VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

June 15, 2016

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

Serial No. 15-494A
NLOS/DEA R1
Docket Nos.: 50-338/339
License Nos.: NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
RESPONSE TO NRC AUDIT
REGARDING LICENSE AMENDMENT REQUEST TO ADDRESS THE ISSUES IDENTIFIED IN WESTINGHOUSE DOCUMENTS NSAL-09-5, REV. 1 AND NSAL-15-1

On December 10, 2015, Dominion submitted a license amendment request (LAR) to the Nuclear Regulatory Commission (NRC) to revise the North Anna Technical Specifications (TS). The LAR addresses the issues identified in Westinghouse (W) Nuclear Safety Advisory Letters NSAL-09-5, Rev. 1, and NSAL-15-1, Rev. 0.

As part of its review, the NRC staff conducted an audit of the LAR and its supporting technical documentation with the Dominion staff on May 4, 2016. As a result of the audit, Dominion agreed to provide additional information to the NRC to facilitate completion of their review. The additional information is provided in the attachment.

Should you have any questions regarding this submittal, please contact Ms. Diane E. Aitken at (804) 273-2694.

Sincerely,

Mark D. Sartain
Vice President – Nuclear Engineering

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mark D. Sartain, 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 15th day of June, 2016.

My Commission Expires: August 31, 2019

GARY DON MILLER
Notary Public
Commonwealth of Virginia
Reg. # 7629412
My Commission Expires August 31, 2019

Notary Public

A001
NRR

Attachment: Additional Information in Support of NRC Review of License Amendment Request Associated with Westinghouse NSALs-09-5, Rev. 1 and 15-1, Rev. 0

Commitments made in this letter: No new regulatory commitments.

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NRC Senior Resident Inspector
North Anna Power Station

Serial No: 15-494A
Docket Nos.: 50-338/339

ATTACHMENT

Additional Information in Support of NRC Review of License Amendment Request Associated with Westinghouse NSALs-09-5, Rev. 1 and 15-1, Rev. 0

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

Additional Information in Support of NRC Review of License Amendment Request Associated with Westinghouse NSALs-09-5, Rev. 1 and 15-1, Rev. 0 North Anna Power Station Units 1 and 2

On December 10, 2015, Dominion submitted a license amendment request (LAR) to the Nuclear Regulatory Commission (NRC) to revise the North Anna Technical Specifications (TS) to address the issues identified in Westinghouse (W) Nuclear Safety Advisory Letters NSAL-09-5, Rev. 1, and NSAL-15-1, Rev. 0 (Reference 1).

As part of its review effort, the NRC staff conducted an audit of the LAR and its supporting technical information with the Dominion staff on May 4, 2016. As a result of the audit, Dominion agreed to provide additional information to the NRC to facilitate completion of their review. The additional information is provided below.

NRC Question No. 1

Explain why Dominion is introducing separate terms and associated Technical Specifications (TS) and Required Actions for steady-state and transient FQs ($F_Q^E(Z)$ and $F_Q^T(Z)$, respectively).

Dominion Response

Following the review of NSAL-15-1 (Reference 2), it was concluded that the current TS structure, which combined the steady-state and transient FQs into one Limiting Condition for Operation (LCO) and F_Q term ($F_Q^M(Z)$), was not adequate to address the issues of NSAL-15-1. In particular, the proposed requirement to trend measured and predicted, steady-state and transient FQs separately was not feasible using only the single term $F_Q^M(Z)$. Splitting $F_Q^M(Z)$ into its steady-state component ($F_Q^E(Z)$) and transient component ($F_Q^T(Z)$) allows each quantity to be evaluated individually, thus ensuring periods of decreasing margin are evaluated. In addition, splitting $F_Q^M(Z)$ into individual components allows appropriate Required Actions to be specified in the event either $F_Q^E(Z)$ or $F_Q^T(Z)$ exceeds its limit. This separation of variables is consistent with NUREG-1431 (Reference 3) and satisfactorily addresses the issues in NSAL-15-1.

The Westinghouse Relaxed Axial Offset Control (RAOC) and the Dominion Relaxed Power Distribution Control (RPDC) methodologies are similar in their objective, key operational limits that are supported, and the analysis basis used to simulate the behavior of potential core axial power distributions. Due to the similarities between the RAOC and RPDC methodologies, the steady-state and transient terms and actions are analogous to those documented in NUREG-1431.

NRC Question No. 2

What is the justification for the proposed phrase, 'after each $F_Q^T(Z)$ determination,' associated with the Completion Times for LCO 3.2.1.B? This proposed phrase is not consistent with the terminology in the current revision of NUREG-1431 (Revision 4).

Dominion Response

The proposed phrase in the LCO 3.2.1.B Completion Times is meant to provide consistency with the existing language used for the Completion Times of LCO 3.2.1.A and LCO 3.2.1.B (and the language in current LCO 3.2.1.A). While the proposed phrase is inconsistent with Revision 4 of NUREG-1431 (Reference 3), the Completion Times are functionally equivalent. The proposed phrase does not allow a different outcome or Completion Time since the Completion Times for the Required Actions associated with LCOs 3.2.1.A and LCO 3.2.1.B start after each F_Q determination. The F_Q determinations are performed simultaneously by Surveillance Requirements (SR) 3.2.1.1 and 3.2.1.2 for the steady-state and transient FQs.

NRC Question No. 3

What is the justification for the additional Required Action [B.2 – Reduce THERMAL POWER as specified in the COLR] for LCO 3.2.1.B? The current revision of NUREG-1431 has only one Required Action associated with this LCO.

Dominion Response

Following the review of NSAL-09-5, Revision 1 (Reference 11), Dominion concluded that additional operating space reductions were needed to regain the required amount of margin to satisfy LCO 3.2.1.B. LCO 3.2.1.A currently requires either a 1% reduction of power or a 1% reduction of Axial Flux Difference (AFD) limits for each 1% by which $F_Q^M(Z)$ exceeds its limit. The Dominion analysis showed that this was not always sufficient and determined that a combination of reductions in power and AFD limits were necessary to regain the required margins. Therefore, separate Required Actions (one for AFD limits and one for THERMAL POWER) were introduced for LCO 3.2.1.B. While there are two separate Required Actions, they must both be performed concurrently. [Note that both operating space reductions (AFD Limits and THERMAL POWER) will be tabulated in the same Core Operating Limits Report (COLR) table.] While the additional Required Action is not consistent with the current NUREG-1431 (Reference 3), it was recognized that NUREG-1431 does not address the concerns of NSAL-09-5. The additional Required Action is specifically intended to address the NSAL-09-5 concerns of regaining transient F_Q margin.

NRC Question No. 4

Attachment 1, page 12, of the original Dominion LAR submittal (Reference 1) indicates, 'This approach, although different in the details of application from that recommended in Reference 2, has been deemed to be more suitable for use with Dominion methods.' Explain why the approach is more suitable for use with Dominion methods.

Dominion Response

The recommended long term action specified in NSAL-15-1 (Reference 2) was to implement the TSTF that contains the final revised TS associated with WCAP-17661-P (Reference 10) after approval by the NRC. As discussed in the LAR (Reference 1, page 10 of Attachment 1), Dominion strategically chose not to adopt WCAP-17661-P and the associated TSTF. Alternatively, Dominion chose to implement a modified version of the interim actions from NSAL-15-1 as the permanent resolution of the NSAL-15-1 issues. The elements of this approach are elaborated further in Dominion's response to Question 9.

The approach chosen for North Anna was determined by Dominion evaluation to most appropriately address the issues in NSAL-15-1 for NAPS with the following desirable aspects: 1) it directly addresses the issues of NSAL-15-1; 2) it retains the existing F_Q TS surveillance scheme and structure; 3) it retains the existing axial control calculational methodology (RPDC), and 4) it allows a cycle-specific determination of appropriate penalty factors, thereby continually validating the approach. Thus, this approach was noted as being "more suitable" for use with Dominion methods versus adopting the WCAP-17661-P approach.

NRC Question No. 5

Please confirm that the fuel thermal conductivity degradation (TCD) issue has been addressed for North Anna.

Dominion Response

The TCD issue was addressed during the NRC reviews of Dominion LARs (References 4 and 5) that were submitted to support the introduction of the Westinghouse RFA-2 fuel product at North Anna. Calculations and supporting material addressing resolution of fuel TCD for North Anna were reviewed during an audit that was attended by NRC, Westinghouse and Dominion personnel (Reference 6). Summary results for the TCD assessment are documented in the North Anna UFSAR. References 7, 8, 9 and 14 document NRC approval of the North Anna LARs (References 4 and 5).

NRC Question No. 6

Regarding LCO 3.2.1, Required Action A.2, why is the phrase, '$F_Q^M(Z)$ exceeds limit,' struck out and replaced with, 'that THERMAL POWER is limited below RTP by Required Action A.1'?

Dominion Response

LCO 3.2.1 Required Actions A.2 and A.3 were changed from '$F_Q^M(Z)$ exceeds limit' to 'that THERMAL POWER is limited below RTP by Required Action A.1' because the proposed LCO 3.2.1.A pertains only to $F_Q^E(Z)$ not meeting limits. The modified language is functionally equivalent to the current language for Required Action 3.2.1.A.2.2 and Required Action 3.2.1.A.2.3 because it retains the current Required Action of reducing trip setpoints by 1% for each 1% by which limits are not met, by referencing Required Action A.1. Required Actions 3.2.1.A.2.2 and 3.2.1.A.2.3 ensure that the neutron flux high trip setpoints and overpower delta-T trip setpoints are reduced to limit THERMAL POWER consistent with Required Action A.1. The modified language is used to provide consistency with the language used in the proposed LCO 3.2.1.B.3 and LCO 3.2.1.B.4, which is discussed in Dominion's response to Question 7.

NRC Question No. 7

Regarding LCO 3.2.1, why are the proposed Required Actions B.3 and B.4 indicated to reduce the associated setpoints (Neutron Flux and Overpower delta-T, respectively) for each 1%, 'that THERMAL POWER is limited below RTP by Required Action B.2'?

Dominion Response

LCO 3.2.1.A currently requires either a 1% reduction of power or a 1% reduction in AFD limits for each 1% by which $F_Q^M(Z)$ exceeds its limit (referred to as "1-for-1" below). The Dominion analysis performed during the review of NSAL-09-5, Rev. 1 (Reference 11) determined that a combination of reductions in power and AFD limits were necessary to regain the required margins to satisfy the LCO for transient FQs. The power reductions required can be greater than the "1-for-1" Required Actions of the current LCO. Since "1-for-1" required actions may no longer be adequate for restoring margin, requiring "1-for-1" trip setpoint reductions may also be inadequate. Therefore, the proposed language for Required Actions B.3 and B.4 requires identical reductions in trip setpoints as those identified in Required Action B.2 to restore F_Q margins. In the event that $F_Q^T(Z)$ does not meet its limit, LCO 3.2.1.B Required Actions are performed to reduce the allowable operating space. Required Actions B.3 and B.4 ensure that the neutron flux high trip setpoints and overpower delta-T trip setpoints are reduced by at least the amount that THERMAL POWER is limited below RTP by Required Action B.2.

During review of this question it was identified that further clarification may be needed regarding AFD limit and THERMAL POWER reductions imposed by Required Actions 3.2.1.B.1 and 3.2.1.B.2, respectively. The AFD band and THERMAL POWER reductions are designed to limit the operating space in which the unit can operate to maintain margin for $F_Q^T(Z)$. Application of the power reduction is meant to limit the maximum THERMAL POWER at which the unit can operate (less than RTP). Likewise, application of the AFD limit reductions are meant to narrow the AFD limits from what is specified in the COLR. Therefore, a modified version of the proposed COLR Table 3.2-3 (Attachment 1 of Reference 1) is provided to more clearly define the Required Actions. An example application of the operating space reductions is presented after proposed COLR Table 3.2-3.

Proposed COLR Table 3.2-3
Required Operating Space Reductions for $F_Q^T(Z)$ Exceeding Its Limits

Required $F_Q^T(Z)$ Margin Improvement	Required THERMAL POWER Limit (% RTP)	Negative AFD Band Reduction From AFD Limits* (% AFD)	Positive AFD Band Reduction From AFD Limits* (% AFD)
≤ 1%	≤ 97%	≥ 2.0%	≥ 2.0%
> 1% and ≤ 2%	≤ 95%	≥ 3.0%	≥ 3.0%
> 2% and ≤ 3%	≤ 92%	≥ 3.5%	≥ 3.5%
> 3%	≤ 50%	N/A	N/A

(* Axial Flux Difference Limits are provided in COLR Figure 3.2-2.)

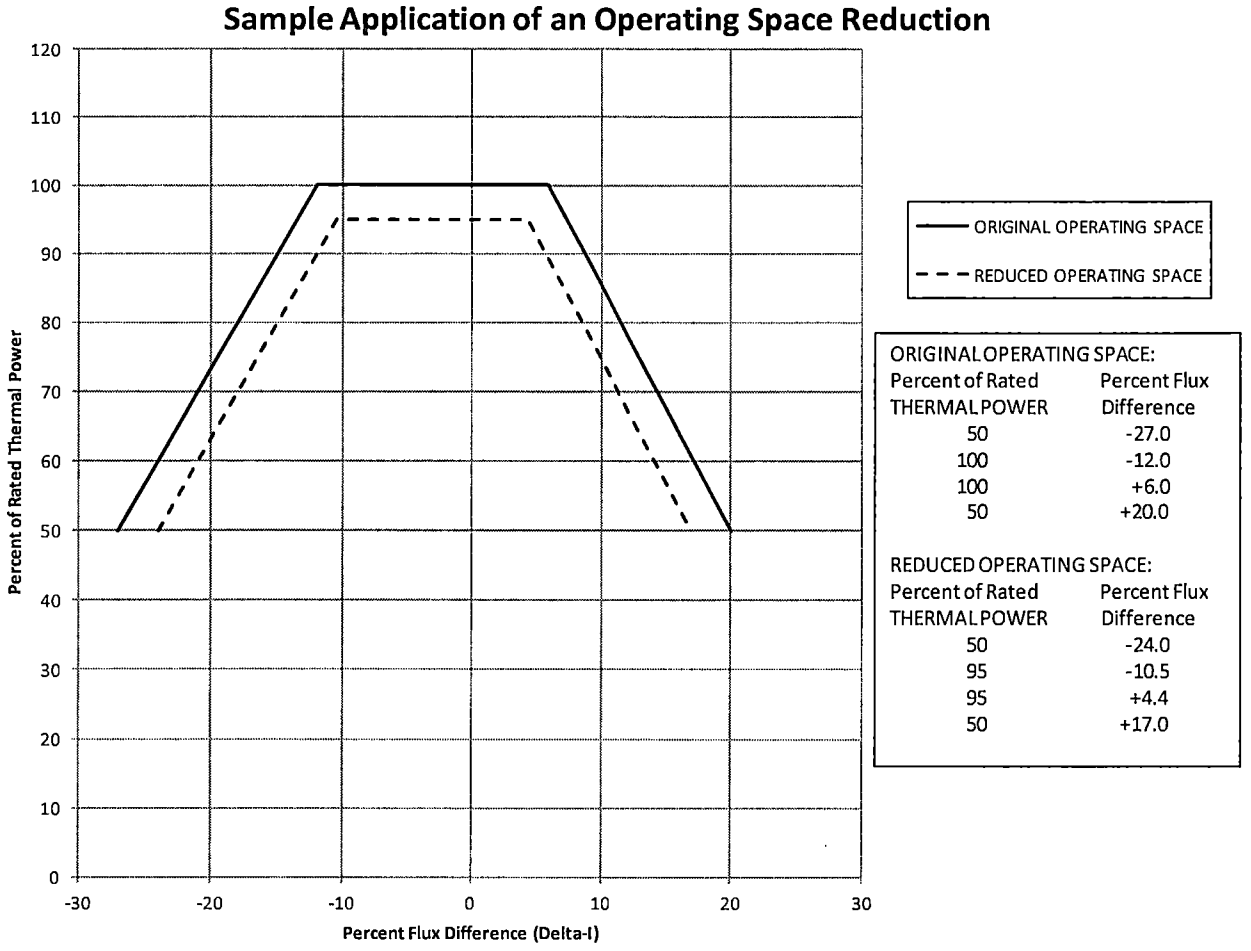
Sample Application of an Operating Space Reduction

1) The results of a flux map analysis show that $F_Q^T(Z)$ exceeds the limit by 1.5%.

2) THERMAL POWER is limited to ≤ 95% RTP. If current THERMAL POWER > 95%, reduce power to ≤ 95% RTP.

3) Negative and Positive AFD bands from COLR Figure 3.2-2 are narrowed by ≥ 3.0%. Adjust AFD as necessary to adhere to the limitation in Table 3.2-3.

4) The figure below illustrates: a) the original operating space and b) the reduced operating space needed to improve margin for $F_Q^T(Z)$.



NRC Question No. 8

What is the justification for Insert 1 contained in Attachment 2 of the original Dominion LAR submittal (Reference 1)?

Dominion Response

Insert 1 of Attachment 2 to Reference 1 is a note indicating that SR 3.2.1.2 is not required to be performed prior to thermal power exceeding 75% RTP after a refueling. SR 3.2.1.2 requires a Surveillance of $F_Q^T(Z)$ during initial startup following each refueling within 12 hours after achieving equilibrium conditions after exceeding 75% RTP. The justification for the note is provided in "Insert 8" of Attachment 4 to Reference 1. Insert 8 indicates THERMAL POWER levels below 75% are typically non-limiting with respect to meeting the limit for $F_Q^T(Z)$. Also, initial startups following a refueling are slow and well controlled due to startup ramp rate limitations and fuel conditioning requirements. Furthermore, startup physics testing and flux symmetry

measurements, also performed at low power, provide confirmation that the core is operating as expected. Consequently, the initial startup following a refueling will not result in non-equilibrium power shapes that could challenge the $F_Q^T(Z)$ limit. The frequency associated with SR 3.2.1.2 ensures that verification of $F_Q^T(Z)$ is performed prior to extended operation at high power levels where the maximum permitted peak FQs could be challenged by non-equilibrium operation. The addition of this note was identified as an improvement item in response to an NRC request for additional information during the review of WCAP-17661-P, Revision 1 (Reference 10).

NRC Question No. 9

Attachment 1, page 12, of the original Dominion LAR submittal (Reference 1) provides a discussion of the cycle specific analyses that will be performed to determine the appropriate penalty factor required to accommodate potential increases in $F_Q(Z)$ over the surveillance period. Describe the basis for the penalty factors in the context of addressing NSAL-09-5 and NSAL-15-1.

Dominion Response

NSAL-15-1 (Reference 2) notified Westinghouse customers of an issue associated with Surveillance Requirement (SR) 3.2.1.2 in TS 3.2.1.B of NUREG-1431, Revision 4 (Reference 3). As specified in NSAL-15-1, for certain trends in measured $F_Q(Z)$ and pre-calculated allowance factor W(Z), the existing SR may not ensure that the transient $F_Q^W(Z)$ limit will be met between the performance of scheduled monthly surveillances for those plants that use the W(Z) F_Q surveillance methodology. Based on the similarities between RAOC and RPDC methodologies, Dominion determined that the findings in NSAL-15-1 could be applicable to North Anna Units 1 and 2. Dominion's evaluation of NSAL-15-1 determined that the specific issue existed in Dominion's RPDC methodology and implemented the interim guidance associated with NSAL-15-1.

For RAOC plants, the SR in NUREG-1431 addresses the application of an appropriate factor in the event that measured F_Q (designated $F_Q^C(Z)$) had increased since the previous evaluation. Dominion currently has a similar SR for North Anna Units 1 and 2. NSAL-15-1 notified customers of the potential for $F_Q^W(Z)$ to be increasing while $F_Q^C(Z)$ was decreasing, in which case the SR may be insufficient to ensure that the transient $F_Q^W(Z)$ LCO is met. Therefore, NSAL-15-1 effectively notified customers that the measured trend in steady-state F_Q is not necessarily indicative of the trend in transient F_Q. For this reason, Dominion opted to use both measured and projected trends of both steady-state and transient F_Q to ensure the LCO will be met. Although using the projected trend in steady-state F_Q is beyond the recommended actions of NSAL-15-1, Dominion included this additional criterion since the trend in steady-state F_Q was the original basis for not needing to trend transient F_Q. This is identified in NSAL-15-1 with the statement, "under most conditions, the variation in F_Q^W will follow the variation of

F_Q^C, and the current TS Surveillance Note (SR 3.2.1.2) is sufficient". Dominion's approach bounds the expected possibilities of F_Q trending.

The proposed revised surveillance requirements provide guidance for application of, and determination of the magnitude of, a penalty factor for the measured $F_Q(Z)$. The penalty factor will be applied under the following conditions: a) if the trend in measured maximum equilibrium F_Q ($F_Q^E(Z)/K(Z)$) or transient F_Q ($F_Q^T(Z)/K(Z)$) has increased since the previous surveillance, or b) if the trend in predicted maximum $F_Q^E(Z)/K(Z)$ or maximum $F_Q^T(Z)/K(Z)$ over the next required surveillance period is increasing. The LAR (Reference 1) specifies that the penalty factor will be defined in the COLR, which allows specific numerical values of the penalty factor to be evaluated for each reload core.

Sample penalty factors are provided on Attachment 1, Page 13, of Reference 1. The penalty factors are derived from the larger of the predicted increases in maximum $F_Q^E(Z)/K(Z)$ and $F_Q^T(Z)/K(Z)$ over the applicable burnup range, with a minimum penalty factor of 2%. This penalty factor is applied when either measured or predicted increasing trends in maximum equilibrium and transient F_Q exist, thereby addressing the NSAL-15-1 issue.

NRC Question No. 10

What is the technical justification for the different Completion Times associated with the violation of the steady-state and transient F_Q limits (15 minutes versus 4 hours)?

Dominion Response

The technical justification for the 4-hour Completion Time in LCO 3.2.1.B, Required Actions B.1 and B.2, versus the 15-minute completion time in LCO 3.2.1.A Required Action A.1, is explained below by comparison of the different scenarios under which the LCOs are entered.

Required Action A.1 of LCO 3.2.1.A is entered when the conditions associated with SR 3.2.1.1 are not met. This surveillance requirement addresses the direct comparison of the current measured FQ to the FQ limit. When measured $F_Q^E(Z)$ exceeds the limit, a 15-minute action time is appropriate to return $F_Q^E(Z)$ to within the limit as quickly as possible.

Required Actions B.1 and B.2 of LCO 3.2.1.B are entered when the conditions associated with SR 3.2.1.2 are not met. This surveillance requirement addresses the condition when $F_Q^T(Z)$ is not within its limit. $F_Q^T(Z)$ is obtained by adjusting the current measured FQ by a factor that bounds all allowable modes of operation over the surveillance period when comparing to the FQ limit. The most limiting normal operational transients require multiple changes in core conditions and considerable time

to develop, since it is the impact of the build-up and decay of fission products that make the transients extreme. Xenon, the most significant of the fission product contributors, has over a 9 hour half-life; therefore, its fission product time scale will significantly limit the severity of potential transients when restricted to 4-hours prior to the new THERMAL POWER and AFD limits being in place. A 15-minute Completion Time is not necessary since the 4-hour Completion Time is short enough to preclude FQ limiting transients. The use of a 4-hour completion time to restrict plant conditions such that $F_Q^T(Z)$ is within its limits allows adequate time for operators to make planned and controlled maneuvers while effectively preventing the extreme transients that would be necessary to produce the FQ limiting conditions.

Conversely, reducing power and controlling/reducing AFD to be within new limits (and any resultant actions such as the insertion of control rods) within a 15-minute time frame from a condition that may be quite stable (and unlikely to result in future peaking factor issues if maintained) could lead to the initiation of a normal operational transient and increase the probability of exceeding the FQ limits. A 4-hour Completion Time (versus 15-minutes) allows time for operator actions to be performed to minimize the initiation of a normal operational transient.

NRC Question No. 11

The SER for VEP-NE-1, Rev. 0 (Reference 12) provides a discussion of the calculational uncertainties that are applied to F_Q. Address whether Reference 1 impacts any calculational uncertainties that affect F_Q.

Dominion Response

The Summary of Technical Evaluation section of the SER for VEP-NE-1, Rev. 0 (Reference 12) includes a discussion of uncertainties associated with the calculation of F_Q. Although it discusses the uncertainties in the context of the codes used at the time Rev. 0 was published, the key acceptance test for uncertainties remains unchanged. Uncertainty factors are developed such that the factors bound the 95/95 upper tolerance limit determined by comparison to the measured data. The proposed changes and analysis supporting Reference 1 do not affect the numerical values of uncertainties that have been previously approved for North Anna.

NRC Question No. 12

LAR Attachment 1, Page 9, discusses previous adjustments to the F_Q surveillance region and corresponding Technical Specification Bases changes that are being tracked in Dominion's Corrective Action System. Describe this change and the schedule for completion of the Dominion corrective action.

Dominion Response

Around 2006, internal and external operating experiences (including Westinghouse Communication 06-IC-03, Reference 13) indicated the F_Q axial surveillance region may be inadequate to address peak steady state or transient F_Q. At that time, North Anna Units 1 and 2 had 15% exclusion zones at the top and bottom of the axial core height with the bases dating back to the implementation of the RPDC methodology in the 1980's. The bases statement for the exclusion zones indicated that they, "are excluded from the evaluation because of the low probability that these regions would be more limiting in the safety analyses and because of the difficulty of making a precise measurement in these regions." Improvements in measurement and analytical techniques and advancements in core designs, including axially dependent fuel and burnable absorber designs together with longer cycles, all began to challenge the bases statement, thus resulting in the operating experiences noted in 2006.

Dominion's technical evaluation of the issue identified in 2006 determined that peak steady state or transient F_Q could occur at North Anna within the 15% exclusion zones based on industry operating experiences and the North Anna core designs at that time. In addition, it was noted that improvements in Dominion's measurement and analytical techniques had been made such that reliable measurements could be attained closer to the top and bottom of the axial core height. As a result of the technical evaluation, Dominion procedurally expanded the F_Q axial surveillance region to include from 8% to 92% of the axial core height in 2006. This change met the concerns noted in Westinghouse Notice 06-IC-03 and effectively realigned the F_Q axial surveillance region with the bases statement. A recent assessment was performed by Dominion based on current North Anna core designs which concluded that the 8% top and bottom F_Q axial exclusion zones currently in use continue to be adequate.

The F_Q axial surveillance region is not prescribed in Technical Specifications (TS), but is described in the TS Bases. During the preparation of the LAR, it was noted that the description of the F_Q surveillance exclusion regions in the North Anna TS Bases had not been updated when the expanded surveillance region was procedurally implemented in 2006. Therefore, although this Bases change is not directly related to resolution of the Westinghouse F_Q NSALs (References 2 and 11), it was mentioned in the LAR submittal because the affected Bases pages were included in the TS Bases markups. This inconsistency was entered into the North Anna corrective action program, and a TS Bases change has been initiated through the station license basis document change process. The assigned date to complete the TS Bases change is July 7, 2016.

References

1. Letter from M. D. Sartain (Dominion) to USNRC, "Virginia Electric and Power Company (Dominion) - North Anna Power Station Units 1 and 2 License Amendment Request to Address the Issues Identified in Westinghouse Documents NSAL-09-5, Rev.1 and NSAL-15-1, Serial No. 15-494, December 10, 2015.

2. Westinghouse Nuclear Safety Advisory Letter, NSAL-15-1, Rev. 0, "Heat Flux Hot Channel Factor Technical Specification Surveillance," February 3, 2015.

3. NUREG-1431, Revision 4, Vol. 1 and 2, "Standard Technical Specifications - Westinghouse Plants."

4. Letter from Leslie N. Hartz (Dominion) to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Proposed License Amendment Request (LAR) Addition of Analytical Methodology to COLR Best-Estimate Large Break Loss of Coolant Accident (BE-LBLOCA)," Serial No. 10-575, October 21, 2010 (ADAMS Accession No. ML102980447).

5. Letter from J. A. Price (Dominion) to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Proposed License Amendment Request (LAR) Addition of Analytical Methodology to COLR," Serial No 10-404, July 19, 2010 (ADAMS Accession No. ML102020165).

6. Memorandum from Anthony J. Mendiola (DSS) to Gloria J. Kulesa (DORL), "Regulatory Audit Report – Virginia Electric and Power Company North Anna Power Station Units 1 and 2 Proposed License Amendment Request for Addition of Analytical Methodology to COLR – Fuel Transition (TAC Nos. ME4262, ME4263) and Addition of Analytical Methodology to COLR – Best Estimate LB LOCA (TAC NOs ME4933, ME4934," US NRC, July 18, 2011 (ADAMS Accession No. ML111741223).

7. Letter from V. Sreenivas (USNRC) to D. A. Heacock (Dominion), "North Anna Power Station, Units 1 and 2, Issuance of Amendments Regarding Addition of Analytical Methodology to Core Operating Limits Report for Best Estimate Large Break Loss-of-Coolant Accident (TAC Nos. ME4933 and ME4934)," February 29, 2012 (ADAMS Accession No. ML12054A168).

8. Letter from V. Sreenivas (USNRC) to D. A. Heacock (Dominion), "North Anna Power Station, Units 1 and 2 – Correction Re: Issuance of Amendments Regarding Addition of Analytical Methodology to Core Operating Limits Report for Best Estimate Large Break Loss-of-Coolant Accident (TAC Nos. ME4933 and ME4934)," March 13, 2012 (ADAMS Accession No. ML12067A078).

9. Letter from V. Sreenivas (USNRC) to D. A. Heacock (Dominion), "North Anna Power Station, Units 1 and 2, Issuance of Amendments Regarding Addition of Analytical Methodology to Core Operating Limits Report for the Critical Heat Flux Correlation (TAC Nos. ME4262 and ME4263)," February 29, 2012 (ADAMS Accession No. ML12054A162).

10. WCAP-17661-P, Revision 1, "Improved RAOC and CAOC FQ Surveillance Technical Specifications," November 2013.

11. Westinghouse Nuclear Safety Advisory Letter, NSAL-09-5, Rev. 1, "Relaxed Axial Offset Control FQ Technical Specification Actions," September 23, 2009.

12. Safety Evaluation Report, transmitted in letter from Herbert N. Berkow (NRC) to W. L. Stewart (VEPCO), "Acceptance for Referencing of Licensing Topical Report VEP-NE-1, "VEPCO Relaxed Power Distribution Control Methodology and Associated FQ Surveillance Technical Specifications," February 26, 1986.

13. Westinghouse Notice 06-IC-03, "F_Q and F_{xy} Surveillance Zone Issue," February 21, 2006.

14. Letter from V. Sreenivas (USNRC) to D. A. Heacock (Dominion), "North Anna Power Station, Units 1 and 2 – Correction Re: Issuance of Amendments Regarding Addition of Analytical Methodology to Core Operating Limits Report for the Critical Heat Flux Correlation (TAC Nos. ME4262 and ME4263)," dated March 13, 2012 (ADAMS Accession No. ML12066A208).