UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
Washington, D.C. 20555

INSPECTION AND ENFORCEMENT MANUAL

QAVT

TEMPORARY INSTRUCTION 2515/76

EVALUATION OF LICENSEE'S PROGRAM FOR QUALIFICATION OF ELECTRICAL EQUIPMENT LOCATED IN HARSH ENVIRONMENTS

2515/76-01 PURPOSE

To provide guidance (1) for the inspection of licensee environmental qualification programs for electrical equipment important to safety located in harsh environments as required by 10 CFR 50.49 and (2) for determining that licensee commitments for resolution of outstanding issues from NRC equipment qualification (EQ) safety evaluation reports (SERs) are being properly implemented.

2515/76-02 OBJECTIVES

To review licensee's implementation of a program for meeting 10 CFR 50.49 requirements.

To review the licensee's implementation of SER corrective action commitments.

To review the licensee's implementation of a program for maintaining the qualified status of equipment during the life of the plant.

To perform a physical inspection of equipment to determine that the installations agree with SER commitments and qualification requirements.

2515/76-03 BACKGROUND

In response to IE Bulletin 79-01B and NUREG-0588, licensees submitted EQ documentation. This documentation was reviewed by the NRR-EQB staff, and SERs were issued listing the deficiencies in the documentation. Meetings were held with the licensees during 1983 and 1984 to establish commitments for corrective action. 10 CFR 50.49 became effective on February 22, 1983, further establishing formal qualification requirements.

2515/76-04 REFERENCES

04.01 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," effective February 22, 1983.

04.02 Regulatory Guide 1.89, "Environmental Qualification of Certain Equipment Important to Safety for Nuclear Power Plants," Revision 1, June 1984.

04.03 NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Equipment," (for Comments Version), July 1981.

04.04 "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors," November 1979 (DOR Guidelines).

04.05*+Technical Evaluation Report (TER), "Review of Licensees'Resolution of Outstanding Issues from NRC Equipment Environmental Qualification Safety Evaluation Report." An individual TER for each operating power plant prepared by Franklin Research Center under NRC Contract 03-79-118.

04.06+ NRC Safety Evaluation Reports concerning environmental qualification of safety-related electrical equipment, including the SER that forwarded the TER to each licensee.

04.07*+Licensee's commitments for corrective action including May 1983 SER/TER response, 1984 minutes of meeting with NRC, and subsequent changes.

04.08 Regulatory Guide 1.97, "Instrumentation for Light Water-Cooled Nuclear Reactor Power Plants to Assess Plant and Environmental Conditions During and Following an Accident," Revision 2, December 1980.

04.09 Technical Evaluation Report, "Implementation Guidance for New and Corrective Equipment Environmental Qualification," prepared by Franklin Research Center Under NRC Contract 03-79-118, April 22, 1983.

04.10*+

a. Licensee's list of equipment requiring environmental qualification (Master List, submitted in May 1983).

b. Master List, version in effect at time of inspection.

04.11*+

a. Generic Letter 84-24, D. G. Eisenhut to Licensees and Applicants, dated December 27, 1984, Subject: Certification of Compliance to 10 CFR 50.49.

b. Licensee's Response to Generic Letter 84-24.

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* These documents shall be available for the inspectors' use thoughout the inspection.

+ These documents shall be obtained for review before the inspection.

04.12* Licensee's current System Component Evaluation Worksheets (SCEW sheets) or equivalent (earlier SCEW sheets may have been included in previous licensee submittals).

04.13*+Licensee's procedures applicable to equipment qualification (EQ program, procurement of qualified equipment, maintenance of qualified equipment and modifications to plant that could affect qualified equipment).

04.14* Licensee qualification documentation and/or files.

2515/76-05 RESPONSIBILITIES

A team should be assigned to perform this inspection with the following members as a minimum:

a. Team Leader - A regionally based inspector to lead discussion with licensee, to conduct entrance and exit interviews, to coordinate team activities and participate in the inspection effort. (May also perform role b, c, or d below).

b. Technical Specialist - Knowledgeable about the application and operation of electrical power and control equipment requiring EQ.

c. Quality Assurance Specialist - Knowledgeable of quality assurance requirements for procurement, maintenance, and testing of electrical equipment requiring EQ.

d. Equipment Qualification Specialist - Knowledgeable of EQ testing and analysis requirements and requirements for documenting qualification results.

2515/76-06 INSPECTION REQUIREMENTS

06.01 Pre-Inspection Tasks

The following tasks should be accomplished before the site inspection:

a. Document Review

Inspectors should obtain and review copies of the plant-specific documents marked by a plus (+) in Section 04 of this TI.

b. Sample Selection

The inspection will include evaluation of qualification documentation and visual inspection of 10 to 15 equipment items. Selection of the devices to be evaluated is important since multiple concerns must be addressed by the inspection. Rank the sample list in importance with the most critical devices first. The list of devices should contain as many different equipment types as possible and should be developed with the following concerns in mind:

* These documents shall be available for the inspectors' use throughout the inspection.

+ These documents shall be obtained for review before the inspection.

1. Table 4-1 and the Equipment Item Checksheet Index in Section 4 of Reference 04.05 should be the starting point for development of the sample list. Devices listed in categories I.B, II.A, II.B, II.C, and IV may be chosen as samples. Tables 4-2, 4-3, and 4-4 provide further information concerning deficiencies in the documentation. Reference 04.10 provides the base list of items that the licensee has determined to require qualification in accordance with 10 CFR 50.49.

2. Outstanding IE bulletins and information notices related to qualified equipment should be considered. Generic Letter 84-24 (Reference 04.11.a) lists several such bulletins and notices.

3. Plant-specific EQ-related problems reported under 10 CFR Part 21 or paragraphs 50.72 and 50.73 should be considered.

4. Access to the equipment during the walk-through inspection should be considered.

5. Equipment which the licensee added to or deleted from the list of devices requiring qualification since issuance of Reference 04.05 should be considered.

6. Equipment that has changed from one category to another (e.g., from qualification not established to qualified) since issuance of Reference 04.05 should be considered.

7. Special attention should be given to devices listed in Reference 04.05 for which no documentation was submitted for review.

8. Equipment that has been installed as replacement for non-qualified equipment should be included.

9. At least one piece of equipment qualified to the DOR Guidelines (Reference 04.04) should be included.

10. The list of samples should cover a variety of equipment types including transmitters, valve operators, solenoid operated valves, cables, limit switches, motors, terminal blocks, and containment penetrations when possible.

11. Probabilistic Risk Analysis (PRA) of the sensitivity of hypothetical severe accident damage to component failure should be considered. Appendix A to this TI lists the most significant EQ-related components identified in one study in order of decreasing significance.

12. Partial review of certain files should be considered to address more rapidly, the treatment of specific concerns such as those cited in 06.01b.2 and 3 above.

Some modification of the sample list during the inspection may be desirable or necessary.

c. Team Member Assignments

The responsibility for the main segments of the inspection (see 06.02) should be divided among the team members before the inspection. The segments may be performed in parallel; however, comparison and correlation of information discovered during the inspection is necessary. For example, maintenance requirements described in qualification documentation should be compared with maintenance procedures, and master list equipment descriptions should be compared with the installed equipment.

d. Licensee Contact

Approximately 3 weeks before the inspection, the following items should be reviewed with the licensee:

1. Detailed inspection scope.

2. Documents to be made available for the inspection - see 04, References.

3. Advance copies of procedures - reference 04.13.

4. Licensee presentation in the entrance meeting covering:

   (a) organization chart with EQ applicability
   (b) overview of EQ program
   (c) overview of EQ documentation file organization

5. Advance arrangements for plant walkdown to avoid unnecessary delays.

6. Other logistics matters as appropriate.

06.02 Inspection Tasks

a. Entrance Meeting

During the entrance meeting at the start of the inspection, the team leader will describe the scope of the inspection and identify the list of the samples selected, including identification of walkdown samples. The logistics of the inspection should be discussed. The licensee's presentation to describe its organization, EQ program, and the status of program implementation should be made.

b. Procedural and Programmatic Inspection

1. Review the licensee's procedures to determine that a program has been implemented to generate, maintain, and distribute the list of equipment requiring qualification in accordance with 10 CFR 50.49.

2. Review EQ program documentation to determine that the licensee has implemented procedures for review and approval of EQ documentation and for establishing equipment qualification.

3. Review selected maintenance and/or surveillance procedures to determine that EQ requirements have been incorporated.

4. Determine that the procedures for procurement of replacement and spare equipment address EQ requirements and that they require qualification of the equipment to be established prior to use in the plant. Review selected procurement documents to determine that EQ requirements have been incorporated. In most instances, Paragraph (1) of 10 CFR 50.49 requires that replacement equipment must be qualified to a higher level than the DOR Guidelines. RG 1.89, Revision 1, provides guidance for alternatives to this requirement.

5. Determine that the procedures for control of plant modifications include evaluations of the effect of the modification on qualified equipment (e.g., the modification requires equipment that is qualified or the modification affects the environment of qualified equipment). Review selected modification packages and related documents such as work requests to determine that EQ requirements have been incorporated.

6. Determine by interviewing licensee personnel performing work involving qualified equipment that they are aware of EQ requirements and procedures. Determine that personnel performing review and approval of qualification documentation have appropriate training or experience.

7. Determine that the licensee has established and implemented a mechanism for addressing IE bulletins and information notices relating to equipment requiring qualification.

8. Review licensee QA/QC audit records for evidence of conformance to procedure requirements.

c. Documentation File Inspection

1. Review the completeness of the licensee's list of equipment requiring qualification by determining that the list includes the equipment listed in the licensee's list of emergency procedures equipment and that equipment required by RG 1.97 is included. Compare Reference 4.10a to 4.10b. Review the changes made to the EQ list and determine that they been made in accordance with established procedures.

2. Review the qualification files for the samples selected in 06.01b to determine if they contain the qualification specification for the equipment, adequate documentation of the qualification of the equipment, and a positive statement that the documentation has been reviewed and approved and the equipment determined to be qualified for its application. The review should be general in nature to determine that the important qualification requirements have been addressed. A checklist that can be used as a guide for these reviews is contained in Appendix B. Not every checklist item need be reviewed for each file; the Comments Column can be marked N/A for items not reviewed. In-depth review of one qualification package is addressed in Subsection 06.02c.5 below.

3. Review the documentation files to determine that the licensee has demonstrated that the qualified devices are the same as, or have been proven to be adequately similar to, the devices requiring qualification (i.e., the installed equipment).

4. For the selected samples, determine if that the commitments for corrective action stated in Reference 04.07 have been fulfilled or appropriate action is being taken.

5. Determine if the licensee's procedures for review and approval of qualification documentation have been implemented through review of the documentation file for a new device qualified to the requirements of 10 CFR 50.49 or for a piece of replacement equipment.

   This evaluation should entail an in-depth review of the adequacy of the qualification documentation in addition to the evaluation of the licensee's review and approval process. The check sheet provided in Appendix A should be completed for the in-depth review of one component file.

6. Obtain the equipment descriptions, model and serial number, and plant ID for use in the physical inspection. Determine any special requirements for device orientation, connections, housing seals, etc. dictated by the EQ documentation. (Appendix C contains checklists for standard pieces of equipment.)

7. For Westinghouse plants, verify that the licensee has satisfactorily addressed IE Information Notice 84-90 concerning main steam line breaks.

d. Physical Inspection

1. At the beginning of the inspection, discuss the accessibility of the devices to be inspected with the licensee. Modify the list as appropriate.

2. Through use of the equipment checklists contained in Appendix C, determine if the installed equipment is the same as that described in the licensee's documentation and that the equipment appears to be properly installed and maintained. The team member reviewing the documentation for a component should also perform the physical inspection, if possible. Physical inspection of the equipment by the entire team is desirable.

3. Determine if the equipment surrounding the device being inspected may fail in a manner that could prevent the device from performing its safety function. Any condition that could adversely affect the safety function of equipment being inspected should be noted for discussion with the licensee.

2515/76-07 REPORTING REQUIREMENTS

The team leader is responsible for the timely assembly and generation of the inspection report. The results of the inspection will be documented in a standard inspection report. A copy of the report shall be forwarded to the Office of Inspection and Enforcement, Vendor Program Branch, and to the Office of Nuclear Reactor Regulation, Environmental Qualification Branch.

2515/76-08 EXPIRATION DATE

This temporary instruction shall remain in effect for one year from the date of issue.

2515/76-09 IE CONTACT

R. C. Wilson (492-4841)

2515/76-10 STATISTICAL DATA REPORTING

The hours expended in the above activities should be reported under module 25576 on NRC form 766.

END

Appendices

APPENDIX A

MOST SIGNIFICANT EQ-RELATED COMPONENTS

PWR Component Sensitivities, PRA Study

Solenoid Valves for Control Valves	Auxiliary Feedwater
Motor Operators for Valves	Auxiliary Feedwater
Pump Motors	Auxiliary Feedwater
Motor Operators for Valves	High Pressure ECC
Motor Operators for Valves	Service Water
Pump Motors	Service Water
Motor Operators for Valves	Low Pressure ECC
Pump Motors	High Pressure ECC
Pump Motors	Low Pressure ECC

BWR Component Sensitivities, PRA Study

Motor Operators for Valves	Low Pressure ECC
Motor Operators for Valves	Service Water
Pump Motors	Service Water
Motor Operators for Valves	High Pressure ECC
Pump Motors	Low Pressure
Pump Motors	High Pressure ECC

APPENDIX B

CHECKLIST FOR REVIEW OF LICENSEE EQ DOCUMENTATION FILES

This checklist is provided for use in performing evaluations of the adequacy of a qualification package for a piece of equipment. Such reviews will determine the adequacy of the EQ program for the device and will determine the adequacy of the licensee's review and approval process for the equipment. Perform a complete review for one file. For other files, items not reviewed should be marked "N/A" in Comments Column.

Plant/Docket No.: _____ Reviewer: _____

Component(s): _____

Equipment Documentation File: _____

Criteria: 10 CFR 50.49 ___ or DOR Guidelines ___ or Other ___

EQ Issue		Covered in EQ Documentation Yes	No	Comments
1.	Positive statement by the licensee that the equipment is qualified for its application.	___	___	
2.	Full description of the equipment.	___	___	
3.	If qualification sample is not identical to the installed devices, a similarity analysis has been provided.	___	___	
4.	Allowed mounting methods and orientations.	___	___	
5.	Interfaces - conduit, housing seal, etc.	___	___	
6.	A qualified life has been established based on accelerated aging-thermal, radiation, cyclic, as appropriate.	___	___	
7.	All type tests performed on the same specimen (N/A DOR Guidelines).	___	___	

Component(s): _____

EQ Issue		Covered in EQ Documentation Yes	No	Comments
8.	Performance/acceptance criteria (operating time, transmitter accuracy, etc. as applicable to component).	—	—	
9.	Test sequence conforms to IEEE 323-74 or justification has been provided (N/A DOR Guidelines).	—	—	
10.	Radiation dose covers accident and normal service (DOR Guidelines permits analysis).	—	—	
11.	DBE exposure simulation meets plant requirements:	—	—	
	Steam Exposure	—	—	
	Temperature	—	—	
	Pressure	—	—	
	Humidity	—	—	
	(DOR Guidelines requires test for steam environment.)			
12.	Chemical or water spray simulation performed when required.	—	—	
13.	Accident environment margin. (N/A DOR Guidelines).	—	—	
14.	Submergence test (if required for application).	—	—	
15.	Test anomalies resolved.	—	—	
16.	Applicable INs, etc. resolved.	—	—	
17.	Maintenance/Surveillance Criteria and Life Defined.	—	—	
18.	References clearly identified and attached or retrievable (including I.D. of plant equipment).	—	—	

APPENDIX C

PHYSICAL INSPECTION CHECKLISTS

This appendix contains checklists for use in physical inspection of environmentally qualified equipment. Prior to the physical inspection, checklists should be prepared for each device that is to be inspected. The blank spaces in the "Documented Information" section of the checklist should be completed from the information in the licensee's documentation files relating to the device. Alternately, SCEW sheets, other licensee's current equivalent, may be used in lieu of completing some of the checksheet spaces. During the physical inspection, the installed condition should be compared with the documented condition. Agreement between the "As-installed" and "As-documented" information should be marked in the "Yes" column. A disagreement should be marked with a "No" and a description of the nature of the disagreement placed in the "Comments" column. A space is provided for general comments at the bottom of the checklist.

Checklists are provided for the following equipment:

Pressure Transmitters (also to be used for level and flow transmitters)
Motorized Valve Actuators
Limit Switches
Solenoid Operated Valves
Electric Motors
Cables

A general form is provided for other devices.

TRANSMITTER PHYSICAL INSPECTION CHECKLIST

Component ID No.: _____ Reviewer: _____

Documented Information		Installed Condition Agrees with Documented: Yes	No	Comments
1.	Location Bldg. ____ Room ___ Elev ___	___	___	
2.	Manufacturer _____	___	___	
3.a.	Model No. _____	___	___	
b.	Range/Type Code _____	___	___	
c.	Serial No. _____	___	___	
4.	Mounting Description _____ _____	___	___	
5.	Orientation _____ _____	___	___	
6.	Process Connection Type ____ _____	___	___	
7.	Electrical Connection Type __ _____	___	___	
8.	Housing Seals in Good Condition, Covers in Place	___	___	
9.	Does Installed Device Experience a Significant Temperature Rise from Process?	___	___	(If yes, review documentation to determine whether considered)
10.	Ambient Normal Expected Temperature Range _____	___	___	(If ambient temperature exceeds normal expected, verify that qualified life evaluation considered)

General Comments on Physical Inspection:

MOTORIZED VALVE ACTUATOR PHYSICAL INSPECTION CHECKLIST

Component ID No.: _____ Reviewer: _____

Documented Information		Installed Condition Agrees with Documented: Yes	No	Comments
1.	Location Bldg. ___ Room ___ Elev ___	___	___	
2.	Manufacturer _____	___	___	
3.a.	Model No. _____	___	___	
b.	Serial No. _____	___	___	
4.	Mounting Description _____ _____	___	___	
5.	Orientation _____ _____	___	___	
6.	Housing Seals in Good Condition, Covers in Place	___	___	
7.	Housing and Motor Drains ___ _____	___	___	
8.	Does Installed Device Have a Brake?	___	___	(If yes, verify qualification status)
9.	Conduit Seals _____	___	___	
10.	Ambient Normal Expected Temperature Range _____	___	___	(If ambient temperature exceeds normal expected conditions, verify that licensee has considered the elevated temperature in the qualified life evaluation)

General Comments on Physical Inspection:

LIMIT SWITCH PHYSICAL INSPECTION CHECKLIST

Component ID No.: _____ Reviewer: _____

Documented Information	Installed Condition Agrees with Documented: Yes	No	Comments
1. Location Bldg. ___ Room ___ Elev ___	___	___	
2. Manufacturer _____	___	___	
3. Model No. _____	___	___	
4. Mounting Description _____ _____	___	___	
5. Orientation _____ _____	___	___	
6. Electrical Connection Type _____	___	___	
7. Housing Seals in Good Condition	___	___	
8. Ambient Normal Expected Temperature Range _____	___	___	(If ambient temperature exceeds normal expected conditions, verify that licensee has considered the elevated temperature in the qualified life evaluation)

General Comments on Physical Inspection:

SOLENOID OPERATED VALVE PHYSICAL INSPECTION CHECKLIST

Component ID _____ Reviewer: _____

Documented Information	Installed Condition Agrees with Documented: Yes	No	Comments
1. Location Bldg. ___ Room ___ Elev ___	___	___	
2. Manufacturer _____	___	___	
3. a. Model No. _____	___	___	
b. Voltage _____	___	___	
c. Configuration _____	___	___	
4. Mounting Description _____ _____	___	___	
5. Orientation _____ _____	___	___	
6. Process Connection Type _____ _____	___	___	
7. Electrical Connection Type ___ _____	___	___	
8. Housing Seals in Good Condition	___	___	
9. Does Installed Device Experience a Significant Temperature Rise from Process?	___	___	(If yes, documentation must be reviewed to determine if the temperature rise was considered)
10. Ambient Normal Expected Temperature Range _____	___	___	(If ambient temperature exceeds normal expected conditions, verify that licensee has considered the elevated temperature in the qualified life evaluation)

General Comments on Physical Inspection:

ELECTRIC MOTOR PHYSICAL INSPECTION CHECKLIST

Component ID: _____ Reviewer: _____

Documented Information	Installed Condition Agrees with Documented: Yes	No	Comments
1. Location Bldg. ___ Room ___ Elev ___	___	___	
2. Manufacturer _____	___	___	
3.a. Model No. _____	___	___	
b. Serial No. _____	___	___	
c. Voltage _____ Hp ___	___	___	
4. Mounting and Orientation ___ _____	___	___	
5. Accessories _____	___	___	
Coolers _____	___	___	
Lubricant Reservoirs _____	___	___	
Heaters _____	___	___	
6. Housing Seals and Covers in Place and Tight ___ _____	___	___	
7. Area Surrounding Motor is Clean and Dry _____	___	___	
8. Ambient Normal Expected Temperature Range _____	___	___	
9.a. Junction Box Type _____ _____	___	___	
b. Drainage Method _____ _____	___	___	

General Comments on Physical Inspection:

CABLE PHYSICAL INSPECTION CHECKLIST

Documented Information	Installed Condition Agrees with Documented: Yes	No	Comments
1. Location Bldg. ___ Room ___ Elev ___	___	___	
2.a. Manufacturer _____	___	___	
b. Model No. _____	___	___	
c. Batch No. _____	___	___	
3.a. Insulation Type _____	___	___	
b. Jacket Type _____	___	___	
c. Number of Conductors _____	___	___	
d. Conductor Size _____	___	___	
e. Shield Configuration _____ _____	___	___	
4. Voltage Rating _____	___	___	(General Information may not be discernible as installed)
5. Ambient Normal Expected Temperature Range _____	___	___	
6. General Condition of Installed Cable	None	Some	
a. Obvious signs of mistreatment	___	___	
b. Obvious surface flaws	___	___	
c. Obvious flaws on conductor insulation at terminations	___	___	

General Comments on Physical Inspection:

EQUIPMENT DESCRIPTION

Component ID _____ Reviewer: _____

Documented Information	Installed Condition Agrees with Documented: Yes	No	Comments
1. Location Bldg. ___ Room ___ Elev ___	___	___	
2. Manufacturer _____	___	___	
3.a. Model No. _____	___	___	
b. Serial No. _____	___	___	
4. Mounting Description _____	___	___	
5. Orientation _____	___	___	
6. Process Connection Type _____	___	___	
7. Electrical Connection Type _____	___	___	
8. Housing Seals in Good Condition, Covers In Place	___	___	
9. Does Installed Device Experience a Significant Temperature Rise from Process?	___	___	(If yes, documentation must be reviewed to determine if the temperature rise was considered)
10. Ambient Normal Expected Temperature Range _____	___	___	(If ambient temperature exceeds normal expected conditions, verify that licensee has considered the elevated temperature in the qualified life evaluation)

General Comments on Physical Inspection:

APPENDIX G

EQ PROGRAM EVALUATION RESULTS FROM NUCLEAR POWER PLANTS

EQ PROGRAM
EVALUATION RESULTS AT KEWAUNEE
(DOR)

Construction Permit (CP): 8/6/68
Operating Permit (OP): 12/21/73

Technical Evaluation Report (TER) January 14, 1983

As a result of the review performed by Franklin Research Center (FRC), the 172 equipment items on the Kewaunee master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and the overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	14
Category I.B	Equipment qualification pending modification	43
Category II.A	Equipment qualification not established	74
Category II.B	Equipment not qualified	0
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	20
Category III.A	Equipment exempt from qualification	1
Category III.B	Equipment not in the scope of the review	2
Category IV	Documentation not made available	18

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	69
2.	Adequate similarity between equipment and test specimen was not established	44
3.	Aging degradation was not evaluated adequately	59
4.	Qualified life or replacement schedule was not established	58
5.	Program to identify aging degradation not established	0
6.	Criteria regarding aging simulation not met	1
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	8
8	Criteria regarding spray not satisfied	5
9.	Criteria regarding submergence not satisfied	7
10.	Criteria regarding radiation not satisfied	9
11.	Criteria regarding test sequence not satisfied	2
12.	Criteria regarding test failures or severe anomalies not satisfied	0
13.	Criteria regarding functional testing not satisfied	1
14.	Criteria regarding instrument accuracy not satisfied	1
15.	Test duration margin not satisfied	0
16.	Criteria regarding margins not satisfied	0

The most common problems among the equipment items at Kewaunee included inadequate or missing documentation, lack of similarity between tested and actual devices, and inadequate evaluation of aging. FRC stated that many of the references used by the licensee were not included in the submittal, making the review difficult.

FRC also made the following observations about the licensee's program deficiencies:

- It was not possible to determine, for the items that referenced documentation, that the qualified results were applicable to the installed equipment, especially for cable.

- The licensee referenced aging analyses and evaluations, but often did not include them for review.

- In many cases, when responding to the staff's Safety Evaluation Report (SER) of the material submitted for IE Bulletin 79-01B, the licensee stated "an evaluation is in progress." No plan or schedule was given by the licensee for the resolution of the problem.

- The Limitorque operator evaluation only considered motors and switches. Torque switches, wiring, etc., should have also been included.

- Accuracy was not included in the licensee's analysis of instrumentation circuits. It was not possible to determine whether the instrument was functionally adequate for its application.

TER SER February 2, 1983

On February 2, 1983, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the issues identified in the TER, and devote special attention to the items in Categories I.B, II.A, and II.B where justification for continued operation was not submitted, and the deficiencies identified in the Master Equipment List, qualification of submerged equipment, documentation of qualified items, Limitorque operator qualification, and instrumentation.

Final SER July 11, 1984

Based on a meeting with the licensee on January 20, 1984, and the March 16, 1984 submittal to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. In general NRC acceptance of the licensee's EQ program was based on 1) the resolution of deficiencies identified in the FRC TER, 2) program compliance with 10 CFR 50.49, and 3) a justification for continued operation for those equipment items for which qualification had not yet been established (because all of the equipment at Kewaunee was accepted as qualified, no justification for continued operation was warranted).

The staff used the methodology in Appendix C to perform the safety evaluation.

Site Inspection March 9 to April 3, 1987

The staff conducted a special, announced inspection of the Kewaunee EQ program from March 9 to April 3, 1987. The staff used the inspection methodology in Appendix E to perform the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee's program met 10 CFR 50.49 requirements.

The inspection covered the following EQ program areas at Kewaunee:

- Licensee actions on previous inspection findings
- Responses to NRC Bulletins
- Actions on SER/TER commitments
- Program compliance with 50.49
- Documentation file review including cables, splices, terminations, terminal blocks, motors, SOVs, penetrations, seals, lubricants, transmitters, RTDs, rad monitors, switches, and miscellaneous electrical devices. Some discrepancies were noted in auditability and performance criteria of the equipment.
- Physical plant inspection
- An issue regarding Raychem splices (IN 86-53) at Kewaunee

EQ PROGRAM
EVALUATION RESULTS AT PALISADES
(DOR-SEP)

CP: 3/14/67
OP:10/16/72

Systematic Evaluation Plant (SEP) TER May 30,1980

The licensee identified 42 separate safety related equipment items in their 1978 submission for SEP plants to the NRC. These items were reviewed by FRC and categorized into three classes: 1) fully satisfied the guidelines, 2) does not satisfy the guidelines (includes a review of deviations), and 3) not within the guideline scope. Most of the items reviewed fell in the "Not satisfied: deviation judged to be unacceptable."

The majority of the deviations fell into one of the following groups:

- relationship between installed and t ed equipment not established
- aging not evaluated and qualified life not calculated
- duration of steam exposure not sufficient
- steam exposure does not fully envelope the accident profile
- vendor Certification of Compliance cited as evidence of qualification
- submergence not addressed in test program
- radiation not included in test program

TER SER December 30, 1982

As a result of the review performed by FRC, the 143 equipment items on the Palisades master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	41
Category I.B	Equipment qualification pending modification	20
Category II.A	Equipment qualification not established	33
Category II.B	Equipment not qualified	4
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	24
Category III.A	Equipment exempt from qualification	3
Category III.B	Equipment not in the scope of the review	18
Category IV	Documentation not made available	0

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	40
2.	Adequate similarity between equipment and test specimen not established	23
3.	Aging degradation evaluated inadequately	22
4.	Qualified life or replacement schedule were not established	42
5.	Program to identify aging degradation not established	12
6.	Criteria regarding aging simulation not met	1
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	8

8. Criteria regarding spray not satisfied.....2
9. Criteria regarding submergence not satisfied.....11
10. Criteria regarding radiation not satisfied.....6
11. Criteria regarding test sequence not satisfied.....2
12. Criteria regarding test failures or severe anomalies not satisfied.....6
13. Criteria regarding functional testing not satisfied.....0
14. Criteria regarding instrument accuracy not satisfied.....0
15. Test duration margin not satisfied.....3
16. Criteria regarding margins not satisfied.....0

FRC identified three basic concerns following their review of the Palisades EQ program. For the items placed in Category II.A, many had aging or qualified life deficiencies, lack of documentation, or incomplete traceability of the tested specimen to the installed item.

TER SER April 25, 1983

On April 25, 1983, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the issues identified in the TER, and d vote special attention to items in Categories I.B and II.A where justification for continued operation was not submitted, and to the resolution of deficiencies with items in Category II.B.

Final SER January 31, 1985

Based on a meeting with the licensee on January 10, 1984, and the February 14 and June 15, 1984 submittals from the licensee to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. The program's acceptance was based upon 1) the proposed resolution of EQ deficiencies identified in the April 25, 1983 SER, and the December 30, 1982 FRC TER, 2) compliance with the requirements of 10 CFR 50.49, and 3) JCOs for those equipment items (13) for which EQ was not established at the time of the SER.

The staff used the methodology described in Appendix C to perform the safety evaluation.

Site Inspection December 8, 1986 to January 13, 1987

The staff conducted a special, announced inspection of the Palisades EQ program from December 8, 1986 to January 13, 1987. The staff used the inspection methodology described in Appendix E to perform the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee's program met 10 CFR 50.49 requirements.

The inspection covered the following EQ program areas at Palisades:

- Licensee actions on previously identified EQ findings
- Licensee actions on SER/TER commitments
- Program compliance with 50.49
- Documentation file review including cables, splices, terminations, terminal blocks, motors, HOVs, SOVs, penetrations, seals, lubricants, transmitters, RTDs, radiation monitors, and miscellaneous electrical devices. Some discrepancies were noted in auditability and completeness of some files, use of similarity between as-tested and as-installed equipment, and the performance criteria of some equipment.
- NRC Bulletins were reviewed against the licensee's documentation.
- A plant walkdown. During the walkdown, one discrepancy was noted on Limitorque operator T-drains being plugged.

EQ PROGRAM
EVALUATION RESULTS AT
NINE MILE POINT 1
(DOR)

CP: 4/12/65
OP: 12/26/74

IER August 26, 1982

As a result of the review performed by FRC, the 100 equipment items on the Nine Mile Point 1 (NMP1) master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	3
Category I.B	Equipment qualification pending modification	21
Category II.A	Equipment qualification not established	69
Category II.B	Equipment not qualified	0
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	4
Category III.A	Equipment exempt from qualification	1
Category III.B	Equipment not in the scope of the review	0
Category IV	Documentation not made available	2

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	68
2.	Adequate similarity between equipment and test specimen was not established	24
3.	Aging degradation not evaluated adequately	22
4.	Qualified life or replacement schedule not established	22
5.	Program to identify aging degradation not established	2
6.	Criteria regarding aging simulation not met	4
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	6
8.	Criteria regarding spray not satisfied	1
9.	Criteria regarding submergence not satisfied	0
10.	Criteria regarding radiation not satisfied	8
11.	Criteria regarding test sequence not satisfied	0
12.	Criteria regarding test failures or severe anomalies not satisfied	0
13.	Criteria regarding functional testing not satisfied	1
14.	Criteria regarding instrument accuracy not satisfied	0
15.	Test duration margin not satisfied	0
16.	Criteria regarding margins not satisfied	0

FRC identified some additional basic concerns in their review of the Nine Mile Point 1 (NMP1) EQ program.

FRC pointed out that NMP1 had not resolved the staff's concern over the identification of safety-related systems and display instrumentation. FRC's review found that the list of systems and display instrumentation was still incomplete and recommended that the licensee submit a complete and

comprehensive list of systems to be qualified to the NRC for review and approval.

In addition, even though the deficiencies identified in the original staff SER were addressed by the licensee, no schedule was given for their resolution.

TER SER December 20, 1982

On December 20, 1982, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the issues identified in the TER, and devote special attention to items in Categories I.B, II.A, and II.B where justification for continued operation was not submitted, and to the resolution of concerns regarding the completeness of the safety-related equipment list and display instrumentation specifically identified in the FRC TER.

Final SER January 10, 1985

Based on a meeting with the licensee on March 15, 1984, and the May 31, 1984 submittal to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. The program's acceptance was based upon the 1) the proposed resolution of EQ deficiencies identified in the December 30, 1982 SER, and the August 6, 1982 FRC TER, 2) compliance with the requirements of 10 CFR 50.49, and 3) JCOs for those components (408 tag numbers in 88 equipment item groups) for which EQ was not established at the time of the SER.

The staff used the methodology described in Appendix C to perform the safety evaluation.

Site Inspection August 19 to 23, 1985

The staff conducted a special, announced inspection of the NMP1 EQ program from August 19 through 23, 1985. The staff used the inspection methodology described in Appendix E to perform the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee had implemented an "interim" EQ program that met 10 CFR 50.49 requirements. However, the interim program had significant deficiencies. The most significant program deficiencies identified during the inspection were: 1) lack of auditable documentation to support qualification, and, in several instances, 2) information provided by the licensee did not support the qualification of the equipment item. During the course of the inspection, the licensee provided a schedule for implementing the final EQ program.

The inspection included the following EQ program areas at NMP1:

- Licensee actions on previously identified EQ findings
- Licensee actions on SER/TER commitments
- Program compliance with 50.49; including procedures, master equipment list, maintenance and surveillance program, procurement and upgrading, QA and training
- Documentation file review including cables, splices, terminations, terminal blocks, motors, MOVs, SOVs, penetrations, seals, lubricants, transmitters, RTDs, radiation monitors, and miscellaneous electrical devices. Some discrepancies were noted in auditability and completeness of some files, use of similarity between as-tested and as-installed equipment, and the performance criteria of some equipment.
- Licensee activities regarding applicable NRC Bulletins and Notices
- A plant walkdown

EQ PROGRAM
EVALUATION RESULTS AT
TURKEY POINT 3/4
(DOR)

CP: 4/27/67
OP:(3) 7/19/72
(4) 4/10/73

TER September 30, 1982

As a result of the review performed by FRC, the 111 equipment items on the Turkey Point 3/4 master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	1
Category I.B	Equipment qualification pending modification	13
Category II.A	Equipment qualification not established	49
Category II.B	Equipment not qualified	6
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	34
Category III.A	Equipment exempt from qualification	0
Category III.B	Equipment not in the scope of the review	8
Category IV	Documentation not made available	0

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	40
2.	Adequate similarity between equipment and test specimen not established	24
3.	Aging degradation not evaluated adequately	66
4.	Qualified life or replacement schedule not established	69
5.	Program to identify aging degradation not established	9
6.	Criteria regarding aging simulation not met	16
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	23
8.	Criteria regarding spray not satisfied	12
9.	Criteria regarding submergence not satisfied	3
10.	Criteria regarding radiation not satisfied	10
11.	Criteria regarding test sequence not satisfied	2
12.	Criteria regarding test failures or severe anomalies not satisfied	8
13.	Criteria regarding functional testing not satisfied	2
14.	Criteria regarding instrument accuracy not satisfied	8
15.	Test duration margin not satisfied	4
16.	Criteria regarding margins not satisfied	0

Even though no common problems were identified in the FRC TER evaluation, the FRC evaluation indicated problems with aging evaluation, qualified life determinations, and adequate documentation regarding equipment qualification.

TER SER December 13, 1982

On December 13, 1982, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the issues identified in the TER, and devote special attention to items in Categories I.B, II.A, and II.B where justification for continued operation was not submitted, and to the resolution of concerns regarding the qualification of safety-related equipment listed in Category II.B.

Final SER October 25, 1984

Based on a meeting with the licensee on May 8, 1984, and the July 12, 1984 submittal to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. Program acceptance was based on 1) the resolution of deficiencies identified int he FRC TER, 2) program compliance with 10 CFR 50.49, and 3) a justification for continued operation (JCO) for those equipment items for which qualification had not yet been established. All equipment was accepted as qualified for Unit 4, therefore, no justification for continued operation was warranted. JCOs for three limit switches and six flow switches were accepted for Unit 3.

The staff used the methodology in Appendix C to perform the safety evaluation.

Site Inspection March 2 to 6, 1987

The staff conducted a special, announced inspection of the NMP1 EQ program from March 2 through 6, 1987. The staff used the inspection methodology described in Appendix E to perform the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee had implemented a EQ program that met 10 CFR 50.49 requirements, however, several unresolved deficiencies were identified. No deficiencies were identified in the implementation of SER/TER commitments.

The most significant program deficiencies identified during the inspection were: 1) lack of auditable documentation to support qualification, and, 2) in several instances, information provided by the licensee did not support the qualification of the equipment item; for example, Raychem splices were found

in unqualified configurations, and references to Scotch electrical tape qualification data were not properly related to 3M-brand electrical tape installed in the plant.

The inspection included the following EQ program areas at Turkey Point:

- Licensee actions on SER/TER commitments.
- Program compliance with 50.49; including procedures, documentation requirements, master equipment list, defining environmental zones, maintenance and surveillance program, modifications and new equipment, procurement and upgrading, QA and training.
- Documentation file review including cables, splices, terminations, terminal blocks, motors, MOVs, SOVs, penetrations, seals, lubricants, transmitters, RTDs, radiation monitors, and miscellaneous electrical devices. Some discrepancies were noted in auditability and completeness of some files, use of similarity between as-tested and as-installed equipment, and the performance criteria of some equipment.
- Licensee activities regarding applicable NRC Bulletins and Notices.
- A plant walkdown.

EQ PROGRAM
EVALUATION RESULTS AT
MONTICELLO
(DOR)

CP: 6/19/67
OP: 1/9/81

IER August 23, 1982

As a result of the review performed by FRC, the 150 equipment items on the Monticello master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	7
Category I.B	Equipment qualification pending modification	56
Category II.A	Equipment qualification not established	65
Category II.B	Equipment not qualified	8
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	11
Category III.A	Equipment exempt from qualification	2
Category III.B	Equipment not in the scope of the review	1
Category IV	Documentation not made available	0

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	74
2.	Adequate similarity between equipment and test specimen not established	29
3.	Aging degradation not evaluated adequately	48
4.	Qualified life or replacement schedule not established	46
5.	Program to identify aging degradation not established	4
6.	Criteria regarding aging simulation not met	9
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	38
8.	Criteria regarding spray not satisfied	2
9.	Criteria regarding submergence not satisfied	0
10.	Criteria regarding radiation not satisfied	18
11.	Criteria regarding test sequence not satisfied	0
12.	Criteria regarding test failures or severe anomalies not satisfied	13
13.	Criteria regarding functional testing not satisfied	1
14.	Criteria regarding instrument accuracy not satisfied	2
15.	Test duration margin not satisfied	0
16.	Criteria regarding margins not satisfied	0

The most common problems among the equipment items at Monticello included inadequate or missing documentation, inadequate evaluation of aging or qualified life, incorrect temperature or pressure exposure criteria associated with qualification testing, and lack of similarity between tested and actual devices.

FRC observed that the licensee tried to qualify some equipment for LOCA or HELB environments by analysis using inadequate technical justification;

specifically for references, assumptions, failure-modes-and-effects analysis, and the identification of materials based on valid manufacturer's information. The licensee also tried to qualify Rotork A series MOVs using a test report with unsubstantiated testing anomalies.

FRC also indicated that some of the assumptions the licensee used to qualify certain components were in error or incomplete (e.g., post accident drywell temperatures). In addition, the licensee did not provide post-accident environmental service conditions for the torus and other affected areas of the plant. FRC also noted that the licensee's method for aging and determining qualified life was not technically valid.

TER SER January 4, 1983

On January 4, 1983, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the deficiencies in the TER, and devote special attention to the items in Categories I.B, II.A, and II.B where justification for continued operation was not submitted, and the deficiencies identified for Category II.B where equipment was determined not to be qualified.

Final SER December 13, 1984

Based on a meeting with the licensee on December 12, 1983, and the February 10, 1984 submittal to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. Program acceptance was based on 1) the resolution of deficiencies identified int he FRC TER, 2) program compliance with 10 CFR 50.49, and 3) a justification for continued operation for those equipment items for which qualification had not yet been established. Because all equipment was accepted as qualified, no justification for continued operation was warranted at Monticello.

The staff used the methodology in Appendix C to perform the safety evaluation.

Site Inspection October 26, 1987 through January 28, 1988

The staff conducted a special, announced inspection of the Monticello EQ program from March 9 to April 3, 1987. The staff used the inspection methodology described in Appendix E to complete the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed

on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee's program met 10 CFR 50.49 requirements.

The inspection covered the following EQ program areas at Monticello:

- Actions on SER/TER commitments
- Licensee's implementation of Regulatory Guide 1.97 (Open Item review)
- Responses to NRC Bulletins and Information Notices
- Program compliance with 50.49; including procedures, master equipment list, maintenance and surveillance program, procurement and upgrading, QA and training.
- Documentation file review including cables, splices, terminations, terminal blocks, motors, SOVs, penetrations, seals, lubricants, transmitters, RTDs, rad monitors, switches, and miscellaneous electrical devices. Some discrepancies were noted in auditability, and performance criteria of the equipment.
- Physical plant inspection

During the documentation review, the inspectors identified several equipment installation and file auditability deficiencies.

EQ PROGRAM
EVALUATION RESULTS AT
PEACH BOTTOM UNITS 2 & 3
(DOR)

CP: 1/31/68
OP: 7/2/74

IER August 3, 1982

As a result of the review performed by FRC, the 130 equipment items on the Peach Bottom master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	1
Category I.B	Equipment qualification pending modification	22
Category II.A	Equipment qualification not established	66
Category II.B	Equipment not qualified	0
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	34
Category III.A	Equipment exempt from qualification	2
Category III.B	Equipment not in the scope of the review	5
Category IV	Documentation not made available	0

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	57
2.	Adequate similarity between equipment and test specimen not established	25
3.	Aging degradation not evaluated adequately	57
4.	Qualified life or replacement schedule not established	36
5.	Program to identify aging degradation not established	2
6.	Criteria regarding aging simulation not met	0
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	24
8.	Criteria regarding spray not satisfied	1
9.	Criteria regarding submergence not satisfied	1
10.	Criteria regarding radiation not satisfied	4
11.	Criteria regarding test sequence not satisfied	0
12.	Criteria regarding test failures or severe anomalies not satisfied	0
13.	Criteria regarding functional testing not satisfied	4
14.	Criteria regarding instrument accuracy not satisfied	0
15.	Test duration margin not satisfied	0
16.	Criteria regarding margins not satisfied	0

The most common problems among the equipment items at Peach Bottom included inadequate or missing documentation, inadequate evaluation of aging or qualified life, incorrect temperature or pressure exposure criteria associated with qualification testing, and lack of similarity between tested and actual devices. FRC also identified generic problems with the licensee's response to the NRC's original SER, specifically in the area of scheduling required upgrades, and explaining environmental assumptions on the component evaluation worksheets.

TER SER December 20, 1982

On December 20, 1982, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, and requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the deficiencies in the TER, and devote special attention to the items in Categories I.B, II.A, and II.B where justification for continued operation was not submitted, to resolving deficiencies regarding the completeness of the master equipment list, and to providing plans for the replacement or qualification of unqualified equipment and a schedule for accomplishing the corrective actions.

Final SER October 18, 1984

Based on a meeting with the licensee on December 5, 1983, and the February 21 and June 13, 1984, submittals to clarify any outstanding issues from the FRC TER, the staff accepted the licensee's EQ program. Program acceptance was based on 1) the resolution of deficiencies identified in the FRC TER, 2) program compliance with 10 CFR 50.49, and 3) a justification for continued operation for those equipment items (19 for each plant) for which qualification had not yet been established.

The staff used the methodology described in Appendix C to perform the safety evaluation.

Site Inspection October 26, 1987 through January 28, 1988

The staff conducted a special, announced inspection of the Peach Bottom EQ program from June 15-19, 1987. The staff used the inspection methodology in Appendix E to complete the inspection.

The objective of the inspection was to determine whether the licensee's EQ program complied with the requirements of 10 CFR 50.49. To accomplish this objective, the staff reviewed the licensee's implementation of their EQ program and the licensee's actions on SER/TER commitments. The staff focussed on the adequacy of the EQ documentation, and included a plant walkdown of EQ components.

As a result of the inspection, the staff concluded that the licensee's program met 10 CFR 50.49 requirements.

The inspection covered the following EQ program areas at Peach Bottom:

- Actions on SER/TER commitments.
- Licensee's implementation of Regulatory Guide 1.97.

- Responses to NRC Bulletins and Information Notices, and actions related to IN 86-03 and IN 86-53.
- Program compliance with 50.49; including procedures, master equipment list, maintenance and surveillance program, procurement and modifications, QA and training.
- Documentation file review including cables, splices, terminations, terminal blocks, motors, SOVs, penetrations, seals, lubricants, transmitters, RTDs, rad monitors, switches, and miscellaneous electrical devices. Some discrepancies were noted in general procedures for controlling file content, which subsequently lead to problems with auditability, and documenting the performance criteria of the equipment.
- QA/QC interfaces.
- Physical plant inspection.

During the documentation review, the inspectors identified several deficiencies. Among the unresolved items were deficiencies in procurement procedures, general file deficiencies, a component not meeting Reg Guide 1.97 requirements, incomplete or not updated files, and incomplete master equipment list.

EQ PROGRAM
EVALUATION RESULTS AT
ST. LUCIE 1 (DOR)

CP: 7/1/70
OP: 3/1/76

IER February 28, 1982

As a result of the review performed by FRC, the 182 equipment items on the St. Lucie Unit 1 master equipment list were grouped into the following categories: (See Appendix B for a detailed description of each category and an overall methodology FRC used to conduct this review)

Category I.A	Equipment qualified	6
Category I.B	Equipment qualification pending modification	27
Category II.A	Equipment qualification not established	59
Category II.B	Equipment not qualified	9
Category II.C	Equipment satisfies all requirements except qualified life or replacement schedule justified	30
Category III.A	Equipment exempt from qualification	2
Category III.B	Equipment not in the scope of the review	47
Category IV	Documentation not made available	2

The deficiencies that were identified for each equipment item were further categorized into the following groups:

1.	Documented evidence of inadequate qualification	49
2.	Adequate similarity between equipment and test specimen not established	28
3.	Aging degradation not evaluated adequately	53
4.	Qualified life or replacement schedule not established	72
5.	Program to identify aging degradation not established	1
6.	Criteria regarding aging simulation not met	10
7.	Criteria regarding temperature/pressure exposure (EQ testing) not met	43
8.	Criteria regarding spray not satisfied	15
9.	Criteria regarding submergence not satisfied	8
10.	Criteria regarding radiation not satisfied	12
11.	Criteria regarding test sequence not satisfied	9
12.	Criteria regarding test failures or severe anomalies not satisfied	9
13.	Criteria regarding functional testing not satisfied	2
14.	Criteria regarding instrument accuracy not satisfied	1
15.	Test duration margin not satisfied	11
16.	Criteria regarding margins not satisfied	0

The most common problems among the equipment items at St. Lucie Unit 1 included inadequate or missing documentation, inadequate evaluation of aging or qualified life, incorrect temperature or pressure exposure criteria associated with qualification testing, and lack of similarity between tested and actual devices. FRC cited several Fischer and Porter level and pressure transmitter models with inadequate qualification test packages. In addition, the licensee's qualification methods that included extrapolating thermal aging analyses and saturated steam test results were questioned by FRC. Before the

licensee could use these techniques, adequate technical justification had to be presented.

TER SER April 21, 1981

On April 21, 1983, the staff issued an SER on the licensee's EQ program which included the FRC TER as an attachment. In the SER, the staff concurred with the program deficiencies identified by FRC in the TER, requested that the licensee send additional information related to those deficiencies.

Based on the results of the FRC TER, the staff did not accept the licensee's program. The staff requested that the licensee resolve the deficiencies in the TER, and devote special attention to the items in Categories I.B and IV where justification for continued operation was not submitted, to resolving deficiencies regarding the equipment in Category II.B (Equipment Not Qualified), and to resolve the staff concerns regarding the radiation dose rate inside the containment identified in the FRC TER.

Final SER November 15, 1984

Based on a meeting with the licensee on May 8, 1984, and the July 12, 1984, submittal to clarify any outstanding issues from the FRC TER, the staff accepted the licensees EQ program. Program acceptance was based on 1) the resolution of deficiencies identified in the FRC TER, 2) program compliance with 10 CFR 50.49, and 3) a justification for continued operation for those equipment items (22) for which qualification had not yet been established. The licensee responded to the SER in December 1984 by stating that all of the equipment items within the scope of 10 CFR 50.49 have been qualified.

The staff used the methodology described in Appendix C to perform the safety evaluation.

Site Inspection

The staff conducted special, announced inspections of the licensee's EQ program to verify that the program had been implemented adequately. The EQ inspection at St. Lucie Units 1 and 2 were conducted in two phases due to plant operation. The staff issued a single inspection report for each phase of the inspection covering both units. Each unit was inspected against its own EQ requirements (i.e., Unit 1: DOR, Unit 2: Category II).

Phase 1: March 31, 1986 to April 4, 1986

The purpose of this inspection was to review the licensee's implementation of a program meeting the requirements of 10 CFR 50.49 at Unit 1. Phase 1 of the site inspection verified that the documentation in the EQ files supported qualification, and checked the as-installed configuration of EQ equipment located outside the containment. The inspection covered the following EQ program areas at St. Lucie:

- EQ Program procedures.