CHARLES H. CRUSE
Vice President
Nuclear Energy

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410 495-4455

BGE

November 4, 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 for the Review of the Calvert Cliffs Nuclear Power Plant, Units 1 & 2, Integrated Plant Assessment, Water Chemistry Program

REFERENCES:

(a) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated April 8, 1998, "Application for License Renewal"

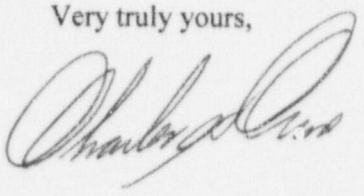
(b) Letter from Mr. D. L. Solorio (NRC) to Mr. C. H. Cruse (BGE), August 27, 1998, "Request for Additional Information for the Review of the Calvert Cliffs Nuclear Power Plant, Units 1 & 2, Integrated Plant Assessment on Water Chemistry Program"

(c) Letter from Mr. D. L. Solorio (NRC) to Mr. C. H. Cruse (BGE), September 24, 1998, "Renumbering of NRC Requests for Additional Information on Calvert Cliffs Nuclear Power Plant License Renewal Application Submitted by the Baltimore Gas and Electric Company"

Reference (a) forwarded the Baltimore Gas and Electric Company (BGE) license renewal application. Reference (b) forwarded questions from NRC staff on certain sections of the BGE License Renewal Application, on the subject of water chemistry. Reference (c) forwarded a numbering system for tracking BGE's response to all of the BGE License Renewal Application requests for additional information and the resolution of the responses. Attachment (1) provides our responses to the questions contained in Reference (b). The questions are renumbered in accordance with Reference (c).

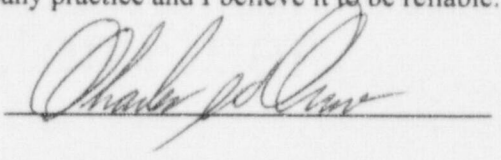
Should you have further questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, Charles H. Cruse, being duly sworn, state that I am Vice President, Nuclear Energy Division, Baltimore Gas and Electric Company (BGE), and that I am duly authorized to execute and file this response on behalf of BGE. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other BGE employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.



Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of Calvert, this 4 day of November, 1998.

WITNESS my Hand and Notarial Seal:

Michelle D. Hall
Notary Public

My Commission Expires:

February 1, 2002
Date

CHC/KRE/dlm

Attachment: (1) Response to Request for Additional Information; Integrated Plant Assessment, Water Chemistry Program

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
S. S. Bajwa, NRC
A. W. Dromerick, NRC
H. J. Miller, NRC
C. I. Grimes, NRC
D. L. Solorio, NRC
Resident Inspector, NRC
R. I. McLean, DNR
J. H. Walter, PSC

ATTACHMENT (1)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION;

INTEGRATED PLANT ASSESSMENT, WATER CHEMISTRY PROGRAM

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
November 4, 1998

NRC Question No. 9.1

Control of the secondary water chemistry plays an important role in ensuring that steam generators and other components exposed to secondary water will not be damaged by corrosion and will preserve their integrity. Please include the following information on your secondary water chemistry control program:

(a) What amine is being used for controlling pH in the secondary water system?

(b) Specify major differences in the secondary water chemistry (feedwater and/or steam generator) for power operation, startup, and shutdown.

(c) Describe and provide technical bases for any significant differences in secondary water chemistry parameters specified in the Calvert Cliffs Nuclear Power Plant Technical Procedure CP-217, "Specifications and Surveillance - Secondary Chemistry," and the values recommended by the Electric Power Research Institute (EPRI) in their guideline reports, referenced in Section 5.12, "Main Steam, Steam Generator Blowdown, Extraction Steam, and Nitrogen and Hydrogen Systems," of Appendix A to the Baltimore Gas and Electric Company (BGE) License Renewal Application (LRA).

(d) Specify the upper limits of the major chemistry parameters and the allowable time period to restore chemistry parameters to acceptable limits.

BGE Response

Baltimore Gas and Electric Company has requested clarification from NRC on this item and has agreed to work toward clarification through forthcoming interaction, most likely in the form of a public meeting. Baltimore Gas and Electric Company may supplement this response, based on the outcome of that interaction.

NRC Question No. 9.2

Were there any significant secondary water chemistry excursions in the past? If such excursions have occurred, describe any significant impact on the condition of the plant, such as increased potential for corrosion damage of the components in the secondary water system.

BGE Response

Secondary water chemistry excursions of varying extent have occurred over the operating history of Calvert Cliffs. The excursions introduced bay water, well water, or resin beads into the condensate system. No significant impact on the condition of the plant has been documented. Extensive experience (inspections and testing) shows that degradation caused by excursions is slow as compared to the inspection interval.

Calvert Cliffs Chemistry programs have incorporated the EPRI Pressurized Water Reactor Secondary Chemistry Guidelines since they were introduced. The Guidelines incorporate industry experience and provide direction to optimize plant-specific chemistry parameters.

NRC Question No. 9.3

The scope of Calvert Cliffs Technical Procedure CP-204, "Specification and Surveillance Primary Systems," includes the Reactor Coolant System (RCS) and the Chemical and Volume Control System (CVCS). These systems perform different functions and consequently have different Chemistry procedures. Please describe how CP-204 is applied to the RCS and CVCS.

BGE Response

Calvert Cliffs Technical Procedure CP-204 is used to control not only the chemistry of the RCS, but also for those systems that interface with the RCS. The scope of CP-204 includes the following systems/components:

- Reactor Coolant (Modes 1 through 6);
- Spent Fuel Pool (Modes 1 through 6);
- Refueling Water Storage Tank (Modes 1 through 6);
- Refueling Pool (Mode 6);
- Safety Injection Tanks (Modes 1 through 6);
- High Pressure Safety Injection Pump Discharge (Modes 1 through 6);
- Boric Acid Storage Tank (Modes 1 through 6);
- Reactor Coolant Waste Receiver Tank (Modes 1 through 6);
- Reactor Coolant Waste Evaporator Bottoms (Modes 1 through 6);
- Boric Acid Batching Tank (Modes 1 through 6);
- CVCS Ion Exchangers (Modes 1 through 6); and
- Spent Fuel Pool Ion Exchangers (Modes 1 through 6).

In the case of Section 5.2, "Chemical and Volume Control System," CP-204 is credited with minimizing the effects of crevice corrosion and pitting that occur due to fluid stagnation for components listed in Section 5.2, Group 2 of the BGE LRA. Maintaining system chemistry conditions to minimize impurities will limit the rate and effects of degradation due to these age-related degradation mechanisms. For Section 4.1, "Reactor Coolant System," CP-204 is credited in Group 6 with mitigating the effects of intergranular attack on the reactor coolant pump seal water heat exchanger (RCS side) by monitoring and maintaining the RCS chemistry. The procedure is also credited in Section 4.1, Group 7 for minimizing the effects of stress corrosion cracking/intergranular stress corrosion cracking on the RCS piping (device code -CC, except the reactor pressure vessel head seal leakage detection line).

NRC Question No. 9.4

The two factors important to minimize corrosion of the primary coolant system components are pH and lithium hydroxide. Describe the pH level and lithium concentrations during a fuel cycle, or describe the procedure for their control.

BGE Response

Calvert Cliffs Procedure CP-204 is credited with controlling water chemistry to: minimize impurity ingress to plant systems; reduce corrosion product generation, transport, and deposition; reduce collective radiation exposure through chemistry; improve integrity and availability of plant systems; and extend component and plant life. Calvert Cliffs Procedure CP-204 lists the parameters to monitor (e.g., lithium, chloride, fluoride, sulfate, oxygen, pH), the frequency of monitoring these parameters, and the acceptable value or range of values for each parameter. Calvert Cliffs Procedure CP-204 is described in Section 4.1, Groups 6 (intergranular attack) and 7 (stress corrosion cracking), of the BGE LRA.