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Dominion

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United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 05-020A
NL&OS/ETS: R0
Docket Nos. 50-280/281
50-338/339
50-336/423
License Nos. DPR-32/37
NPF-4/7
DPR-65/NPF-49

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
NORTH ANNA AND SURRY POWER STATIONS UNITS 1 AND 2
MILLSTONE POWER STATION UNITS 2 AND 3
INFORMATION REGARDING A LYNXT ERROR SUPPORTING THE REQUEST FOR APPROVAL OF TOPICAL REPORT DOM-NAF-2 REACTOR CORE THERMAL-HYDRAULICS USING THE VIPRE-D COMPUTER CODE INCLUDING APPENDIX A - QUALIFICATION OF THE F-ANP BWU CHF CORRELATIONS IN THE DOMINION VIPRE-D COMPUTER CODE

In a September 28, 2004 letter (Serial No. 04-406), Dominion/DNC submitted Topical Report DOM-NAF-2, "Reactor Core Thermal-Hydraulics Using the VIPRE-D Computer Code," and Appendix A to the Topical Report DOM-NAF-2, "Qualification of the F-ANP BWU CHF Correlations in the Dominion VIPRE-D Computer Code," for NRC review and approval. Dominion/DNC was recently notified by Framatome ANP of an error identified in the LYNXT code, which was used to benchmark the VIPRE-D code. Although the impact of this error is considered negligible and should not affect the NRC's review of VIPRE-D, Dominion/DNC is providing a description of the error and the impact for your information. The attachment to this letter summarizes the error and the impact on the DNB benchmark analyses.

Although the docket number is identified for each Dominion/DNC unit, Dominion/DNC is requesting the approval of the generic application of this topical report. Plant specific applications of this topical report, including applicable appendixes, will be submitted to the NRC for review and approval, in accordance with Section 2.1 of DOM-NAF-2.

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

Very truly yours,

Leslie N. Hartz
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Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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Attachment 1

Topical Report DOM-NAF-2

05-020A

REACTOR CORE THERMAL-HYDRAULICS USING THE VIPRE-D COMPUTER CODE

INFORMATION REGARDING A LYNXT ERROR

Virginia Electric and Power Company (Dominion)
Dominion Nuclear Connecticut (DNC)

Characterization of the LYNXT Error

During the development of a new version of the LYNXT computer code, Framatome ANP detected an error that affects the LYNXT DNB predictions for previous code versions. It was discovered that two different surface fits to the ASME steam tables were used to calculate the values for the thermodynamic quality for a given local coolant condition within the code. The difference in the two values is based on two different water property subroutines used to generate the saturated liquid enthalpy (h_f) and the latent heat of vaporization (h_{fg}), which are needed to calculate the thermodynamic quality given the local coolant enthalpy. One thermodynamic quality definition was being used in the flow field calculations and the second definition was being used in the calculation of the DNBR. Although the two definitions are very close (maximum observed differences less than 0.2 percent in h_f and h_{fg}) there is an impact on DNBR predictions. Neither surface fit is incorrect by itself, but the inconsistency of using two different values for the quality was characterized as a code error.

Generic Impact of the LYNXT Error

Due to the location of the error in the LYNXT code, there is no impact to the LYNXT/BWU code/correlation limits reported in Framatome ANP's Topical Report BAW-10199 and Addendum 2. The differences between the DNBR results provided by the corrected and the uncorrected versions of the LYNXT code are extremely small, but observable.

Specific Impact to DOM-NAF-2

Topical Report DOM-NAF-2 describes Dominion's use of the VIPRE-D code, including modeling and qualification for Pressurized Water Reactors (PWR) thermal-hydraulic design. The Topical is entirely based on VIPRE-D calculations, and it does not rely on LYNXT results. However, the Topical includes information about VIPRE-D benchmarks to the NRC-approved code, LYNXT, to assist the NRC in the review of the VIPRE-D Topical Report.

- For the 173 North Anna statepoints used in Section 5.1 in the Topical Report DOM-NAF-2, the average difference between LYNXT predictions with the error and without the error is less than 0.02%, and the maximum difference is less than 0.15%.

- The maximum change to any numerical value reported in Section 5 of the main body of Topical Report DOM-NAF-2 regarding benchmark DNBR calculations between VIPRE-D and LYNXT is 0.02%.

- The comparisons between the corrected LYNXT and VIPRE-D are slightly better than the comparisons between the uncorrected LYNXT and VIPRE-D.

Appendix A to Topical Report DOM-NAF-2 documents Dominion's qualification of the BWU-N, BWU-Z and BWU-ZM correlations with VIPRE-D. Tables A.4.1-3 and A.4.3-3 of Appendix A list the LYNXT/BWU code/correlation limits for information in comparison

to the calculated values for VIPRE-D/BWU. Since there is no impact to the LYNXT/BWU code-correlation limits reported in Framatome ANP's Topical Report BAW-10199 (including Addendum 2), Appendix A to Topical Report DOM-NAF-2 is not affected by this error.

Appendix B to Topical Report DOM-NAF-2 documents Dominion's qualification of the WRB-1 correlation with VIPRE-D. Appendix B to Topical Report DOM-NAF-2 is not affected by this error.

Conclusion

Based on the above discussion, Dominion has concluded that the LYNXT error has a negligible impact to the information provided in Topical Report DOM-NAF-2, including Appendixes A and B.