

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

10 CFR 50.90

January 6, 2004

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

Serial No. 03-313J
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
SUPPLEMENTAL INFORMATION FOR REALISTIC LARGE BREAK LOSS OF
COOLANT ACCIDENT (RLBLOCA) CONTAINMENT PRESSURE ANALYSIS
PROPOSED TECHNICAL SPECIFICATIONS CHANGES AND EXEMPTION
REQUEST FOR USE OF FRAMATOME ANP ADVANCED MARK-BW FUEL

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), Questions 2, 4, 10a, 10b and containment modeling on November 10, 2003 (Serial No. 03-313G) and December 8, 2003 (Serial No. 03-313H), and Question 4 on December 16, 2003 (Serial No. 03-313I). In follow up telephone calls conducted on December 15 and 17, 2003, the NRC Staff requested additional information regarding the Refueling Water Storage Tank (RWST) water temperature used in the minimum containment pressure analysis.

The attachment to this letter provides the requested information and provides the basis for the selection of RWST water temperature. 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.

A001

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 February 16, 2004. We appreciate your consideration of our technical and scheduler 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:

1. The first report of LBLOCA PCT effects made per the provisions of 10CFR50.46(a)(3)(ii) following operation with Framatome ANP Advanced Mark-BW fuel will include an additional 8°F on the reported 95/95 PCT result, applicable to both North Anna 1 and 2.
2. In future North Anna RLBLOCA analyses, the assumed treatment of RWST temperature in the containment pressure analysis will be either a biased lower bound or sampled range that encompasses the allowable Technical Specifications values. This modeling change will be incorporated into the first RLBLOCA reanalysis performed following operation with Advanced Mark-BW fuel.

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

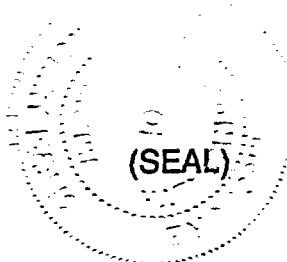
Mr. M. T. Widmann
NRC Senior Resident Inspector
North Anna Power Station

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 6th day of January, 2004.
My Commission Expires: 3/31/04.

Maggie McClure
Notary Public



Attachment 1

**Supplemental Response to Request for Additional Information
Regarding Containment Minimum Pressure Analysis-RWST Temperature**

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
Regarding Containment Minimum Pressure Analysis-RWST Temperature

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), December 8, 2003 (Serial No. 03-313H) and December 17, 2003 (Serial No. 03-313I) the supplemental information was provided to the NRC. The additional information requested by the NRC Staff in the December 15 and 17, 2003 telephone conference calls regarding the Refueling Water Storage Tank (RWST) water temperature used in the minimum containment pressure analysis is provided below. The response is applicable to both North Anna Units 1 and 2, even though the original RAs received were specific to Unit 2.

Containment Response Modeling - RWST Temperature

The North Anna RLBLOCA containment analysis assumed a value of 45°F for the containment spray (i.e., RWST) temperature. The NRC Staff is concerned with this assumption since this value does not specifically address the entire allowable range of 40-50°F in the plant Technical Specifications. It is also the NRC Staff's understanding that enveloping the Technical Specifications range may increase PCT from the RLBLOCA analysis by up to 30°F, which is not a trivial impact. Please provide a resolution of this item, using one of the following approaches:

- reanalyze the RLBLOCA assuming 40°F
- revise the minimum Technical Specifications value to 45°F
- add a PCT penalty that reflects enveloping the TS range
- provide justification with which NRC Staff can conclude this input is acceptable as modeled

Response:

This question was discussed during several telephone conference calls between Dominion and NRC staff the week of December 15-19, 2003. The selection and usage of this parameter and the manner in which it is to be accommodated in the North Anna 1 and 2 RLBLOCA analyses is described below.

1) RLBLOCA Plant Parameter Selection Methodology

Section 5.1 of EMF-2103 presents an overview of the Framatome ANP RLBLOCA methodology plant input parameter selection process. The defined approach first identifies important plant process parameters based on a formal review. The list of

candidate parameters established by this formal review is presented in Table 5.1 of EMF-2103. Candidate parameters were identified based on Phenomena Identification and Ranking Table (PIRT) results, plant-specific technical specifications, and anticipated utility requests. Table 5.2 of EMF-2103 presents results of correlating the list of candidate parameters from Table 5.1 with specific PIRT-defined phenomena. Sensitivity studies were performed to quantify the expected effects of varying individual process parameters. As stated in EMF-2103, "The primary value of these calculations is to establish a perspective on the level of importance a safety analysis team might give in quantifying process parameter uncertainties." In the methodology development 50°F was selected as a threshold of high importance – consistent with the 10 CFR 50.46 definition of significant PCT impact. Table 5.3 of EMF-2103 presents the list of plant process parameters for which sensitivity was greater than this threshold. These were the plant parameters rigorously addressed in the methodology.

Framatome developed a refined basis for this threshold of significance that acknowledges the inherent RLBLOCA approach of combining the effects of many separate parameters to determine the reported PCT result. Separate effects sensitivity cases were performed to quantify the effect on PCT of various parameter variations. These results were ranked from largest to smallest PCT effect. The expected effect on the RLBLOCA PCT result from varying these single parameters was approximated by applying the root-mean squares method, which is the value of the square root of the sum of the squares. When ranked in this fashion, it was determined that a separate single parameter effect PCT change of 30°F corresponded to approximately a 1°F change in expected PCT from an explicit RLBLOCA plant calculation.

Framatome ANP performed a separate study to quantify the inherent uncertainty associated with the code calculations. This study, documented in Appendix C of EMF-2103, identified an inherent code uncertainty of approximately 30°F for plant calculations. Thus, the magnitude of code uncertainty approximates the 30°F result that equates to a 1°F effect on the total PCT. Since, at that threshold, parametric sensitivities are indistinguishable from inherent code uncertainty, this value was chosen to be the threshold between medium and low importance parameters. The distinction between medium and low ranked plant parameters is that the medium parameters may be treated either explicitly or indirectly through the treatment of other parameters. Low ranked parameters require no explicit treatment and may be selected at nominal values.

2) Confirmation of Treatment Relating to North Anna Technical Specifications Parameters

Dominion has reviewed the existing North Anna 1 and 2 Technical Specifications to ensure that parameters with significance for LBLOCA core cooling analyses are accommodated in the RLBLOCA analysis. This review has confirmed that for such parameters with Technical Specifications limits, the treatment in the RLBLOCA analysis is either: 1) ranged as a statistical parameter encompassing the allowable Technical Specification range or 2) modeled with a conservatively biased (upper or

lower) to reflect the range. The RWST temperature assumed in the containment analysis is the only Technical Specification item with potential significance for LBLOCA PCT results that was modeled assuming a nominal value.

3) Parameter Selection Treatment – RWST Temperature

Application of the RLBLOCA parameter selection process from Item 1 concluded that containment pressure is a parameter with medium impact on PCT

- Application of the selection process to the second-tier parameter of containment spray temperature (i.e., RWST temperature) identified that it was expected to have an insignificant effect on PCT. RWST temperature did not meet the established threshold of separate effect sensitivity (30°F, corresponding to <1°F on 95/95 PCT) that warranted rigorous parameter treatment. This more rigorous treatment could be either biasing or ranging the parameter value.

RWST temperature was thus set at a nominal value, defined as the midpoint of the Technical Specifications range of 40-50°F

- In addition to the work described above that implemented the generic RLBLOCA parameter selection approach, an additional assessment was performed in response to the NRC request to confirm the validity of the RLBLOCA selection approach. This involved investigating a 5°F reduction in the assumed RWST temperature (i.e., 40°F versus 45°F in the results submitted to NRC)

This resulted in an increase of the limiting case 95/95PCT by 8°F, confirming that the assumed variation in this parameter is insignificant and validating the original parameter selection for RWST temperature

4) North Anna Sensitivity Impact Commitment via 10CFR50.46

Dominion understands the NRC Staff's concern involving the relationship between analysis inputs and Technical Specifications limits. Even though the treatment of RWST temperature effects noted above is consistent with the approved RLBLOCA methodology, Dominion will include a temporary adjustment in the reported 95/95 PCT as follows. The first report of LBLOCA PCT effects made per the provisions of 10CFR50.46(a)(3)(ii) following operation with Framatome ANP Advanced Mark-BW fuel will include a +8°F adjustment on the reported 95/95 PCT result, applicable to both North Anna 1 and 2. In future North Anna RLBLOCA analyses, the assumed treatment of RWST temperature in the containment pressure analysis will be either a biased lower bound or sampled range that encompasses the allowable Technical Specifications values. This modeling change will be incorporated into the first RLBLOCA reanalysis performed following operation with Advanced Mark-BW fuel.