKBESTOS, MODEL NOT STATED
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 47
LICENSEE REFERENCE(S): 55, 676
FUNCTION (PLANT ID): CARRY CURRENT
SERVICE: NOT STATED
LICENSEE SUBMITTAL: SCEW(S): 72 AND 72A [64]

EQUIPMENT ITEM NO. 48
 ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
 OKONITE, MODEL NOT STATED
 REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
 TER CHECKSHEET NO. 48
 LICENSEE REFERENCE(S): 56, 2103, 65
 FUNCTION (PLANT ID): CARRY CURRENT
 LICENSEE SUBMITTAL: SCEW(S): 73 [64]

EQUIPMENT ITEM NO. 49
 MOTOR CONTROL CENTER LOCATED IN THE ELECTRICAL PENETRATION AREA IN THE
 AUXILIARY BLDG. 84' ELEVATION
 GENERAL ELECTRIC MODEL 7700
 REQUIRED OPERATING TIME: RECIRC. 120 DAYS
 TER CHECKSHEET NO. 49
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): POWER TO VARIOUS MOTOR OPERATED VALVES (A,B,C EAST/WEST
 VITAL VALVE CONTROL CENTERS)
 LICENSEE SUBMITTAL: SCEW(S): 74 [12]

EQUIPMENT ITEM NO. 50
 MOTOR LOCATED IN THE CONTAINMENT EL. 130'
 WESTINGHOUSE SPIN NO. PSE RCADCF
 REQUIRED OPERATING TIME: LOCA/MSLB, 1 YEAR
 TER CHECKSHEET NO. 50
 LICENSEE REFERENCE(S): 553, 604, 640
 FUNCTION (PLANT ID): DRIVES CONTAINMENT FAN COOLER MOTOR (11, 12, 13, 14, 15)
 LICENSEE SUBMITTAL: SCEW(S): 75 [64]

EQUIPMENT ITEM NO. 51
 HYDROGEN RECOMBINER LOCATED IN THE CONTAINMENT
 WESTINGHOUSE MODEL NOT STATED
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 51
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): LIMIT COMBUSTIBLE GAS BUILD-UP INSIDE CONTAINMENT
 (WESTINGHOUSE/STURTEVANT 11,12)
 SERVICE: POST LOCA
 LICENSEE SUBMITTAL: SCEW(S): 76 [12]

EQUIPMENT ITEM NO. 52
ELECTRICAL CONNECTOR LOCATED IN THE PENETRATION AREA
BURNDY MODEL HY LUG
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 52
LICENSEE REFERENCE(S): 3305, 39
FUNCTION (PLANT ID): CONNECTION OF ELECTRICAL CABLES AT EQUIPMENT TERMINAL
BLOCKS
SERVICE: NOT STATED
LICENSEE SUBMITTAL: SCEW(S): 78 [64]

EQUIPMENT ITEM NO. 53
THERMOCOUPLE LOCATED IN THE CONTAINMENT
TEM TEX MODEL 304 250 TG 12 SA2 1H CC TC
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 53
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): CONTAINMENT AIR TEMPERATURE (TA4312 THRU 4321; TA4348)
SERVICE: NOT STATED
LICENSEE SUBMITTAL: SCEW(S): 80 [12]

EQUIPMENT ITEM NO. 54
LEVEL SWITCH LOCATED IN THE CONTAINMENT
GEMS MODEL LS 800
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 54
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): NOT STATED (LA0223 & LA0224)
SERVICE: CONTAINMENT SUMP LEVEL
LICENSEE SUBMITTAL: SCEW(S): 81 [12]

EQUIPMENT ITEM NO. 55
THERMOCOUPLE LOCATED IN THE CONTAINMENT
WESTINGHOUSE SPIN NO. RCRIUI 583 F014
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 55
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): NOT STATED
SERVICE: INCORE TEMPERATURE
LICENSEE SUBMITTAL: SCEW(S): 82 [64]

EQUIPMENT ITEM NO. 56
HUMIDITY DETECTOR LOCATED IN THE CONTAINMENT
FOXBORO MODEL 2711AG
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 56
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MEASURES HUMIDITY IN CONTAINMENT (TA6356 THRU 6360Z)
LICENSEE SUBMITTAL: SCEW(S): 83 [64]

EQUIPMENT ITEM NO. 57
RADIATION MONITOR LOCATED IN THE CONTAINMENT
TRAPELO MODEL TA 63A
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 57
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): (RA-4314)
SERVICE: CONTAINMENT RADIATION DETECTOR HIGH RANGE
LICENSEE SUBMITTAL: SCEW(S): 84 [64]

EQUIPMENT ITEM NO. 58
REED SWITCH LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL KD 8805 12
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 58
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VARIOUS
SERVICE: ROD POSITION INDICATION
LICENSEE SUBMITTAL: SCEW(S): 86 [64]

EQUIPMENT ITEM NO. 59
RADIATION DETECTOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL SR WL23706 IR WL23707 PR WL23708
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 59
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): NOT STATED
SERVICE: NEUTRON DETECTION
LICENSEE SUBMITTAL: SCEW(S): 87 [64]

EQUIPMENT ITEM NO. 60
ELECTRIC MOTOR LOCATED IN THE CONTAINMENT
WESTINGHOUSE MODEL TBFC
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 60
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): MOTIVE POWER TO FAN (NOZZLE SUPPORT FANS)
SERVICE: NOZZLE SUPPORT COOLING
LICENSEE SUBMITTAL: SCEW(S): 88 [64]

EQUIPMENT ITEM NO. 61
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL NT 344A75
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 61
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0928)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOLATION VALVE
LICENSEE SUBMITTAL: SCEW(S): 94 [12]

EQUIPMENT ITEM NO. 62
HYDROGEN-OXYGEN ANALYZER LOCATED IN THE CONTAINMENT
BACHARACH MODEL ND
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 62
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): NOT STATED (XA8650, XA8651)
SERVICE: COMBUSTABLE GAS DETECTOR
LICENSEE SUBMITTAL: SCEW(S): 98 [12]

EQUIPMENT ITEM NO. 63
LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
NAMCO MODEL EA 170 11302
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 63
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): OPERATOR INDICATION AND VALVE POSITION (SJ78, SJ79,
SJ108)
SERVICE: VALVE POSITION INDICATION
LICENSEE SUBMITTAL: SCEW(S): 90 [64]

EQUIPMENT ITEM NO. 64
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 NAMCO MODEL D 2400X
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 64
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION & VALVE CONTROL (SS110, SS107,
 SS104, SS103)
 SERVICE: POSITION INDICATION FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 99 [12]

EQUIPMENT ITEM NO. 65
 PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION NOT STATED)
 FISCHER AND PORTER MODEL 50EP1041 AC
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 65
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): BORON INJECTION TANK, SAFETY INJECTION PUMP DISCHARGE
 PRESSURE (PA0227, PA7461, PTO942)
 LICENSEE SUBMITTAL: SCEW(S): 51 [12]

EQUIPMENT ITEM NO. 66
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED IN THE MECHANICAL PENETRATION AREA
 FISCHER AND PORTER MODEL 10B2495
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 66
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): AUXILIARY FEEDWATER FLOW #13SG, POST ACCIDENT MONITORING
 (FA1095)
 LICENSEE SUBMITTAL: SCEW(S): 24 [64]

EQUIPMENT ITEM NO. 67
 SQUARE ROOT EXTRACTOR LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 FISCHER AND PORTER MODEL 50E53212
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 67
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): POST ACCIDENT MONITORING (FA3971)
 SERVICE: #13SG AUXILIARY FW. FLOW
 LICENSEE SUBMITTAL: SCEW(S): 26 [12]

EQUIPMENT ITEM NO. 68
 DIFFERENTIAL PRESSURE TRANSMITTER LOCATED OUTSIDE CONTAINMENT (LOCATION
 NOT STATED)
 FISCHER AND PORTER MODEL 10B2496 A C
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 68
 LICENSEE REFERENCE(S): 639
 FUNCTION (PLANT ID): CHARGING FLOW TO BORON INJECTION TANK, SAFETY INJECTION
 PUMP DISCHARGE (FA7464, FA0226, FA7462)
 FUNCTION (PLANT ID): RHR PUMP DISCHARGE FLOW (FA1422, FA1423))
 LICENSEE SUBMITTAL: SCEW(S): 59 [64]

EQUIPMENT ITEM NO. 69
 PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE INBOARD/OUTBOARD
 PENETRATION AREAS
 ROSEMOUNT MODEL 1153AGA
 REQUIRED OPERATING TIME: 14 DAYS
 TER CHECKSHEET NO. 69
 LICENSEE REFERENCE(S): 29, 30, 31, 32, 1764, 3297
 FUNCTION (PLANT ID): STEAM PRESSURE TRIP INPUT FOR REACTOR PROTECTION SYSTEM
 & POST ACCIDENT MONITORING (PA0667 THRU 674; PA0734;
 PA0736; PA0738; PA0740)
 LICENSEE SUBMITTAL: SCEW(S): 16 [12]

EQUIPMENT ITEM NO. 70
 LIMIT SWITCH LOCATED IN THE INBOARD/OUTBOARD PENETRATION AREAS
 NAMCO MODEL D2400X2
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 70
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (11MS167, 12MS167, 13MS167, 14MS167)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 20A [12]

EQUIPMENT ITEM NO. 71
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL LB831654
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 71
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV1078, SV1080, SV1082, SV1084, SV0114)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 32 AND 89 [12]

EQUIPMENT ITEM NO. 72
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL HTX8344A75
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 72
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV1023)
SERVICE: PILOT VALVE CONTROL FOR PURGE AIR INLET OUTSIDE ISOLATION
LICENSEE SUBMITTAL: SCEW(S): 34A [12]

EQUIPMENT ITEM NO. 73
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL HTX834475
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 73
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV1025)
SERVICE: PILOT VALVE CONTROL FOR PRESSURE-VACUUM RELIEF DAMPER
LICENSEE SUBMITTAL: SCEW(S): 35A [12]

EQUIPMENT ITEM NO. 74
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL X8342B22
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 74
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0558, SV0559)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 33 [12]

EQUIPMENT ITEM NO. 75
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL HTX834477
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 75
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0804)
SERVICE: PILOT VALVE CONTROL FOR PURGE AIR INLET OUTSIDE ISOLATION
LICENSEE SUBMITTAL: SCEW(S): 35B [12]

EQUIPMENT ITEM NO. 76
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL HTB34477
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 76
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV1024)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 35 [12]

EQUIPMENT ITEM NO. 77
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL HT834475
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 77
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0805)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 36 [12]

EQUIPMENT ITEM NO. 78
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL LBX83146
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 78
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0505, SV0514, SV0515, SV0516, SV0517)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 37 [12]

EQUIPMENT ITEM NO. 79
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL FT8320A101
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 79
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0510, SV0511, SV0512, SV0513)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 38 [12]

EQUIPMENT ITEM NO. 80
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL FT8321A2
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 80
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (VARIOUS ID NUMBERS)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 39 [12]

EQUIPMENT ITEM NO. 81
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL 831654
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 81
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0249, SV164)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 91 [12]

EQUIPMENT ITEM NO. 82
SOLENOID VALVE LOCATED IN THE CONTAINMENT
ASCO MODEL X8342822
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 32
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV1120 THRU SV1124: SV1115 THRU SV1119)
FUNCTION (PLANT ID): VALVE OPERATION (SV0621, 0624, 0627, 0630, 0633)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 92 [12]

EQUIPMENT ITEM NO. 83
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL FT831654
REQUIRED OPERATING TIME: LESS THAN 10 SEC
TER CHECKSHEET NO. 83
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV0688)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 96 [12]

EQUIPMENT ITEM NO. 84
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT8314B6
 REQUIRED OPERATING TIME: LESS THAN 10 SEC
 TER CHECKSHEET NO. 84
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0400, SV0423)
 SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
 LICENSEE SUBMITTAL: SCEW(S): 97 [12]

EQUIPMENT ITEM NO. 85
 SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
 ASCO MODEL FT831654
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 85
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): VALVE OPERATION (SV0117, 118, 119)
 FUNCTION (PLANT ID): VALVE OPERATION (SV0575)
 SERVICE: PILOT VALVE
 LICENSEE SUBMITTAL: SCEW(S): 57 [12]

EQUIPMENT ITEM NO. 86
 LIMIT SWITCH LOCATED IN THE MECHANICAL PENETRATION AREA
 MICRO SWITCH MODEL LSQ051
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 86
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): LIMIT SWITCH FOR 1PR18
 SERVICE: POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 102 [12]

EQUIPMENT ITEM NO. 87
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 MASONEILAN MODEL 496 2
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 87
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): OPERATOR INDICATION (LIMIT SWITCH FOR WL16 VC2 VC3 VC6)
 SERVICE: POSITION INDICATOR FOR VALVES
 LICENSEE SUBMITTAL: SCEW(S): 77 [12]

EQUIPMENT ITEM NO. 88
 LIMIT SWITCH LOCATED IN THE CONTAINMENT
 MICRO SWITCH MODEL LSQ051
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 88
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): NOT STATED (LIMIT SWITCH FOR 1PR17)
 SERVICE: POSITION INDICATION
 LICENSEE SUBMITTAL: SCEW(S): 101 [12].

EQUIPMENT ITEM NO. 89
 PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT
 FISCHER AND PORTER MODEL 50EP1031BCXA NS
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 89
 LICENSEE REFERENCE(S): NOT CITED
 FUNCTION (PLANT ID): ACCUMULATOR INSTRUMENTATION (PA230, PA231, PA235, PA236,
 PA239, PA240, PA243, PA244)
 SERVICE: ACCUMULATOR PRESSURE
 LICENSEE SUBMITTAL: SCEW(S): 14B [12]

EQUIPMENT ITEM NO. 90
 MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
 LIMITORQUE MODEL SMB, CLASS B INSULATION, RELIANCE MOTOR
 REQUIRED OPERATING TIME: NOT STATED
 TER CHECKSHEET NO. 90
 LICENSEE REFERENCE(S): 59, 635, 639, 1590, 19
 FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1PR6; 1PR7;
 11-14SJ54)
 LICENSEE SUBMITTAL: SCEW(S): 63-2 [12]

EQUIPMENT ITEM NO. 91
 MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT
 LIMITORQUE MODEL SMB, CLASS H INSULATION, RELIANCE MOTOR
 REQUIRED OPERATING TIME: 120 DAYS
 TER CHECKSHEET NO. 91
 LICENSEE REFERENCE(S): 19, 60, 1590, 695
 FUNCTION (PLANT ID): MOTIVE POWER FOR VALVE OPENINGS/CLOSINGS (1RH1, 2;
 1RH26; CC187; CC190; CV284)
 LICENSEE SUBMITTAL: SCEW(S): 63-1 [12]

EQUIPMENT ITEM NO. 92
SOLENOID VALVE LOCATED IN THE MECHANICAL PENETRATION AREA
ASCO MODEL XB342822
REQUIRED OPERATING TIME: NOT STATED
TER CHECKSHEET NO. 92
LICENSEE REFERENCE(S): NOT CITED
FUNCTION (PLANT ID): VALVE OPERATION (SV1120 THRU SV1124; SV1115 THRU SV1119)
FUNCTION (PLANT ID): VALVE OPERATION (SVO621, 624, 627, 630, 633)
SERVICE: PILOT VALVE FOR CONTAINMENT ISOL. VALVE
LICENSEE SUBMITTAL: SCEW(S): 92 [12]

EQUIPMENT ITEM NO. 93
PRESSURE TRANSMITTER LOCATED IN INSTRUMENT PANEL IN THE CONTAINMENT
ROSEMOUNT MODEL 1153AHA
REQUIRED OPERATING TIME: MSLB, LESS THAN 1 HOUR, POST ACCIDENT MONITORING
TER CHECKSHEET NO. 93
LICENSEE REFERENCE(S): 29, 30, 31, 3297, 1764
FUNCTION (PLANT ID): STEAM FLOW TRIP INPUT TO REACTOR PROTECTION SYSTEM
(FA101, FA102, FA103, FA104, FA0688, FA0689, FA0690)
LICENSEE SUBMITTAL: SCEW(S) 11 [12]

EQUIPMENT ITEM NO. 94
ELECTRICAL CABLE LOCATED IN THE CONTAINMENT
ROCKBESTOS/SILICONE
REQUIRED OPERATING TIME: LOCA/MSLB, 120 DAYS
TER CHECKSHEET NO. 94
LICENSEE REFERENCE(S): 57, 1327
FUNCTION (PLANT ID): CARRY CURRENT
SERVICE: NOT STATED
LICENSEE SUBMITTAL: SCEW(S) 72A [64]

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 presented in this appendix.

<u>Function</u>	<u>System</u> ¹
Emergency Reactor Shutdown	Reactor Protection
	Safeguards Actuation
	Charging and Letdown
	Reactor Coolant
Containment Isolation	Main Feedwater
	Containment Ventilation
	Auxiliary Feedwater
	Charging and Letdown
	Safety Injection
	Residual Heat Removal
	Containment Spray
	Containment Ventilation
	Sampling
	Component Cooling
	Main Feedwater Isolation
	Containment Isolation ²
Reactor Core Cooling	Safety Injection
	Residual Heat Removal
	Charging & Letdown

1. The NRC staff recognized 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 function of the system(s) with the responsible IE regional reviewer and/or the licensee.
2. Includes all other systems with containment isolation valves which are not listed above under "Containment Isolation."

<u>Function</u>	<u>System¹</u>
Containment Heat Removal	Containment Spray
	Containment Ventilation
	Residual Heat Removal
Core Residual Heat Removal	Residual Heat Removal
	Pressurizer
	Main Feedwater
	Auxiliary Feedwater
	Main Steam
	Steam Dump
	Component Cooling
	Service Water
Prevention of Significant Release of Radioactive Material to Environment	Containment Spray
	Containment Ventilation
	Combustible Gas Control
	Containment Parameters
	Sampling
Supporting Systems	Emergency Power
	Control Room Habitability
	Safety Equipment Area Ventilation

C.2 SAFETY-RELATED INSTRUMENTATION

In Section 3.1 of the NRC SER dated June 8, 1981 [15], 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 16, the Licensee provided the following response:

"Display instrumentation mentioned in the Emergency Operating Procedures was included as part of the Salem environmental qualification review effort. This instrumentation was included in the master list and evaluation forms under the applicable systems. For example, steam generator level is included under Main Steam. A separate listing of all the primary instruments and attendant cables, panels, terminal blocks, etc., was not deemed necessary since all the devices were included in the system performing the function. Other devices which do not perform a system safety function were included under 'Containment Parameters' or 'Miscellaneous' in Section IV of the report. In the next revision to the Salem Environmental Qualification Report, a cross-indexing of display instrumentation will be provided.

Those instrumentation items which were included in the Emergency Operating Procedures but are not required for any operator action do not require environmental qualification. The operating procedures have been revised to reflect potential inaccuracy of the devices. The operators will be aware of their potential failure. A discussion of these items was provided in the following Bases of Section VII of the report. 18B, 21, 23, 29, 33 and 37."

Evaluation

The Licensee has stated that display instruments mentioned in the emergency procedures have been included with the appropriate systems. The Licensee has adequately addressed the concern of the NRC regarding identification of instrumentation.

With regard to the need for environmental qualification of instruments which are not required for operator action during an accident, these instruments are evaluated on an individual basis in the body of the report.

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 [15]:

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

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

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

"The FRC review will consist of:

- o Review the licensee's justification 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.

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

On January 25, 1982, the NRC was provided with the completed review of the licensees' statements presented as a basis for justification for interim operation in response to the NRC 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

* 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: Public Service Electric and Gas Company
Plant Name: Salem Unit 1
NRC Docket No. 50-272
NRC TAC No. 42467
NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 468

References:

- a. Letter to S. A. Varga, NRC.
Subject: Response to SER for Environmental Qualification of
Electrical Equipment for Salem Nuclear Generating Station Unit No. 1
Public Service Electric & Gas, 10-Sep-81
- b. Office of Nuclear Reactor Regulation
Safety Evaluation Report for Salem Unit 1
Environmental Qualification of Safety-Related
Electrical Equipment
NRC, 08-Jun-81
- c. Salem Generating Station Units 1 & 2
Environmental Qualification Review Report, Volume I, Rev. 1
Public Service Electric & Gas, 01-Dec-80
M-P80-118-02, Proprietary

The Licensee has submitted technical information in Reference a in response to the NRC SER [b] on environmental qualification. In Reference a, the Licensee refers to Reference c for previously submitted justifications for continued operation. FRC has reviewed these documents [a,b,c]. As a result of this review, FRC concludes that the Licensee has stated that the equipment items are environmentally qualified; or has provided a technically sound rationale as a basis for justification for continued plant operation; or has provided a technically sound rationale or other additional information which in FRC's judgment provides a basis for justification for continued operation; with the following exceptions:

<u>Equipment Item</u>	<u>Equipment Description/ Function</u>	<u>SCEW Sheet No.</u>	<u>Status Code</u>	<u>Basis for Deficiency</u>
None				

In general, Licensee's response to the SER addressed and provided resolution of deficiencies identified in the SER and provided adequate rationale as a basis for justification for interim operation."

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.

REQUES: 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

Public Service Electric and Gas Company

Salem Unit 1

NRC Docket No. 50-272

November 19, 1981

Rev. 1, March 3, 1982

NRC TAC No. 42467

Rev. 2, June 8, 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 10, 1981 [1] and December 1, 1980 [2].*

On February 8, 1982, Public Service Electric and Gas Company (PSE&G) submitted a response to the FRC RAI [5]. This submittal contained those items that were requested with the exception of the following:^{(1)**}

1. proprietary test reports and technical information (RAI items A.l.a, A.l.g, A.l.i, A.l.j, A.l.l, A.l.m, A.l.n, A.l.o, A.l.p, A.l.aa, A.l.hh)⁽¹⁾
2. test reports referenced but not applicable to installed equipment at Salem Units 1 and 2 (RAI items A.l.h, A.l.aaa, A.l.bb~~h~~)⁽¹⁾
3. qualification data which have been deleted from the Licensee's list of references (A.l.x, A.l.y)⁽¹⁾
 - A.l.x-PSE&G Analysis EQ 16.03⁽¹⁾
 - A.l.y-PSE&G Analysis EQ 16.06⁽¹⁾
4. two letters referenced incorrectly in the previous RAI (A.l.qq, A.l.ss)⁽¹⁾

*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.

5. the specified operating times that were missing from numerous SCEW sheets. (A.2.C-the Licensee stated that this information was irrelevant since the equipment either lacked sufficient qualification data or was located in a non-harsh environment)⁽¹⁾
6. the specific locations and plant identification nos. (A.2.d)⁽¹⁾

With respect to the proprietary documents, FRC has continued to maintain a system of controls over proprietary material which has been acceptable to both the NRC and industry; therefore, FRC requests a single legible copy of the documents identified in item 1 above.⁽¹⁾

By letter dated May 28, 1982, PSE&G transmitted to FRC additional information on environmental qualification of safety-related electrical equipment for Salem Units 1 and 2, excluding Westinghouse proprietary information. PSE&G stated that the Westinghouse proprietary information has been submitted by Westinhouse directly to the NRC.⁽²⁾

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 [3], a legible single copy of each of the following qualification documents is requested in order that the FRC evaluation may proceed:
- a. Westinghouse letter report NS-TMA-2120, September 14, 1979, Table 1-2 (SCEW 13) [2] (Proprietary - as stated by Licensee) [5]⁽¹⁾
 - b. Wyle Report No. 44439-2, Rev. A; Figure III-4B (SCEW 3) [2] 2/8/82 [5]⁽¹⁾
 - c. Wyle Laboratories Report No. 44439-1, March 23, 1979 (SCEW 60) [2] 2/8/82 [5]⁽¹⁾
 - d. Thermal Analysis, Stone & Webster, January 25, 1979 (SCEW 63-1) [2] 2/8/82 [5]⁽¹⁾
 - e. CONAX Report IPS-400 (SCEW 64) [2] 2/8/82 [5]⁽¹⁾

***This column will be completed by FRC as the requested information is received.

DATE RECEIVED BY FRC***

- f. Wyle Laboratories Report No. 17448-1 (SCEW 64) [2] 2/8/82 [5]⁽¹⁾
- g. CONAX Report IPS-422A (SCEW 66) [2] 6/3/82 [6]⁽²⁾
(Proprietary - as stated by Licensee) [5]⁽¹⁾
- h. Wyle Test Report No. 43757-2 (SCEW 74)⁽¹⁾ [2] Received for Task
(Proprietary - Report Not Applicable to plant - 467⁽²⁾
as stated by Licensee) [5]⁽¹⁾
- i. Westinghouse Letter SE-SAII-868 (SCEW 75)⁽¹⁾ [2] Received⁽²⁾
(Proprietary - as stated by Licensee) [5]⁽¹⁾
- j. Westinghouse BURL-3851, July 21, 1980
(SCEW 76)⁽¹⁾ [2] Received⁽²⁾
(Proprietary - as stated by Licensee) [5]⁽¹⁾
- k. Wyle Report 44152-1, Rev. A (SCEW 85)⁽¹⁾ [2] 2/8/82 [5]⁽¹⁾
(Information for justification for interim
operations as stated by Licensee [5])⁽¹⁾
- l. Westinghouse Letter Report NS-TMA-1950,
September 29, 1978 (SCEW 13) [2] Received⁽²⁾
(Proprietary - Information for justification
for interim operations as stated by
Licensee [5])⁽¹⁾
- m. PSE&G Documentation Evaluation - EQ 10.00
(SCEW 1) [2] 2/8/82 [5]⁽¹⁾
(Not including proprietary data) [5]⁽¹⁾
- n. PSE&G Calculation - EQ 10.02 (SCEW 1) [2] 2/8/82 [5]⁽¹⁾
(Not including proprietary data) [5]⁽¹⁾
- o. PSE&G Analysis - EQ 10.03 (SCEW 1) [2] 2/8/82 [5]⁽¹⁾
(Not including proprietary data) [5]⁽¹⁾
- p. PSE&G Documentation - EQ 26.00 (SCEW 3) [2] 2/8/82 [5]⁽¹⁾
(Information for justification for interim
operations - not including proprietary
information [5])⁽¹⁾
- q. PSE&G Documentation Evaluation - EQ 11.00
(SCEW 7) [2] 2/8/82 [5]⁽¹⁾
- r. PSE&G Calculation - EQ 11.01 (SCEW 7) [2] 2/8/82 [5]⁽¹⁾
- s. PSE&G Analysis - EQ 11.03 (SCEW 7) [2] 2/8/82 [5]⁽¹⁾

DATE RECEIVED BY FRC***

t. PSE&G Analysis - EQ 11.02 (SCEW 16) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
u. PSE&G Evaluation - EQ 13.00 (SCEW 10) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
v. PSE&G Calculation - EQ 13.01 (SCEW 10) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
w. PSE&G Documentation Evaluation - EQ 16.00 (SCEW 27) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
x. <u>deleted [5]</u> ⁽¹⁾	
y. <u>deleted [5]</u> ⁽¹⁾	
z. PSE&G Analysis - EQ 12.00 (SCEW <u>60</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
aa. PSE&G Documentation Evaluation - EQ 28.00 (SCEW 54) [2] <u>(Not including proprietary data) [5]</u> ⁽¹⁾	<u>2/8/82 [5]</u> ⁽¹⁾
bb. PSE&G Documentation Evaluation - EQ 20.00 (SCEW 62) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
cc. PSE&G Documentation Evaluation - EQ 19.00 (SCEW 64) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
dd. PSE&G Documentation Evaluation - EQ 01.00 (SCEW 65) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
ee. PSE&G Calculation - EQ 01.03 (SCEW 65) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
ff. PSE&G Calculation - EQ 01.05 (SCEW 65) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
gg. PSE&G Documentation Evaluation - EQ 02.00 (SCEW 66) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
hh. Conax Report IPS-414 (SCEW 66) [2] <u>(Proprietary - as stated by Licensee) [5]</u> ⁽¹⁾	<u>6/3/82 [6]</u> ⁽²⁾
ii. PSE&G Calculation - EQ 02.06 (SCEW 66) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
jj. PSE&G Calculation - EQ 02.07 (SCEW 66) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
kk. PSE&G Figure - EQ 02.08 (SCEW 66) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
ll. PSE&G Documentation Evaluation - EQ 04.00 (SCEW <u>67</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
mm. PSE&G Documentation Evaluation - EQ 05.00 (SCEW <u>69</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾

DATE RECEIVED BY FRC***

nn. PSE&G Documentation Evaluation - EQ 24.00 (SCEW <u>69A</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
oo. PSE&G Documentation Evaluation - EQ 27.00 (SCEW <u>69B</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
pp. PSE&G Documentation Evaluation - EQ 21.00 (SCEW <u>68</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
qq. Samuel Moore Letter dated June 1978 (SCEW <u>68</u>) ⁽¹⁾ [2]	
rr. PSE&G Documentation Evaluation - EQ 06.00 (SCEW <u>70</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
ss. Triangle - PWC Letter dated 2/77 (SCEW <u>70</u>) ⁽¹⁾ [2]	
tt. PSE&G Document - EQ 03.02 (SCEW <u>71</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
uu. PSE&G Documentation Evaluation - EQ 03.00 (SCEW <u>71</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
vv. PSE&G Documentation Evaluation - EQ 08.00 (SCEW 72) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
ww. PSE&G Documentation Evaluation - EQ 09.00 (SCEW 73) [2]	<u>2/8/82 [5]</u> ⁽¹⁾
xx. Salem Environmental Qualification Review Report - Rev. 2, January 16, 1981 (Page 53) [1]	<u>6/3/82 [6]</u> ⁽²⁾
yy. Salem Environmental Qualification Review Report - Rev. 3, February 9, 1981 (Page 53) [1]	<u>6/3/82 [6]</u> ⁽²⁾
zz. PSE&G Document Evaluation - EQ 07.00 (SCEW <u>72A</u>) ⁽¹⁾ [2]	<u>2/8/82 [5]</u> ⁽¹⁾
aaa. GE Letter to PSE&G dated November 17, 1980 (SCEW <u>74</u>) ⁽¹⁾ [2] <u>(Proprietary - report not applicable to plant - as stated by Licensee) [5]</u> ⁽¹⁾	
bbb. PSE&G Documentation Evaluation - EQ 14.00 (SCEW <u>74</u>) ⁽¹⁾ [2] <u>(Report not applicable to plant - as stated by Licensee [5])</u> ⁽¹⁾	

DATE RECEIVED BY FRC***

- ccc. PSE&G Documentation Review - EQ 15.00
(SCEW 75)⁽¹⁾ [2] 2/8/82 [5]⁽¹⁾
- ddd. PSE&G Documentation Evaluation -
EQ 29.00 (SCEW 63-2)⁽¹⁾ [2] 2/8/82 [5]⁽¹⁾
- eee. PSE&G Documentation Evaluation -
EQ 17.00 (SCEW 63-1)⁽¹⁾ [2] 2/8/82 [5]⁽¹⁾
- fff. PSE&G Documentation Evaluation -
EQ 18.00 (SCEW 13) [2] 2/8/82 [5]⁽¹⁾
(Information for justification for interim
operations as stated by Licensee [5])⁽¹⁾
2. a. FRC requests a legible copy of the four
plant layout drawings which were contained
in Section III of Reference 2. 2/8/82 [5]⁽¹⁾
- b. FRC requests temperature/pressure time-
dependent environmental profiles or
equivalent for inboard/outboard
penetration areas and mechanical
penetration areas (elevation 78' and 100'). 2/8/82 [5]⁽¹⁾
- c. Numerous SCEW sheets in Reference 2 do not
contain information on the specified
operating time. FRC requests this
information. (Licensee has committed to
submit this information in the next
submittal [5])⁽¹⁾
- d. FRC requests the specific location and
full model number for ASCO NP series
solenoid valves referenced on SCEW 60 in
Reference 2. (Licensee submitted model
nos. without plant IDs and locations
[5])⁽¹⁾ 6/3/82 [6]⁽²⁾
3. A review of the information submitted on Feb.
8, 1982 [5] resulted in a list of references
not previously requested. FRC requests a
single legible copy of the following
documents so that the review may be
completed:⁽¹⁾
- a. Okonite Report No. 0379-1 (referenced in
PSE&G EQ 09.00 [5])⁽¹⁾ 6/3/82 [6]⁽²⁾

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- b. Conax Report No. IPS-422 (referenced in PSE&G EQ 02.06 [5])⁽¹⁾ 6/3/82 [6]⁽²⁾
- c. Isomedix Inc. Report dated February 1977 (referenced in PSE&G EQ 06.00 [5])⁽¹⁾ 6/3/82 [6]⁽²⁾
- d. Boston Insulated Wire Company Report No. B912 (referenced in PSE&G EQ 027.00 [5])⁽¹⁾ 6/3/82 [6]⁽²⁾
- e. Boston Insulated Wire Company Report No. B913 (referenced in PSE&G EQ 24.00 [5])⁽¹⁾ 6/3/82 [6]⁽²⁾
- f. PSE&G EQ 28.05 [5]⁽¹⁾ 6/3/82 [6]⁽²⁾
- g. PSE&G EQ 28.02 [5]⁽¹⁾ 6/3/82 [6]⁽²⁾
- h. PSE&G EQ 28.03 [5]⁽¹⁾ 6/3/82 [6]⁽²⁾

B. FRC REVIEW OF INSTALLED TMI ACTION PLAN ITEMS

INFORMATION REQUESTED

DATE RECEIVED BY FRC***

1. References 1 and 2 do not provide adequate detail with respect to identification of TMI Action Plan equipment installed as of 1/1/81.

- a. Identification of all TMI Action Plan equipment installed as of 1/1/81 is requested.
- b. Identification of TMI Action Plan equipment installed with implementation dates after 1/1/81 is requested.

c. The correlation of these equipment items with the specific sections of NUREG-0737 [4] presented below (as applicable) is requested. 6/3/82 [6]⁽²⁾

IIE1.2, IIE4.2, IIE3.1, IIG1, IIF2, IID3, IIK3.12, IIK3.9, IIB3, IIE4.1.

DATE RECEIVED BY FRC***

[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?]

- d. For all installed TMI Action Plan equipment identified, a System Component Evaluation Worksheet (SCEW) (in accordance with 79-01B format) is requested.
 - e. 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.
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. 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.
- 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. Letter to S. A. Varga, NRC.
Subject: Response to SER for Environmental Qualification of
Electrical Equipment for Salem Nuclear Generating Station Unit No. 1
Public Service Electric & Gas, 10-Sep-81
2. Salem Generating Station Units 1 & 2
Environmental Qualification Review Report, Volume I, Rev. 1
Public Service Electric & Gas, 01-Dec-80
M-P80-118-02, Proprietary
3. Office of Nuclear Reactor Regulation
Safety Evaluation Report for Salem Unit 1
Environmental Qualification of Safety-Related
Electrical Equipment
NRC, 08-Jun-81
4. NUREG-0737, "Clarification of TMI Action Plan Requirements"
NRC, November 1980
5. E. A. Liden
Letter to C. J. Crane, FRC. Subject: Environmental Qualification of
Safety-Related Electrical Equipment; Transmittal of Requested
Information on Salem 1 & 2; with Attachment
Public Service Electric & Gas, 08-Feb-81⁽¹⁾
6. E. A. Liden
Letter to C. J. Crane, FRC. Subject: Environmental Qualification of
Electrical Equipment; Request for Additional Information Units 1 and
2, Salem Nuclear Generating Station, With Enclosures; Public Service
Electric and Gas Company, May 28, 1982⁽²⁾