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Dominion®

March 23, 2016

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

Serial No. 16-084
NLOS/WDC R0
Docket No. 50-423
License No. NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST TO ADOPT DOMINION CORE DESIGN AND SAFETY ANALYSIS METHODS AND TO ADDRESS THE ISSUES IDENTIFIED IN WESTINGHOUSE DOCUMENTS NSAL-09-5, REV. 1, NSAL-15-1, AND 06-IC-03 (CAC NO. MF6251)

By letter dated May 8, 2015, Dominion Nuclear Connecticut, Inc. (DNC) submitted a license amendment request (LAR) for Millstone Power Station Unit 3 (MPS3). The proposed amendment would revise the Technical Specifications (TS) to enable use of the Dominion nuclear safety analysis and reload core design methods for MPS3 and address the issues identified in three Westinghouse communication documents. In a letter dated January 8, 2016, the Nuclear Regulatory Commission (NRC) transmitted a request for additional information (RAI) to DNC related to the LAR. DNC responded to the RAI questions in letters dated January 28 and February 25, 2016. In an email dated February 24, 2016, the NRC transmitted an RAI to DNC related to the content of the TS changes proposed in the LAR. The attachment to this letter provides the DNC response to the NRC's RAI. During development of the RAI response, an additional proposed TS change was identified. This proposed change does not affect the no significant hazards considerations provided in the May 8, 2015 LAR.

If you have any questions regarding this submittal, please contact Wanda Craft at (804) 273-4687.

Sincerely,

Mark D. Sartain
Vice President – Nuclear Engineering

Vicki L. Hull
NOTARY PUBLIC
Commonwealth of Virginia
Reg. # 140542
My Commission Expires May 31, 2018

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 Dominion Nuclear Connecticut, Inc. 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 23rd day of March, 2016.

My Commission Expires: 5-31-18.

Vicki L. Hull
Notary Public

A001
NRR

Commitments made in this letter: None

Attachment:

Response to Request for Additional Information Regarding License Amendment Request to Adopt Dominion Core Design and Safety Analysis Methods and to Address the Issues Identified in Westinghouse Documents NSAL-09-5, Rev. 1, NSAL-15-1, and 06-IC-03 (CAC No. MF6251)

cc: U.S. Nuclear Regulatory Commission
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ATTACHMENT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST TO ADOPT DOMINION CORE DESIGN AND SAFETY ANALYSIS METHODS AND TO ADDRESS THE ISSUES IDENTIFIED IN WESTINGHOUSE DOCUMENTS NSAL-09-5, REV. 1, NSAL-15-1, AND 06-IC-03 (CAC NO. MF6251)

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RAI #1

New proposed Action b in insert A to LCO 3.2.2.1, Action b, proposes a 4-hour Completion Time (CT) to reduce thermal power until the heat flux hot channel factor $F_Q(Z)$ is within its limits. What is the technical basis for a completion time of 4 hours instead of the 15-minute completion time in LCO 3.2.2.1, Action a(1)? No technical basis was provided in the CTS or the LAR to support this CT. Please provide the technical justification.

DNC Response

TS LCO 3.2.2.1 Action b(1) is entered when the calculated value of $F_Q^M(Z)$ is not within its limits after increasing the measured $F_Q(Z)$ component of the power distribution map by manufacturing tolerances, measurement uncertainties, and augmenting the $F_Q(Z)$ limit with a cycle-dependent function that accounts for power distribution transients that may be encountered during normal operation. The augmentation of the $F_Q(Z)$ limit by the cycle-dependent function is mathematically equivalent to the $F_Q^W(Z)$ nomenclature described in NUREG-1431 for LCO 3.2.1B, Action B and its associated technical bases. The $F_Q(Z)$ limit for $F_Q^M(Z)$ associated with TS LCO 3.2.2.1 Action a(1) does not include any factors to account for non-equilibrium situations and is mathematically equivalent to the $F_Q^c(Z)$ nomenclature described in NUREG-1431 for LCO 3.2.1B, Action A and its associated technical bases.

The completion times proposed under TS LCO 3.2.2.1 Action b(1) are structured to be consistent with equivalent actions of LCO 3.2.1B, Action B in NUREG-1431, which are intended to preclude core peaking factors from being exceeded if a normal operational transient occurs. However, upon further review of Action a of Insert A to LCO 3.2.2.1, Dominion proposes to modify the originally proposed 15-minute completion time for complying with the reduced AFD limits under TS LCO 3.2.2.1 Action b(1)a, to a completion time of 4 hours. As discussed in Section 3.2 of the May 8, 2015 LAR, reductions in both the AFD limits and THERMAL POWER limits are required to return $F_Q^M(z)$ (denoted as $F_Q^W(Z)$ in NUREG-1431) within its non-equilibrium limits under the proposed changes to TS LCO 3.2.2.1 Action b(1). Since Actions a and b of Insert A are required to be completed to demonstrate $F_Q^M(z)$ within its non-equilibrium limits, DNC considers that the required completion time should also be identical.

Actions a and b in Insert A to LCO 3.2.2.1 are consistent with LCO 3.2.1B Action B.1 (Reduce AFD limits ≥ 1% for each 1% F_Q^W (Z) exceeds limit) of NUREG-1431, which has a completion time of 4 hours. A change to Action a of Insert A for LCO 3.2.2.1 Action b(1) is provided below. In addition, an editorial change is proposed to Action f of Insert A to clarify the numbering. To aid review of revised Insert A, deleted text is struck through and added text is italicized and bolded.

Revised INSERT "A" for LCO 3.2.2.1 ACTION b(1)

a. Within ~~15 minutes~~ ***4 hours***, control the AFD to within the new reduced AFD limits specified in the COLR that restores $F_Q(Z)$ to within its limits, and

b. Reduce the THERMAL POWER by the amount specified in the COLR that restores $F_Q(Z)$ to within its limits within 4 hours, and

c. Reduce the Power Range Neutron Flux - High Trip Setpoints by ≥1% for each 1% that the THERMAL POWER level is reduced within 72 hours, and

d. Reduce the Overpower ΔT Trip Setpoints by ≥1% for each 1% that the THERMAL POWER level is reduced within 72 hours, and

e. Within 8 hours, reset the AFD Alarm Setpoints to the modified limits, and

f. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the reduced limit required by ~~(1)b.~~ ***ACTION b(1)b*** above; THERMAL POWER may then be increased provided $F_Q(Z)$ is demonstrated through incore mapping to be within its limits.

RAI #2

New proposed Action c in insert A to LCO 3.2.2.1, Action b, proposes a 72-hour CT to reduce the power range neutron flux – high trip setpoints by 1% for each 1% that the thermal power level is reduced. What is the technical basis for a 72-hour CT to adjust the power range neutron flux – high trip setpoints instead of the 4-hour CT allowed elsewhere in CTS (e.g., existing LCO 3.2.1.1 Action a.2 or LCO 3.2.2.1, Action a(1))? Please provide the technical justification.

Additionally, please consider submitting a revised insert A, renumbering all the proposed actions in proposed insert A to LCO 3.2.2.1, Action b, using numerals instead of letters. This may better fit the outline format of MPS3 CTS to avoid confusion. The actions of insert A would actually be sub-actions to an Action b in CTS.

DNC Response

TS LCO 3.2.2.1 Action b(1) is entered when the calculated value of $F_Q^M(Z)$ is not within its limits after increasing the measured $F_Q(Z)$ component of the power distribution map by manufacturing tolerances, measurement uncertainties, and augmenting the $F_Q(Z)$ limit with a cycle-dependent function that accounts for power distribution transients that may be encountered during normal operation. The augmentation of the $F_Q(Z)$ limit by the cycle-dependent function is mathematically equivalent to the $F_Q^W(Z)$ nomenclature described in NUREG-1431 for LCO 3.2.1B, Action B and its associated technical bases. The $F_Q(Z)$ limit for $F_Q^M(Z)$ associated with TS LCO 3.2.2.1 Action a(1) does not include any factors to account for non-equilibrium situations and is mathematically equivalent to the $F_Q^c(Z)$ nomenclature described in NUREG-1431 for LCO 3.2.1B, Action A and its associated technical bases.

The new proposed actions provided in Insert A to LCO 3.2.2.1 are intended to be consistent with NUREG-1431 LCO 3.2.1B Action B ($F_Q^W(z)$ not within limits). Action c in revised Insert A to LCO 3.2.2.1 is consistent with LCO 3.2.1B Action B.2 (Reduce Power Range Neutron Flux - High trip setpoints ≥ 1% for each 1% that the maximum allowable power of the AFD limits is reduced) of NUREG-1431, which has a completion time of 72 hours.

The NRC suggests using numerals rather than letters in Insert A to LCO 3.2.2.1. However, use of letters is consistent with the current MPS3 TS numbering format. Insert A identifies sub-actions a through f of LCO 3.2.2.1 Action b(1) (e.g., b(1)a, b(1)b.....b(1)f).

RAI #3

The NRC staff finds that the proposed extension of time to complete the precision flow balance in SR 4.2.3.1.3.a from 24 hours to 7 days is not consistent with the existing guidance in NUREG-1431, Revision 4 which specifies 24 hours. NUREG-1431, Rev. 4, LCO 3.4.1 bases explain that the result is used to calibrate the RCS flow rate indicators. Please explain any operational ramifications of the extended completion time. For example, would the licensee remain at 90% power for the proposed 7 day time period? If not, address how the licensee would account for any potential non-conservatism that may exist in the flow rate indicators.

DNC Response

The proposed extension of the completion time for the precision heat balance to determine the reactor coolant system (RCS) flow in SR 4.2.3.1.3.a from 24 hours to 7 days provides flexibility to enable the operators and reactor engineers to focus on key activities immediately following a refueling outage. The relaxation of the completion time to perform the precision heat balance from 24 hours to 7 days after reaching 90% of RATED THERMAL POWER is reasonable to establish stable operating conditions, install test equipment, perform the test, and analyze the results. The reactor core power is not limited to 90% of rated thermal power prior to the completion of Surveillance Requirement (SR) 4.2.3.1.3.a.

Use of the precision heat balance provides a numerical value in gallons per minute (gpm) for the RCS total flow rate. The sensors and indicators associated with the precision heat balance and calculation of the RCS total flow rate are calibrated each refueling outage to remove any drift in the instrumentation that occurred during the past cycle of operation. Impacts to the precision heat balance due to sensor drift from extending the completion time to 7 days are negligible and do not impact the calculation of the RCS total flow rate. Therefore, extending the completion of the precision heat balance from 24 hours to 7 days does not adversely impact the determination of the calculated RCS total flow rate.

The RCS total flow rate is used as the reference for the normalization of the cold leg elbow taps. The elbow taps are installed in each loop of the RCS (MPS3 Final Safety Analysis Report (FSAR) Section 7.2.2.2.2). The elbow taps provide a precise indication of RCS flow and are capable of detecting changes in the RCS flow rate. The sensors and indicators associated with the elbow taps are calibrated each refueling outage to remove any drift in the instrumentation that occurred during the past cycle of operation. The elbow tap indicators display flow in terms of percent which is derived from the elbow taps' sensing of pressure drop. The elbow taps trend changes in the pressure drop which correlates to changes in the RCS flow rate, as shown in FSAR Section 7.2.2.2.2.

Following each refueling outage, the operators survey the RCS flow using the elbow tap indicators in accordance with the Surveillance Frequency Control Program to satisfy SR 4.2.3.1.3.b. The surveillance is performed in Mode 1 prior to exceeding 90% RATED THERMAL POWER as part of the control room surveillances. The acceptance criterion for the RCS flow rate surveillance verifies the RCS flow rate is greater than the TS 3.2.3.1.a required RCS total flow rate. This allows the operators to identify changes in RCS flow rate that would challenge the RCS total flow rate in TS 3.2.3.1.a prior to exceeding 90% RATED THERMAL POWER and prior to performing the precision heat balance. The precision heat balance provides further confirmation that the acceptance criterion used in the control room surveillances continues to satisfy TS 3.2.3.1.a for RCS total flow rate.

The extension of the completion time of the precision heat balance for determining the RCS total flow rate provides flexibility to enable the operators and reactor engineers to focus on key activities immediately following a refueling outage, does not impact the calculation of the RCS total flow rate, and does not affect the ability of the operators to identify changes in RCS flow rate that would challenge TS 3.2.3.1.a for RCS total flow. Thus, there is no potential non-conservatism associated with the flow rate indicators due to the extension of the completion time in SR 4.2.3.1.3.a from 24 hours to 7 days.