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November 12, 1998

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Response to Request for Additional Information; Summary Report on the
Verification of Seismic Adequacy of Mechanical and Electrical Equipment in
Operating Reactors (TAC Nos. M69435 & M69436)

REFERENCE: (a) Telephone Conference between Mr. A. W. Dromerick, et al (NRC) and
Mr. J. M. Osborne/Mr. M. A. Wright (BGE), on October 30, 1998,
"Request for Additional Information (RAI) Regarding the Calvert Cliffs
Nuclear Power Plant, Unit Nos. 1 and 2, Summary Report on the
Verification of Seismic Adequacy of Mechanical and Electrical
Equipment in Operating Reactors, (TAC Nos. M69435 and M69436)"

Attachment (1) provides our response to Reference (a). Should you have additional questions regarding
this matter, we will be pleased to discuss them with you.

Very truly yours,

CHC/JMO/bjd

Attachment: (1) Response to Request for Additional Information; Summary Report on the
Verification of Seismic Adequacy of Mechanical and Electrical Equipment in
Operating Reactors

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
S. S. Bajwa, NRC
A. W. Dromerick, NRC

H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR
J. H. Walter, PSC

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ATTACHMENT (1)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION;
SUMMARY REPORT ON THE VERIFICATION OF SEISMIC ADEQUACY OF
MECHANICAL AND ELECTRICAL EQUIPMENT IN OPERATING REACTORS

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
November 12, 1998

ATTACHMENT (1)

Response to Request for Additional Information; Summary Report on the Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors

NRC Question 1:

On page 20 of your March 23, 1998 submittal [Reference (1)], and in our letter dated August 13, 1998 [Reference (2)], you indicated that all but 3 of the 31 unresolved outliers (discussed in Tables 5.3-1 and 5.3-2) have been resolved. Identify the three unresolved outliers and summarize the specific analysis or methods for resolution and provide the status of resolution for these three outliers.

BGE Response:

As of October 30, 1998, there are only two remaining outliers at Calvert Cliffs Nuclear Power Plant (CCNPP). They both relate to the same type of equipment items, which are two Control Room Heating, Ventilating and Air Conditioning Air Handling Units (AHUs). The Unique Equipment Identifiers for these two items are:

1M1435
2M0410

The mounting for a portion of each of the combination fan/coil/filter units, while considered acceptable per our Current Licensing Basis, does not satisfy all of the Unresolved Safety Issue A-46, "Seismic Qualification of Equipment in Operating Plants," methodology acceptance criteria for verification of seismic adequacy. The outlier pertains to the use of two vibration isolators per AHU, which appear to not provide sufficient lateral restraint to satisfy the Generic Implementation Procedure, Revision 2 (GIP-2). These isolators are just two of the eight supports provided for each of the AHUs.

This mounting will be reconstructed/upgraded during a planned modification to both Control Room Heating, Ventilating and Air Conditioning AHUs. An Engineering Service Package has been initiated to implement this modification and is scheduled for installation no later than June 30, 2001.

NRC Question 2:

The Summary Report, Section 5.1.1, indicates that some Safe Shutdown Equipment List (SSEL) items are located in the Turbine Building. Is the Turbine Building seismically qualified? If not, identify all SSEL equipment items that are located in the Turbine Building, and discuss how each SSEL equipment item will not be damaged.

BGE Response:

The CCNPP Turbine Building was designed and constructed in accordance with the Uniform Building Code, which required the consideration of a seismic loading comparable to the site operating basis earthquake seismic demand of 0.08 g's horizontal and 0.053 g's vertical. During the conduct of seismic verification walkdown activities at CCNPP, the Seismic Capability Engineers determined that the Turbine Building did not exhibit any vulnerabilities.

Their conclusion was based on the following information:

1. On Page D-6 of GIP-2, this discussion is provided:

Non-Seismic Category I Structures. If any safe shutdown equipment is located in non-Seismic Class I structures, then potential structural vulnerabilities of the building should be identified;

ATTACHMENT (1)

**Response to Request for Additional Information;
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Equipment in Operating Reactors**

2. Review of Electric Power Research Institute Report NP-7149-D, "Summary of the Seismic Adequacy of Twenty Classes of Equipment Required for the Safe Shutdown of Nuclear Plants," shows that the overwhelming majority of investigated equipment items were installed in non-seismically designed commercial structures or fossil power plants.

Based on the above discussion, it is accepted as a basic premise of the A-46 methodology that typical nuclear plant structures do not collapse or suffer other catastrophic failure as a result of an earthquake.

Of the 34 Turbine Building SSEL items, all but 8 are located in the auxiliary feedwater pump rooms. At CCNPP, the auxiliary feedwater pump rooms are Seismic Category I structures. The other eight items are four large control valves plus their attached instruments (two solenoid valves and two current-to-pressure indicators). All are free from the potential for adverse spatial interactions.

NRC Question 3:

The Pretreated Water Storage Tanks (PWSTs) 0TKPWSTWG11 and 0TKPWSTWG12 were considered outliers due to "capacity versus demand" and anchorage issues. In reference to the resolution on page 25-2 of Enclosure B to your March 23, 1998 submittal [Reference (1)], you assumed that the failure mechanism was due to a failure of the bond stress between the bolt and the concrete. The staff considers that there isn't sufficient concrete in the edge and that the assumption of the concrete bond failure mode applied in this case may be unconservative. Please provide a justification.

BGE Response:

The original seismic outliers for the PWSTs were "capacity vs. demand" and "anchorage" related. The anchorage outlier was based on the bolt edge distance and the fact that the embedment depth did not satisfy the requirements of GIP-2.

Based on the presence of a significant amount of reinforcing steel in the ring foundation the analysts concluded that failure due to an unreinforced concrete shear cone was not credible. The reinforced concrete ring is not susceptible to collapsing on itself horizontally due to the additional strength provided by the buried slab to which it is attached and its soil embedment depth. Page 25-13 of Enclosure B of the March 23, 1998 letter goes into detail on determining the "monolithic" nature of the concrete ring/slab. A sketch is attached which provides additional details on the ring foundation. This sketch represents a "section" cut of the PWST ring foundation.

The failure mechanism was, therefore, concluded to be the failure of the bond stress between the cast-in-place anchor and the concrete. The use of an ultimate bond stress of 200 psi for plain steel rod is considered acceptable per EPRI Report NP-5228-SL, Rev. 1, Volume 1.

Baltimore Gas and Electric Company believes the conclusion of seismic adequacy for the PWSTs is justified.

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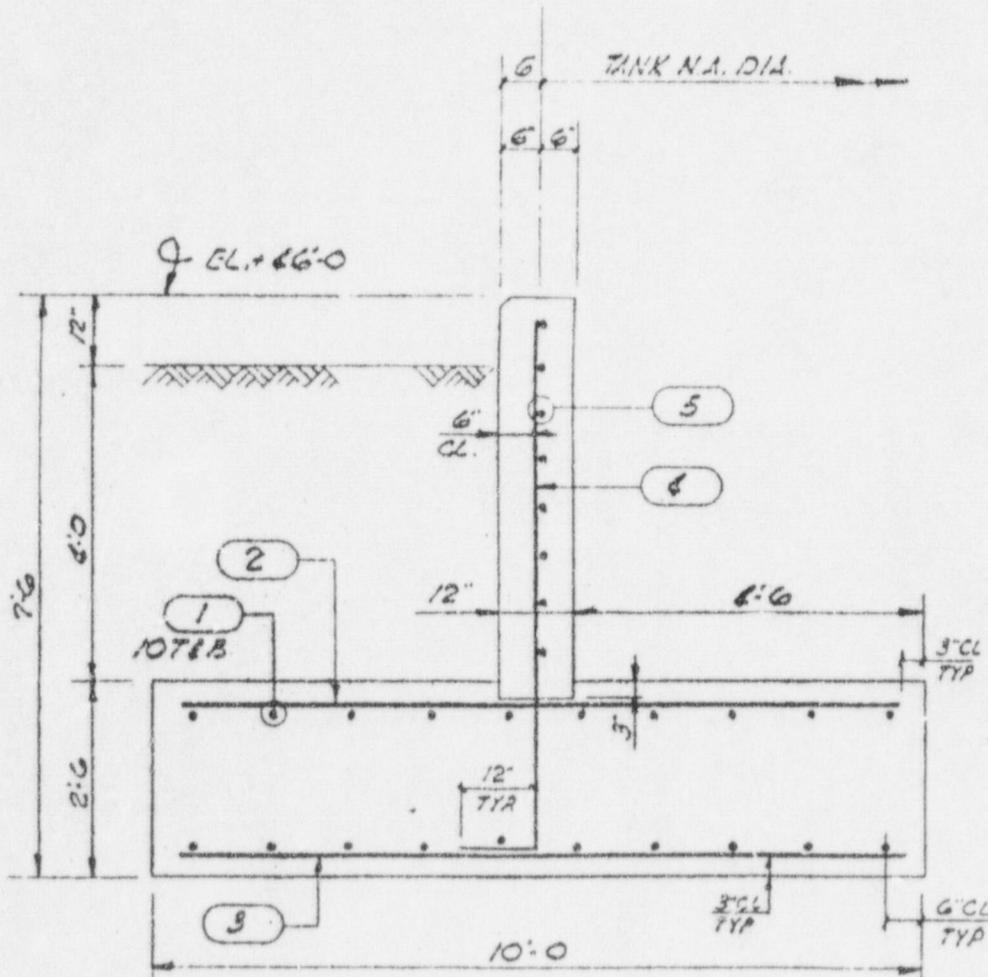
References:

1. Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated March 23, 1998, Response to Request for Additional Information on the Resolution of Unresolved Safety Issue A-46, Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. M69435; M69436)
2. Letter from Mr. C. H. Cruse (BGE) to Document Control Desk (NRC), dated April 13, 1998, Revised Commitment for Resolution of USI A-46 (TAC Nos. M69435; M69436)

ATTACHMENT (I)

Response to Request for Additional Information;
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The sketch below is from BGE Drawing 12005G-0012 (Bethlehem Steel Drawing 5274-DG12)



SECTION

Note: All Rebar is Size #7.
Items 2 & 3 are on 10" C to C.
Item 4 is on 5" C to C.
Item 5 is ~7" to 8" C to C.