UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 23, 1994

Docket Nos. 50-317
and 50-318

LICENSEE: Baltimore Gas and Electric Company

FACILITY: Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2

SUBJECT: SUMMARY OF THE NOVEMBER 19, 1993, DESIGN AUDIT OF THE NEW EMERGENCY DIESEL GENERATOR BUILDING - CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 (TAC NO. M85222) AND UNIT NO. 2 (TAC NO. M85223)

BACKGROUND:

On July 21, 1988, Part 50 of Title 10 of the Code of Federal Regulations was amended to include a new Section 50.63, entitled, "Loss of All Alternating Current Power," referred to as the station blackout (SBO) rule. The SBO rule requires that each light-water cooled nuclear power plant be able to withstand and recover from an SBO of specified duration. The SBO rule also requires that information defined in the rule be provided to the staff for review.

Baltimore Gas and Electric Company (BG&E) responded to the requirements of the rule and the staff approved its response by letter, dated February 12, 1992. The staff's approval included the addition of a new safety-related Class-1E emergency diesel generator (EDG). A series of meetings are being held to discuss various design aspects of the EDG project. Several reports, including a Civil Engineering Design Report, have been provided by BG&E for NRC staff review and approval.

PURPOSE:

Perform a design audit of the emergency diesel generator building (EDGB) which is being constructed at the Calvert Cliffs Nuclear Power Plant site to house the new safety-related Class-1E EDG. A list of attendees is enclosed.

SUMMARY:

The audit was performed at the Bechtel Power Corporation, 1801 Research Boulevard, Gaithersburg, Maryland, on November 19, 1993. Bechtel Power Corporation is the Architect/Engineer for the new EDGB. The audit concentrated on the beam and column supports which use anchor bolts and on the design of the columns.

The acceptance criteria for the design of the concrete and the studs under combined tension and shear are based on interaction formulae as given in the Prestressed Concrete Institute (PCI) Design Handbook. The factors of safety as provided by BG&E in a preaudit response are not necessary when anchors are under combined tension and shear.

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The steel columns are designed on the allowable stress basis. The columns are designed for both axial compression and bending; thus, it is necessary to satisfy the interaction equation for columns. Therefore, the use of a factor of safety is not necessary for the steel columns.

Nelson studs are used for support anchors of the main steel structural members such as columns and beams. Bechtel has established an in-house design guide on the design of such anchors based on industry standards. The concrete pullout strengths are different in the standards on which the design guide is based. Based on the latest edition of the PCI Design Handbook, the derivation of the formula for the concrete pullout strength indicates that the factor should be 12.57. The design guide uses a larger factor. BG&E was requested to revise the concrete pullout strengths by using a factor of 12.57 and assure the design meets its required specifications. This is an open item requiring resolution.

The steel beams were designed for load combinations involving dead load, live load, and vertical seismic loading. The vertical seismic load is obtained by multiplying the vertical acceleration by the dead load only (sheet nos. 12, 20, and 50 of calculation No. DC-93-001). Justification for not including live loads in calculating the vertical seismic load was not provided. This is an open item requiring resolution.

Based on the limited audit, it was concluded that conservative assumptions were used in the design of the EDGB. It is necessary to resolve the open items identified above for the NRC staff to complete its review of the Civil Engineering Design Report.

During the audit, discussions related to the Societies Alsacienne De Constructions Me'chaniques Del MulHouse (SACM) Diesel Generator and Mechanical Systems Design Report were held. The NRC staff identified three items requiring clarification to allow it to complete its review of the report. The items are:

1) Are the SACM supplied components fabricated to standards other than American Society of Mechanical Engineers (ASME) Code, Section III, Subsection ND, classified as Quality Group C?

2) Justification for the use of ASME Code, Section VIII, instead of Section III in the design and fabrication of the high temperature and low temperature radiators of the SACM EDG cooling water system.

3) The degree to which the standards used for SACM fabricated components are similar to or meet the intent of the ASME Code.

BG&E indicated that the SACM supplied components fabricated to other standards than the ASME Code are classified as Quality Group C. The EDG radiators were procured to ASME Code, Section VIII, because none were available for procurement to ASME Code, Section III. However, BG&E noted that the design of the radiators is in accordance to the ASME Code, Section III. BG&E indicated

that it has documentation available to demonstrate that the SACM fabricated components are similar or meet the intent of the ASME Code.

The NRC staff indicated that the information provided resolved items 1 and 2. In relation to item 3, the NRC staff indicated that BG&E should maintain the documentation on the SACM fabricated components for a future audit.

Daniel G. McDonald

Daniel G. McDonald, Senior Project Manager
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Office of Nuclear Reactor Regulation

Enclosure:
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cc w/enclosure:
See next page

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ENCLOSURE

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Chen P. Tan	NRC/NRR\ECGB
Jai Rajan*	NRC/NRR/EMEB
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Guy H. Goddard	Bechtel Civil
Jim Ryan	Bechtel Civil
Patricia Furio	BG&E
Gary J. O'Connell	BG&E
K. L. Khianey	Bechtel
P. R. Britnell	Bechtel QA
Charles R. Mahon	BG&E/Diesel Generator Project
Eugene W. Thomas	Bechtel Civil Staff
Christy Leerovar**	Bechtel Mechanical
JoAnna Candle**	Bechtel Mechanical

* Via Telecon
**Parttime attendance

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Original signed by:

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See next page

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