

NRR-PMDAPEm Resource

From: Sreenivas, V
Sent: Tuesday, December 24, 2013 1:41 PM
To: 'david.heacock@dom.com'
Cc: 'Tom Shaub'; 'david.sommers@dom.com'; Pascarelli, Robert; Cotton, Karen; 'Gary D Miller'
Subject: NORTH ANNA AND SURRY: RAI - ADDITION OF AN ANALYTICAL METHODOLOGY CORE OPERATING LIMITS REPORTS (COLRS) AND AN INCREASE TO THE SURRY MINIMUM TEMPERATURE
Attachments: IBMgetContent.pdf

REQUEST FOR ADDITIONAL INFORMATION (RAI)

By letter dated June 26, 2013, Virginia Electric and Power Company (Dominion), requests an amendment to the Renewed Facility Operating License (FOL) Numbers DPR-32, DPR-37 for North Anna Power Station (NAPS) Units 1 and 2 and the Technical Specifications (TS) of Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively. The proposed license amendment requests the approval of the following items: (1) generic application of Appendix D, "Qualification of the ABB-NV and WLOP Critical Heat Flux (CHF) Correlations in the Dominion VIPRE-D Computer Code," to Fleet Report DOMNAF- 2-A, "Reactor Core Thermal-Hydraulics Using the VIPRE-D Computer Code,"(2) the plant specific application of Appendix D to DOM-NAF-2-A to North Anna and Surry Power Stations (in accordance with Section 2.1 of DOM-NAF-2-A), and (3) an increase in the Surry Power Station TS Minimum Temperature for Criticality.

The scope of this license amendment consists of analytical and testing over an anticipated range of conditions over which the correlations are applied for low flow and low pressure conditions for the NAPS Units 1 and 2 and Surry Unit 1 and 2. The LAR also contains justification for increasing the TS minimum temperature for criticality at Surry Units 1 and 2. The RAI is herewith enclosed. The purpose of this email along with the attached letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's detailed technical review of this request. Please submit the additional information requested in this attachment in order to complete its detailed technical review.

Please submit the response to these RAIs by January 31, 2014. If you have any questions please contact me at your earliest.

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REQUEST FOR ADDITIONAL INFORMATION
PROPOSED LICENSE AMENDMENT REQUEST
ADDITION OF AN ANALYTICAL METHODOLOGY TO THE NORTH ANNA
AND SURRY CORE OPERATING LIMITS REPORTS (COLRS) AND AN INCREASE TO THE
SURRY MINIMUM TEMPERATURE FOR CRITICALITY
(DOCKET NOS 50-280/281, 50-338/339)
(TAC NOS MF2364, MF2365, MF2366, MF2367)

By letter dated June 26, 2013 (Reference 1), Virginia Electric and Power Company (Dominion), requests an amendment to the Renewed Facility Operating License (FOL) Numbers DPR-32, DPR-37 for North Anna Power Station (NAPS) Units 1 and 2 and the Technical Specifications (TS) to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively. The proposed license amendment request the approval of the following items: (1) generic application of Appendix D, "Qualification of the ABB-NV and WLOP Critical Heat Flux (CHF) Correlations in the Dominion VIPRE-D Computer Code," to Fleet Report DOM-NAF-2-A, "Reactor Core Thermal-Hydraulics Using the VIPRE-D Computer Code,"(2) the plant specific application of Appendix D to DOM-NAF-2-A to North Anna and Surry Power Stations (in accordance with Section 2.1 of DOM-NAF-2-A), and (3) an increase in the Surry Power Station TS Minimum Temperature for Criticality.

The scope of this license amendment consists of analytical and testing over an anticipated range of conditions over which the correlations are applied for low flow and low pressure conditions for the NAPS Units 1 and 2 and Surry Unite 1 and 2. The LAR also contains justification for increasing the TS minimum temperature for criticality at Surry Units 1 and 2.

Division of Safety Systems staff has reviewed the license amendment request, and has determined that additional information is needed in order to complete our evaluation.

RAI-1 Attachment 1, Sections 1, 2.3, and 5.1.2

- (a) Describe the impact of increasing the Minimum Temperature for Criticality for Surry Units on maintaining the shutdown margin during the startup of the units.
- (b) It is stated that "the increased Minimum Temperature for Criticality will continue to be verified against the assumptions in the safety analyses on a reload basis and does not impact the NRC approved analytical methods used to determine the core operating limits such as the MTC. Describe the processes/procedures in place to achieve this objective.
- (c) Explain how the increase in TS Minimum Temperature for Criticality coupled with introduction of the W-3 alternate CHF correlations at Surry units will provide (1) *increased flexibility in loading pattern development as well as improved margins, and (2) improved predictive capabilities in determining the thermal-hydraulic performance at Surry*, as claimed in Section 2.3 of Attachment 1 of the LAR.

ENCLOSURE

RAI-2 Attachment 1 Section 4.2

Please provide details of how the retained DNBR margin is used to offset generic DNBR penalty for rod bow. Explain how the rod bow penalty is quantified in the analysis.

RAI-3 Attachment 1, Sections 4.2 and 4.3

It is stated that WLOP CHF correlation is to be applied when the conditions occur outside of the range of applicability of the primary CHF correlation, say, for low pressure or low flow conditions. Please provide response to the questions below:

- (a) Provide details of the correlation(s) currently used to analyze low pressure or low flow transients at Surry and North Anna Units.
- (b) What is the impact/advantage on DNBR and thermal performance margins when Surry and North Anna transition to WLOP CHF correlation to analyze low pressure or low flow transients.

RAI-4 Attachment 1, Sections 4.2 and 4.3

Please show with typical calculations in support of your statement that *there are no changes to the OT Δ T, OP Δ T, F Δ H, reactor protection system, or the Reactor Core Safety Limits (RCSLs) due to the implementation of the W-3 alternate CHF correlations at North Anna and Surry units.*

RAI-5

Limitations and Conditions Number 3 for the Safety Evaluation Report for WCAP-14565-P-A stipulates that *Selection of the appropriate DNB correlation, DNBR limit, engineering hot channel factors for enthalpy rise, and other fuel dependent parameters will be justified for each application of each correlation on a plant specific basis.* This is also listed as Number 7 of Section 7.0 *Conclusions* of Topical Report WCAP-14565=P-A.

Please describe how the Limitations and Conditions number 3 is justified/implemented in connection with the use of ABB-NV and WLOP correlations in North Anna and Surry units.

REFERENCES

- (1) Letter from David A. Heacock (Dominion) to US NRC, "Proposed License Amendment Request (LAR) Addition of an Analytical Methodology to The North Anna and Surry Core Operating Limits Reports (COLRS) and an Increase to The Surry Minimum Temperature for Criticality," Dominion, June 26, 2013