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January 8, 2015

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

Serial No. NA3-14-058R
Docket No. 52-017
COL/DBE

**DOMINION VIRGINIA POWER**
**NORTH ANNA UNIT 3 COMBINED LICENSE APPLICATION**
**SRP 2.4.12: RESPONSE TO RAI LETTER 158**

On November 21, 2014, the NRC transmitted a letter requesting additional information to support the review of certain portions of the North Anna Unit 3 Combined License Application (COLA), which consisted of one question.

The response to the following Request for Additional Information (RAI) question is provided in the enclosure:

- RAI 7710, Question 02.04.12-4 Ditch Construction Characteristics

This information will be incorporated into a future submission of the North Anna Unit 3 COLA, as described in the enclosure.

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

Very truly yours,

Mark D. Mitchell

Mark D. Mitchell

Enclosure:

Response to NRC RAI Letter No. 148, RAI 7710 Question 02.04.12-4

Commitments made by this letter:

This information will be incorporated into a future submission of the North Anna Unit 3 COLA, as described in the enclosure.

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NRO

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. Mitchell, who is Vice President–Generation Construction of Virginia Electric and Power Company (Dominion Virginia Power). He has affirmed before me that he is duly authorized to execute and file the foregoing document on behalf of the Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 8TH day of JANUARY, 2014
My registration number is 253183 and my
Commission expires: SEPTEMBER 30, 2016

Kathy W. Prokopis
Notary Public

KATHY W. PROKOPIS NOTARY PUBLIC MY COMMISSION NUMBER 253183 COMMONWEALTH OF VIRGINIA

cc: U. S. Nuclear Regulatory Commission, Region II
P. H. Buckberg, NRC
T. S. Dozier, NRC
G. J. Kolcum, NRC
D. Paylor, VDEQ
W. T. Lough, SCC
P. W. Smith, DTE
M. K. Brandon, DTE
R. J. Bell, NEI

**ENCLOSURE**

**Response to NRC RAI Letter No. 148**

**RAI No. 7710, Question 02.04.012-4**

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**North Anna Unit 3**

**Dominion**

**Docket No. 52-017**

**RAI NO.: 7710 (RAI Letter 148)**

**SRP SECTION: 2.4.12 – DITCH CONSTRUCTION CHARACTERISTICS**

**DATE OF RAI ISSUE: 11/21/2014**

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**QUESTION NO.: 02.04.12-4**

Water level contours of observed pre-construction water levels (FSAR, Revision 7, Figures 2.4-212 through 2.4-214b) in portions of the reactor building complex (RBC) are shown to be above the DCD requirement on maximum groundwater level. Post-construction groundwater model simulations (ML14013A113, Enclosure 7) indicate that drainage ditches surrounding the RBC will maintain groundwater level elevations per DCD requirements in the area of the RBC by intercepting and draining off excess groundwater. Staff requests that a discussion be included in the FSAR describing the function of the drainage ditches in maintaining groundwater levels below the DCD requirement. This discussion should include drainage ditch design, construction methods, and materials, such as the information contained in Enclosure 7, page 33 of 93 and as shown for the Type II ditch detail on the Finished Grading Plan, Sheet 1, Drawing No. WG3-3-Y12-PLD-C0030.

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**Dominion Response:**

FSAR Section 2.4.12.4 will be revised to describe the function of the drainage ditches in maintaining groundwater levels below the DCD requirement. The FSAR revision will also address the design, construction methods, and materials used for the drainage ditches. Two sensitivity cases are also described. The sensitivity cases demonstrate that the maximum groundwater level meets the minimum depth to groundwater requirement.

**Proposed COLA Revision**

FSAR Section 2.4.12.4 will be revised as indicated in the attached markup.

# Markup of North Anna COLA

The attached markup represents Dominion's good faith effort to show how the COLA will be revised in a future COLA submittal in response to the subject RAI. However, the same COLA content may be impacted by revisions to the DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be somewhat different than as presented herein.

between December 2002 and November 2007 to provide data on groundwater flow direction, gradient, and seasonal groundwater level fluctuations at the site.

Prior to site earthwork activities, some observation wells will need to be abandoned. As discussed in Section 2.5.4.5.1, the design plant grade elevation for Unit 3 is 290 ft NAVD88 (290.86 ft NGVD29). To achieve this elevation, excavation will be required in the southern portion of the power block area while lower areas to the north will need to be filled. As a result, existing observation wells in these and other areas of the site will be abandoned prior to the start of earthwork activities. An evaluation of the existing observation well locations will be performed to determine which wells will be abandoned and if any new wells will be required to establish an adequate monitoring network for the evaluation of impacts on site groundwater levels during plant construction. Abandoned wells will be grouted in compliance with Virginia regulations.

Evaluation of the groundwater monitoring program will include a review of the frequency with which groundwater level measurements are made in the observation wells. Groundwater levels in all or selected wells will be measured on a monthly basis for the duration of any temporary dewatering activities, and on a quarterly basis thereafter for two years following the completion of construction. Groundwater levels will then be measured on a semi-annual or annual basis during plant operation.

### 2.4.12.4 Design Bases for Subsurface Hydrostatic Loading

The first paragraph of this SSAR section is supplemented as follows with information on the design plant grade elevation for Unit 3.

**NAPS COL 2.0-23-A**

This maximum groundwater level means that a permanent dewatering system is not needed for safe operation of Unit 3, based on the groundwater design bases for safety-related SSCs as described in DCD Section 3.4.1 and the comparison with the DCD site parameter value for maximum groundwater level as shown in Table 2.0-201.

The third paragraph of this SSAR section is supplemented as follows with information on the maximum groundwater level for hydrostatic loading purposes.

Construction of Unit 3 at a design plant grade elevation of 290 ft NAVD88 (290.86 ft NGVD29), 5.8 m (19 ft) higher than that of Units 1 and 2, will

result in the maximum groundwater level in this area being higher than that previously estimated in the SSAR. The pre-construction ground surface in the Unit 3 power block area ranges in elevation from about 318 ft NAVD88 (318.86 ft NGVD29) (B-919) to 272 ft NAVD88 (272.86 ft NGVD29) (B-928) and the piezometric head contour maps (Figure 2.4-207 through Figure 2.4-214b) indicate that groundwater level elevations in this area range from about 300 to 265 ft NAVD88 (300.86 to 265.86 ft NGVD29).

As discussed in Section 2.5.4.5.1, the Unit 3 design plant grade elevation will be achieved by excavation in the southern portion of the power block area and filling in lower areas to the north. A 3-horizontal to 1-vertical (3H:1V) slope will be cut into the existing natural ground surrounding the southern and eastern sides of the plant area.

Because earthwork and construction associated with Unit 3 will alter the existing groundwater levels within the power block area, a numerical groundwater flow model was constructed to evaluate these effects and determine maximum post-construction groundwater levels beneath the power block area. The groundwater model was developed using site-specific hydrogeologic and hydrologic data and the computer code Groundwater Vistas version 6.07 (Reference 2.4-209). The post-construction piezometric head contour map (Figure 2.4-216) indicates that maximum groundwater level elevations in the power block area range from about 270 to 284 ft NAVD88 (270.86 to 284.86 ft NGVD29). The maximum groundwater level elevation in the power block area around Seismic Category I structures is approximately 282.6 ft NAVD88 (283.46 ft NGVD29) or 7.4 ft below the design plant grade elevation of 290 ft NAVD88 (290.86 ft NGVD29), and occurs at the southern edge of the Fuel Building.

Post-construction simulation results indicate that the groundwater level elevations in the power block area are controlled by the drainage ditches, which are represented in the groundwater model as drain cells. The ditches are constructed with 3H:1V side slopes and varying bottom widths. Type I ditches (located east of the Circulating Cooling Water Tower and to the north of the Turbine Building) are seeded ditches and Type II ditches (those immediately surrounding the power block area) are constructed with a geotextile and an 18-inch layer of rip rap. The geotextile meets Virginia Department of Transportation (VDOT) requirements. The rip rap is: a) installed in a minimum of two layers; b) of

a density greater than 165 pounds per cubic foot; c) hard, durable, and angular in shape; d) resistant to weathering and water action; e) free from overburden, spoil, shale, and organic material. The drainage ditches do not include any features (e.g., concrete lining) that would impede the discharge of groundwater into the drainage ditches.

Because post-construction groundwater modeling simulation results indicate that the groundwater elevations in the power block area are influenced by the surrounding drainage ditches, two sensitivity cases were developed using a conductance value an order of magnitude lower and higher than that of the base case. Compared to the base case maximum groundwater level of 6 ft below plant grade, the simulation case with the lower conductance value increased the maximum groundwater level more than 3 ft (i.e., approximately 3 ft below plant grade); in the simulation case with higher conductance, however, the maximum groundwater level decreased by approximately 0.5 ft (i.e., 6.5 ft below plant grade). In both sensitivity cases, the maximum groundwater level meets the minimum depth to groundwater requirement of 2 ft below plant grade (Table 2.0-201).

~~This maximum groundwater level means that~~ Therefore, a permanent dewatering system is not needed for safe operation of Unit 3, based on the groundwater design bases for safety-related SSCs as described in DCD Section 3.4.1 and the comparison with the DCD site parameter value for maximum groundwater level as shown in Table 2.0-201.

## 2.4.13 Accidental Releases of Liquid Effluents to Ground and Surface Waters

**NAPS COL 2.0-24-A**

The information needed to address DCD COL Item 2.0-24-A is included in SSAR Section 2.4.13, which is incorporated by reference with the following supplements.

The purpose of this section is to provide a conservative analysis of a postulated, accidental release of radioactive liquid effluents to the environment at the Unit 3 site. The accident scenario is described. The model used to evaluate radionuclide transport is presented, along with potential pathways of contamination to water users. The radionuclide transport analysis is described, and the results are summarized. The radionuclide concentrations and associated doses to which a water user might be exposed are compared against the regulatory limits.