

ROBERT E. DENTON  
Vice President  
Nuclear Energy

Baltimore Gas and Electric Company  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
Lusby, Maryland 20657  
410 586-2200 Ext. 4455 Local  
410 260-4455 Baltimore



August 2, 1994

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  
Request for Additional Information - AAC Power Design Report (TAC  
Nos. M89086 and M89087)

REFERENCE: (a) Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE),  
dated June 17, 1994, Request for Additional Information Regarding  
Alternate AC Power Design Report

In the referenced letter, additional information was requested to complete your review of the Alternate AC Power Design Report. The information requested is provided in Attachment (1). Should you have any further questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

RED/PSF/dlm

Attachment: As Stated

cc: (Without Drawings)  
D. A. Brune, Esquire  
J. E. Silberg, Esquire  
M. K. Boyle, NRC  
T. T. Martin, NRC  
P. R. Wilson, NRC  
R. I. McLean, DNR  
J. H. Walter, PSC

(With Drawings)  
D. G. McDonald, Jr., NRC

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## ATTACHMENT (1)

### **RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ALTERNATE AC POWER DESIGN REPORT**

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#### Question 1

*The last sentence on page 1 of Attachment (2) states, "Such structures are designed and constructed so that the design basis earthquake (DBE), five operating basis earthquakes (OBEs) followed by a safe shutdown earthquake (SSE) would not cause impairment of safety-related features." The staff does not understand this. In the design of a seismic category I structure, the DBE has been replaced by SSE and the earthquakes to be considered are the two earthquakes, OBE and SSE, specified by the ground spectra for the plant site. The staff does not understand how the five OBEs and one SSE are used. Please provide an explanation.*

#### Response

The Station Blackout (SBO) Diesel Generator Building is conservatively designed for SSE loads and seismic Category I allowables.

In order to avoid confusion, the last sentence on page 1 of Attachment (2) should be revised to state:

Such structures are designed and constructed so that a safe shutdown earthquake (SSE) would not cause impairment of a safety-related feature.

Likewise, the second sentence of the second paragraph of the response to B.3 of Attachment (1) should be revised to state:

In order to preclude failure and impact on the adjacent Category I structure, the main girders, columns, and bracing for the SBO Diesel Generator Building have been analyzed to demonstrate that the SBO Diesel Generator Building will not collapse under safe shutdown earthquake loads.

#### Question 2

*From the description of the SBO Diesel Generator Building in Section 2.2, it appears that the building is a framed steel structure supported on a reinforced concrete mat foundation with metal decking as the roof and metal sheets as siding. Provide a plan view and an elevation view showing the relation to the Emergency Diesel Generator Building.*

#### Response

Two elevation views and one plan view (Drawings 64-051-E, 64-055-E, 64-056-E) showing the SBO Diesel Generator Building in relation to the Emergency Diesel Generator (EDG) Building are provided.

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#### Question 3

*Since the SBO Diesel Generator Building is not designed for tornado wind loading and its structural members may be broken off resulting in missiles more damaging to the EDG Building than those considered. Indicate what design measures will be taken to avoid such an occurrence and provide the details.*

#### Response

As stated in the Alternate AC (AAC) Diesel Generator Design Report, Section 2.2 of Attachment (2):

The AAC structure is designed to remain intact, but not necessarily functional, following a design basis earthquake or under tornado-generated wind loads (Regulatory Guide 1.76).

The SBO Diesel Generator Building structural members which could become tornado missiles that would exceed the design basis tornado missiles of the EDG Building were designed for the lateral tornado wind loads that would be generated by a tornado for Region I identified in Regulatory Guide 1.76. Therefore, these structural members will not become tornado missiles. The tube steel bracing is shown on drawings C-1114 and C-1115.

#### Question 4

*From what is described in Section 2.3, Earthquake Analysis, it appears that the seismic design of the SBO Diesel Generator Building is in accordance to Standard Review Plan (SRP) 3.7.2 which is for category I structures, and is acceptable. However, in Section 2.0 it is indicated that the SBO Diesel Generator Building is designed to meet the structural requirements of the Standard Building Code (SBC), which according to B.3 of NUMARC 87-00, is the Uniform Building Code (UBC) equivalent design code of record for the area of the plant. Indicate if there is any such SBC for the Calvert Cliffs area. If there is none and the UBC is the SBC, indicate which portions of the UBC are used in the design.*

#### Response

The SBC is the governing Code for Calvert County:

1991 Edition     Standard Building Code, Southern Building Code Congress  
International, Inc.

As recommended by NUMARC 87-00 and described in the AAC Diesel Generator Design Report, Section 2.0 of Attachment (2), at a minimum, the SBO Diesel Generator Building is designed to meet the requirements of the SBC.

However, since the SBO Diesel Generator Building is a non-Category I structure, interaction with the adjacent Category I Diesel Generator Building was also considered in its design. In cases where failure of the non-Category I SBO Diesel Generator Building could affect the adjacent Category I Diesel Generator Building (e.g., earthquakes and tornadoes), codes and standards more

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AAC Diesel Generator Design Report, Sections 2.2 and 2.3 of Attachment (2), describe the design features and analysis performed to meet Acceptance Criteria II.8 of SRP 3.7.2 and wind loads from a Region I tornado described in Regulatory Guide 1.76.

#### Question 5

*The description on the SBO Diesel Generator Building seismic design, which is based on SRP 3.7.2, needs some clarification. On one hand it appears very detailed, such as consideration of three-component earthquakes, and on the other hand, a single degree of freedom system is used for the seismic analysis in the vertical direction. Provide the model used for the SBO Diesel Generator Building and the analysis method in more details.*

#### Response

The seismic analysis of the SBO Diesel Generator Building was performed by hand calculations using the equivalent static load methodology described in Attachment (2), Section 2.3, of the AAC Diesel Generator Design Report and SRP Section 3.7.2. The hand calculations considered the following:

- The design response spectra from Regulatory Guide 1.60, Revision 1, normalized to the maximum horizontal and vertical SSE Calvert Cliffs ground accelerations.
- Seven percent damping, which corresponds to the Regulatory Guide 1.61 SSE damping value for a bolted steel structure.
- Multi-mode factor of 1.5 for the horizontal response and 1.0 for the vertical response. Seismic loads were incorporated in the building's lateral analysis by simultaneous consideration of the three directional responses.

#### Question 6

*Indicate if other codes, such as the ACI-318 and AISC standards, are used for the structural design of the SBO Diesel Generator Building in addition to the SBC.*

#### Response

Both ACI-318-89, Revised 1992, and the AISC Manual of Steel Construction, Allowable Stress Design, Ninth Edition, are used for the design of the SBO Diesel Generator Building.

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## **SEE APERTURE CARDS**

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