UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RE: ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY

CONSUMERS POWER COMPANY

BIG ROCK POINT PLANT

DOCKET NO. 50-155

1.0 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 (GDC) 1 and 4 of Appendix A and Sections III, XI, and XVII of Appendix B to 10 CFR Part 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).

2.0 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)) 1E Bulletin (IEB) 79-01, "Environmental Qualification of Class 1E Equipment." This Bulletin, together with IE Circular 78-08 (issued on May 31, 1978), required licensees to perform reviews to assess the adequacy of their environmental qualification programs. 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 Part 50, Appendix A, 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,

Based on the results of the audit, the staff concluded that the licensee had not demonstrated that the qualification program for the Big Rock Point Plant would meet the requirements of 10 CFR 50.49. The staff recommended that the licensee initiate immediate and large scale efforts to bring its equipment qualification program into compliance with 10 CFR 50.49

Consumers Power Company has initiated efforts to improve its equipment qualification program, as evidenced by letters of August 27, and October 31, 1984, January 7 and 28, 1985 and February 7 and 21, 1985.

3.0 EVALUATION

The evaluation of the acceptability of the licensee's electric equipment environmental qualification program is based on the results of audits performed by the staff of: (1) the licensee's proposed resolution of the environmental qualification deficiencies identified in the April 26, 1983 SER and February 18, 1983 FRC TER; (2) compliance with the requirements of 10 CFR 50.49; and (3) JCO for those equipment items for which the environmental qualification is not yet completed.

3.1 Proposed Resolutions of Identified Deficiencies

The proposed resolutions for the equipment environmental qualification deficiencies, identified in the April 26, 1983 SER, and the FRC TER enclosed with it are described in the licensee's submittals. During the March 14, 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 26, 1983 were also discussed and the resolution of these items has been found acceptable by the staff.

The licensee's equipment environmental qualification files will be re-audited by the staff during follow-up inspections to be performed by Region III, with assistance from IE Headquarters and NRR staff as necessary. Since a significant amount of documentation has already been reviewed by the staff and FRC, 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 master list of qualified equipment is accurate and complete, and that their 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.

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. The proposed resolutions were discussed in detail on an item by item basis with the licensee during the March 14, 1984 meeting. Replacing, shielding or exempting equipment, for an acceptable reason, are clearly acceptable methods for resolving environmental qualification deficiencies. The staff also discussed with the licensee how analyses were used to resolve deficiencies identified in the FRC TER.

Based on these discussions and review of your submittal, the staff finds your approach for resolving the identified environmental qualification deficiencies acceptable.

3.2 Compliance With 10 CFR 50.49

In an August 27, 1984 submittal, the licensee described the approach used to identify equipment within the scope of paragraph (b)(1) of 10 CFR 50.49, safety-related equipment relied upon to remain functional during and following design basis events. The licensee states that a combination of two somewhat independent methods was utilized to develop a list of equipment as defined by Paragraph (b)(1) of 10 CFR 50.49 for the Big Rock Point Plant. Each method utilized a detailed review of loss of reactor coolant procedures on a step-by-step basis to identify equipment necessary to mitigate the effects of either a Loss of Coolant Accident (LOCA) or a Main Steam Line Break (MSLB). Plant piping and instrument diagrams as well as electrical one-line and schematic drawings were utilized by CPC staff in support of their evaluation of these procedures. As the list was being developed, no distinction was made by the licensee as to whether the equipment was classified as either safety-related or non-safety-related. Rather, equipment was listed if is was determined that it provided a necessary mitigating function.

The first method consisted of performing the procedural review and identifying, at the systems level, information required by the operator as well as manual and automatic actions that must be performed to implement safety functions. The active equipment, e.g., indicators, transmitters, switches, valves, etc., required to provide information and perform functions, was identified, along with the component's location. A review of electrical schematic diagrams was then performed for each active device in order to identify the more passive devices (e.g., power supplies, cable, penetrations, terminal blocks, etc.) which are required to support the successful operation of the active device. The location of the required passive devices was also noted. Finally, a list was developed which identified all necessary electrical equipment (active and passive) residing in a harsh environment.

The second method again consisted of a review of the loss of reactor coolant procedures and determining those systems used to cope with a LOCA or MSLB. In this method, however, a listing of only the necessary systems was developed. Utilizing the Plant Instrument Data Book, the locations of all of the equipment associated with these systems was identified. A determination was made as to which equipment was needed. This new list was compared to the list developed in the first method. A final equipment list was generated based on these two listings.

The effect of flooding outside of containment was evaluated to determine if the failure of electric equipment combined with the potential of flooding would affect the ability to bring the plant to safe shutdown.

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 electric equipment within the scope of paragraph (b)(2) of 10 CFR 50.49, non-safety-related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions, is summarized below:

A review for mechanically-connected auxiliary systems, containing electric components necessary for the required operation of safety-related equipment, has been performed by Consumers Power Company, and no such equipment has been identified. Consumers Power Company has also completed a review ensuring that adequate electric isolation exists between non-safety-related electrical circuits and circuits associated with the EEQ-listed equipment. The list of electric equipment provided in its October 31, 1984 submittal therefore, is judged by the licensee to address all electric equipment within the scope of paragraph (b)(2) of 10 CFR 50.49.

The staff finds the methodology used by the licensee 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 in its January 7, 1985 submittal, that installed post-accident monitoring equipment, including those items required by NUREG-0737 at the Big Rock Point Plant, was evaluated for inclusion on the Equipment Qualification list. The post-accident monitoring equipment and associated components, found to be located in a harsh environment, have been included on the Equipment Qualification list, and are considered to be qualified within the scope of 10 CFR 50.49. Consumers Power Company concludes, therefore, that the Big Rock Point Plant Electric Equipment Qualification list complies with the scope requirements of paragraph (b) of 10 CFR 50.49.

The staff has not yet completed its review for conformance to Regulatory Guide 1.97. Further staff review for Regulatory Guide 1.97 conformance may result in the licensee being required to include additional equipment in its environmental qualification program, however, the licensee has included in its environmental qualification program, certain post-accident monitoring equipment, using the guidance of Regulatory Guide 1.97.

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.

3.3 Justification for Continued Operation

The licensee has provided, in its February 21, 1985 submittal, a JCO addressing each item of equipment for which the environmental qualification is not yet completed (see enclosure 1 for the JCO equipment list).

The staff has reviewed each JCO provided and finds them acceptable, since they are based on essentially the same criteria that were used by the staff (and its contractor) to review JCO 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 cannot 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.

The staff's acceptance of the JCO referenced above supports continued power operation; however, since the staff has required that each item of equipment, for which the environmental qualification is not yet complete, be complete by November 30, 1985, the need for JCO subsequent to November 30, 1985, has been eliminated. Consequently, the staff requires all JCO for the facility, to be resolved by November 30, 1985.

4.0 CONCLUSIONS

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

- Consumers Power Company's electric 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 the April 26, 1983 SER and 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.

5.0 ACKNOWLEDGEMENT

Principal Contributors: R. LaGrange and T. Rotella.

Dated: November 15, 1985

Justification for Continued Operation Equipment List

Big Rock Point Tag No.	NRC TER No.	Description
--	61	PVC Cable
MO-7066	5	Limitorque Motor Operator Model SMA000
SV-4897	--	Solenoid Valve
LT-3171	32	Level Transmitter Barton 386
FT-2161 FT-2162 FT-2163 FT-2164	33	Flow Transmitter Barton 386
PCS-6626 POS-6618 POS-6623 POS-6624 POS-6653 POS-6654 POS-6655	--	Position Switches
POS-6680 POS-6681 POS-6682 POS-6683 POS-6684 POS-6685 POS-6686 POS-6687	--	Position Switch Splices and Seals
POS-6628 POS-6629 POS-6660 POS-9101 POS-9102 POS-9103 POS-9104 POS-6649	--	Position Switches
-- --	-- --	Stanwick Terminal Blocks (JB 153, 154)
--	--	Terminal Blocks (JB/PDIS-7814)

Justification for Continued Operation Equipment List

Big Rock Point Tag No.	NRC TER No.	Description
--	--	Terminal Blocks (JB/SV-4895)
--	--	Terminal Blocks (JB/PDIX-4869)
--	--	(JB/SV-4891)
--	--	Terminal Block (SV-9151)
--	61, 1	PVC Cable (MD-7068)

Based on discussions during the meetings, the audit and a review of the licensee's submittals, we have concluded that Consumers Power Company's Equipment Qualification Program is in compliance with the requirements of 10 CFR 50.49, that the proposed resolution for each of the environmental qualification deficiencies identified for Big Rock Point is acceptable, and that continued operation of Big Rock Point will not present undue risk to the public health and safety.

Sincerely,

John A. Zwolinski, Chief
Operating Reactors Branch No. 5
Division of Licensing

Enclosure:
Safety Evaluation

cc w/enclosure:
See next page

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