October 27, 2004

Mr. George Vanderheyden, Vice President
Calvert Cliffs Nuclear Power Plant, Inc.
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST TO USE ALTERNATE DECAY HEAT REMOVAL IN MODE 6 REFUELING (TAC NOS. MC3595 AND MC3596)

Dear Mr. Vanderheyden:

In reviewing your submittal of June 7, 2004, concerning the subject request for amendment to incorporate the use of an alternate cooling method to function as a path for decay heat removal when in Mode 6 with the refueling pool fully flooded, the Nuclear Regulatory Commission (NRC) staff has determined that additional information contained in the enclosure to this letter is needed to complete its review. The NRC staff discussed the issue with your staff on September 20, 2004. As agreed to by your staff, we request you respond within 30 days of the date of this letter.

If you have any questions, please contact me at 301-415-1030.

Sincerely,

/RA/

Richard V. Guzman, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure: As stated

cc w/encl: See next page

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PUBLIC	RGuzman	RLaufer	JUhle
PDI-1 R/F	SLittle	YOrechwa	OGC
ACRS	GMatakas, RI	DLPM DPR	

ACCESSION NUMBER: ML042990452

OFFICE	PDI-1/PM	PDI-1/LA	SRXB/SC	PDI-1/SC
NAME	RGuzman	SLittle	JUhle	RLaufer
DATE	10/25/04	10/25/04	10/25/04	10/27/04

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REQUEST FOR ADDITIONAL INFORMATION (RAI) CONCERNING

AMENDMENT REQUEST TO INCOPORATE THE USE OF AN ALTERNATE COOLING

METHOD TO FUNCTION AS A PATH FOR DECAY HEAT REMOVAL

WHEN IN MODE 6 REFUELING

CALVERT CLIFFS NUCLEAR POWER PLANT (CCNPP), UNIT NOS. 1 AND 2

DOCKET NOS. 50-317 AND 50-318

1. In the RAI responses for WCAP-15872, response C1 states, "... good agreement between fluid temperatures based on the computational fluid dynamics (CFD) analysis and the Calvert Cliffs test data at the reactor vessel flange elevation was predicted assuming a natural circulation path with down-flow in the center of the core and up-flow at the core periphery. This flow pattern was found to best represent the post-refueled conditions, where fresh fuel occupies a checkerboard arrangement in the core center, which existed during the alternate heat removal test phase at Calvert Cliffs."

   The comparison of the consistency of the CCNPP Unit 2 test data with CFD predictions, for the demonstration of the application of a one-dimensional model in conjunction with a multidimensional CFD calculation, is for post-refueled conditions. At issue to the technical specification change request for CCNPP are the pre-refueled conditions.

   Provide the justification that for the limiting pre-refueled conditions at CCNPP, the appropriate CFD computed bypass and mixing coefficients correctly predict the refueling pool fluid temperature with sufficient margin so as to preclude exceeding the CCNPP operating limit of 140 °F. Specifically, are the CFD computed bypass and mixing coefficients sensitive to the core fuel arrangement and/or the concomitant flow pattern during natural circulation?

2. You state, "A minimum decay heat value of ~ 3.0 MW is also required to maintain enough natural circulation to provide sufficient mixing of borated coolant to minimize the effects of boron dilution accident and to prevent boron stratification."

   a. How do you arrive at a minimum decay heat value of ~ 3.0 MW? What is the maximum k_{eff} of the CCNPP core under these conditions? What is the worth of the boron that is subject to potential dilution and/or stratification? What is the k_{eff} of the CCNPP core at a decay heat value of 2.0 MW?

   b. How do you assure that this minimum decay heat load is maintained during refueling under the alternate heat removal alignment? What do you compute and/or measure?

3. You propose to use the spent fuel cooling loop in lieu of a shutdown cooling loop. The spent fuel pool is designed to maintain $k_{eff} < 1.0$ without boron and at optimum moderation. What is your defense-in-depth for a dilution accident with a fluid at those conditions?

Enclosure

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

cc:

President
Calvert County Board of
Commissioners
175 Main Street
Prince Frederick, MD 20678

James M. Petro, Esquire
Counsel
Constellation Energy
750 East Pratt Street, 17th floor
Baltimore, MD 21202

Jay E. Silberg, Esquire
Shaw, Pittman, Potts, and Trowbridge
2300 N Street, NW
Washington, DC 20037

Lou Larragoite
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Resident Inspector
U.S. Nuclear Regulatory
Commission
P.O. Box 287
St. Leonard, MD 20685

Mr. R. I. McLean, Administrator
Radioecology Environ Impact Prog
Department of Natural Resources
Nuclear Evaluations
580 Taylor Avenue
Tawes State Office Building
Annapolis, MD 21401

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Kristen A. Burger, Esquire
Maryland People's Counsel
6 St. Paul Centre
Suite 2102
Baltimore, MD 21202-1631

Patricia T. Birnie, Esquire
Co-Director
Maryland Safe Energy Coalition
P.O. Box 33111
Baltimore, MD 21218

Mr. Loren F. Donatell
NRC Technical Training Center
5700 Brainerd Road
Chattanooga, TN 37411-4017