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Subject: 04-785A: Dominion Nuclear North Anna, LLC North Anna Early Site PermitApplication
Draft Safety Evaluation Report Open Item 2.5-2

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February 18, 2005

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

Serial No. 04-785A
ESP/JDH
Docket No. 52-008

DOMINION NUCLEAR NORTH ANNA, LLC
NORTH ANNA EARLY SITE PERMIT APPLICATION
DRAFT SAFETY EVALUATION REPORT OPEN ITEM 2.5-2

On December 20, 2004, the NRC issued its Draft Safety Evaluation Report (DSER) for Dominion Nuclear North Anna, LLC's North Anna Early Site Permit application. The DSER contained open items for which the NRC requested a response by March 3, 2005. The purpose of this letter is to describe our planned approach to respond to Open Item 2.5-2.

During a February 1, 2005 conference call with the NRC staff, Dominion committed to submit its planned approach for responding to Open Item 2.5-2 prior to March 3, 2005. This letter fulfills that commitment.

As we had discussed during the conference call, to support the current review schedule, Dominion will submit a significant portion of the response by March 3, 2005. That submittal will include a detailed description of the required analyses, input parameters, etc., and planned changes to the North Anna ESP application Site Safety Analysis Report (SSAR). Final analysis results and any required changes to the SSAR will be submitted by March 31, 2005.

If you have any questions or require additional information, please contact Mr. Joseph D. Hegner at 804-273-2770.

Very truly yours,

A handwritten signature in black ink, appearing to read "Eugene S. Grecheck".

Eugene S. Grecheck
Vice President-Nuclear Support Services

Enclosure: Planned Approach to Respond to DSER Open Item 2.5-2

Commitments made in this letter:

- 1. By March 3, 2005, submit a response to DSER Open Item 2.5-2 that contains a detailed description of the analysis, input parameters, etc., including planned changes to the SSAR.**
- 2. By March 31, 2005, complete the analysis and submit the final results and SSAR changes.**

**cc: U. S. Nuclear Regulatory Commission, Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, Georgia 30303**

**Mr. Mike Scott
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555**

**Mr. M. S. King
NRC Senior Resident Inspector
North Anna Power Station**

**Mr. Jack Cushing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555**

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 Support Services, of Dominion Nuclear North Anna, LLC. He has affirmed before me that he is duly authorized to execute and file the foregoing document on behalf of Dominion Nuclear North Anna, LLC, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 18th day of February, 2005.

My Commission expires: August 31, 2008

Margaret B. Bennett
Notary Public

(SEAL)

Serial No. 04-785A
Docket No. 52-008
Planned Approach to Respond to DSER Open Item 2.5-2
Page 1

Enclosure

Planned Approach to Respond to DSER Open Item 2.5-2

DSER Open Item 2.5-2 (DSER page 2-167)

2.5.2.3.5 Seismic Wave Transmission Characteristics of the Site

The staff focused its review of SSAR Section 2.5.2.5, "Seismic Wave Transmission Characteristics of the Site," on the applicant's incorporation of the seismic wave transmission characteristics of the material overlying the base rock at the site into the determination of the SSE. SSAR Section 2.5.4.7 provides a description of the transmission characteristics of the site material.

According to the applicant's responses to RAIs 2.5.2-1(c) and 2.5.2-8, the applicant's SSE represents the ground motion at a depth well below the ground surface. However, 10 CFR 100.23(d)(1) states the following:

The Safe Shutdown Earthquake Ground Motion for the site is characterized by both horizontal and vertical free-field ground motion response spectra at the free ground surface.

As explained in more detail below, the staff has determined that the applicant's SSE does not represent the free-field ground motion at the free ground surface.

Figure 2.5.2-5, which reproduces SSAR Figure 2.5-62, shows that the shear wave velocity values for the ESP site reach a value of about 2500 feet per second (ft/s) at a depth of 60 feet.

This shear wave value is well below that of the hard rock conditions ($V_s = 9200$ ft/sec) assumed by the EPRI 2003 study for CEUS ground motion models. In addition, the applicant did not make shear wave velocity measurements at a depth greater than 65 feet. Thus, the shear wave velocity value of 9200 ft/s may not be reached at the ESP site until a considerable depth below the ground surface. According to SSAR Figure 2.5-62 from the ground surface to a depth of 30 feet, the shear wave velocity at the site varies from 600 ft/s to about 1300 ft/s. The applicant needs to incorporate these lower (600 – 1300 ft/s) shear wave velocities, as well as other subsurface material properties and their uncertainties, into the determination of the ESP site SSE. In addition, the applicant should provide the site amplification or transfer function for the staff to review. The staff needs this information to determine that the applicant has provided an SSE that meets the requirements of Appendix S to 10 CFR Part 50 and 10 CFR 100.23, which define the SSE as "free-field ground motion response spectra at the free ground surface." This is **Open Item 2.5-2**.

Planned Response Approach

The current SSE spectrum in SSAR Section 2.5.2 is defined for “hard” rock conditions—rock that has a shear wave velocity of 2.8 km/s or about 9200 ft/sec [per Sections 3.2.4 and 5.1.4 of the December 2004 EPRI CEUS Ground Motion Project Report (Reference 1)]. DSER Open Item 2.5-2 requests an evaluation of the effect on the SSE of site-specific subsurface materials and states that the SSE should represent the “free-field ground motion at the free ground surface” in order to comply with the requirements of 10 CFR 100.23.

As discussed during a February 1, 2005 conference call between NRC Staff and Dominion, we intend to perform an analysis to modify the current hard rock SSE spectrum to meet the “free-field ground motion at the free ground surface” criteria of 10 CFR 100.23(d)(1) and Section I.1 of Standard Review Plan (SRP) Section 3.7.1 (Reference 2). The SSE ground motion will be estimated at a control point at the top of a hypothetical outcrop of Zone III-IV material. This is consistent with Section I.1 of SRP Section 3.7.1, which states, in part:

...For sites composed of one or more thin soil layers overlying a competent material or in case of insufficient recorded ground-motion data, the control point is specified on an outcrop or a hypothetical outcrop at a location on the top of the competent material...

The existing Units 1 and 2 containment buildings are founded on the Zone III-IV material which is “sound bedrock” (per SSAR Section 2.5.2.5), “competent” (for the purposes of SRP Section 3.7.1), and “rock or rock-like” (for the purposes of SRP Section 3.7.2 II.4.b, Soil Structure Interaction, Modeling of Supporting Soil) (Reference 3).

As identified in SSAR Table 2.5-45, the shear wave velocities for the Zone III-IV material range from 2500 to 4500 ft/sec, and the average shear wave velocity is specified as 3300 ft/sec. A shear wave velocity of 3300 ft/sec will be used in the control point SSE analysis. The elevation of the top surface of the Zone III-IV material varies across the site, as shown in SSAR Figures 2.5-57 and 2.5-58. The top of the Zone III-IV material will be chosen to be at a representative Elevation of 250 ft in the control point SSE analysis. As requested in the open item, our analysis will also identify the site amplification or transfer function.

It is likely that any new reactor building (containment) structure will be founded at an elevation lower than Elevation 250 ft and within Zone IV material. Therefore, ground motions at a second control point at the top of a hypothetical outcrop of Zone IV material will also be estimated and included in the SSAR. Per SSAR Table 2.5-45, the shear wave velocities for the Zone IV material range from 4000 to 8000 ft/sec, and the average shear wave velocity is specified as 6300 ft/sec. A shear wave velocity of 6300

ft/sec will be used for this analysis. The top of the Zone IV material will be chosen to be at a representative Elevation of 205 ft. The purpose of this second control point is to provide an SSE ground motion that is closer (both in shear wave velocity and in elevation) to the ground motion that would eventually be used in detailed structural design.

A response to this DSER Open Item will be submitted by March 3, 2005, which will contain a detailed description of the analysis, input parameters, etc., including our planned changes to the SSAR. We anticipate completing the analysis and submitting the final results and SSAR changes by March 31, 2005.

References

1. EPRI CEUS Ground Motion Project Final Report, Technical Report No. 1009684, December 2004. Submitted as part of Dominion response to Open Item 2.5-1, dated January 25, 2005.
2. NRC NUREG-0800, Standard Review Plan, Section 3.7.1, Seismic Design Parameters, Revision 2, August 1989.
3. NRC NUREG-0800, Standard Review Plan, Section 3.7.2, Seismic System Analysis, Revision 2, August 1989.