

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 22, 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 24, 1983. A Safety Evaluation Report was sub-

sequently issued to the Arkansas Power and Light Company on April 15, 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 Arkansas 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 April 26, 1984, a meeting was held to discuss Arkansas Power and Light's proposed method to resolve the environmental qualification deficiencies identified in the April 15, 1983 SER and March 24, 1983 FRC TER. Discussions also included Arkansas Power and Light'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 an August 6, 1984 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 April 15, 1983 SER and March 24, 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 15, 1983 SER, and the FRC TER enclosed with it, are described in the licensee's August 6, 1984 submittal. During the April 26, 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 15, 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 April 26, 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 IV, 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 August 6, 1984 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 environmental effects (including flooding) from all postulated design basis accidents (both inside and outside containment) analyzed in Chapter 15 of the ANO-2 FSAR were considered in the identification of safety-related electrical equipment to be environmentally qualified. These accidents include LOCA's and the Main Steam Line Break inside containment, and various High Energy Line Breaks (HELB's) outside containment. Those systems required to perform the following functions were first identified:

1. Detect the accident and initiate protective actions.
2. Carry out safeguards system action to mitigate the consequences of the accident.
3. Shut the reactor down, maintain it in a safe shutdown condition, and dissipate decay heat.

4. Provide essential auxiliary support services such as electric power, cooling water, lubrication, etc.
5. Maintain suitable environmental conditions for equipment operation (e.g., pump room cooling).

All devices within those systems which are essential to achieving the above functions were included on the EQ equipment list.

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. In preparation of the EQ list, P&ID's were reviewed to select those components considered essential without regard to any previous designation such as "Q - non Q".
2. The wiring diagrams (schematics) for each device identified as described above were reviewed to identify any auxiliary devices within the circuitry of the required device whose failure to function due to the postulated accident could prevent the proper functioning of the required device. All such devices found were therefore considered essential and included in the EQ list.
3. Auxiliary (support) systems were considered in the preparation of the main list (e.g., lube oil, cooling water, etc.).
4. Nonsafety-related electrical circuits indirectly associated with the safety-related electrical equipment were considered by virtue of the electrical design criteria used for ANO-2 including the use of industry

standards (e.g., IEEE). The protection systems at ANO-2 conform to IEEE 279 which includes consideration of protective and control systems interactions, separation criteria, etc. Protection is further assured by proper design considerations such as use of protective fuses, relays and circuit breakers.

5. All devices determined to be in a non-harsh environment were checked to ensure that supporting electrical equipment (handswitches, terminal boxes, motor control centers, etc.), were not located in a harsh environment.

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 in preparation of the main list, many devices which provided control room indication for post-accident monitoring were included on the list (10 CFR 50.49 Section b(3)). In addition, AP&L is currently addressing the requirements of Reg. Guide 1.97. It is expected that additional instrumentation (namely, category 1 and 2 equipment) requiring environmental qualification will be identified as a result of this effort, consequently, all such instrumentation will be demonstrated to meet the environmental qualification requirements as agreed to by the staff and in accordance with a schedule approved by the staff.

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 August 6, 1984 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 August 6, 1984 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 Arkansas Power and Light's electrical equipment environmental qualification program complies with the requirements of 10 CFR 50.49.
- o The proposed resolutions for each of the environmental qualification deficiencies identified in the April 15, 1983 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.

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Justification for Continued Operation Equipment List

<u>Tag No.</u>	<u>TER No.</u>	<u>Description</u>
ANO-2	NRC	
2TE-4610-1, 4610-2,4610-3 4610-4,4611-1, 4611-2,4611-3, 4611-4, 4710-1, 4710-2,4710-3, 4710-4,4711-1, 47711-2,4711-3, 4711-4	106	Rosemount Temperature Sensors Model No. 104-AFC
2TE-4635-1, 4635-2,4635-3, 4635-4,4735-1, 4735-2,4735-3, 4735-4	NA	Rosemount Temperature Sensors Model No. 104-AFC
2UCD-8203-1, 8209-1,8216-2, 8222-2	71	Baldor Damper Motors Model No. M-3534 TEFC
2ZS-8203-1, 8204-1,8209-1, 8210-1,8216-2, 8217-2,8222-2, 8223-2	107	