

BALTIMORE GAS AND ELECTRIC COMPANY

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NUCLEAR POWER DEPARTMENT  
CALVERT CLIFFS NUCLEAR POWER PLANT  
LUSBY, MARYLAND 20657

December 27, 1982

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

ATTENTION: MR. R. A. Clark, Chief  
Operating Reactors Branch #3  
Division of Licensing

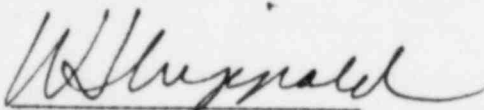
SUBJECT: Calvert Cliffs Nuclear Power Plant  
Unit 2, Docket No. 50-318, DPR-69  
Response to NRC Question on  
Application of FATES3 to Cycle 5

Gentlemen:

NRC staff posed a verbal question relative to the impact of an NRC imposed restriction to the FATES3 grain size on the Cycle 5 operating limits. The attachment is a response to that question.

Should you have any questions, please contact us.

Very truly yours,



W. J. Lippold  
Nuclear Fuel Management

WJL:fld

Attachment

cc: J. A. Biddison, Esquire  
G. F. Trowbridge, Esquire  
D. H. Jaffe - NRC  
R. R. Mills - CE  
R. E. Architzel - NRC/CC

A001

December 22, 1982

### ATTACHMENT

#### Impact of NRC Imposed FATES3 Grain Size Restriction on Calvert Cliffs 2 Cycle 5 Operating Limits

A burnup dependent restriction on  $\text{UO}_2$  grain size for use in the FATES3 (CEN-161) fission gas release model has been assessed with respect to its impact on FATES3 results and the FATES3 dependent safety analyses of Calvert Cliffs 2 Cycle 5. The purpose of this assessment was only to determine the validity of the as-submitted operational limits of Unit 2 Cycle 5 with the restriction imposed. The restriction is stated as follows:

$$G_{\text{eff}} = \text{MIN} [G_{\text{init}}, \text{MAX} (1.0, G_b)]$$

where  $G_{\text{eff}}$  = effective grain size to be used for the analysis of steady-state fission gas release and as the starting point for transient grain-boundary-sweeping calculations,  $\mu\text{m}$

$G_{\text{init}}$  = the initial as-fabricated (design) grain size,  $\mu\text{m}$

$$G_b = 15.0 [1.0 - B/55.0]$$

and where  $G_b$  = burnup dependent grain size limit,  $\mu\text{m}$

$B$  = local burnup, GWD/MTU

MIN = minimum function

MAX = maximum function

The restriction was incorporated into FATES3 and an evaluation performed for the Calvert Cliffs 2 Cycle 5 reload. Results show that the only change in Unit 2 Cycle 5 of any significance is that the end-of-cycle fission gas release and rod internal gas pressure is increased in the lead burnup rod (a maximum of 40.0 GWD/MTU rod average and 44.0 GWD/MTU local burnup). However, the maximum internal pressure remains below the nominal reactor coolant system pressure throughout Cycle 5. Further, the higher end-of-cycle fission gas release and internal gas pressure was evaluated for its impact on the FATES3 dependent safety analyses and found to have either no impact or to be non-limiting. The established as-submitted operating limits for Calvert Cliffs 2 Cycle 5, therefore, remain valid.

WJL:fld