George Vanderheyden
Vice President
Calvert Cliffs Nuclear Power Plant
Constellation Generation Group, LLC

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410.495.4455
410.495.3500 Fax

Constellation Energy

January 3, 2005

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Response to Request for Additional Information Concerning the License Amendment Request to Incorporate Methodology References for the Implementation of PHOENIX-P, ANC, PARAGON, and Zirconium Diboride into the Technical Specifications

This letter provides the information requested in Reference (a). This information supports and/or clarifies the information provided in Reference (b). This information does not affect the No Significant Hazards Consideration Determination or the Environmental Impact Review of Reference (b).

Requested Information:

1. ***In Attachment 3 to the July 15, 2004, letter, which provides supplemental information to demonstrate the applicability of the Westinghouse nuclear physics code package to Calvert Cliffs, Table 2.2-3 provides comparisons between the measurements and predictions (using the PHOENIX-P/ANC codes) of the Calvert Cliffs Unit 2 Cycles 13 and 14 control rod worth. These comparisons show that the differences are as high as -6.9% and 7% for CEA [control element assembly] groups 2 and 5, respectively.***

   Provide justification for using the Westinghouse nuclear physics package to Calvert Cliffs in light of these large differences.

   CCNPP Response:

   Table 2.2-3 of Attachment 3 to the July 15, 2004, letter provides a comparison of the predictions of the Westinghouse nuclear physics code package (PHOENIX-P/ANC) to Calvert Cliffs 2 Cycles 13 and 14 measured control rod worth. The comparison of total measured control rod worth shows very good agreement between measured and predicted at 0.4% and -2.2% for Cycles 13 and 14, respectively. This indicates very good prediction of total scram worth.

   The table also shows that the differences between measured worths of individual CEA groups and PHOENIX-P/ANC predictions range from -6.9% to 7%. This is within the CEA Group uncertainty

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of ±10% used in the current Nuclear Regulatory Commission (NRC) approved design methods, as reported in CENPD-266-P-A, "The ROCS and DIT Computer Codes for Nuclear Design."

The differences between the measured and predicted values in the CEA worths are incorporated into the uncertainties. The uncertainties are conservatively applied in the safety analysis methodology.

2. ***The NRC has approved WCAP-16072-P-A, "Implementation of Zirconium Diboride Burnable Absorber in CE [Combustion Engineering] Nuclear Power Fuel Assembly Designs," with conditions and limitations specified in Section 4.0 of the Safety Evaluation Report. In referencing WCAP-16072-P-A for the use of Zirconium Diboride (ZrB_2) in the Calvert Cliffs integral fuel burnable absorber design, the licensee states (in Section 4 of Attachment 1 to the July 15, 2004, letter) that Calvert Cliffs agrees to all conditions and limitations in the Safety Evaluation Report [SER] that approved the Zirconium Diboride Topical. The licensee also states that Calvert Cliffs will update staff training and procedures for the operating strategy that may result in the peak positive MTC [moderator temperature coefficient] occurring after the beginning of the fuel cycle.***

Please provide a regulatory commitment for the conditions and limitations specified in the SER on WCAP-16072, including actions committed by Calvert Cliffs, the types of actions (either one-time action or continuing compliance) and scheduled completion dates if required.

CCNPP Response:

Each condition and limitation specified in the SER, each action committed to by Calvert Cliffs Nuclear Power Plant (CCNPP), the types of action, and currently scheduled completion date is listed in the table below:

Conditions and Limitations from WCAP-16072-P-A SER	Action by Calvert Cliffs	Type of Action	Scheduled Completion
1. A license amendment is required to add this Topical Report to the Core Operating Limits Report analytical methods listed in the licensee's Technical Specifications.	Calvert Cliffs Nuclear Power Plant requested a license amendment to add this Topical Report to the Core Operating Limits Report analytical methods listed in the Technical Specifications. The request was submitted in Reference (b).	One time action	Completed
2. Plant-specific core design guidelines or cycle-specific calculations shall be used to verify that required power margins in the axial cutback regions are maintained within safety analysis limitations.	Cycle specific evaluations will be performed as part of the reload efforts to verify that required power margins in the axial cutback regions are maintained within the safety analysis limitations.	Continuing Compliance	

Conditions and Limitations from WCAP-16072-P-A SER	Action by Calvert Cliffs	Type of Action	Scheduled Completion
3. Plant Technical Specification Surveillance Requirements (SRs) on MTC validate the physics predictions and ensure that plant operations remain within allowable limits. In addition to current SRs, licensees shall confirm that the peak positive hot full power (HFP) MTC is within the Technical Specification limits at the highest Reactor Coolant System (RCS) soluble boron concentration predicted during full power operation. The peak positive HFP MTC shall be derived by adjusting the measured MTC at HFP beginning-of-cycle (BOC) conditions to the maximum HFP soluble boron concentration expected during the cycle. A direct measurement of MTC is required at the highest RCS soluble boron concentration predicted during full power operation. This direct measurement is only required for the first application of ZrB_2 integral fuel burnable absorber (IFBA) in a CE 14x14 or 16x16 fuel assembly design. During the first cycle implementation,	The CCNPP Technical Specification requires an MTC measurement with each fuel cycle within seven effective full power days of initially reaching an equilibrium condition of $\geq$ 90% rated thermal power. After that MTC measurement, CCNPP will confirm that the peak positive HFP MTC is within the Technical Specification limits at the highest RCS soluble boron concentration expected during full power operation for the fuel cycle. The peak positive full power MTC shall be derived by adjusting the measured MTC at full power conditions to the maximum full power soluble boron concentration expected during the cycle.	Continuing Compliance	

Conditions and Limitations from WCAP-16072-P-A SER	Action by Calvert Cliffs	Type of Action	Scheduled Completion
Westinghouse shall provide the staff with a letter containing the following information: i. Measured HFP BOC MTC (Technical Specification SR), ii. Measured HFP MTC at highest RCS soluble boron concentration, iii. Calculated HFP MTC at highest RCS soluble boron concentration, and iv. Demonstrated accuracy of the calculated HFP MTC within current analytical uncertainties.	No action required by Calvert Cliffs. As stated in the SER and Reference (d), Westinghouse shall provide the staff with a letter containing the items i through iv. Also, see response to Question 3 below.		
In addition, plant procedures used to perform MTC surveillances shall be updated, where appropriate, to reflect the calculated peak positive HFP MTC along with ZrB_2 IFBA's distinctive trend in RCS critical boron concentration.	Calvert Cliffs will update the procedures used to perform MTC surveillances. This update will reflect the requirement to verify the peak positive full power MTC.	One time action	Unit 2 procedures are scheduled to be updated prior to February 1, 2005. Unit 1 procedures to be updated prior to February 1, 2006.
4. Prior to startup following a Condition III or IV event, licensees must evaluate clad hydriding to ensure that hydrides have not precipitated in the radial direction.	In the event of a Condition III or IV event at Calvert Cliffs, an evaluation of fuel structural integrity with respect to radial hydriding will be performed prior to power ascension.	NA	NA

Conditions and Limitations from WCAP-16072-P-A SER	Action by Calvert Cliffs	Type of Action	Scheduled Completion
5. CEN-372-P-A constraints and limitations with regard to rod internal pressure and departure from nucleate boiling propagation must continue to be met. In addition, licensees must ensure that the following two conditions are satisfied: a. For Condition I (normal), Condition II (moderate frequency), and Condition III (infrequent) events, fuel cladding burst must be precluded for ZrB_2 IFBA fuel rods. Using models and methods approved for CE fuel designs, licensees must demonstrate that the total calculated stress remains below cladding burst stress at the cladding temperatures experienced during any potential Condition II or Condition III event. Within the confines of the plant's licensing basis, licensees must evaluate all Condition II events in combination with any credible, single active failure to ensure that fuel rod burst is precluded. b. For Condition IV non-loss-of-coolant accident events which predict clad burst, the potential impacts of fuel rod ballooning and bursting need to be specifically addressed with regard to coolable geometry, RCS pressure, and radiological source term.	The constraints and limitations of CEN-3 72-P-A will continue to be met. Analysis performed for the implementation of ZrB_2 IFBA at Calvert Cliffs has demonstrated that cladding bursts are precluded for Condition I, II, III, and IV events.	Continuing Compliance	

3. ***Section 4 of Attachment 1 states that "Calvert Cliffs will confirm that the peak positive hot full power MTC is within the TS limits at the highest RCS soluble boron concentration predicted during full power operation. The peak positive HFP MTC will be determined by adjusting the HFP MTC measured at beginning of cycle to the maximum HFP soluble boron concentration expected during the fuel cycle." However, Condition 3 in the staff's safety evaluation for WCAP-16072-P-A states that "in order to ensure a conservative adjustment, a direct measurement of MTC is required at the highest RCS soluble boron concentration predicted during full power***

operation. This direct measurement is only required for the first application of ZrB_2 IFBA in a Combustion Engineering 14x14 or 16x16 fuel assembly design."

Since Calvert Cliffs may be the first application of ZrB_2 IFBA in a CE 14x14 fuel assembly design, the licensee's regulatory commitment needs to include that a direct measurement of MTC at the peak soluble boron concentration will be performed.

CCNPP Response:

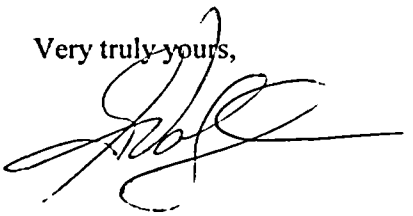
Current best estimate predictions for Calvert Cliffs Unit 2 Cycle 16 show that the cycle maximum, full power, RCS boron concentration will exceed the beginning of cycle value by only 4 ppm. The difference in MTC associated with these two boron levels is negligible. Any difference between the measured MTC at the beginning of cycle and at the time of maximum RCS boron concentration would be dominated by the measurement uncertainty. This would not validate the confirmation method.

The commitment in the SER will be satisfied during Cycle 18 of Arkansas One Unit 2 as described in Reference (c). ANO-2 is also a CE plant implementing Zirconium Diboride IFBA. ANO-2 Cycle 18 is scheduled to commence operation at essentially the same time as Calvert Cliffs Unit 2 Cycle 16. The difference between BOC and cycle maximum RCS boron concentration is much larger (about 180 ppm) for ANO-2 Cycle 18. The difference between the MTC measured at BOC and the MTC measured at peak RCS boron concentration will be more significant and can be used in evaluating the peak MTC confirmation method. Also, documented in Reference (d), Westinghouse committed to supply the NRC the measurement data from ANO-2 for the first application of ZrB_2 IFBA in a CE fuel assembly design.

If the MTC measurement at peak RCS boron concentration for ANO-2 Cycle 18 should show that the MTC confirmation method needs to be adjusted with additional conservatisms, then Calvert Cliffs will apply additional conservatisms when confirming the MTC at the maximum HFP soluble boron concentration expected during the fuel cycle.

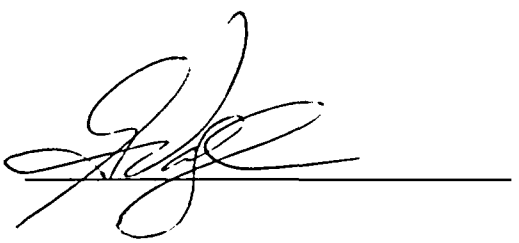
Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



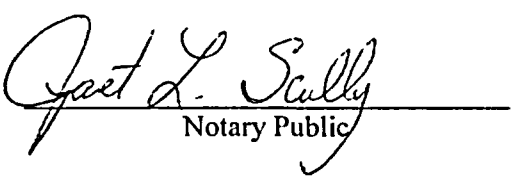
STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, George Vanderheyden, being duly sworn, state that I am Vice President - Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP), and that I am duly authorized to execute and file this License Amendment Request on behalf of CCNPP. 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 CCNPP 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 St. Mary's, this 3RD day of January, 2005.

WITNESS my Hand and Notarial Seal:



Notary Public

My Commission Expires:

March 25, 2007
Date

BSM/DJM/bjd

REFERENCES:

(a) Letter from Mr. R. V. Guzman (NRC) to Mr. G. Vanderheyden (CCNPP), dated December 14, 2004, Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (CCNPP 1 and 2) – Request for Additional Information RE: Incorporating Core Operating Limits Analytical Methodology References into Technical Specifications (TAC Nos. MC4019 and MC4020)

(b) Letter from Mr. B. S. Montgomery (CCNPP) to Document Control Desk (NRC), dated July 15, 2004, "License Amendment Request: Incorporate Methodology References for the Implementation of PHOENIX-P, ANC, PARAGON, and Zirconium Diboride into the Technical Specifications"

(c) Letter from J. S. Forbes (Entergy) to U.S. Nuclear Regulatory Commission, dated July 8, 2004, "License Amendment Request to Support Cycle 18 Core Reload Arkansas Nuclear One, Unit 2 III 2CAN070402"

(d) Letter from J. A. Gresham (Westinghouse Electric Company) to U.S. Nuclear Regulatory Commission, dated September 8, 2004, "Westinghouse's Response to Item 3 of Section 4.0 (CONDITIONS AND LIMITATIONS) of the Final Safety Evaluation for topical report WCAP-16072-P-A, Revision 0, 'Implementation of Zirconium Diboride Burnable Absorber Coatings in CE Nuclear Power Fuel Assembly Designs' "

cc: J. Petro, Esquire
J. E. Silberg, Esquire
R. V. Guzman, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR