

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

10CFR50.90

May 16, 2011

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

Serial No. 11-279
NL&OS/ETS R1
Docket Nos. 50-338/339
License Nos. NPR-4/7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
SUPPLEMENTAL INFORMATION TO SUPPORT
PROPOSED LICENSE AMENDMENT REQUEST(LAR)
ADDITION OF ANALYTICAL METHODOLOGY TO COLR

In a July 19, 2010 letter (Serial No. 10-404) supplemented by a September 9, 2010 letter (Serial No. 10-523), Dominion requested amendments, in the form of changes to the Technical Specifications (TS) to Facility Operating License Numbers NPR-4 and NPR-7 for North Anna Power Station Units 1 and 2, respectively. The proposed amendment requested the inclusion of NRC approved Appendix C of Dominion Fleet Report DOM-NAF-2-A, "Qualification of the Westinghouse WRB-2M CHF Correlation in the Dominion VIPRE-D Computer Code," into Technical Specification 5.6.5.b, as a referenced analytical methodology.

Furthermore, plant specific application of the methodology requires approval of the Statistical Design Limit (SDL) for the relevant code/correlation pair. Consequently, in addition to including Appendix C of Fleet Report DOM-NAF-2-A into TS 5.6.5.b, Dominion also requested NRC review and approval to use Dominion Topical Report VEP-NE-2-A, "Statistical DNBR Evaluation Methodology," with the Westinghouse RFA-2 fuel at North Anna in conjunction with the VIPRE-D/WRB-2M code/correlation pair, and the SDL obtained by this implementation.

Dominion has identified two statements in the July 19, 2010 submittal that need correction. Statements in Attachment 1, Section 4.0, *Technical Evaluation* (last paragraph) and Attachment 4, Section 5, *Conclusions* (1st paragraph) indicated that the existing Reactor Core Safety Limits and protection functions (Overtemperature Delta-T (OT Δ T), Overpower Delta-T (OP Δ T), and F Δ I) did not require revision as a consequence of implementation of the proposed LAR. However, Dominion recently determined that a change is required to the F Δ I reset function for the OT Δ T trip function in order to accommodate representative reload power shapes for Westinghouse RFA-2 fuel with the VIPRE-D code and the Westinghouse WRB-2M and W-3 critical heat flux correlations. Although the overall effort to optimize the F Δ I reset function has not been completed, it has been concluded that no changes will be required to the existing Reactor Core Safety Limits and the OT Δ T and OP Δ T trip setpoint constants. Thus, the current analyses of applicable UFSAR Chapter 15 events will remain bounding. The F Δ I reset function will be implemented under the provisions of 10 CFR 50.59 through Dominion's NRC-approved reload design methodology in VEP-FRD-42-A and the NRC-approved methodology in WCAP-8745-P-A

via the cycle-specific Core Operating Limits Report. Additional details are provided in Attachment 1 to this letter.


In addition, Dominion also identified typographical errors in Table 4.2-1 of Attachment 4 of the July 19, 2010 submittal. Specifically, the safety analysis limits for the VIPRE-D/W-3 code correlation were stated to be 1.42 and 1.58 for application at ≥ 1000 psia and < 1000 psia, respectively. The correct values are 1.44 and 1.61 for application at ≥ 1000 psia and < 1000 psia, respectively. These limits are correctly identified in Table 4.3-1 of Attachment 4. Additional details regarding this correction are provided in Attachment 1 to this letter.

The information provided in the attachment to this letter does not impact the conclusion of the significant hazards consideration determination as defined in 10 CFR 50.92 or the evaluation for eligibility for categorical exclusion as set forth in 10 CFR 51.22(c)(9).

Dominion is currently planning to use Westinghouse RFA-2 fuel in North Anna Units 1 and 2 commencing with North Anna Unit 1, Cycle 23 (Spring 2012) and North Anna Unit 2, Cycle 23 (Spring 2013). Therefore, Dominion continues to request approval of the proposed amendments by July 21, 2011 to complete analysis work required to support operation of the Westinghouse RFA-2 fuel. Dominion also continues to request a 60-day implementation period following NRC approval of the requested license amendments.

If you have any questions or require additional information, please contact Mr. Thomas Shaub at (804) 273-2763.

Sincerely,


J. Alan Price
Vice President – Nuclear Engineering

Commitments made in this letter: None

COMMONWEALTH OF VIRGINIA

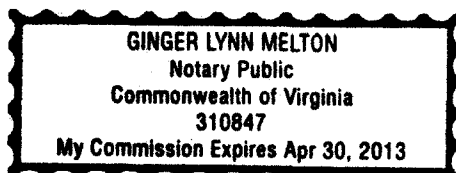
COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. Alan Price, who is Vice President – Nuclear Engineering of Virginia Electric and Power Company. He has affirmed before me that he 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 his knowledge and belief.

Acknowledged before me this 11th day of May, 2011.

My Commission Expires: 4/30/13


Notary Public



I was commissioned a notary as Ginger L. Alligood.

Attachment:

Supplemental Information, Addition of Analytical Methodology to COLR

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ATTACHMENT

SUPPLEMENTAL INFORMATION

ADDITION OF ANALYTICAL METHODOLOGY TO COLR

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

Background

By letter dated July 19, 2010 (Reference 1), Virginia Electric and Power Company (Dominion) submitted a license amendment request for North Anna Power Station (NAPS), Unit Nos. 1 and 2. This proposed amendment requested a change to the Technical Specifications (TSs) to include the U.S. Nuclear Regulatory Commission (NRC) approved Appendix C of Dominion Fleet Report DOM-NAF-2-A (Reference 2) as a referenced analytical methodology into NAPS TS 5.6.5.b. In addition to this amendment, Dominion also requested NRC review and approval to use Dominion Topical Report VEP-NE-2-A (Reference 3) for the Westinghouse 17x17 RFA-2 fuel in conjunction with the VIPRE-D/WRB-2M code/correlation pair, and the Statistical Design Limit (SDL) obtained by this implementation, since the SDL establishes a Design Basis Limit for Fission Product Barrier.

Discussion of Change

The thermal overtemperature ΔT (OT ΔT) and overpower ΔT (OP ΔT) trip functions are discussed in the North Anna Updated Final Safety Analysis Report (UFSAR) and Technical Specifications. Westinghouse in WCAP-8745-P-A (Reference 4) describes the analytical methods used to derive limiting safety-system settings for these trip functions. In Westinghouse-designed reactors, these trip functions are designed to provide protection against fuel centerline melting (by limiting the linear heat generation rate) and departure from nucleate boiling (DNB) and to assure that the vessel temperature rise is proportional to core power during postulated transients (Condition II events). Included in the OT ΔT trip is an FDI reset function, which imposes a penalty on the allowable temperature rise in the event of adverse axial power shapes that may occur during a transient.

The bases for these trip functions are the core thermal limit lines (i.e., reactor safety limit lines), axial offset envelopes, and other reactor coolant system and plant parameters. The core thermal limit lines are defined as the most limiting of vessel exit boiling, hot channel exit quality, and the core DNB considerations. The existing core thermal limit lines were evaluated for the Westinghouse 17x17 RFA-2 implementation using VIPRE-D and the WRB-2M and W-3 correlations and demonstrated to be bounding. The existing axial offset envelopes are based on analysis of bounding power shapes from previous analytical experience with Westinghouse 17x17 Vantage 5H fuel and AREVA Advanced Mark-BW fuel, with the applicable CHF correlations and core thermal-hydraulic analyses. These envelopes were also evaluated for the Westinghouse 17x17 RFA-2 implementation using VIPRE-D and the WRB-2M and W-3 correlations and demonstrated to be bounding. No other reactor coolant system or plant parameters are being changed. Therefore, it was concluded that no changes to the OT ΔT and OP ΔT trip functions were necessary for the Westinghouse 17x17 RFA-2 implementation.

The statements and conclusions in the proposed amendment request of July 19, 2010 were based on analysis of bounding power shapes from previous analytical experience

with Westinghouse 17x17 Vantage 5H fuel and AREVA 17x17 Advanced Mark-BW fuel, with the applicable CHF correlations and core thermal-hydraulic analyses.

In preparation for cycle-specific evaluations, representative reload power shapes for future operating cycles were evaluated for the Westinghouse 17x17 RFA-2 fuel with the VIPRE-D code and the Westinghouse WRB-2M and W-3 CHF correlations. This evaluation resulted in a significant number of unbounded bottom-skewed power shapes. Therefore, a change is required to the FΔI reset function for the OTΔT trip function in order to accommodate these representative reload power shapes for Westinghouse RFA-2 fuel with the VIPRE-D code and the Westinghouse WRB-2M and W-3 CHF correlations.

The needed revision to the FΔI reset function is currently being optimized with respect to plant operating and safety analysis margins. However, it has been concluded that no changes are required to the existing Reactor Core Safety Limits, the OTΔT constants, and the OPΔT constants. Thus, the current analyses of record of applicable UFSAR Chapter 15 events remain bounding.

Dominion intends to implement the change to the FΔI reset function under the provisions of 10 CFR 50.59 using Dominion's NRC-approved reload design methodology in VEP-FRD-42-A (Reference 5) and the NRC-approved methodology in WCAP-8745-P-A via the cycle-specific Core Operating Limits Report and VEP-FRD-42-A and WCAP-8745-P-A are currently listed as NRC-approved methodologies for determining core operating limits in North Anna TS 5.6.5.b.

Correction to Amendment Request

Dominion has identified a needed correction of the following two statements in the proposed amendment.

Attachment 1, Section 4.0, *Technical Evaluation* (last paragraph) reads, "...the existing Reactor Core Safety Limits, (over-temperature ΔT (OTΔT), over-power ΔT (OPΔT), axial power distribution (FΔI), etc) do not require revision as a consequence of this implementation."

and

Attachment 4, Section 5, *Conclusions* (1st paragraph) reads, "The existing Reactor Core Safety Limits, OTΔT, OPΔT and FΔI trip setpoints as well as the current analyses of applicable UFSAR Chapter 15 events were shown to be bounding, and will not be changed."

The corrected statements are as follows:

Attachment 1, Section 4.0, *Technical Evaluation* (last paragraph): "...the existing Reactor Core Safety Limits, OTΔT constants, and OPΔT constants do not require revision as a consequence of this implementation. The FΔI reset function will be revised."

and

Attachment 4, Section 5, *Conclusions* (1st paragraph): "The existing Reactor Core Safety Limits, OTΔT and OPΔT trip setpoint constants were shown to be bounding, and will not be changed. The FΔI reset function for the OTΔT trip function will be revised in order to accommodate reload power shapes for Westinghouse RFA-2 fuel with the VIPRE-D code and the Westinghouse WRB-2M and W-3 CHF correlations. The current analyses of applicable UFSAR Chapter 15 events are unaffected by the change to the FΔI reset function, remain bounding, and will not be changed."

In addition, Dominion also identified typographical errors in Table 4.2-1 of Attachment 4 of the July 19, 2010 submittal. Specifically, the safety analysis limits for the VIPRE-D/W-3 code correlation are stated to be 1.42 and 1.58 for application at ≥ 1000 psia and < 1000 psia, respectively. The correct values are 1.44 and 1.61 for application at ≥ 1000 psia and < 1000 psia, respectively. These limits were correctly identified in Table 4.3-1 of Attachment 4. The revised Table 4.2-1 is shown below with the corrected values in bolded-type.

Table 4.2-1: DNBR Limits for WRB-2M and W-3

VIPRE-D/WRB-2M	
DDL	1.14
SDL	1.25
SAL	1.55
VIPRE-D/W-3	
DDL (≥1000 psia)	1.30
DDL (<1000 psia)	1.45
SAL (≥1000 psia)	1.44
SAL (<1000 psia)	1.61

References

1. Letter from J. A. Price (Dominion) to NRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Proposed License Amendment Request (LAR), Addition Of Analytical Methodology To COLR," July 19, 2010, Dominion Serial No. 10-404.
2. Dominion Fleet Report DOM-NAF-2, Revision 0.2-P-A, "Qualification of the Westinghouse WRB-2M CHF Correlation in the Dominion VIPRE-D Computer Code," August 2010.
3. Dominion Topical Report, VEP-NE-2-A, Revision 0, "Statistical DNBR Evaluation Methodology," June 1987.
4. WCAP-8745-P-A, "Design Bases for the Thermal Overpower DT and the Thermal Overtemperature DT Trip Functions," September 1986.
5. Dominion Topical Report VEP-FRD-42, Revision 2.1-A, "Reload Nuclear Design Methodology," August 2003.