**Eugene S. Grecheck**
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**Dominion®**

January 12, 2009

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

Serial No. NA3-08-059RA
Docket No. 52-017
COL/MJL

**DOMINION VIRGINIA POWER**
**NORTH ANNA UNIT 3 COMBINED LICENSE APPLICATION**
**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 010**
**(FSAR CHAPTER 2)**

On June 17, 2008, the NRC requested additional information to support the review of certain portions of the North Anna Unit 3 Combined License Application (COLA). Dominion responded to the request by letter dated July 14, 2008 (Serial No. NA3-08-059R). In that letter, Dominion deferred its technical response to the following RAI:

- RAI 02.05.04-8 Coefficient of Friction for Foundation Sliding

The preliminary response to RAI 02.05.04-8, Coefficient of Friction for Foundation Sliding, indicated that this RAI relates to, and relies upon, the response to ESBWR DCD RAI 3.8-96 S03, which at the time was being developed by GEH. Since then GEH has responded to DCD RAI 3.8-96 S03 by MFN Letter 06-407, Supplement 11, dated December 12, 2008. Dominion also indicated that a response would be provided 30 days after GEH submits their response. Accordingly, the response to RAI 02.05.04-8 is provided in Enclosure 1 of this letter.

Please contact Regina Borsh at (804) 273-2247 (regina.borsh@dom.com) if you have questions.

Very truly yours,

Eugene S. Grecheck

D089
NRO

COMMONWEALTH OF VIRGINIA

COUNTY OF HENRICO

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Eugene S. Grecheck, who is Vice President Nuclear Development. He has affirmed before me that he is duly authorized to execute and file the foregoing document on behalf of Virginia Electric and Power Company (Dominion Virginia Power), and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 12th day of January, 2009
My registration number is 7173057 and my
Commission expires: August 31, 2012

Wanda K. Marshall
Notary Public

WANDA K. MARSHALL
Notary Public
Commonwealth of Virginia
7173057
My Commission Expires Aug 31, 2012

Enclosures:

1. Response to NRC RAI Letter No. 010, RAI Question No. 02.05.04-8

Commitments made by this letter:

There are no commitments made in this letter.

cc: U. S. Nuclear Regulatory Commission, Region II
T. A. Kevern, NRC
J. T. Reece, NRC
J. J. Debiec, ODEC
G. A. Zinke, NuStart/Entergy
T. L. Williamson, Entergy
R. Kingston, GEH
P. Smith, DTE
J. Burford, Entergy

**ENCLOSURE 1**

**Response to NRC RAI Letter 010**

**RAI Question 02.05.04-8**

**NRC RAI 02.05.04-8**

*FSAR section 2.5.4.10.3 "Earth Pressures," states that "[t]he factor of safety against a gravity wall or structure foundation sliding is normally taken as 1.1 when seismic pressures are included." The staff notes that the ESBWR DCD (Section 3.8.5.4 "Design and Analysis Procedures") states that "selected waterproofing material for the bottom of the basemat is a chemical crystalline powder that is added to the mud mat mixture forming a water proof barrier." Please clarify and justify the coefficient of friction at the interface of the basemat and underlying material used in the calculation of the factor of safety against foundation sliding.*

**Dominion Response**

By letter dated December 12, 2008 (MFN 06-407, Supplement 11), GEH responded to DCD RAI 3.8-96, Supplement 3. GEH provides in Subpart (3) of the response to RAI 3.8-96 S03 the following:

> (3) In the NRC Audit in June 2008, the staff requested the following additional information.
>
> *For the sliding resistance between the basemat and mudmat, GEH needs to provide the technical basis for the coefficient of friction of 0.7. Currently ACI 349 Section 11.7.4.3 which states that mu is 0.6 concrete placed on concrete with surface not intentionally roughened and 1.0 if the surface is intentionally roughened as specified in 11.7.9 (roughened to ¼ inch).*
>
> GEH Response: The weak link at the sliding interface of concrete to soil is the soil, since the concrete surface in contact with soil is rough. As a result, the 0.7 coefficient of friction is controlled by the soil shear strength as a function of internal friction angle, tan ($\varphi$), where $\varphi$ is equal to 35 degrees. Since this friction angle results in a friction coefficient larger than 0.6, which is the value for concrete placed against hardened concrete not intentionally roughened in accordance with ACI 349 Section 11.7.4.3, roughening the mud mat top surface is required to ensure that the interface between the basemat and mud mat is not the controlling sliding surface. The following statement, "The top surface of the mud mat is intentionally roughened in accordance with ACI 349-01 Section 11.7.9 requirement." will be added to DCD Tier 2 Subsection 3.8.6.5.

By making this commitment to ACI 349-01, Section 11.7.9 in DCD Section 3.8.6.5, GEH must assume the coefficient of friction at the interface of the basemat and underlying material (the mud mat) to be 1.0. The surface of the mud mat will be required to be roughened to a full amplitude of approximately ¼ inch per ACI 349-01, Section 11.7.9.

For the summary of calculated factors of safety (FS) refer to Subpart (9). All meet the criteria of either being equal to or greater than 1.1.

**Proposed COLA Revision**

None.