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ARTHUR E. LUNDVALL, JR.  
VICE PRESIDENT  
SUPPLY

July 9, 1984

Director of Nuclear Reactor Regulation  
Attention: Mr. J. R. Miller, Chief  
Operating Reactors Branch #3  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Calvert Cliffs Nuclear Power Plant  
Units Nos. 1 & 2; Dockets Nos. 50-317 and 50-318  
Environmental Qualification of Electrical Equipment

- References:
1. BG&E letter from Mr. A. E. Lundvall, Jr. to Mr. H. R. Denton (NRC), dated May 14, 1984.
  2. NRC letter from Mr. J. R. Miller (NRC) to Mr. A. E. Lundvall, Jr. (BG&E), dated May 31, 1984.
  3. BG&E letter from Mr. A. E. Lundvall, Jr. to Mr. H. R. Denton (NRC), dated June 8, 1984.

Gentlemen:

In Reference 1 we documented in considerable detail the current status of the environmental qualification program at Calvert Cliffs. That submittal also provided a description of our methods for satisfying the requirements of 10 CFR 50.49 with regard to establishing the scope of equipment requiring qualification and identifying the environmental conditions to which this equipment was being qualified. This information had been submitted in response to a request made by representatives of the Equipment Qualification Branch during our meeting with the Staff on March 16, 1984.

In the course of reviewing the information contained in Reference 1, the Staff has requested (Reference 2) that we submit specific certifications further addressing the following four topics:

- (1) The impact of operating in the interim with unqualified equipment (if any) that is assumed to fail under post-accident environmental conditions;
- (2) Our methodology for identifying non safety-related equipment requiring qualification;
- (3) The scope of design basis events considered in our program; and

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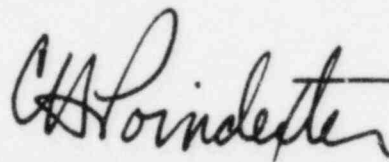
- (4) The nature of the equipment which we consider to be within the scope of 10 CFR 50.49(b)(3), post-accident monitoring instrumentation.

We have carefully reviewed your request and have prepared the statements provided in Attachment 1 for your information and use. In general, we have found it possible to make certifications very similar to those specifically requested by Reference 2. With regard to Item (2), we reaffirm that although we did not perform a separate review to specifically identify any equipment that might fall within the category of equipment defined under 50.49(b)(2), the intent of the rule has been met in that the concerns that are the subject of paragraph (b)(2) were addressed in the electrical design practices incorporated into the original plant design. In this case we have provided supporting discussions condensed from previous submittals.

On a related matter, we are providing you with an updated summary sheet (Attachment 2) which reflects the resolution of Franklin TER Items 33, 34 and 35 (Fischer and Porter flow transmitters). As discussed in Reference 3, qualification for these items is complete.

If you should have any questions concerning the attached responses, please do not hesitate to contact us.

Very truly yours,



for A. E. Lundvall, Jr.  
Vice President-Supply

- Attachments: 1. Response to NRC Request for Additional Information  
2. Updated TER Resolution Status Summary Sheet

AEL/BSM/vf

cc: D. A. Brune, Esq.  
G. F. Trowbridge, Esq.  
Mr. D. H. Jaffe, NRC  
Mr. T. Foley, NRC  
Mr. J. C. Ventura, Bechtel

**RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION:  
Environmental Qualification of Electric Equipment Important to Safety**

**1. REQUEST**

Submit all applicable JCO's that are currently being relied upon and certify the following for each JCO associated with equipment that is assumed to fail:

No significant degradation of any safety function or misleading information to the operator as a result of failure of equipment under the accident environment resulting from a design basis event will occur.

**RESPONSE**

As discussed in References 1 and 3 to this letter, only three justifications for continued operation (JCO's) remain applicable for Calvert Cliffs. These JCO's pertain to qualification documentation deficiencies for (1) an operator for a motor operated valve in the hydrogen purge system, (2) a motor control center located in the electrical penetration room, and (3) a power supply panel serving the electric hydrogen recombiners. A description of each of these qualification deficiencies and our plan and schedule for their resolution was provided in Reference 1. We reiterate our confidence, based on partial qualification data and our knowledge of the materials of construction, that the equipment will perform its function.

In the case of the hydrogen purge system valve operator, category MOV015, we have already completed an identification of non-metallic materials of construction (by disassembly and inspection in the field) and have determined that qualification is demonstrated pending confirmation of our materials identification by the valve motor manufacturer. Likewise, efforts are now well underway with the manufacturers of the two other equipment items (motor control center and recombiner power supply panel) to obtain the required documentation.

**2. REQUEST**

Certify that, in performing the review of the methodology to identify equipment within the scope of 10 CFR 50.49(b)(2), the following steps have been addressed:

- a. 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 which result for electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and electrical distribution diagrams;
- b. The elementary wiring diagrams of the safety-related electrical equipment identified in Item (a), above, 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 required operation of the safety-related equipment and;

- c. The operation of the safety-related systems and equipment was reviewed to identify any directly mechanically connected auxiliary system 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.
- d. Non safety-related electrical circuits indirectly associated with the electrical equipment identified in Item (a), above, by common power supply or physical proximity were considered by a review of the 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.

#### RESPONSE

- a. As discussed in our May 10, 1983 response to 10 CFR 50.49 a list was generated of safety-related electric equipment as defined in paragraph 50.49(b)(1) required to remain functional during or following the design-basis loss of coolant accident (LOCA) or high energy line break (HELB). For equipment located inside containment, the LOCA was identified as the accident resulting in the most severe environmental conditions. Outside containment, the main steam line break (MSLB) was identified as the only design basis accident that would result in a significantly adverse environment. The selection of these accidents and the development of the list of safety-related electric equipment was based upon a review of the following Calvert Cliffs documents:

- Updated Final Safety Analysis Report
- Electrical Circuit and Raceway Schedule
- Instrument Index
- Q-List
- P&IDs
- Electrical Schematics

The actual location of safety-related electric equipment was established using cable tray and conduit layout drawings and later confirmed by plant walkdown.

- b. As a result of electrical system design and installation practices employed during the construction of Calvert Cliffs, all auxiliary devices (such automatic trips) which are electrically connected to the control or power circuitry of safety-related equipment are treated as safety-related and have thus been qualified to the extent that they are exposed to a potentially harsh environment. It should be noted, however, that the vast majority of such devices are located in the control room, the switchgear rooms, or the cable spreading rooms, all of which are considered mild environment areas and out of scope.
- c. Electrical components required for the operation of auxiliary systems which are directly mechanically connected to, and required for the proper operation of safety-related equipment have been qualified to the extent that they are located in a potentially harsh environment. This is due to the fact that during plant

construction these components were treated in a manner consistent with the classification of the system they supported. Consequently, our review of the documents discussed in Item (a), above, included identification of electrical equipment supporting required auxiliary systems.

- d. Electrical design practices employed at Calvert Cliffs minimize the likelihood of either physical or electric interactions between safety-related and non-safety related electrical equipment. These practices include the use of properly coordinated protective relays, circuit breakers, and fuses for fault protection. In addition, physical separation is provided where it is desirable to provide additional assurance that mechanically induced interactions will not degrade the function of safety-related electric equipment.

### 3. REQUEST

Provide certification that all design basis events which could potentially result in a harsh environment, including flooding outside containment, were addressed in identifying safety-related electrical equipment within the scope of 10 CFR 50.49(b)(1).

#### RESPONSE

All design basis events which could potentially result in a harsh environment were addressed in identifying safety-related electrical equipment within the scope of 10 CFR 50.49(b)(1). Appendix 10A of the Calvert Cliffs Updated FSAR provides a detailed assessment of the dynamic effects, including flooding, of pipe ruptures in various high energy fluid systems outside containment. That assessment concludes that adequate protection from flooding is provided by floor drains, water tight doors, pressure retaining walls, and other design features.

### 4. REQUEST

Certify that the electrical equipment within the scope of 10 CFR 50.49(b)(3) is all R.G. 1.97 Category 1 and 2 equipment or that justification has been provided for any such equipment not included in the environmental qualification program.

#### RESPONSE

Our program for evaluating electrical equipment within the scope of 10 CFR 50.49(b)(3) will consider all Regulatory Guide 1.97 Category 1 and 2 equipment. The final identification of equipment requiring qualification pursuant to paragraph 50.49(b)(3) will occur as a part of our R.G. 1.97 implementation program in accordance with commitments made in response to Supplement 1 to NUREG-0737.



## Resolution of FKC TIK Deficiencies

Item	Qualno	Equipment	Deficiency	Resolution	Submittal page
33	FI0001	Flow Transmitter	Equipment Similarity	Equipment qualified. Documentation available.	315
34	FI0001	Flow Transmitter	Equipment Similarity	Equipment qualified. Documentation available.	212,213,231,232
35	FI0001	Flow Transmitter	Equipment Similarity	Equipment qualified. Documentation available.	214,215,233,234
37	IND001	Indicator -Pressure -Level -Flow -Radiation	Qualification Documentation	Out of scope. Relocated to mild environment.	
42	EPA001 EPA002 EPA003 EPA004 EPA005 EPA006	Electrical Penetration Assemblies	Aging Degredation Qualified Life or Replacement Schedule Aging Degredation Program Peak Temperature Criteria Peak Pressure Criteria Duration Spray Criteria Radiation Criteria Test Failures or Anomalies Criteria	Aging evaluated. Qualified life established. Program established. Qualified peak temperature evaluated. Qualified peak pressure evaluated. Qualified duration evaluated. Qualified spray evaluated. Qualified radiation values evaluated. Test failures evaluated. Refer to computer submittal.	63-69, 109-124
43	MR004	Motor	Qualification Documentation	Equipment qualified. Documentation available. Refer to computer submittal.	235,236
44	MR024	Motor	Qualification Documentation	Equipment qualified. Documentation available. Refer to computer submittal.	302
45	MR003	Motor	Qualification Documentation	Equipment qualified. Documentation available. See also Item 48 Refer to computer submittal.	219
46	MR002	Motor	Aging Degredation Qualified Life or Replacement Schedule Spray Criteria  Radiation Criteria	Aging evaluated. Qualified life established. Equipment not subject to spray. Fan/motor assembly entirely enclosed in NEMA 4 enclosures. Radiation evaluated. Refer to computer submittal.	31-34
47	MR006	Motor	Qualification Documentation	Equipment qualified. Documentation available. Refer to computer submittal.	208,209