

July 27, 2016

MEMORANDUM TO: Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Operation

FROM: Eric R. Oesterle, Acting Chief */RA/*
Reactor Systems Branch
Division of Safety System
Office of Nuclear Reactor Regulation

SUBJECT: SAFETY EVALUATION INPUT FOR NORTH ANNA POWER
STATION, UNITS 1 AND 2, PROPOSED LICENSE AMENDMENT
TO REVISE THE TECHNICAL SPECIFICATIONS TO ADDRESS
THE ISSUE IDENTIFIED IN WESTINGHOUSE DOCUMENTS
NSAL-09-5. REV. 1 AND NSAL-15-I (TAC NO. MF7186 AND
MF7187)

By letter dated December 10, 2015 (ADAMS Accession No. ML15352A108), Dominion (the licensee) submitted a license amendment request (LAR) for the North Anna Power Station, Units 1 and 2. The proposed license amendment revises the North Anna Power Station Units 1 and 2 technical specifications (TS) to address the issues identified in two Westinghouse Nuclear Safety Advisory Letter, NSAL-09-5, Rev. 1 and NSAL-15-1, Rev. 0

The staff of the reactor systems branch (SRXB) has reviewed the LAR and found that it is acceptable. The SRXB staff provides its bases for approval in the Enclosure.

The safety evaluation input for revision to the North Anna Power Station Units 1 and 2 TS Sections will be provided separately by technical specifications branch and will be included in the final safety evaluation report.

This effort completes the SRXB review of the LAR under TAC No. MF7186 and MF7187.

Docket Nos.: 50-338
50-339

CONTACT: Fred Forsaty, NRR/DSS
301-415-8523

July 27, 2016

MEMORANDUM TO: Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Operation

FROM: Eric R. Oesterle, Acting Chief **/RA/**
Reactor Systems Branch
Division of Safety System
Office of Nuclear Reactor Regulation

SUBJECT: SAFETY EVALUATION INPUT FOR NORTH ANNA POWER STATION, UNITS 1 AND 2, PROPOSED LICENSE AMENDMENT TO REVISE THE TECHNICAL SPECIFICATIONS TO ADDRESS THE ISSUE IDENTIFIED IN WESTINGHOUSE DOCUMENTS NSAL-09-5. REV. 1 AND NSAL-15-I (TAC NO. MF7186 AND MF7187)

By letter dated December 10, 2015 (ADAMS Accession No. ML15352A108), Dominion (the licensee) submitted a license amendment request (LAR) for the North Anna Power Station, Units 1 and 2. The proposed license amendment revises the North Anna Power Station Units 1 and 2 technical specifications (TS) to address the issues identified in two Westinghouse Nuclear Safety Advisory Letter, NSAL-09-5, Rev. 1 and NSAL-15-1, Rev. 0

The staff of the reactor systems branch (SRXB) has reviewed the LAR and found that it is acceptable. The SRXB staff provides its bases for approval in the Enclosure.

The safety evaluation input for revision to the North Anna Power Station Units 1 and 2 TS Sections will be provided separately by technical specifications branch and will be included in the final safety evaluation report.

This effort completes the SRXB review of the LAR under TAC No. MF7186 and MF7187.

Docket Nos.: 50-338
50-339

CONTACT: Fred Forsaty, NRR/DSS
301-415-8523

DISTRIBUTION: EOesterle, NRR FForsaty, NRR

ADAMS Accession No ML ML16209A413

NRR-106

OFFICE	NRR/DSS/SRXB	NRR/DSS/SRXB:BC
NAME	FFORSATY	EOESTERLE
DATE	07/25/2016	7/ 27 /2016

OFFICIAL RECORD COPY

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO ADOPTION OF DOMINION CORE DESIGN AND SAFETY ANALYSIS
METHODS AND TO ADDRESS THE ISSUES IDENTIFIED IN WESTINGHOUSE
DOCUMENTS NSAL-09-5, REV. 1, NSAL-15-1
FOR NORTH ANNA POWER STATION UNITS 1 AND 2
DOMINION NUCLEAR CONNECTICUT, INC

1.0 INTRODUCTION

By letter dated December 10, 2015 (ADAMS Accession No. ML15352A108), Dominion (the licensee) submitted a license amendment request (LAR) for the North Anna Power Station (NAPS), Units 1 and 2. The proposed license amendment revises the NAPS Units 1 and 2 technical specifications (TS) to address the issues identified in two Westinghouse nuclear safety advisory letter, NSAL-09-5, Rev. 1 (Reference 1) and NSAL-15-1, Rev. 0 (Reference 2).

In the license amendment request Dominion has proposed the following changes to NAPS TS:

- Revise TS 3.2.1, "Heat Flux Hot Channel Factor," LCO by removing the former F_Q term $F_Q^M(Z)$ and splitting that term into a steady state component $F_Q^E(Z)$ and a transient component $F_Q^T(Z)$;
- Revise TS 3.2.1, Actions table to allow a separate Condition/Required Actions/Completion Time structure so each term could be evaluated individually to address NSAL-15-1 thereby allowing continued operation when the LCO is not met; and
- Revise TS 3.2.1 surveillance requirement (SR) by replacing the single SR with separate SRs that address the steady state and transient components of the FQ term.

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) uses the following requirements and guidance documents in evaluating the licensee's amendment request:

10 CFR 50.34, "Contents of construction permit and operating license applications; technical information," of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR) requires that safety analysis reports analyze the design and performance of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents. As part of the core reload process, licensees perform reload safety evaluations to ensure that their safety analyses remain bounding for the design cycle. To confirm that the

ENCLOSURE

analyses remain bounding, they confirm that the inputs to the safety analyses are conservative with respect to the current design cycle. These inputs are checked using analytical models, and if key safety analysis parameters are not bounded, further analysis of the affected transients or accidents is performed to ensure that the applicable acceptance criteria are satisfied.

10 CFR 50.36, "Technical Specifications", paragraphs (d)(2), (d)(3), and (d)(5) state that technical specifications will include limiting conditions for operations, surveillance requirements, and administrative controls. Limiting conditions for operations are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met. Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.

Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications", provides guidance for removal of cycle-specific parameter limits from Technical Specifications.

NUREG1431, Rev. 4.0, "Standard Technical Specifications for Westinghouse Plants," provides guidance for implementation of Standard Technical Specifications (STS) for Westinghouse plants.

3.0 TECHNICAL EVALUATION

NSAL-09-5, Rev. 1 notified Westinghouse customers of an issue associated with the required actions for condition B of TS 3.2.1B, "Heat Flux Hot Channel Factor $F_Q(Z)$ (RAOC-W(Z) Methodology)," in Reference 3 for plants that have implemented the relaxed axial offset control (RAOC) methodology. In certain situations where transient $F_Q(Z)$, is not within its limit, the existing required actions may be insufficient to restore $F_Q(Z)$ to within the limit. NSAL-09-5, Rev. 1 provided clarification regarding the applicability of the recommended interim actions to address this issue and how they should be implemented, including potential inclusion in plant specific TS changes. Dominion's evaluation of NSAL-09-5, Rev. 1 determined that it was applicable to NAPS, based on the similarities between the RAOC and Dominion's relaxed power distribution control (RPDC) methodologies.

NSAL-15-1 notified Westinghouse customers of an issue associated with SR 3.2.1.2 in TS 3.2.1B of Reference 3. For certain trends in measured $F_Q(Z)$ and non-equilibrium factor $W(Z)$, the existing SR may not ensure that the transient F_Q , $F_Q^W(Z)$, limit will be met between the performance of the monthly flux map measurement, for those plants that use $W(Z)$ F_Q surveillance methodology. Dominion's evaluation of Reference 2 determined that it was also applicable to NAPS, based on the similarities between RAOC and RPDC methodologies.

The RPDC methodology discussed in Dominion TR VEPNE-1, Rev. 0.1-A, "VEPCO Relaxed Power Distribution Control Methodology (Reference 4), and Section 3.2 of the LAR (ADAMS Accession No. ML15352A108) is a Dominion method for axial power distribution control with a variable axial flux difference (ΔI) band. This method provides an increasing ΔI band

with decreasing power in order to maintain approximately constant analysis margin to the design bases limits at all power levels.

The RPDC analysis process consists of: (1) the generation of power shapes that bound the delta-I range; (2) the selection of delta-I bands such that all bands satisfy the core operating limits report (COLR) height dependent hot channel factor, $F_Q(Z)$, limit with verification that the proposed delta-I bands satisfy loss-of-coolant accident FQ and loss of flow accident thermal-hydraulic evaluations; (3) the analysis of limiting Condition II events to ensure the power shapes within the final delta-I band are used as initial conditions; (4) the verification to confirm that over-power delta temperature (OP Δ T) and over-temperature delta-T (OT Δ T) limits are conservative to ensure that margin to fuel design limits is maintained; and (5) the formulation of N(Z) functions (non-equilibrium power distribution multiplier) to support the implementation of FQ TS surveillance.

The NRC safety evaluation report approving Dominion TR VEP-NE-1, Rev. 0.1-A (Reference 4) accepted the Dominion RPDC method for use at NAPS and SPS, and also allowed the RPDC method for use at plants with reload cores similar to those of NAPS and SPS. Therefore, the use of the RPDC method discussed in Dominion TR, VEP-NE-1, Rev. 0.1-A, and Section 3.2 of the LAR (ADAMS Accession No. ML15352A108) is acceptable to support NAPS licensing applications.

Staff's review indicates that the change in TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," ensures that the required actions will be taken in the event that transient $F_Q(Z)$ surveillance limits are not met. Changes are also proposed that define separate terms, action steps and surveillance requirements for steady-state and transient $F_Q(Z)$, denoted as $F_Q^E(Z)$ and $F_Q^T(Z)$, respectively. The use of separate surveillance requirements in this manner is consistent with the NRC approved Westinghouse Standard Technical Specifications, NUREG-1431, Rev. 4 (Reference 3). The revised surveillance requirements provide guidance for application of, and determining the magnitude of a penalty factor for the measured $F_Q(Z)$. The factor will be applied if the trend in measured values indicates decreasing margin to the applicable limit since performing the previous surveillance or if the trend in predicted values indicates decreasing margin to the applicable limit prior to the next required surveillance. The proposed changes specify that this factor will be defined in the COLR, which allows specific numerical values of the factor to be evaluated for each reload core. These changes are consistent with the previously NRC approved SR requirements and are acceptable.

In addition, the Bases for TS 3.2.1 are being modified to address the proposed changes to TS 3.2.1. The TS Bases changes are provided for information only. The licensee stated in the LAR that the changes to the TS Bases will be incorporated in accordance with the TS Bases Control Program (TS 5.5.13) and are acceptable.

The proposed TS changes documented in NAPS LAR (ML15352A108) intend to address the issues identified in Westinghouse NSAL-09-5, Rev. 1, and NSAL-15-1 (References 1 and 2). The specifics of the proposed TS changes are reviewed by the STSB. The results of the STSB evaluation of the proposed TS changes will be added to the SRXB safety evaluation report.

4.0 TECHNICAL EVALUATION CONCLUSIONS

The SRXB staff determined that the proposed changes to TS 3.2.1 are acceptable for NAPS. This determination is based on the following considerations: (1) that the change in TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," ensures that the required actions will be taken in the event that transient $F_Q(Z)$ surveillance limits are not met and (2) that the use of separate surveillance requirements in proposed manner is consistent with the NRC approved Westinghouse Standard Technical Specifications, NUREG-1431, Rev. 4 (Reference 3) and (3) that the proposed changes are to be evaluated and will be validated for each reload core.

The staff determined based on these considerations that proposed changes are consistent with the requirements of 10 CFR 50.34, 10 CFR 50.36 and GL 88-16.

5.0 CONCLUSION

The NRC has reviewed Dominion's submittals and supporting documentation and finds that the proposed use of Dominion nuclear core design and safety analysis methods and the proposed TS changes discussed in the LAR Sections 3.1 and 3.2 are acceptable for use in licensing applications at NAPS.

The NRC staff has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the NRC's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

6.0 REFERENCES

1. Westinghouse Nuclear Safety Advisory Letter NSAL-09-5, Rev. 1, dated 9/23/2009, "Relaxed Axial Offset Control Technical Specification Actions;"
2. Westinghouse Nuclear Safety Advisory Letter NSAL-15-1, dated 2/03/2015, "Heat Flux Hot Channel Factor Technical Specification Surveillance."
3. NUREG-1431, Revision 4, Vol. 1 and 2, "Standard Technical Specifications - Westinghouse Plants."
4. Topical Report, VEP-NE-1, Rev. 0.1-A, "VEPCO Relaxed Power Distribution Control Methodology and Associated FQ Surveillance Technical Specifications," August 2003. (ADAMS Accession No. ML15313A154)