

July 15, 2008

Mr. Eugene S. Grecheck
Vice President - Nuclear Development
Dominion
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 017 (SRP
SECTIONS: 02.01.02, 02.03.01, 02.03.02, 02.03.05, 09.02.01, and 14.02)
RELATED TO THE NORTH ANNA UNIT 3 COMBINED LICENSE
APPLICATION

Dear Mr. Grecheck:

By letter dated November 26, 2007, Dominion Virginia Power (Dominion) submitted a combined license application for North Anna Unit 3 pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application.

The staff has identified that additional information is needed to continue portions of the review and the request for additional information (RAI) is contained in the enclosure to this letter. To support the review schedule, Dominion is requested to respond within 45 days of the date of this letter. If the RAI response involves changes to application documentation, Dominion is requested to include the associated revised documentation with the response.

Should you have questions, please contact me at (301) 415-0224 or Thomas.Kevern@nrc.gov.

Sincerely,

/RA/

Thomas A. Kevern, Senior Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-017

Enclosure:
Request for Additional Information

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RELATED TO THE NORTH ANNA UNIT 3 COMBINED LICENSE
APPLICATION

Dear Mr. Grecheck:

By letter dated November 26, 2007, Dominion Virginia Power (Dominion) submitted a combined license application for North Anna Unit 3 pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application.

The staff has identified that additional information is needed to continue portions of the review and the request for additional information (RAI) is contained in the enclosure to this letter. To support the review schedule, Dominion is requested to respond within 45 days of the date of this letter. If the RAI response involves changes to application documentation, Dominion is requested to include the associated revised documentation with the response.

Should you have questions, please contact me at (301) 415-0224 or Thomas.Kevern@nrc.gov.

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Docket No. 52-017

Enclosure: Request for Additional Information

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NRO-002

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DATE	06/13/2008	06/13/2008	07/07/2008		07/11/2008
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NAME	JTatum*	PWilson*	DGalvin*	RHolmes*	TKevern*
DATE	05/27/08	07/01/08	07/08/08	07/11/08	07/14/08
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DATE	06/23/08	06/25/08	06/30/08	07/11/08	07/15/08

*Approval captured electronically in the electronic RAI system.

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**Request for Additional Information
North Anna, Unit 3
Dominion
Docket Number 52-017**

SRP Sections: 02.01.02 - Exclusion Area Authority and Control; 02.03.01 - Regional Climatology; 02.03.02 - Local Meteorology; 02.03.05 - Long-Term Atmospheric Dispersion Estimates for Routine Releases; 09.02.01 - Station Service Water System; SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants
Application: FSAR Sections 2.1.2, 2.3.1, 2.3.2.3, 2.3.5, 9.2.1, 14.2.9.1

QUESTIONS

02.01.02-1

The North Anna Early Site Permit identifies COL Item 2.1-2 "A COL or CP applicant should arrange with the appropriate local, State, Federal, or other public agencies to provide for control of the portions of Lake Anna and the waste heat treatment facility (WHTF) that are within the exclusion area. Staff review of FSAR Section 2.1.2, Exclusion Area Authority and Control, indicates the supplemental information provided in this Section does not address the arrangements at the WHTF. Please address the arrangements for control of the WHTF area.

02.03.01-1

ESBWR DCD COL Item 2.0-7-A states, in part, that the COL applicant is to determine the basic speed of extreme wind for use in the design of nonsafety-related structures that are not included as part of the ESBWR standard plant design. FSAR Section 2.3.1, Regional Climatology, NAPS COL 2.0-7-A, states that the information to address the DCD COL Item 2.0-7-A is included in SSAR Section 2.3.1. However, staff review identified that SSAR Section 2.3.1 does not provide the basis for this wind speed value. Please revise FSAR Section 2.3.1 to provide the basis for the FSAR Table 2.0-2R wind speed value of 90 mi/hr which is to be used in the design of nonsafety-related structures that are not included as part of the ESBWR standard plant design.

02.03.01-2

10 CFR 52.79(a)(1)(iii) states in part that COL applications must identify the meteorological characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. In order to be compliant with 10 CFR 52.79(a)(1)(iii), please provide the following information: 1) the highest of either the 100-year return period or historic maximum dry-bulb temperature, coincident wet bulb temperature, and non-coincident wet bulb temperature values should be compared to the corresponding ESBWR 0% exceedance maximum ambient design temperature site parameters shown on FSAR Table 2.0-201 (FSAR page 2-20); and 2) the lowest of either the 100-year return period or historic minimum dry-bulb temperatures should be compared to the ESBWR 0% exceedance minimum values ambient design temperature site parameter shown on FSAR Table 2.0-201 (FSAR page 2-21). Use of the 100-year return period temperatures are intended to cover

situations where the historical data used to characterize a site may not extend over a significant time interval to capture cyclical events.

02.03.01-3

In FSAR Table 2.0-201, please clarify whether the "7.8 °C (18 °F)" value listed as the Unit 3 minimum ambient design temperature 2% exceedance value (FSAR page 2-17) and 1% exceedance value (FSAR page 2-19) be corrected to read "-7.8 °C (18 °F)."

02.03.02-2

FSAR Section 2.3.2.3, Potential Influence of the Plant and the Facilities on Local Meteorology, includes discussion of salt deposition. Please explain why the service water cooling tower produces higher salt deposition rates than the CIRC hybrid cooling tower even though the CIRC hybrid cooling tower is modeled with a higher drift rate.

02.03.05-1

FSAR Table 2.3-17R presents maximum predicted annual average X/Q and D/Q values for the ESE sector for various distances out to 50 miles. Please revise the FSAR to explain why the X/Q and D/Q values presented in FSAR Table 2.3-17R differ from the X/Q and D/Q values presented in SSAR Table 2.3-17. Please also consider adding this qualifier to other FSAR and ER tables presenting X/Q and D/Q values used in routine release dose calculations.

09.02.01-1

Tier 1 of the ESBWR DCD, Section 4.1, specifies as a COL interface requirement that the plant-specific PSWS be capable of removing 2.02x10⁷ MJ (1.92x10¹⁰ BTU) over a period of seven days without active makeup. The proposed plant-specific ITAAC (Part 10: ITAAC, Table 2.4.2-1) specifies a cooling tower basin water inventory requirement as a way of demonstrating that the heat removal capability specified by the DCD has been satisfied. While water inventory is an important factor that must be addressed by the ITAAC, it does not demonstrate that the cooling towers are capable of dissipating the specified heat load. The capability of cooling towers to dissipate heat is dependent upon a number of other factors that should be taken into consideration, such as cooling tower design attributes; the capability to satisfy the PSWS pump minimum net positive suction head (NPSH) requirements for the most limiting cooling tower basin water level, temperature, and flow conditions; the maximum allowed PSWS water supply temperature; and the most limiting meteorological assumptions that pertain to the site for determining: (a) heat dissipation capability, and (b) water inventory requirements. Transient analyses that take these factors into consideration (including margin for expected degradation and operating flexibility) and confirmatory testing are usually necessary in order to adequately demonstrate that cooling tower performance satisfies the specified heat removal requirement. Also, the basis and justification for using the combined cooling tower basin inventory for Trains A and B were not explained and justified. Please revise the proposed ITAAC to include consideration of these factors such that the specified cooling tower performance capability is adequately demonstrated for both defense-in-depth and RTNSS functions, and revise the FSAR accordingly to fully describe the plant licensing basis in this regard.

09.02.01-2

In response to COL Item 9.2.1-1-A, "Material Selection," the applicant proposes to use fiberglass reinforced polyester pipe (FRPP) in locations where the plant service water system (PSWS) piping is buried to preclude long-term corrosion. The review criteria specified by the SRP 3.6.1 relative to pipe failure is based on the use of metal pipe. In order to assure that the use of nonmetallic pipe will not adversely impact safety-related SSCs or those that are subject to the RTNSS long-term safety criteria, the following additional information needs to be reflected in the applicable sections of the FSAR and plant-specific ITAAC as appropriate: a) the criteria and limitations for using FRPP; b) an evaluation of the impact of using FRPP on SWS reliability and availability assumptions, especially during seismic events; and c) a revised evaluation of the consequences (including flooding effects) of pipe failure during seismic events. Please note that, unless otherwise justified, the evaluation should assume the failure of all FRPP in addition to the failures that are postulated for metallic pipe and the other considerations that are specified by the SRP.

09.02.01-3

COL Item 9.2.1-1-A, "Material Selection," indicates that the applicant is to specify plant-specific plant service water system (PSWS) material selections based on water quality analysis in order to preclude long-term corrosion and fouling. The response to this COL item (NAPS COL 9.2.1-1-A) only addressed material selection for buried piping but did not provide material specifications for any other parts of the PSWS, including those for the cooling towers and related components. Please provide additional information to specify and explain the material selections that pertain to the remainder of the PSWS.

09.02.01-4

Tier 2 of the ESBWR DCD, Section 9.2.1.6, "COL Information," specifies in part that the COL applicant needs to establish provisions to preclude long-term corrosion and fouling based on site water quality analysis. The FSAR does not explain what specific vulnerabilities are considered to be pertinent based upon operational experience that applies and why chemical treatment alone is sufficient for addressing these vulnerabilities. Chemical treatment is a common practice and suitable for addressing service water system corrosion and fouling problems to some extent, but it is usually implemented as part of a more comprehensive program (or collection of programs) to address service water system vulnerabilities. For example, considerations for precluding long-term corrosion and fouling of service water systems typically include: (i) establishing a program of surveillance and control techniques (such as chemical treatment) to prevent flow blockage problems due to biofouling; (ii) establishing a routine inspection and maintenance program to assure that corrosion, erosion, protective coating failure, silting, biofouling and others that are applicable cannot degrade defense-in-depth and RTNSS cooling functions that are credited; and (iii) establishing a test program to verify (initially and periodically) the heat transfer capability of heat exchangers that are important to safety has not degraded over time. Please provide additional information in FSAR Section 9.2.1.2, System Description, to describe: a) the corrosion and fouling mechanisms and vulnerabilities that are anticipated based on industry operating experience and the plant-specific location, and b) programmatic controls that will be implemented to address these considerations and to assure that PSWS performance (including cooling towers) will not degrade over time.

09.02.01-5

Tier 2 of the ESBWR DCD, Section 9.2.1.2, indicates that the heat rejection facilities are dependent upon actual site conditions and provides CDI for the standard plant design. FSAR Section 9.2.1.2 replaces the CDI with plant-specific information, but does not indicate what part is plant-specific information and what is standard design information. In order to avoid possible confusion relative to the North Anna 3 design basis and the change process that applies, please indicate what part of the information in the FSAR is NAPS-CDI (such as with double brackets).

09.02.01-6

Tier 2 of the ESBWR DCD, Section 9.2.1.2, indicates that the heat rejection facilities are dependent upon actual site conditions and provides conceptual design information (CDI) for the standard plant design. FSAR Section 9.2.1.2 replaced the CDI with plant-specific information (NAPS CDI), indicating that the heat rejection facility for North Anna 3 consists of mechanical draft plume abated cooling towers. In order for the NRC to determine if the cooling towers are capable of performing their defense-in-depth and RTNSS functions, please provide amplifying information to include cooling tower design attributes that are credited (such as minimum number of fans needed); the minimum net positive suction head (NPSH) requirement for the PSWS pumps and available margin based on the most limiting cooling tower basin water level, temperature, and flow conditions; the maximum allowed PSWS water supply temperature; and the most limiting meteorological assumptions that pertain to the site for determining: (a) heat dissipation capability, and (b) water inventory requirements. In addition, please describe plant-specific vulnerabilities and degradation mechanisms that are anticipated based on operational experience and site location, potential impacts of postulated cooling tower failures and other interactions on safety-related SSCs, and how these considerations are addressed. In addition please describe programmatic controls being implemented to assure that the functional capability of the cooling towers will be maintained over the life of the plant.

09.02.01-7

Although the initial plant test program specified by Tier 2 of the ESBWR DCD for plant service water system (PSWS) is incorporated by reference, the test program does not verify that performance of the CDI portions of PSWS (including alternate heat sink) satisfies design specifications for the various modes of operation. Please provide additional information to describe how the design capability of the PSWS will be verified by the initial plant test program.

14.02-5

FSAR Section 14.2.9.1.3 describes the preoperational test for personnel monitors and radiation survey instruments. Please provide amplifying information as follows:

- (a) Describe the general types of personnel monitors and radiation survey instruments that are covered by this test.
- (b) Under the heading "Prerequisites", the text states that "High radiation alarm setpoints have been properly established based on sensor location, background radiation level, expected radiation level and low occupational dose prior to the test." Explain how the

specification “low occupational dose” is used as an input in establishing radiation alarm setpoints for the personnel monitors and radiation survey instruments covered by this preoperational test.

14.02-6

In FSAR Section 14.2.9.1, Site-specific Pre-Operational Tests, STD SUP 14.2-1 addresses pre-operational tests applicable to FSAR 14.2.9.1.3, Personnel Monitors and Radiation Survey Instruments Preoperational test. The staff notes that RG 1.68 (Appendix A, Section 1.k (Preoperational Testing-Radiation Protection Systems)) includes “laboratory equipment used to analyze or measure radiation levels and radioactivity concentrations” as one of the system types that should receive pre-operational testing to demonstrate proper operation. Please include a site-specific pre-operational test for laboratory equipment in FSAR Section 14.2.9.1 or justify the absence of such testing.