



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

SAFETY EVALUATION

PREPARED BY THE OFFICE OF NUCLEAR REACTOR REGULATION

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-266

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 IE Electrical Equipment in Operating Reactors" (DOR Guidelines).

BACKGROUND

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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 IE 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.

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 May 21, 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 September 28, 1982. A Safety Evaluation Report was subsequently issued to the Wisconsin Electric Power Company on December 22, 1982, 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 to be met for demonstrating the environmental qualification of electrical equipment important to safety located in a harsh environment. In accordance with this rule, equipment for Point Beach Unit 1 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 October 13, 1983, a meeting was held to discuss Wisconsin Electric's proposed method to resolve the environmental qualification deficiencies identified in the December 22, 1982 SER and September 28, 1982 FRC TER. Discussions also included Wisconsin Electric'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 a November 23, 1983 submittal 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 December 22, 1982 SER and September 28, 1982 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 December 22, 1982 SER, and the FRC TER enclosed with it, are described in the licensee's November 23, 1983 submittal. During the October 13, 1983 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 December 22, 1982 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, installing radiation shielding, and determining that some equipment is outside the scope of 10 CFR 50.49, and therefore not required to be environmentally qualified, e.g., required for cold shutdown only. We discussed the proposed resolutions in detail on an item by item basis with the licensee during the October 13, 1983 meeting. Replacing, shielding 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. In order to confirm the adequacy of the analyses and documentation, it will be audited by the staff during follow-up inspections of the licensee's environmental qualification files to be performed by Region III, with assistance from IE Headquarters and NRR staff as necessary. During these follow-up inspections, implementation of the licensee's commitments and actions, i.e., replacement and shielding 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 November 23, 1983 submittal, 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 flooding and environmental effects resulting from all postulated design-basis accidents documented in Chapter 14 of the PBNP Final Safety Analysis Report (FSAR), including the Loss-of-Coolant Accident (LOCA) and the Steam-Line Break Accident (SLBA) inside containment, were considered in the identification of safety-related electrical equipment which was to be environmentally qualified. The flooding and environmental effects resulting from High-Energy Line Breaks (HELBs) outside containment, as documented in Appendix E of the FSAR, were also considered in the identification of this equipment. The effects of flooding outside containment from sources other than HELBs were analyzed at PBNP in 1975 as documented in letters to the NRC dated February 17 and October 24, 1975, regarding "Potential for Flooding of Safety-Related Equipment." Certain protective measures implemented at that time, including erection of barrier walls, preclude

adverse flooding effects to safety-related equipment required for safe shutdown or mitigation of the consequences of postulated accidents. Therefore, all design-basis events including accidents at PBNP were considered in the identification of electrical equipment within the scope of paragraph (b)(1) of 10 CFR 50.49 (i.e., "Safety-related electric equipment...").

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 list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10 CFR 50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the PBNP Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams;
2. The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips) whose failure due to postulated environmental conditions could prevent the required operation of the safety-related equipment; and

3. The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&IDs, component technical manuals, and/or systems descriptions in the FSAR.
4. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the original PBNP electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

The systems and equipment generated in Steps 2, 3, or 4 above were then compared to the "Master List of Electrical Equipment at Point Beach Nuclear Plant for IE Bulletin 79-01B." The licensee states that the results of the above review indicated that no additional electrical equipment was identified which was not previously included on that "Master List." Therefore, the list of electrical equipment provided in its November 23, 1983 submittal is judged by the licensee to address all electrical equipment within the scope of paragraph (b)(2) of 10 CFR 50.49.

We find the methodology 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 refers to its September 1, 1983 letter for identification of instrumentation and sampling equipment which requires environmental qualification to meet the intent of Regulatory Guide 1.97. The staff has not yet completed its review for conformance to Regulatory Guide 1.97. However, in the

enclosure to its September 1, 1983 letter the licensee has identified equipment, located in potentially harsh environment areas, associated with Regulatory Guide 1.97, Rev. 2, Category 1 and 2 variables that it states is not within the scope of 10 CFR 50.49(b). In the footnotes to that enclosure, the licensee has provided justification for not including the equipment within the scope of the rule. The staff will determine the acceptability of these justifications as part of its review for conformance with Regulatory Guide 1.97. This 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.

-Justification for Continued Operation

The licensee has provided, in its November 23, 1983 submittal, 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 November 23, 1983 submittal 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.

- o Wisconsin Electric's electrical equipment environmental qualification program complies with the requirements of 10 CFR 50.49.
- o The proposed resolution for each of the environmental qualification deficiencies identified in the December 22, 1982 SER and FRC TER are acceptable.
- o Continued operation until completion of the licensee's environmental qualification program will not present undue risk to the public health and safety.

This completes the Point Beach Unit 1 electrical equipment environmental qualification program review. Upon completion of the program, the licensee is required to 1) submit a letter stating that all equipment within the scope of 10 CFR 50.49 has been identified and is environmentally qualified, and 2) maintain all environmental qualification documentation up to date and in an auditable form as required by paragraph (j) of 10 CFR 50.49.

Principal Contributor:

R. LeGrange, DE

Date: August 30, 1984

Justification for Continued Operation Equipment List

| <u>PBNP</u> <u>Tag No.</u> | <u>NRC</u> <u>TER No.</u> | <u>Description</u> |
|-------------------------------|------------------------------|--|
| PT922, 923 | 1 | Foxboro Pressure Transmitters |
| FT924, 925 | 4 | Foxboro Differential Pressure Transmitters |
| FT928 | 3 | Foxboro Differential Pressure Transmitter |
| PT936, 937 940, 941 | None | Foxboro Pressure Transmitters |
| LT931 | 2 | Foxboro Differential Pressure Transmitter |
| FT962, 963 | None | Foxboro Differential Pressure Transmitters |
| FT626 | 7 | Foxboro Differential Pressure Transmitters |
| PT628, 629 | 8 | Foxboro Pressure Transmitters |
| FT619 | 6 | Foxboro Differential Pressure Transmitter |
| FT4036, 4937 | None | Foxboro Differential Pressure Transmitters |
| LT4038, 4039 4040, 4041 | 17 | Foxboro Differential Pressure Transmitters |
| PT420, 420A 420B | 13 | Foxboro Pressure Transmitters |
| LT426, 427 428, 433 | 11 | Foxboro Differential Pressure Transmitters |

| <u>PBNP</u> <u>Tag No.</u> | <u>NRC</u> <u>TER No.</u> | <u>Description</u> |
|--|------------------------------|--|
| PT 429, 430 431, 449 | 10 | Foxboro Pressure Transmitters |
| PT498 | None | Foxboro Pressure Transmitter |
| LT106, 172, 190, LT102, 171, 189 | 12 | Foxboro Differential Pressure Transmitters |
| FT 464, 465 474, 475 | 15 | Foxboro Differential Pressure Transmitters |
| PT468, 469, 478, 479, 482, 483 | 16 | Foxboro Pressure Transmitters |
| LT461, 462, 463, 471, 472, 473 | 14 | Foxboro Differential Pressure Transmitters |
| LT 460 A&B 470 A&B | 14 | Foxboro Differential Pressure Transmitters |
| PT945 thru 950 | 9 | Foxboro Pressure Transmitters - |
| PT968, 969 | None | Foxboro Pressure Transmitters |
| LT960, 961 | 5 | Gems Delaval Level Transmitters |

| PBNP <u>Tag No.</u> | NRC <u>TER No.</u> | <u>Description</u> |
|------------------------|-----------------------|--|
| TE621 | 30 | Conax Resistance Temperature Detectors |
| TE622, 623 | 30 | Conax Resistance Temperature Detectors |
| TE45CA-D 451A-D | 32 | Conax Resistance Temperature Detectors |
| RC430, 431C | 19 | ASCO Solenoid Valves |
| CV1296 | 22 | ASCO Solenoid Valve |
| CV313A | None | ASCO Solenoid Valve |
| CV371A | None | ASCO Solenoid Valve |
| HV3213, 3245 | 20 | ASCO Solenoid Valves |
| HV3200C | 21 | ASCO Solenoid Valve |
| CV466, 476 | None | ASCO Solenoid Valves |
| CV 480, 481 | None | ASCO Solenoid Valves |
| SV951, 953, 955 | 23 | ASCO Solenoid Valves |
| SV966C | 18 | ASCO Solenoid Valve |
| SV959 | None | ASCO Solenoid Valve |

| <u>Tag No.</u> | <u>TER No.</u> | <u>Description</u> |
|---|----------------|--|
| PBNP IA3047, 3048 | NRC None | ASCO Solenoid Valves |
| CV5958, 5959 | | ASCO Solenoid Valves |
| RC570A&B 575A&B, 580 A&B | None | Target Rock Solenoid Valves |
| LT 494, 495 | None | Foxboro Differential Pressure Transmitters |
| LT496, 497 | None | Foxboro Differential Pressure Transmitters |
| TE 499-502, 506-509, TE 503 & 510 | None | Conax Thermocouples |
| TE1 thru 39 | 31 | Control Products Corp. Thermocouples |
| PCV434, 435 | None | Crosby Lift Indicating Switch Assemblies |
| HA969, thru 967 | None | Exo-Sensor Hydrogen Analyzers |
| TE3292, 3293 | None | Conax RTDs |
| TE3294, 3295 | None | Conax RTDs - |
| RE126, 127, 128 | None | General Atomic Radiation Monitors |
| LT958, 959 | None | Gems Delaval Level Transmitters |



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SAFETY EVALUATION

PREPARED BY THE OFFICE OF NUCLEAR REACTOR REGULATION

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNIT NO. 2

DOCKET NO. 50-301

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 IE 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 IE 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.

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 20, 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 May 21, 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 September 28, 1982. A Safety Evaluation Report was subsequently issued to the Wisconsin Electric Power Company on December 22, 1982, 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 to be met for demonstrating the environmental qualification of electrical equipment important to safety located in a harsh environment. In accordance with this rule, equipment for Point Beach Unit 2 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 October 13, 1983, a meeting was held to discuss Wisconsin Electric's proposed method to resolve the environmental qualification deficiencies identified in the December 22, 1982 SER and September 28, 1982 FRC TER. Discussions also included Wisconsin Electric'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 a November 23, 1983 submittal 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 December 22, 1982 SER and September 28, 1982 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 December 22, 1982 SER, and the FRC TER enclosed with it, are described in the licensee's November 23, 1983 submittal. During the October 13, 1983 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 December 22, 1982 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, installing radiation shielding, and determining that some equipment is outside the scope of 10 CFR 50.49, and therefore not required to be environmentally qualified, e.g., required for cold shutdown only. We discussed the proposed resolutions in detail on an

item by item basis with the licensee during the October 13, 1983 meeting. Replacing, shielding 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. In order to confirm the adequacy of the analyses and documentation, it will be audited by the staff during follow-up inspections of the licensee's environmental qualification files to be performed by Region III, with assistance from IE Headquarters and NRR staff as necessary. During these follow-up inspections, implementation of the licensee's commitments and actions, i.e., replacement and shielding 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 November 23, 1983 submittal, 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 flooding and environmental effects resulting from all postulated design-basis accidents documented in Chapter 14 of the PBNP Final Safety Analysis Report (FSAR), including the Loss-of-Coolant Accident (LOCA) and the Steam-Line Break Accident (SLBA) inside containment, were considered in the identification of safety-related electrical equipment which was to be environmentally qualified. The flooding and environmental effects resulting from High-Energy Line Breaks (HELBs) outside containment, as documented in Appendix E of the FSAR, were also considered in the identification of this equipment. The effects of flooding outside containment from sources other

than HELBs were analyzed at PBNP in 1975 as documented in letters to the NRC dated February 17 and October 24, 1975, regarding "Potential for Flooding of Safety-Related Equipment." Certain protective measures implemented at that time, including erection of barrier walls, preclude adverse flooding effects to safety-related equipment required for safe shutdown or mitigation of the consequences of postulated accidents. Therefore, all design-basis events including accidents at PBNP were considered in the identification of electrical equipment within the scope of paragraph (b)(1) of 10 CFR 50.49 (i.e., "Safety-related electric equipment...").

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 list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10 CFR 50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the PBNP Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams;

2. The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips) whose failure due to postulated environmental conditions could prevent the required operation of the safety-related equipment; and
3. The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&IDs, component technical manuals, and/or systems descriptions in the FSAR.
4. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the original PBNP electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

The systems and equipment generated in Steps 2, 3, or 4 above were then compared to the "Master List of Electrical Equipment at Point Beach Nuclear Plant for IE Bulletin 79-01B." The licensee states that the results of the above review indicated that no additional electrical equipment was identified which was not previously included on that "Master List." Therefore, the list of electrical equipment provided in its November 23, 1983 submittal is judged by the licensee to address all electrical equipment within the scope of paragraph (b)(2) of 10 CFR 50.49.

We find the methodology 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 refers to its September 1, 1983 letter for identification of instrumentation and sampling equipment which requires environmental qualification to meet the intent of Regulatory Guide 1.97. The staff has not yet completed its review for conformance to Regulatory Guide 1.97. However, in the enclosure to its September 1, 1983 letter the licensee has identified equipment, located in potentially harsh environment areas, associated with Regulatory Guide 1.97, Rev. 2, Category 1 and 2 variables that it states is not within the scope of 10 CFR 50.49(b). In the footnotes to that enclosure, the licensee has provided justification for not including the equipment within the scope of the rule. The staff will determine the acceptability of these justifications as part of its review for conformance with Regulatory Guide 1.97. This 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.

Justification for Continued Operation

The licensee has provided, in its November 23, 1983 submittal, 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 November 23, 1983 submittal 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.

- o Wisconsin Electric's electrical equipment environmental qualification program complies with the requirements of 10 CFR 50.49.

- o The proposed resolution for each of the environmental qualification deficiencies identified in the December 22, 1982 SER and FRC TER are acceptable.
- o Continued operation until completion of the licensee's environmental qualification program will not present undue risk to the public health and safety.

This completes the Point Beach Unit 2 electrical equipment environmental qualification program review. Upon completion of the program, the licensee is required to 1) submit a letter stating that all equipment within the scope of 10 CFR 50.49 has been identified and is environmentally qualified, and 2) maintain all environmental qualification documentation up to date and in an auditable form as required by paragraph (j) of 10 CFR 50.49.

Principal Contributor:

R. LeGrange, DE

Date: August 30, 1984

Justification for Continued Operation Equipment List

| <u>PBNP</u> <u>Tag No.</u> | <u>NRC</u> <u>TER No.</u> | <u>Description</u> |
|-------------------------------|------------------------------|--|
| PT922, 923 | 1 | Foxboro Pressure Transmitters |
| FT924, 925 | 4 | Foxboro Differential Pressure Transmitters |
| FT928 | 3 | Foxboro Differential Pressure Transmitter |
| PT936, 937 940, 941 | None | Foxboro Pressure Transmitters |
| LT931 | 2 | Foxboro Differential Pressure Transmitter |
| FT962, 963 | None | Foxboro Differential Pressure Transmitters |
| FT626 | 7 | Foxboro Differential Pressure Transmitters |
| PT628, 629 | 8 | Foxboro Pressure Transmitters |
| FT619 | 6 | Foxboro Differential Pressure Transmitter |
| FT4036, 4937 | None | Foxboro Differential Pressure Transmitters |
| LT4038, 4039 4040, 4041 | 17 | Foxboro Differential Pressure Transmitters |
| PT420, 420A 420B | 13 | Foxboro Pressure Transmitters |
| LT426, 427 428, 433 | 11 | Foxboro Differential Pressure Transmitters |

| <u>PBNP</u> <u>Tag No.</u> | <u>NRC</u> <u>TER No.</u> | <u>Description</u> |
|--|------------------------------|--|
| PT 429, 430 431, 449 | 10 | Foxboro Pressure Transmitters |
| PT498 | None | Foxboro Pressure Transmitter |
| LT106, 172, 190, LT102, 171, 189 | 12 | Foxboro Differential Pressure Transmitters |
| FT 464, 465 474, 475 | 15 | Foxboro Differential Pressure Transmitters |
| PT468, 469, 478, 479, 482, 483 | 16 | Foxboro Pressure Transmitters |
| LT461, 462, 463, 471, 472, 473 | 14 | Foxboro Differential Pressure Transmitters |
| LT 460 A&B 470 A&B | 14 | Foxboro Differential Pressure Transmitters |
| PT945 thru 950 | 9 | Foxboro Pressure Transmitters |
| PT968, 969 | None | Foxboro Pressure Transmitters |
| LT960, 961 | 5 | Gems Delaval Level Transmitters |

| PBNP <u>Tag No.</u> | NRC <u>TER No.</u> | <u>Description</u> |
|------------------------|-----------------------|--|
| TE621 | 30 | Conax Resistance Temperature Detectors |
| TE622, 623 | 30 | Conax Resistance Temperature Detectors |
| TE450A-D 451A-D | 32 | Conax Resistance Temperature Detectors |
| RC430, 431C | 19 | ASCO Solenoid Valves |
| CV1296 | 22 | ASCO Solenoid Valve |
| CV313A | None | ASCO Solenoid Valve |
| CV371A | None | ASCO Solenoid Valve |
| HV3213, 3245 | 20 | ASCO Solenoid Valves |
| HV3200C | 21 | ASCO Solenoid Valve |
| CV466, 476 | None | ASCO Solenoid Valves |
| CV 480, 481 | None | ASCO Solenoid Valves |
| SV951, 953, 955 | 23 | ASCO Solenoid Valves |
| SV966C | 18 | ASCO Solenoid Valve |
| SV959 | None | ASCO Solenoid Valve |

| <u>PBNP</u> <u>Tag No.</u> | <u>NRC</u> <u>TER No.</u> | <u>Description</u> |
|---|------------------------------|--|
| IA3047, 3048 | None | ASCO Solenoid Valves |
| CV5958, 5959 | | ASCO Solenoid Valves |
| RC570A&B 575A&B, 580 A&B | None | Target Rock Solenoid Valves |
| LT 494, 495 | None | Foxboro Differential Pressure Transmitters |
| LT496, 497 | None | Foxboro Differential Pressure Transmitters |
| TE 499-502, - 506-509, TE 503 & 510 | None | Conax Thermocouples |
| TE1 thru 39 | 31 | Control Products Corp. Thermocouples |
| PCV434, 435 | None | Crosby Lift Indicating Switch Assemblies |
| HA969, thru 967 | None | Exo-Sensor Hydrogen Analyzers |
| TE3292, 3293 | None | Conax RTDs |
| TE3294, 3295 | None | Conax RTDs |
| RE126, 127, 128 | None | General Atomic Radiation Monitors |
| LT958, 959 | None | Gems Delaval Level Transmitters |

Wisconsin Electric Power Company

cc:

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Mr. Gordon Blaha
Town Chairman
Town of Two Creeks
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U.S. Environmental Protection Agency
Federal Activities Branch
Region V Office
ATTN: Regional Radiation
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U.S. NRC Resident Inspectors Office
6612 Nuclear Road
Two Rivers, Wisconsin 54241



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

November 28, 1984

Docket Nos. 50-266
and 50-301

Mr. C. W. Fay, Vice President
Nuclear Power Department
Wisconsin Electric Power Company
231 West Michigan Street, Room 308
Milwaukee, Wisconsin 53201

Dear Mr. Fay:

On August 30, 1984 we transmitted the staff's Safety Evaluations concerning Environmental Qualification of Safety Related Electrical Equipment for the Point Beach Nuclear Plant Units 1 and 2. It has been determined that additional clarification regarding the followup inspections mentioned on page 5 of the Safety Evaluations is needed. Therefore, we are providing the enclosed revised page 5 for the Point Beach Units 1 and 2 August 30, 1984 Safety Evaluations. Please incorporate these revisions into your copies of the Safety Evaluations.

Sincerely,

James R. Miller
James R. Miller, Chief
Operating Reactors Branch No. 3
Division of Licensing

Enclosures:
• As stated

cc w/enclosures:
See next page

~~8412100348~~
4/pb

Wisconsin Electric Power Company

cc:

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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 3, 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 November 23, 1983 submittal, 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 flooding and environmental effects resulting from all postulated design-basis accidents documented in Chapter 14 of the PBNP Final Safety Analysis Report (FSAR), including the Loss-of-Coolant Accident (LOCA) and the Steam-Line Break Accident (SLBA) inside containment, were considered in the identification of safety-related electrical equipment which was to be environmentally qualified. The flooding and environmental effects resulting from High-Energy Line Breaks (HELBs) outside containment, as documented in Appendix E of the FSAR, were also considered in the identification of this equipment. The effects of flooding outside containment from sources other than HELBs were analyzed at PBNP in 1975 as documented in letters to the NRC dated February 17 and October 24, 1975, regarding "Potential for Flooding of Safety-Related Equipment." Certain protective measures implemented at that time, including erection of barrier walls, preclude

item by item basis with the licensee during the October 13, 1983 meeting. Replacing, shielding 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 3, 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 analysed 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.

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ATTACHMENT 2RESOLUTION OF PETITIONER'S COMMENTSREGARDING THE FRANKLIN RESEARCH CENTER'S (FRC) TECHNICAL EVALUATION REPORT (TER)

Petitioner's specific comments regarding open items from the September 28, 1982 FRC TER and the Point Beach Nuclear Plant, Units 1 and 2, (PBNP) resolution of each of those items are listed below. Those resolutions have been reviewed by the staff discussed at a meeting held on October 13, 1983 and were found to be acceptable.

1. Items 24, 25, 26, 27: FRC found that electric motors used in the auxiliary building did not have aging degradation adequately evaluated, did not have an established qualified life or replacement schedule, and did not have satisfactory criteria regarding radiation exposure. In addition, some test reports were considered inadequate. In its resolution of the TER items, by letter dated November 23, 1983, the licensee stated that this equipment is environmentally qualified in accordance with 10 CFR 50.49 (i.e., DOR Guidelines), and that documentation now exists in the PBNP Equipment Qualification Files to document qualification of these electric motors.
2. Item 28: FRC found that motors used inside containment did not have aging degradation adequately evaluated, did not have an established qualified life or replacement schedule, did not have satisfactory criteria regarding aging simulation, and did not have satisfactory criteria regarding radiation exposure. In its resolution of the TER items, by letter dated November 23, 1983, the licensee stated that documentation now exists in the PBNP Equipment Qualification File to document the qualification of motors used inside containment.

3. Item 29: FRC found that electrical cable splices used inside containment did not have adequate documentation evidence of similarity established with the test specimen. In its resolution of the TER items, by letter dated November 23, 1983, the licensee stated that documentation now exists in the PBNP Equipment Qualification File to document the qualification of electrical cable splices used inside containment.
4. Item 30: FRC found that qualification was not established and aging degradation was evaluated inadequately for resistance temperature detectors located in the auxiliary building. In addition, a comment stated that similarity with the test specimen had not been satisfactorily established. In its resolution to the TER items and comment, the licensee verified in a telephone conversation on September 3, 1985 that these items have been replaced with qualified resistance temperature detectors and that documentation now exists in the PBNP Equipment Qualification Files to demonstrate the qualification of the new resistance temperature detectors.
5. Item 34: FRC found that qualification was not established for motor control centers located inside the auxiliary building. In its resolution of the TER item, the licensee stated in its November 23, 1983 submittal to the NRC that these motor control centers now have radiation shielding installed and are no longer subjected to a harsh environment and thus are not considered to be within the scope of 10 CFR 50.49.

6. Item 37: FRC found that qualification was not established for thermocouple cables located inside containment. In its resolution of the TER item, the licensee verified in a telephone conversation with the NRC staff on September 3, 1985 that these items have been replaced with qualified thermocouple cables and that documentation now exists in the PBNP Equipment Qualification Files to document the qualification of the new cables.

7. Item 38: FRC found that qualification was not established for electrical instrument cable, lift switches and indicating assemblies which conduct acoustic signal transmissions, located inside the containment building. In addition, a comment states that the referenced test report does not establish qualification as stated by the manufacturer because the signal alterations and temperature resistance capabilities are inadequate. In its resolution of the TER item and comment, the licensee submitted to the NRC a letter dated August 26, 1985 requesting a qualification schedular extension. This letter was accompanied by a justification for continued operation. The Commission approved the request for schedular extension and the equipment is now qualified for both units at the PBNP.

8. Item 39: FRC found that qualification was not established for electrical control cable located inside and outside containment for PORV blocking valves. FRC stated that no test report was submitted to document qualification and further noted that PBNP incorrectly stated that

the PORV blocking valves were not safety related, i.e., the cable did not require qualification. In its resolution of the TER item and comment, the licensee stated in its November 23, 1983 submittal that this equipment is now considered to be safety related and must be environmentally qualified for conditions resulting from a small break loss of cooling accident (SBLOCA), which is the only design basis event (DBE) for which the blocking valves are required and which results in a harsh environment. In addition, the licensee states that documentation now exists in the PBNP Equipment Qualification Files to document the qualification of this control cable.

9. Item 42: FRC found that electrical instrument cable located inside and outside containment was not qualified because adequate similarity between the installed equipment and the test specimen was not established. In its resolution of the TER item, by letter dated November 23, 1983 to the NRC, the licensee stated that additional documentation to establish adequate similarity has been obtained and that documentation now exists in the PBNP Equipment Qualification Files that documents the qualification of this electrical instrument cable.
10. Items 50, 51, 52, 55: FRC found that pump bearing lubricants used on equipment located in the auxiliary building or on equipment located outside containment did not have qualification established. Adequate similarity was not established with the test specimen nor was aging

degradation adequately evaluated for these lubricants. In addition, the criteria regarding aging simulation and radiation exposure were not satisfied nor were the criteria regarding peak temperature exposure adequate. Specific comments also stated that very little documentation existed on lubricants and that some documentation checklists were withheld due to the "proprietary" nature of the information they contained. In its resolution of TER items and specific comments, by letter dated November 23, 1983 the licensee stated that these lubricants are environmentally qualified in accordance with 10 CFR 50.49 (i.e. DOR Guidelines) and that documentation now exists in the PBNP Equipment Qualification Files to document qualification of these motor bearing lubricants.

11. Item 53: FRC found that motor bearing lubricant used inside containment did not have adequate similarity established with the test specimen, did not have an established qualified life or replacement schedule, and did not have adequate criteria regarding peak temperature exposure. In its resolutions to the TER items, the licensee stated in its November 23, 1983 submittal that documentation now exists in the PBNP Equipment Qualification File to document the qualification of the motor bearing lubricant, used inside containment.

12. Items 54, 56: FRC found that motor operated valve gear lubricant and geared limit switch lubricant used inside containment was not qualified because adequate similarity was not established, aging degradation was inadequately evaluated, qualified life or a replacement schedule were not established, the criteria regarding peak temperature exposure were inadequate, and the criteria regarding aging simulation and radiation exposure are not satisfied. In addition, some "proprietary" qualification information was withheld. In its resolution of the TER items, in its submittal dated November 23, 1983 the licensee stated that these lubricants are environmentally qualified and documentation now exists in the PBNP Equipment Qualification File to document the environmental qualification of these lubricants for their specified safety function and their location-specific service conditions throughout the installed life of the lubricants.

13. Items 61, 62, 63, 64, 65: FRC found that motorized valve actuators located inside containment, inside the auxiliary building or inside the component cooling heat exchanger areas did not have adequate similarity established between installed equipment and test specimens, did not have an adequate aging degradation evaluation and did not have a qualified life or replacement schedule established. Therefore, equipment qualification was not considered established. In its resolution of the TER items, the licensee in its November 23, 1983 submittal to the NRC states that it considers this equipment to be environmentally qualified and that documentation now exists in the PBNP Equipment Qualification Files to document qualification of these motorized valve actuators.