February 14, 2006

Mr. David A. Christian
Senior Vice President
and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2 (NORTH ANNA 1 AND 2) - REQUEST FOR ADDITIONAL INFORMATION ON PROPOSED TECHNICAL SPECIFICATION CHANGES ON ADDITION OF ANALYTICAL METHODOLOGY TO THE CORE OPERATING LIMITS REPORT (TAC NOS. MC7526 AND MC7527)

Dear Mr. Christian:

By letter dated July 5, 2005, Virginia Electric and Power Company (VEPCO) submitted proposed license amendments for North Anna 1 and 2. These proposed changes would add a reference in Technical Specification 5.6.5.b, "Core Operating Limits Report (CORL)," to allow the use of an alternate methodology to perform a thermal-hydraulics analysis to predict the critical heat flux and departure from nucleate boiling ratio (DNBR) for the Advanced Mark-BW fuel. In addition, VEPCO requested the Nuclear Regulatory Commission (NRC) staff's approval of the statistical design limits documented in Topical Report VEP-NE-2-A "Statistical DNBR Evaluation Methodology." The NRC staff is reviewing the submittal and has determined that additional information is required to complete its review.

The NRC staff's questions are provided in the enclosure. VEPCO is requested to provide a response to the request for additional information within 45 days.

Sincerely,

***/RA/***

Stephen Monarque, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

Enclosure: As stated

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

ADDITION OF ANALYTICAL METHODOLOGY TO THE CORE OPERATING LIMITS REPORT

NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NOS. 50-338 AND 50-339

By letter dated July 5, 2005, Virginia Electric and Power Company (VEPCO) submitted proposed license amendments to add a reference in Technical Specification 5.6.5.b, "Core Operating Limits Report (COLR)," to permit the use of an alternate methodology to perform a thermal-hydraulic analysis to predict the critical heat flux (CHF) and departure from nucleate boiling (DNB) ratio (DNBR) for the Advanced Mark-BW (AMBW) fuel at North Anna Power Station, Unit Nos. 1 and 2 (North Anna 1 and 2). VEPCO is requested to respond to following questions below.

1. Table 3.1.2-1 lists the uncertainties, probability distributions, nominal values and standard deviation of statistically treated parameters. These uncertainties and distributions deviate somewhat from that listed in Table 4.2-1 in Attachment 6 to Dominion Letter Serial No. 02-167 (L. N. Hartz to NRC, dated March 28, 2002).

   Provide the analyses performed to derive the uncertainty values and distributions of each of these parameters. The uncertainty analysis description should include, as appropriate, a block diagram depicting sensor, processing equipment, computer, and readout devices for each parameter channel. Within each element of the block diagram, identify the accuracy, drift, range, span, operating limits, and setpoints. Identify the overall accuracy of each channel transmitter to final output and specify the minimum acceptable accuracy for use with the determination of the statistical design limit (SDL).

2. Section 3.1 indicates that a bounding rod census curve and the DNB sensitivity to rod power were used in the determination of the SDL that results in core wide DNB probability of less than 0.1% of the total fuel rods.

   a. Provide this bounding rod census curve, and describe the procedures to assure that the rod power distributions of North Anna 1 and 2 reload cores are bounded by this curve.

   b. Describe how the DNB sensitivity to rod power is obtained.

3. Tables 3.1.6-1 and 3.1.6-2 list the nominal statepoints for the Advanced Mark-BW (AMBW) fuel with BWU-Z/ZM and BWU-N CHF correlations, respectively, for the Monte Carlo analysis.

   Explain the reason for the selection of 9 statepoints with 0 axial offset and 16 statepoints with negative axial offsets for the BWU-Z/ZM and the BWU-N correlations, respectively.

Enclosure

4. To demonstrate that the selected nominal statepoints provide a bounding DNBR standard deviation for any set of conditions to which the statistical methodology may be applied, Section 3.1.8 indicates that a regression analysis was performed using the unrandomized DNBR standard deviations at each nominal statepoint as dependent variable and the nominal statepoint pressure, inlet temperatures, powers, and flow rates as independent variables. It concludes that all the regression analyses performed for each independent variable showed extremely low $R^2$ correlation factors, which indicates that the unrandomized DNBR standard deviations are not related to the independent variables evaluated. Figures 3.1.8-1 and 3.1.8-2 provide sample results for the BWU-Z/ZM and BWU-N correlations, respectively, that show the standard deviation of unrandomized DNBR at each statepoint as a function of inlet temperature, and linear regression functions and correlation coefficients, $R^2$.

   a. Clarify the term “unrandomized DNBR standard deviations at each nominal statepoint.”

   b. Provide and justify the limit value of $R^2$ used to determine whether the unrandomized DNBR standard deviations are related to an independent variable.

   c. Provide the results of the regression analyses for all statistically treated parameters as independent variables.

5. To verify that the existing reactor core safety limits and protection setpoints in the Technical Specifications remain acceptable as a result of implementation of the Statistical DNBR Evaluation Methodology to AREVA AMBW fuel at North Anna 1 and 2 with VIPRE-D/BWU, Section 3.2.6 describes the calculations performed for the selected statepoint conditions that include core thermal limits, axial offset envelops, and several transient events, and concludes that the results of the calculation demonstrate that the minimum DNBR values are equal to or greater than the applicable safety analysis limit of 1.60.

   Provide the list of the selected statepoints and the calculation results for each statepoint.

North Anna Power Station, Units 1 & 2

cc:

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