

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

July 24, 2009

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

Serial No. 09-412B
NLOS/ETS R0
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE

In a letter dated March 26, 2009 (Serial No. 09-033), Dominion requested amendments to Operating Licenses NPF-4 and NPF-7 for North Anna Power Station Units 1 and 2, respectively. This measurement uncertainty recapture (MUR) power uprate License Amendment Request (LAR) would increase each unit's authorized core power level from 2893 megawatts thermal (MWt) to 2940 MWt, and make changes to Technical Specifications as necessary to support operation at the uprated power level. In a July 8, 2009 letter (Serial No. 09-412), Dominion responded to the NRC staff's request for additional information (RAI).

In a July 10, 2009 phone call, the NRC staff and Dominion discussed RAI question eleven, which pertained to the impact of the MUR on grid stability. During the call, the NRC requested additional information regarding the actual value of the generator outputs used in the grid stability studies. The requested information was provided to the NRC in a July 16, 2009 letter (Serial No. 09-412A).

A follow up phone call with the NRC staff was held on July 21, 2009 to discuss additional questions provided by the NRC in a July 20, 2009 e-mail. The questions were focused on the grid stability analysis performed by PJM Interconnection (regional transmission organization) to support the increased unit output. As a result of that call, the NRC requested that Dominion provide a docketed response to these questions. The requested information is provided in the attachment to this letter.

The information provided in this letter does not affect the conclusion of the significant hazards consideration discussion provided in Dominion letter dated March 26, 2009 (Serial No. 09-033).

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ATTACHMENT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**LICENSE AMENDMENT REQUEST
MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE**

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2**

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Background

In a July 10, 2009 phone call, the NRC staff and Dominion discussed RAI question eleven, which pertained to the impact of the MUR on grid stability. During the call, the NRC requested additional information regarding the actual value of the generator outputs used in the grid stability studies. The requested information was provided to the NRC in a July 16, 2009 letter (Serial No. 09-412A).

A follow up phone call with the NRC staff was held on July 21, 2009 to further discuss the grid stability analysis performed by PJM to support the increased unit output. As a result of that call the NRC requested additional information. The requested information is provided below.

NRC Question

In Section V.1.D.ii of Attachment 5 of the LAR, the licensee states that the local generation study assessed station operation at maximum capability, and that the study identified no transmission deficiencies. Furthermore, the study indicated no decrement to system First Contingency Incremental Transfer Capability. The licensee states that in the summary section of the PJM impact studies, the maximum facility output is 945 megawatts electric (MWe) for Unit 1 and 938 MWe for Unit 2. In the July 8, 2009 letter, the licensee stated that the maximum facility output is still bounded by the PJM studies (evaluates grid stability for U1 output of 945 MWe and 938 MWe for U2) since subtracting the house loads yields a net output of 932.5 MWe for U1 and 924.9 MWe for U2). Furthermore, the licensee added in its July 16, 2009 letter, that the system impact studies considered the gross generator outputs of 1075 MWe for U1 and 1068 MWe for U2. These studies encompass the increased generator output as a result of the planned turbine replacements. Provide the results of the system impact studies that consider the higher generator outputs.

Dominion Response

The PJM system impact studies (SIS) provide the final power output (gross) values in Table 1, Interconnection Request Breakdown, on page 4 of the stability analysis. Increased generation requests for MUR and MUR plus turbine replacement are stated for each unit. The design inputs consist of 45 MWe for station loads, 20 MWe for MUR, and 65 MWe for turbine replacement. The gross generator output, for each unit, is derived by adding the station loads and the MUR loads to the maximum facility output (MFO) of 945 MWe for Unit 1 and 938 MWe for Unit 2. The MFO values are based on maximum winter generation output and modeled as follows:

Queue Unit # Case: Gross Generator Output = MFO + Station Loads + Case Increase

S108 Unit 1 MUR only: 1010 MWe = 945 MWe + 45 MWe + 20 MWe

S109 Unit 2 MUR only: 1003 MWe = 938 MWe + 45 MWe + 20 MWe

S110 Unit 2 MUR + turbine replacement: 1068 MWe = 938 MWe + 45 MWe + 85 MWe

S112 Unit 1 MUR + turbine replacement: 1075 MWe = 945 MWe + 45 MWe + 85 MWe

The SIS concluded that no transient stability issues related to the Unit 1 and Unit 2 upgrades were found. The SIS further concluded that no transmission deficiencies were identified and no decrement to system First Contingency Incremental Transfer Capability between utilities was indicated.

NRC Question

The July 16, 2009 response refers to the maximum facility output (MFO), the output that could be available to the grid. Please provide details when the MFO is used. Is the MFO used in the transient stability studies? When is the MFO used versus the gross generator output?

Dominion Response

- Please provide details about when the MFO is used.

As described above, PJM uses the MFO plus station loads to determine the facility gross output for stability analyses. PJM uses summer net generation capability to determine thermal system impacts.

- Is the MFO used in the transient stability studies?

Yes, station auxiliary loads are added to the MFO for stability analysis. PJM uses maximum winter unit output at light load conditions to generate worst-case stability conditions.

- When is the MFO used versus the gross generator output?

The MFO is added to station loads to determine generator gross output for stability.

NRC Question

When evaluating post-trip effects (adequate post-trip voltage) on the grid, is the gross generator output used? Explain how the studies ensure adequate post-trip voltages. For the system impact studies, is the generator modeled separately from the station loads such that when the unit trips, the station loads are still represented as loads on the grid?

Dominion Response

- When evaluating post-trip effects (adequate post-trip voltage) on the grid, is the gross generator output used?

The gross output is used in the dynamic stability analysis, which monitors rotor angle, terminal voltage, field voltage, electrical power, and speed deviation.

- Explain how the studies ensure adequate post-trip voltages.

PJM's stability analyses monitor the key variables to ensure post-trip that these variables are maintained within acceptable limits. Stability is performed using PSSE software, which uses industry accepted mathematical modeling methods, to ensure that system voltages (and other variables) are maintained through the transient and post-transient.

- For the system impact studies, is the generator modeled separately from the house loads such that when the unit trips, the house loads are still represented as loads on the grid?

PJM analysis is intended to assess unit behavior given external system disturbances. For external unit trip disturbances of either or both units, station loads are maintained as loads on the grid.

NRC Question

In the LAR and the July 8, 2009 letter, the licensee stated that the PJM system impact studies, the maximum facility output is 945 MWe for Unit 1 and 938 MWe for Unit 2. What is the purpose of this study in relation to the MUR if the study evaluating queues S108-S110 and S112 include the increased generator output due to the MUR and turbine replacements (an increase of 85 MWe)?

Dominion Response

The PJM studies considered both conditions - MUR only and MUR plus turbine replacement. As noted in the response to the first question, both analyses are contained in the documents and, based on the results of the studies, interconnection service agreements (ISA) were established at 1009.3 MWe and 993.7 MWe for Units 1 and 2, respectively. The new ISA will permit Dominion to perform the MUR uprate followed by the turbine replacement efficiency uprate.