

UNITED STATES
NUCLEAR REGULATORY COMMISSION Attachment 1
WASHINGTON, D. C. 20555

MAR 12 1982

50-317

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Operating Reactors
THRU: *Robert A. Clark*
Robert A. Clark, Chief, Operating Reactors Branch #3, DL
FROM: D. H. Jaffe, Project Manager, ORB#3
SUBJECT: EVALUATION OF CALVERT CLIFFS ELECTRICAL EQUIPMENT
QUALIFICATION PROGRAM BY ORPM AND ORB#3 BRANCH CHIEF

In the Franklin Research Center Report of February 5, 1982 Calvert Cliffs Units 1 and 2 were listed, as two of 18 plants without sufficient justification for interim operation in the event of a LOCA. Baltimore Gas and Electric Company (BG&E) submitted their 90 day response to our June 5, 1981 letter on September 1, 1981. Due to Franklin's concern the ORPM and ORB#3 Branch Chief requested the licensee to either submit further information or to come in for a meeting. The licensee chose to make a submittal dated February 26, 1982.

The licensee, in the February 26 submittal (enclosed) broke down the deficiencies into three categories. Our evaluation of each Category is as follows:

1. Resolved Items

Since the licensee's submittal of September 1, 1981, environmental qualification problems for several types of equipment have been resolved. The following equipment types are now considered to be environmentally qualified:

- (a) Republic Teledyne Solenoid Valves
- (b) Coaxial Cable
- (c) 5kV Power Cable
- (d) Solenoid Valves
- (e) Fischer and Porter Transmitters

With regard to item (e), this equipment will be replaced due to availability problems associated with replacement parts.

2. Items which are expected to be successfully resolved

The following equipment types will be evaluated by June 1982:

- (a) Multiconductor Control Cable
- (b) Rosemount RTD's

The licensee has presented justification for their belief that the above equipment will be successfully qualified.

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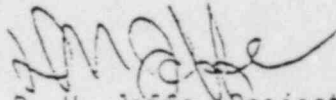
203220475 *KA*

Dupe

3. Performs function prior to, or coincident with, failure

Dragon Solenoid Valves are utilized for the post-LOCA hydrogen sampling capability. These unqualified valves will be replaced with qualified equipment during the 1982 refueling outages for Units 1 and 2, as part of a program to upgrade the post-accident sampling capability. The licensee has indicated that, should these valves fail as a result of environmental factors, the failure will cause these valves to close and thus perform their containment isolation function.

Based upon our review of BG&E's February 26, 1982 submittal, we believe that sufficient information has been presented to justify continued operation of Calvert Cliffs Units 1 and 2.



D. H. Jaffe, Project Manager
Operating Reactors Branch #3
Division of Licensing

Enclosure: As stated



Advance
Copy

HANDLED ON

MAR 2 1982

E.L. "MONTE" DONNER

cc. M Williams =

Z Rosztoczy

February 26, 1982

R Clark

CHARLES CENTER • P. O. BOX 1475 • BALTIMORE, MARYLAND 21203

ARTHUR E. LUNDVALL JR.
VICE PRESIDENT
SUPPLY

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attn: Mr. Tom Novak
Assistant Director Operating Reactors
Division of Licensing

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2; Dockets Nos. 50-317 & 50-318
Response to I&E Bulletin 79-01B

- References:
- (a) Letter dated 9/1/81 from A. E. Lundvall to B. H. Grier
 - (b) Safety Evaluation issued 5/28/81 to A. E. Lundvall, Jr.

Gentlemen:

This letter supplements reference (a) which constituted our 90-day response to the Safety Evaluation Report, reference (b). It provides clarification of Section IV, Qualification for Continued Operation, specifically addressing those equipment for which we have not provided documentation of the qualification information which demonstrates that such equipment meets the I&E Bulletin of NUREG-0893.

Attachments to this letter present discussions of specific equipment requiring supplemental information. We have also enclosed one bound volume of updated computer printout summary sheets for each unit. The applicable summary sheets are referenced in the attachments.

As previously stated in reference (a), we identified the use of saturation temperature for our containment peak temperature during the postulated LOCA. We also stated that a reassessment would be made to the 200F higher temperature. A preliminary review of the profiles for containment equipment has identified sufficient conservatism such that an equivalence analysis shows the actual test to be more severe. Therefore, we can establish qualifications of the required containment equipment to the higher peak temperature.

Very truly yours,

Dupe PDR

~~8203098075~~

cc: J. A. Biddison, Esquire (w/o encl)
C. F. Trowbridge, Esquire (w/o encl)
Mr. D. K. Jaffe - NRC (w/ encl) ✓
Mr. R. E. Architzel - NRC (w/o encl)

This is a silicone rubber insulated cable with asbestos fillers and asbestos braided jacket. We have used this cable throughout the plant, including the containment buildings. We have not been able to locate conclusive test data to support qualification for the postulated LCCA. The cable we purchased is no longer produced nor is similar cable made. This cable was a special order for our plant. We have issued a purchase order to Kyle Laboratories for performance of a LCCA test to our profile. Completion is anticipated this date.

We have identified the base compound used for the insulation as silicon silicone rubber. The same base compound has been used by other manufacturers for similar cable configurations. These have subsequently been qualified by test.

On the basis of the similarity of the base compound we believe that the Wattfield Control Cable is fully qualified, and we expect that the Kyle Laboratories test report will provide documentation of qualification.

These valves are located in the piping area outside of the containment and are required to close the main steam isolation valve. Our initial decision to replace these valves was based on our inability to obtain information from the manufacturer. We have now obtained information from the manufacturer, identifying the non-metallic materials as polyamide, ethylene glycol ether and silicon. The potentially detrimental environmental parameter is the calculated radiation dose of 1.5MR. We have reviewed the non-metallics used in these assemblies and have found polyamide to be the most sensitive to radiation. At a dose of 1.7 MR, this material shows a 25% loss of tensile strength, i.e., tensile strength, elongation, etc. We believe this dose is sufficient to have a deleterious effect on the material. Therefore, we conclude that continued safe operation can be maintained with the existing valve assemblies.

This cable has a silicone rubber insulation with a hypalon jacket. The outstanding item identified on the summary sheet pertains to chemical spray. Hypalon is the trade name for chlorosulfonated polyethylene which has been successfully tested by other manufacturers to 3000 ppm B/A solution. Therefore, the existing cable is considered qualified and the outstanding item is considered resolved.

This cable is used outside the containment and the insulation material is the same as that shown on code CBL017, p. 66 of the summary sheets. Since this cable is not exposed to an incident as severe as a LOCA and similar materials have been qualified for LOCA, this is considered qualified for its application.

2000

Solenoid Valves

Code: SV0011

4. 11

10V3828

10V3830

These valves are normally closed/fail open and are required to open upon initiation of a LOCA. The solenoid uses a class H coil which has been tested to temperatures and radiation levels in excess of those indicated on the summary sheet. We do not have any conclusive data addressing the specific valve assembly, however, the review of materials used in the class H coil allows sufficient basis for qualification by analogy. We believe these to be similar to the coils used to qualify the valve assemblies identified by code SV0003 4. 1 on the summary sheet.

Header & Footer Transmitters

1FT6901

Qual PT0001

LT0001

1FT1008
 1FT1011 p. 185
 1FT1021
 1FT1031
 1FT1041

1FT102A-D p. 174
 1FT103
 1FT1013A-D
 1FT1113A-D

1FT103-1 p. 172 ff
 1FT1023A-D p. 127 ff
 1FT1123A-D p. 16 ff

The pressure, level and flow transmitters listed above are used throughout the containment. They are required during LOCA and to achieve a hot standby condition. Their qualification has been verified and is documented in the Containment Injection Nos. 50-317/80-10 and 50-318/80-09. These transmitters and component parts have been tested to radiation levels in excess of our worst case radiation dose. Therefore, we conclude that these transmitters are qualified and provide continued safe operation until the next refueling outage in each unit. We have decided to replace these transmitters because Header & Footer refuses to maintain a QC program which would allow them to supply replacement parts necessary to maintain qualification of these transmitters.

Emergency RTD's

ITE1120A-CD
ITE1120A-ED
ITE1220A-CD
ITE1220A-ED

Code: RTD001
p. 156 ff.

These devices are required during LOCA and to achieve a hot standby condition. Our initial decision to replace them was based on the lack of conclusive test data to support qualification and inconsistent supportive information from the manufacturer. Subsequent review of the design and the similarity of materials used to those used in designs which have been tested to environmental parameters which exceed our requirements lead us to believe that the RTD's are qualified. We have requested an independent evaluation by NRC staff, which will be completed by June 1982.

It is our belief that the Emergency RTD's are qualified and will not require replacement, therefore, continued operation is justified.

APPENDIX D - REVIEW OF LICENSEE'S RESPONSE TO NRC EEQ
SER CONCERNING JUSTIFICATION FOR INTERIM OPERATION

1. BACKGROUND

The NRC Safety Evaluation Report (SER) concerning equipment environmental qualification (EEQ) states [13]:

"Subsection 4.2 identified deficiencies that must be resolved to establish the qualification of the equipment; the staff requires that the information lacking in this category be provided within 90 days of receipt of this SER. Within this period, the licensee should either provide documentation of the missing qualification information which demonstrates that such equipment meets the DOR guidelines or NUREG-0588 or commit to a corrective action (requalification, replacement, relocation, and so forth) consistent with the requirements to establish qualification by June 30, 1982. If the latter option is chosen, the licensee must provide justification for operation until such corrective action is complete."

On January 19, 1982, FRC representatives met with NRC Division of Licensing personnel at NRC offices to discuss the potential for FRC to assist the staff in the technical review of licensees' statements regarding justification for interim plant operation submitted in response to outstanding qualification deficiencies in the NRC EEQ SERs. The results of the meeting were as follows: (1) FRC was requested to proceed immediately with the technical review of licensees' justification for interim operation, (2) the format was established, and (3) the criteria for the review were established. These criteria are presented in Section 2 of this appendix.

On January 21, 1982, the NRC provided the following modification to Final Assignment 13 concerning this subject:

"The FRC review will consist of:

- o Review the licensee's justification of interim operation and provide FRC independent analysis which shows whether or not licensee provided technically sound rationale as a basis for justification for continued plant operation.

- o On January 27, 1982, FRC shall provide a list of those power reactors that have provided technically sound justification for continued operation. FRC shall also provide a list of those power reactors which have not provided technically sound justification for continued operation. In addition to the lists, FRC may provide any additional information which in FRC's judgment is necessary to support the conclusions regarding justification for continued operation."

On January 25, 1982, the NRC was provided with the completed review of the licensees' statements presented as a basis for justification for interim operation in response to the NRC EEQ SER.* On February 5, 1982, at the NRC's request, the NRC was provided with actual examples of licensees' responses to the NRC EEQ SER that provide adequate rationale as a basis for justification for interim operation.**

2. GENERAL DISCUSSION

In general, licensee-submitted justifications for interim operation are based on systems considerations, equipment operability evaluations, or failure-modes-and-effects analyses.

Systems considerations often involve the availability of backup equipment capable of performing the particular safety function of concern. The backup equipment is either environmentally qualified, unqualified but not exposed to a harsh environment at the same time as the primary equipment, or located so that it is unlikely that both the primary and backup equipment would be simultaneously exposed to a severe environment. In general, these systems discussions should consider (1) the possibility of a single-active failure

* C. J. Crane

Letter to R. A. Clark, NRC. Subject: Transmittal of FRC Review of Licensees' Responses to NRC EEQ SER Concerning Justification for Interim Operation
FRC, 25-Jan-82

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Letter to R. A. Clark, NRC. Subject: Transmittal of Actual Examples of Licensees' Responses to NRC EEQ SER Which Provide Adequate Rationale as a Basis for Justification of Interim Operation
FRC, 5-Feb-82

disabling the backup equipment, (2) any major differences in the characteristics of the primary and backup equipment (unless it is obvious that the equipment is essentially identical), (3) the possibility of electrical failure of the primary equipment causing an adverse effect on other safety-related equipment or power supplies, and (4) in the case of display instrumentation, the possibility of an operator being misled by the failed primary equipment. Where equipment has not been demonstrated to be qualified, some justifications discuss administrative procedures or revised operating procedures in effect. Depending upon the specific equipment involved, each of the above considerations need not be discussed in every instance, but, in general, a complete systems discussion would consider the above points.

Where equipment qualification evaluations were used, licensees generally (1) received additional information from manufacturers, (2) applied engineering judgment, (3) performed material analysis, and/or (4) used partial test data in support of the original qualification documentation. Where these evaluations were performed, the licensees determined that, although full qualification was not documented, there was sufficient evidence to suggest that the equipment would perform its intended safety function, thereby justifying interim operation until qualified equipment is installed.

Some licensees provided detailed failure-modes-and-effects analyses of electrical circuitry to demonstrate that, under all identified failure modes, the safety function of the equipment could still be accomplished.

Other justifications involved a combination of qualification information and systems information. For example, if a licensee has qualification information (such as a generic test report or other partial qualification documentation) that tends to confirm the ability of the equipment to remain operable for a specified period of time, justification for interim operation often was based upon a discussion of the required safety function being performed prior to the potential failure. This type of discussion often applies to equipment which performs a short-term trip or isolation function in the early stages of an accident.

Rec 10/1

TER-C5257-487

3. PLANT-SPECIFIC REVIEW

As a result of the review, this plant was evaluated and the results documented on the "Summary of Review of Licensee's 90-Day Response" form reproduced below:

"EQUIPMENT ENVIRONMENTAL QUALIFICATION (EEQ)
Review of Licensees' Resolution of Outstanding Issues
From NRC Equipment Environmental Qualification
Safety Evaluation Reports

SUMMARY OF REVIEW
OF LICENSEE 90-DAY RESPONSE

Utility: Baltimore Gas & Electric Company
Plant Name: Calvert Cliffs Unit 1
NRC Docket No. 50-317
NRC TAC No. 42494
NRJ Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 487

References:

- a. A. E. Lundvall, Jr.
Letter to B. H. Grier (NRC)
Subject: Response to Safety Evaluation Report for IE Bulletin 79-01B
for Calvert Cliffs Nuclear Power Plant Units 1 and 2
Baltimore Gas & Electric Co., 01-Sep-81
- b. Office of Nuclear Reactor Regulation
Safety Evaluation Report for Calvert Cliffs Units 1 & 2
Environmental Qualification of Safety-Related
Electrical Equipment
NRC, 28-May-81

The Licensee has submitted technical information in Reference a in response to the NRC SER [b] on environmental qualification. FRC has reviewed these documents [a, b]. As a result of this review, FRC concludes that the Licensee has provided responses to the concerns expressed in the SER with the exception that justifications for interim operation based on a technically sound rationale have not been provided for electrical equipment identified as deficient in the SER. Specifically, the Licensee provided the following general statement with regard to interim operation:

'IV. JUSTIFICATION FOR CONTINUED OPERATION

The environmental qualification documentation for each safety-related item located in a potentially harsh environment has been evaluated and all remaining problems are the result of insufficient documentation. Our past submittals and this response indicate the effort Baltimore Gas & Electric Company is exerting to ensure full qualification of safety related electrical equipment in hazardous as well as the mild environments. In our earlier letter, Reference (d) we indicated that some of the purchasing activity resulting from our evaluation/assessment may not be initiated until the first quarter of 1982. It is likely that equipment deliveries as well as sufficient qualification reports may not be realized until 1983 because of equipment lead times and qualification testing schedules.

We have also shown that our approach to the evaluation/assessment of the qualification of equipment, the subsequent action plan and the final installation is within the scope and intent of the DOR Guidelines and NUREG 0588.

Based on these considerations we conclude that there is reasonable assurance of continued safe operation of Calvert Cliffs Units 1 and 2 pending completion of our qualification program to bring us in compliance with the DOR Guidelines and NUREG 0588.'

FRC does not consider the above approach responsive to the SER. It is recommended that the Licensee specifically reevaluate the justification for continued operation for each equipment item in light of the stated qualification deficiencies."

4. SUBSEQUENT REVIEW

As a result of FRC's review of the Licensee's 90-day response, described in Section 3 above, a meeting was held between the NRC staff and Licensee

personnel. Following the meeting, the Licensee submitted Reference 17, in which additional information justifying interim operation was submitted for each equipment item not documented as environmentally qualified at the time Reference 17 was submitted.

Evaluation

An evaluation has been conducted of the information provided by the Licensee in Reference 17, regarding justification for interim operation. After reviewing the technical basis of the Licensee's justification for continued operation for each item, it is concluded that the Licensee has provided sufficient technical basis to support justification for interim operation.

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SUMMARY OF REVIEW
OF LICENSEE 90-DAY RESPONSE

Utility: Baltimore Gas & Electric Company
Plant Name: Calvert Cliffs Unit 2
NRC Docket No. 50-318
NRC TAC No. 42495
NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 488

References:

- a. A. E. Lundvall, Jr.
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