VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

December 17, 2003

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 03-313I
NLOS/ETS
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
PROPOSED TECHNICAL SPECIFICATIONS CHANGES AND EXEMPTION REQUEST FOR USE OF FRAMATOME ANP ADVANCED MARK-BW FUEL
SUPPLEMENTAL INFORMATION FOR REALISTIC LARGE BREAK LOSS OF COOLANT ACCIDENT (RLBLOCA) HEAT TRANSFER MODEL

In a May 6, 2003 letter (Serial No. 03-313) Dominion submitted the Realistic Large Break LOCA (RLBLOCA) results for Advanced Mark-BW fuel in North Anna Unit 2 to support the NRC's review of a proposed amendment and exemptions that will permit North Anna Units 1 and 2 to use Framatome ANP Advanced Mark-BW fuel. On August 20, 2003 (Serial No. 03-313A) Dominion provided a response to an August 6, 2003 NRC request for additional information regarding the RLBLOCA results. In an August 28, 2003 meeting to discuss the RLBLOCA analysis results, the NRC staff requested further clarification of Dominion's August 20, 2003 responses. Supplemental information was provided for Questions 1, 5, 9, and 10b on September 5, 2003 (Serial No. 03-313C), Questions 6 and 11a on September 22, 2003 (Serial No. 03-313D), Questions 2, 3, and 4 on September 26, 2003 (Serial Nos. 03-313E and F), and Questions 2, 4, 10a, 10b and containment modeling on November 10, 2003 (Serial No. 03-313G) and December 8, 2003 (Serial No. 03-313H). In a follow up telephone call conducted on December 15, 2003, the NRC Staff requested additional information regarding the specific modeling information associated with the assessment of radiation heat transfer for application in the RLBLOCA.

The attachment to this letter provides the requested information. As noted in our August 20, 2003 letter, this information is applicable to both North Anna Units 1 and 2 even though the RAIs received were specific to Unit 2.

To support the use of Framatome Advanced Mark-BW fuel in North Anna Unit 2, Cycle 17, we respectfully request the NRC to complete their review and approval of the license amendment by December 31, 2003. We appreciate your consideration of our

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technical and schedular requests. If you have any questions or require additional information, please contact us.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Mr. J. E. Reasor, Jr.
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, VA 23060

Commissioner
Bureau of Radiological Health
1500 East Main Street
Suite 240
Richmond, VA 23218

Mr. S. R. Monarque
NRC Project Manager
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 8-H12
Rockville, MD 20852

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

SN: 03-313I
Docket Nos.: 50-338/339
Subject: Proposed Technical Specifications Changes and Exemption Request
Framatome ANP Advanced Mark-BW Fuel

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz who is Vice President – Nuclear Engineering of Virginia Electric and Power Company. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 17th day of December, 2003.

My Commission Expires: 3/31/04.

Maggie McCune
Notary Public

(SEAL)

Attachment 1

Supplemental Response to Request for Additional Information
Radiation Heat Transfer Model from
December 8, 2003 letter (Serial No. 03-313H)

Realistic Large Break LOCA Analysis Results – North Anna

Framatome Fuel Transition Program
Technical Specification Change

Virginia Electric and Power Company
(Dominion)
North Anna Power Station Units 1 and 2

Dominion Supplemental Response to NRC Request for Additional Information
North Anna Realistic LBLOCA Analysis
Radiation Heat Transfer Model from
December 8, 2003 letter (Serial No. 03-313H)

In an August 28, 2003 meeting, the NRC staff requested additional information to supplement the responses provided in Dominion's August 20, 2003 letter (Serial No. 03-313A). In letters dated September 5, 2003 (Serial No. 03-313C), September 22, 2003 (Serial No. 03-313D), September 26, 2003 (Serial Nos. 03-313E and F), November 10, 2003 (Serial No. 03-313G) and December 8, 2003 (Serial No. 03-313H) the supplemental information was provided to the NRC. The additional information requested by the NRC Staff in the December 15, 2003 telephone conference call to address the specific modeling associated with the assessment of radiation heat transfer for application in the RLBLOCA is provided below. The response provided below is applicable to both North Anna Units 1 and 2, even though the RAIs received were specific to Unit 2.

Radiation Heat Transfer Modeling

NRC Request:

In a telephone conference call on December 15, 2003, the NRC Staff requested the details of the radiation enclosure used to demonstrate that the minimum thermal radiation expected in the North Anna core for the hot rod bounds the reflood test data used to develop the RELAP5 core heat transfer model. This includes showing the 5x5 array and fence, showing the location of hot rod, guide tube thimbles and fence. Also present the temperature assumed for the hot rod, surrounding rods, rod thimble and fence at the time of PCT used to compute the equivalent radiation heat transfer coefficient for the hot rod to the surrounding surfaces. If the pin radial peaking factors are provided for the enclosure, please provide PCT for the average assembly rod and hot rod.

Response:

The radiant heat transfer analysis performed using the R2RRAD code modeled the 6x6 assembly array presented in Figure 1. As stated in the previous responses (Dominion letters 03-313G and 03-313H), the R2RRAD code was modified to: a) examine 6x6 assembly arrays (rather than 5x5), b) account for the larger diameter guide tube rods (shaded rods in Figure 1), and c) calculate an average assembly radiant heat transfer coefficient. To address the potential variation of local power peaking associated with the sampling process inherent in the FANP RLBLOCA methodology, a bounding R2RRAD analysis was performed. The calculation assumes that the hot rod temperature is equal to the average hot assembly rod temperature. This approach is equivalent to assuming a flat distribution of local peaking factors within the assembly; it represents the condition providing an absolute minimum radiant heat transfer. Table 1 presents the temperature

parameter values applied in this bounding analysis. Rod and guide tube temperatures were obtained from the limiting PCT S-RELAP5 RLBLOCA calculation. The fence temperature is an average of the surrounding assembly temperatures and the hot assembly temperature. [Note: the fact that both the guide tube and fence temperatures are equivalent is coincidence].

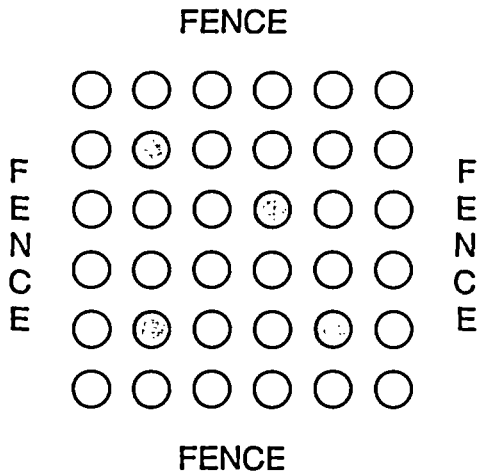

Figure 1. 6x6 Assembly Array Modeled for rod-to-rod Radiant Heat Transfer Calculations.

Table 1. North Anna Unit 2 Key Temperatures.

Temperatures	*Degrees F*
Hot Rod	*1,838*
Hot Assembly	*1,838*
Guide Tube	*1,650*
Boundary (Fence)	*1,650*

Since this approach makes the hot rod indistinguishable from an average rod, there is no particular influence of the hot rod location. The resulting average and maximum radiant heat transfer from the R2RRAD analysis is given in Table 2. While the analysis results reflect a lower radiant heat transfer component relative to the analysis presented in the original RAI response, these results still bound the FLECHT-SEASET and FLECHT-Skewed results.

Table 2. R2RRAD code results: North Anna Minimum Radiant Heat Transfer

Case	*Assembly Average HTC (BTU/hr-ft2-R)*	*Maximum Rod HTC (BTU/hr-ft2-R)*
North Anna (min)	*2.41*	*3.87*