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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY

INTRODUCTION

Equipment which is used to perform a necessary safety function must be demonstrated to be capable of maintaining functional operability under all service conditions postulated to occur during its installed life for the time it is required to operate. This requirement, which is embodied in General Design Criteria 1 and 4 of Appendix A and Sections III, XI, and XVII of Appendix B to 10 CFR 50, is applicable to equipment located inside as well as outside containment. More detailed requirements and guidance relating to the methods and procedures for demonstrating this capability for electrical equipment have been set forth in 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment" (which supplements IEEE Standard 323 and various NRC Regulatory Guides and industry standards), and "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" (DOR Guidelines)

BACKGROUND

On February 8, 1979, the NRC Office of Inspection and Enforcement (IE) issued to all licensees of operating plants (except those included in the systematic evaluation program (SEP)) IE Bulletin (IEB) 79-01, "Environmental Qualification of Class 1E Equipment." This Bulletin, together with IE Circular 78-08 (issued on May 31, 1978), required the licensees to perform reviews to assess the adequacy of their environmental qualification programs.

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On January 14, 1980, NRC issued IEB 79-01B which included the DOR Guidelines and NUREG-0588 as attachments 4 and 5, respectively. Subsequently, on May 23, 1980, Commission Memorandum and Order CLI-80-21 was issued and stated that the DOR Guidelines and portions of NUREG-0588 form the requirements that licensees must meet regarding environmental qualification of safety-related electrical equipment in order to satisfy those aspects of 10 CFR 50, Appendix A, General Design Criterion (GDC) 4. Supplements to IEB 79-01B were issued for further clarification and definition of the staff's needs. These supplements were issued on February 29, September 30, and October 24, 1980.

In addition, the staff issued orders dated August 29, 1980 (amended in September 1980) and October 24, 1980 to all licensees. The August order required that the licensees provide a report, by November 1, 1980, documenting the qualification of safety-related electrical equipment. The October order required the establishment of a central file location for the maintenance of all equipment qualification records. The central file was mandated to be established by December 1, 1980. The staff subsequently issued a Safety Evaluation Report (SER) on environmental qualification of safety-related electrical equipment to the licensee on June 8, 1981. This SER directed the licensee 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 (requalification, replacement (etc.))." The licensee was required to respond to NRC within 90 days of receipt of the SER. In response to the staff SER issued in 1981, the licensee submitted additional information regarding the qualification of safety-related electrical equipment. This information was evaluated for the staff by the Franklin Research Center (FRC) in order to: 1) identify all cases where the licensee's response did not resolve the significant qualification issues, 2) evaluate the licensee's qualification documentation in accordance with established criteria to determine which equipment had adequate documentation and which did not, and 3) evaluate the licensee's qualification documentation for safety-related electrical equipment located in harsh environments required for TMI Lessons Learned Implementation. A Technical Evaluation Report (TER) was issued by FRC on March 18, 1983. A Safety Evaluation Report was subsequently issued to the New York Power Authority on April 19, 1983, with the FRC TER as an attachment.

A final rule on environmental qualification of electric equipment important to safety for nuclear power plants became effective on February 22, 1983. This rule, Section 50.49 of 10 CFR 50, specifies the requirements of electrical equipment important to safety located in a harsh environment. In accordance with this rule, equipment for FitzPatrick may be qualified to the criteria specified in either the DOR Guidelines or NUREG-0588, except for replacement equipment. Replacement equipment installed subsequent to February 22, 1983 must be qualified in accordance with the provisions of 10 CFR 50.49, using the guidance of Regulatory Guide 1.89, unless there are sound reasons to the contrary.

A meeting was held with each licensee of plants for which a TER had been prepared for the staff by FRC in order to discuss all remaining open issues regarding environmental qualification, including acceptability of the environmental conditions for equipment qualification purposes, if this issue had not yet been resolved. On March 30, 1984, a meeting was held to discuss New York Power Authority's proposed method to resolve the environmental qualification deficiencies identified in the April 19, 1983 SER and March 18, 1983 FRC TER. Discussions also included New York Power Authority's general methodology for compliance with 10 CFR 50.49, and justification for continued operation for those equipment items for which environmental qualification is not yet completed. The minutes of the meeting and proposed method of resolution for each of the environmental qualification deficiencies are documented in the June 15 and October 15, 1984 submittals from the licensee.

EVALUATION

The evaluation of the acceptability of the licensee's electrical equipment environmental qualification program is based on the results of an audit review performed by the staff of: (1) the licensee's proposed resolutions of the environmental qualification deficiencies identified in the April 19, 1983 SER and March 18, 1983 FRC TER; (2) compliance with the requirements of 10 CFR 50.49; and (3) justification for continued operation (JCO) for those equipment items for which the environmental qualification is not yet completed.

Proposed Resolutions of Identified Deficiencies

The proposed resolutions for the equipment environmental qualification deficiencies, identified in the April 19, 1983 SER, and the FRC TER enclosed with it, are described in the licensee's June 15 and October 15, 1984 submittals. During the March 30, 1984 meeting with the licensee, the staff discussed the proposed resolution of each deficiency for each equipment item identified in the FRC TER and found the licensee's approach for resolving the identified environmental qualification deficiencies acceptable. The majority of deficiencies identified were documentation, similarity, aging, qualified life and replacement schedule. All open items identified in the SER dated April 19, 1983 were also discussed and the resolution of these items has been found acceptable by the staff.

The approach described by the licensee for addressing and resolving the identified deficiencies includes replacing equipment, performing additional analyses, utilizing additional qualification documentation beyond that reviewed by FRC, obtaining additional qualification documentation and determining that some equipment is outside the scope of 10 CFR 50.49, and therefore not required to be environmentally qualified, e.g., located in a mild environment. We discussed the proposed resolutions in detail on an item by item basis with the licensee during the March 30, 1984 meeting. Replacing or exempting equipment, for an acceptable reason, are clearly acceptable methods for resolving environmental qualification deficiencies. The more lengthy discussions with the licensee concerned the use of additional analyses or documentation. Although we did not review the additional analyses or documentation, we discussed how analysis was being used to resolve deficiencies identified in the FRC TER, and the content of the additional documentation in order to determine the acceptability of these methods. The licensee's equipment environmental qualification files will be audited by the staff during follow-up inspections to be performed by Region I, with assistance from IE Headquarters and NRR staff as necessary.

Since a significant amount of documentation has already been reviewed by the staff and Franklin Research Center, the primary objective of the file audit will be to verify that they contain the appropriate analyses and other necessary documentation to support the licensee's conclusion that the equipment is qualified. The inspections will verify that the licensee's program for surveillance and maintenance of environmentally qualified equipment is adequate to assure that this equipment is maintained in the as analyzed or tested condition. The method used for tracking periodic replacement parts, and implementation of the licensee's commitments and actions, e.g., regarding replacement of equipment, will also be verified.

Based on our discussions with the licensee and our review of its submittal, we find the licensee's approach for resolving the identified environmental qualification deficiencies acceptable.

Compliance With 10 CFR 50.49

In its June 15 and October 15, 1984 submittals, the licensee has described the approach used to identify equipment within the scope of paragraph (b)(1) of 10 CFR 50.49, equipment relied upon to remain functional during and following design basis events. The licensee states that the safety design basis of safety systems as described in the FitzPatrick FSAR were reviewed along with existing plant emergency operating procedures. Based on this review, systems and components required to remain functional in order to mitigate postulated design basis events were identified. The environmental conditions at the specific location of the safety-related equipment was then determined. Safety-related equipment determined to experience postulated harsh environments as a result of these events were included in the 10 CFR 50.49 listing. The Authority has identified all design-basis events which could result in a potentially harsh environment, including flooding due to a high-energy line break (HELB) outside containment.

The licensee's approach for identifying equipment within the scope of paragraph (b)(1) is in accordance with the requirements of that paragraph, and therefore acceptable.

The method used by the licensee for identification of electrical equipment within the scope of paragraph (b)(2) of 10 CFR 50.49, nonsafety-related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions, is summarized below:

1. A review of the electrical elementary diagrams for the safety-related equipment identified under paragraph (b)(1) was performed. This review confirmed the application of the original plant design criteria for electrical separation of safety-related electrical equipment and circuit coordination/protection schemes. As a result, no non-safety related electrical equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions were identified.
2. The operation of the safety-related electrical equipment identified in Item 1 was reviewed to identify any directly mechanically connected auxiliary systems which have electrical components which are necessary for the required operation of the safety-related equipment. As a result, no such equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions was identified.

We find the methodology being used by the licensee is acceptable since it provides reasonable assurance that equipment within the scope of paragraph (b)(2) of 10 CFR 50.49 has been identified.

With regard to paragraph (b)(3) of 10 CFR 50.49, the licensee states that Regulatory Guide 1.97, Rev. 2 Instrumentation . . .to Assess Plant and Environments During and Following an Accident was reviewed as it applies to Boiling Water Reactors (BWR). Instruments were then identified which were presently installed in the FitzPatrick Plant and which meet the required design criteria. If those instruments required environmental qualification (categories 1 and 2), the associated components were included in the 10 CFR 50.49 component listing.

The staff has not yet completed its review for conformance to, and acceptability of, the licensee's Regulatory Guide 1.97 submittal. The further staff review for Regulatory Guide 1.97 Conformance may result in the licensee being required to include additional equipment in its environmental program.

We find the licensee's approach to identifying equipment within the scope of paragraph (b)(3) of 10 CFR 50.49 acceptable since it is in accordance with the requirements of that paragraph.

Justification for Continued Operation

The licensee has provided, in its June 15 and October 15, 1984 submittals, justification for continued operation addressing each item of equipment for which the environmental qualification is not yet completed (see enclosure for the JCO equipment list).

We have reviewed each JCO provided by the licensee in its June 15, and October 15, 1984 submittals and find them acceptable since they are based on essentially the same criteria that were used by the staff and its contractor to review JCO's previously submitted by licensees. These criteria, listed below, are also essentially the same as those contained in 10 CFR 50.49(i).

- a. The safety function can be accomplished by some other designated equipment that is qualified, and failure of the principal equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.
- b. Partial test data that does not demonstrate full qualification, but provides a basis for concluding the equipment will perform its function. If it can not be concluded from the available data that the equipment will not fail after completion of its safety function, then that failure must not result in significant degradation of any safety function or provide misleading information to the operator.

- c. Limited use of administrative controls over equipment that has not been demonstrated to be fully qualified. For any equipment assumed to fail as a result of the accident environment, that failure must not result in significant degradation of any safety function or provide misleading information to the operator.

CONCLUSIONS

Based on the above evaluation, we conclude the following with regard to the qualification of electric equipment important to safety within the scope of 10 CFR 50.49.

- ° New York Power Authority's electrical equipment environmental qualification program complies with the requirements of 10 CFR 50.49.
- ° The proposed resolutions for each of the environmental qualification deficiencies identified in the April 19, 1983 SER and FRC TER are acceptable.
- ° Continued operation until completion of the licensee's environmental qualification program will not present undue risk to the public health and safety.

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Dated: March 12, 1985

Justification for Continued Operation Equipment List

<u>JAF Tag No.</u>	<u>NRC TER No.</u>	<u>Description</u>
02VME-71A-L	157	ENDEVCO Acoustical Monitors
02VMY-71A-L	164	UNHOLTZ-Dickie Impedance Converters
02-3AU-278 (A-D)	None	Rosemount Analog Trip Units
12-3PT-178 (A-D)	56, 59	Rosemount Pressure Transmitters
02-3LITS-73	90	Yarway Level Indicating Switch
13LS-12	None	Terry Square D Level Switch
16-1RTD-107, -108	None	Burns Resistance Temperature Detectors
17RE-50A, B	None	General Electric Radiation Monitors
17RE-53A, B	None	Victoreen Radiation Monitors
17RE-431, -432 17RE-458A, B	None	Nuclear Measurements Corp. Radiation Monitors
17RE-434A, B-463A, B- 17RT-434A, B-463A, B	None	Victoreen Radiation Monitors
20PNS-83-95	None	NAMCO Position Switches

<u>JAF Tag No.</u>	<u>NRC TER No.</u>	<u>Description</u>
20SOV-83-95	None	Atwood and Morrill Solenoid Valves
23LS-99-100	None	Magnetrol Level Switches
27E/P-103A, B	None	Taylor Electro-Pneumatic Converters
27DWA-HTA, HTB 2702-AZ-101A, B	None	Taylor/Burns/Beckman Heat Tracing