May 6, 2009

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. 036 (SRP SECTIONS: 9.2.1, 9.5.4, AND 13.3) 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 90 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

May 6, 2009

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Vice President - Nuclear Development
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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.

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Enclosure: Request for Additional Information

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OFFICE	TR: SBPB	BC: SBPB	PM:DNRL:NGE1	OGC (NLO)	PM:DNRL:NGE1
NAME	RRadlinski*	SBloom*	MEudy*	SBrock-Kirkwood*	TKevern*
DATE	03/25/09	03/25/09	03/31/09	04/06/09	05/06/09
OFFICE	TR: SBPB	BC: SBPB	PM:DNRL:NGE1	OGC (NLO)	PM:DNRL:NGE1
NAME	LWheeler*	JSegala*	TKevern*	SBrock-Kirkwood*	TKevern*
DATE	04/24/09	04/24/09	05/01/09	05/05/09	05/06/09

*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: 09.02.01 - Station Service Water System; 09.05.04 - Emergency Diesel Engine Fuel Oil Storage and Transfer System; 13.03 - Emergency Planning
Application: FSAR Sections: 9.2.1; 9.5.4; 13.3

QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB)

09.02.01-8

Reference RAI 9.2.1-01 (ID 363/1172) and Dominion response dated August 28, 2008.
Tier 1 of the DCD, Section 4.1, specifies as a COL interface requirement that the plant-specific plant service water system (PSWS) be capable of removing 2.02×10^7 MJ (1.92×10^{10} BTU) over a period of seven days without active makeup. The proposed North Anna 3 COL Inspections, Tests, Analysis and Acceptance Criteria (ITAAC) as described in Part 10, Tier 1/ITAAC Table 2.4.2-1, "ITAAC for Plant Service Water Reserve Storage Capacity," specifies a cooling tower basin water inventory of 2.6 million gallons requirement as a way of demonstrating that the heat removal capability specified by the DCD has been satisfied. The staff determined that water inventory alone does not demonstrate that the cooling towers are capable of dissipating the specified heat load.

Please describe in the NAPS application in Part 10, Tier 1/ITAAC Table 2.4.2-1 additional acceptance criteria, such as a report exists that confirms BTU capability of the PSWS in removing 2.02×10^7 MJ (1.92×10^{10} BTU) over a period of seven days without active makeup or provide similar ITAAC that will demonstrate the interface requirement has been satisfied.

09.02.01-9

Reference RAI 9.2.1-03 (ID 363/1174) and Dominion response dated August 28, 2008.
COL Item 9.2.1-1-A, "Material Selection," indicates that the applicant needs to specify plant-specific PSWS material selection based on water quality analysis in order to preclude long-term corrosion and fouling. The response to this COL Item (NAPS COL 9.2.1-1A) only addressed material selection based on PSWS water treatment regime.

Please describe in the FSAR Section 9.2.1 the specific composition or properties of those materials to be used in the PSWS.

09.02.01-10

Reference RAI 9.2.1-04 (ID 363/1176) and Dominion response dated August 28, 2008.
Tier 2 of the 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. Dominion's response indicated that a Maintenance Rule program is the vehicle that the applicant will be utilizing for monitoring and trending of the PSWS operating parameters along with treatment of the PSWS through a water chemistry program.

Please clarify the response by providing the following:

- Description in the FSAR or drawings which indicate the design of the chemical control system, chemical addition system, or water treatment system for the PSWS

- Explanation of how the PSWS (including AHS cooling towers) will be treated in accordance with 10 CFR 50.65, “Maintenance Rule,” Regulatory Guide 1.160, “Monitoring the Effectiveness of Maintenance at Nuclear Plant Plants,” and NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plant.” Describe if the PSWS will be treated as high-safety-significant (HSS).

09.02.01-11

Reference RAI 9.2.1-05 (ID 363/1177) and Dominion response dated August 28, 2008.
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 replaces the CDI but does not clearly differentiate between plant-specific and standard plant design information.

Please revise the FSAR Section 9.2.1.2 to clearly identify the plant-specific information that addresses the CDI identified in the ESBWR DCD.

09.02.01-12

Reference RAI 9.2.1-07 (ID 363/1179) and Dominion response dated August 28, 2008.
Although the initial plant test program specified by Tier 2 of the DCD for PSWS is incorporated by reference, the test program does not verify that performance of the PSWS (including auxiliary heat sink (AHS)) satisfies design specifications for the various modes of operation. DCD Section 14.2.8.1.51, “Plant Service Water System Preoperational Test,” does not specifically test the AHS (a plant-specific design feature addressing the conceptual design information in the ESBWR DCD) and only references construction of the cooling towers to be completed. DCD Section 14.2.8.2.18, “Plant Service Water System Performance Test,” states that heat exchanger performance is monitored and tested. FSAR Section 14.2 does not specifically address testing the AHS.

Please provide additional information to describe how the design capability of the plant-specific AHS will be verified by the initial plant test program. In addition, design features which minimize an AHS/PSWS water hammer event need to be tested to verify that a water hammer event does not occur when the PSWS pump starts.

09.02.01-13

The plant service water system (PSWS) design bases as described in Design Control Document (DCD) Tier 2, Section 9.2.1, “Plant Service Water System,” indicates that performance of regulatory treatment of non-safety systems (RTNSS) functions is assured by applying the defense-in-depth (DID) principles of redundancy and physical separation to ensure adequate reliability and availability as discussed in DCD Tier 2 Appendix 19A, “Regulatory Treatment of Non-Safety Systems,” Section 19A.8.3, “Augmented Design Standards.” Tier 2 of

the DCD, Table 3.2-1, “Classification Summary,” (revised by the RAI 3.2-6 S02 response) defines the PSWS P41, as safety class non-safety, quality group D, and Quality Class S/N with a seismic category of NS. Quality Class “S” indicates that special quality assurance requirements are applied and “N” indicates the standard nonsafety-related quality assurance requirements are applied. DCD Table 3.2-3, “Quality Group Designation – Codes and Industry Standard,” American Society of Mechanical Engineers (ASME) B31.1, “Power Piping” will be the code utilized for quality group D for piping and valves.

ESBWR DCD COL Item 9.2.1-1-A, “Material Selection,” states that “the COL Applicant will determine material selection and provide provisions to preclude long term corrosion and fouling of the PSWS based on site water quality analysis (Subsection 9.2.1.2).” To address this COL item, FSAR Section 9.2.1.2, “System Description,” states that fiberglass reinforced polyester (FRP) pipe is to be used for buried plant service water system piping to preclude long-term corrosion.

The information submitted is insufficient for staff to determine the acceptability of FRP for this application. For example, special treatment for RTNSS SSCs is not well defined in the application. If the applicant has performed an engineering evaluation to justify the use of FRP in this application, technical information in that engineering evaluation should be submitted to the staff for review.

With respect to the selection of non-metallic material for the PSWS, describe the special treatment quality assurance provisions applicable to supplemental quality class S/N for the FRP used in PSWS for RTNSS systems. This special treatment should include the following considerations;

a.) Describe how operating experiences (OE), where as buried fiberglass materials have been utilized in a similar application such as water service with similar piping size, pressure and temperatures, will be addressed in the selection of the buried fiberglass materials.

b.) Describe if ASME B31,1 “Nonmandatory Appendix III, Rules for Nonmetallic Piping and Piping Lines with Nonmetals,” will be utilized for the fiberglass design and installation. In addition, describe any material standard/classification, for example American Society for Testing and Materials or American Water Works Association that better defines the piping and fitting standards to be utilized.

c.) Since PSWS has special quality assurance requirement in the RTNSS environment, provide details of the buried fiberglass application including:

- piping size, wall thickness, and piping lengths
- design and operating pressures and temperatures
- location with respect to high traffic areas and if it will be necessary to sleeve the fiberglass for protection
- fiberglass to carbon steel interface and location of interface
- material handling and storage, installation, qualification and testing programs for the piping and fittings related to installation personnel
- inservice inspection and accessibility
- details of initial cyclic pressure testing plus hold times
- information to support FRP seismic design acceptability as seismic category NS for RTNSS piping applications

09.05.04-7

In RAI 09.05.04-2, the staff asked the applicant to verify that enough fuel oil inventory is available to operate the DGs at continuous maximum rating for seven days. In the response dated August 4, 2008, the applicant provided an FSAR markup stating that procedures ensure sufficient diesel fuel oil inventory is available onsite so that the standby DGs and ancillary DGs can operate continually for seven days with each operating at its calculated design load, with appropriate margins. The staff finds that the term “appropriate margins” is too ambiguous a term for use in the FSAR. The staff requests for the applicant to specify that the margins are in accordance with ANS 59.51-1997, “Fuel Oil Systems for Safety-Related Emergency Diesel Generators.”

09.05.04-8

In RAI 09.05.04-6, the staff asked the applicant to clarify the corrosion protection methods for the internal and external surfaces of buried DG fuel oil piping and identify the applicable industry standards. The corrosion control methods and industry standards described in the response to this RAI as applied to the buried piping are appropriate and acceptable to the staff. However, the staff considers the response to RAI 09.05.04-06 incomplete until the industry standards referenced in the response are identified in the NAPS FSAR. The staff requests that the applicant revise the NAPS FSAR to include the referenced industry standards.

QUESTIONS for NSIR/DPR/NRLB

13.03-4

In Revision 0 of the COL application, the applicant described in Part 5 Section II.H, “Emergency Facilities and Equipment,” the display capabilities of the technical data systems in the TSC and EOF as including the capability of displaying parameters that are required of the Safety Parameter Display System (SPDS); and that the SPDS function is described in Subsection 18.4.2.11 of the ESBWR DCD. In Revision 1 of the COL application, the applicant changed the “SPDS function” reference to the “HSI function,” without providing the basis for the change and a description of the HSI function.

Please discuss and clarify the change to "HSI function." Identify and revise all COL application parts/sections that are affected by the replacement of "SPDS function" with "HSI function."

13.03-5

In response to RAI 13.03-2.12, the applicant stated that the existing Local Emergency Operations Facility (LEOF) and Central Emergency Operations Facility (CEOF) to support North Anna Units 1 and 2, will not support Unit 3. The applicant further stated the following: "In Unit 3 emergency plan, Section II.H.2, the exception to the guidance in NUREG-0696 is for the proposed EOF at Dominion’s Innsbrook Technical Center in Glen Allen, Virginia. A formal request for the exception will be submitted to the NRC to enable construction prior to and demonstration during the full participation exercise."

The introduction of a new EOF facility – to be located approximately 30 miles from Unit 3 – precludes a full evaluation and finding by the staff as to its adequacy, in support of Unit 3, because the applicant has not followed the appropriate process for such a request. The applicant indicates (1) it is requesting (in the COL application) NRC approval of the proposed location for the EOF, and (2) it will be submitting a formal request for an exception to the NRC to enable construction of the EOF. The applicant's intended path for NRC approval of the new EOF is unclear, in relation to the applicable regulatory bases in support of NRC's reasonable assurance determination associated with emergency planning, and issuance of a combined license for Unit 3. The applicant's self-identified need to submit a formal exception request is undefined, in relation to the regulatory basis, as well as the proper form and content of such a request. In addition, the application does not fully address the generic ITAAC that would be required for a new EOF, which is provided in ITAAC 8.2 of Table C.11.2-B1 in Regulatory Guide 1.206.

The applicant is requested to clarify, and submit appropriate documentation in support of the EOF for Unit 3, consistent with NUREG-0696 and Sections 13.3 and 14.3.10 of NUREG-0800.

<u>13.03-6</u>

In RAI 14.03.10-1.4.d, the staff requested the applicant, in part, to explain why COL application Part 10 Table 2.3-1, "ITAAC For Emergency Planning," does not identify (in the acceptance criteria associated with ITAAC 8.1) exercise objectives and associated acceptance criteria, as called for in RG 1.206, Appendix B, Table C.II.1-B1, "Emergency Planning – Generic Inspections, Test, Analysis, and Acceptance Criteria (EP-ITAAC)." In its response to RAI 14.03.10-1.4.d, the applicant stated the following: "In order to ensure that future exercise objectives are sufficient for a comprehensive test of the COL Emergency Plan, Acceptance Criterion 8.1.1.2 includes a list of EP Program Elements that must be tested, including developing exercise objectives and specific acceptance criteria. Additionally, other Acceptance Criteria provide details directly related to specific objectives that must be met. Acceptance Criteria 2.1.1 and 2.2 address specific notification methods and procedures, Acceptance Criteria 3.1.1, 3.1.2, 3.1.3, 3.1.4, and 3.2 address specific emergency communication objectives, and Acceptance Criterion 6.1 speaks directly to accident assessment and classification and radiological assessment and control."

The staff considered the other acceptance criteria that the applicant cited as directly related to specific (exercise) objectives that must be met, and determined that this listing does not comprise all onsite exercise objective and associated acceptance criteria that would be required for a full-participation exercise. Acceptance criteria 8.1.1.2 identifies what the applicant refers to as eight (EP) Program Elements, and states that exercise objective and specific acceptance criteria addressed each of the Program Elements. In addition, acceptance criteria 2.1.1, 2.2, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2, and 6.1 – which relate to notification, communications, accident assessment and classification, and radiological assessment and control – do not directly address three of the eight listed Program Elements. Further, there is no acceptance criteria for ITAAC 2.3, and the "NOTE" provided states that the EP Program Element is addressed by acceptance criteria 8.1.1.2. The staff does not agree that ITAAC 2.3 is addressed by acceptance criteria 8.1.1.2.

Even though the applicant listed other acceptance criteria that may relate to specific exercise objectives, the list is unacceptable because it does not provide a sufficiently complete identification of onsite exercise objectives and associate acceptance criteria, consistent with

generic acceptance criterion 14.1.1 of Table C.II.1-B1 in Appendix B to RG 1.206 (at C.II.1-B-12). Specifically, the bracketed statement in acceptance criterion 14.1.1 states – in regard to onsite exercise objectives only – that "[t]he COL applicant will identify exercise objectives and associated acceptance criteria." The purpose of the bracketed statement in acceptance criterion 14.1.1 is to give COL applicants maximum flexibility when crafting the ITAAC. Such flexibility is intended to allow an applicant to determine what onsite exercise objectives and acceptance criteria (i.e., scope and detail) are appropriate for their specific circumstance.

The applicant is requested to identify specific onsite exercise objectives and associated acceptance criteria for an exercise (in the form of ITAAC) that are specific in regard to exercise objectives and associated acceptance criteria for Unit 3; and, provide an acceptance criterion for ITAAC 2.3, consistent with acceptance criterion 5.3 of Table C.II.1-B1 to RG 1.206 (at C.II.1-B-4).

13.03-7

In RAI 14.03.10-1.4.a, the staff asked the applicant to explain why Table 2.3-1 does not include an acceptance criterion to reflect the offsite exercise objectives associated with a full or partial participation exercise, and how this is consistent with the intent of generic ITAAC acceptance criterion 14.1.3 of Table C.II.1, "Emergency Planning – Generic Inspection, Test, Analysis, and Acceptance Criteria (EP ITAAC)," in Regulatory Guide (RG) 1.206 (Appendix B). The applicant's response indicated that ITAAC acceptance criterion 14.1.3 of Table C.II.1 is not needed since (1) acceptance criterion 8.1.1.2 in Table 2.3-1 is inclusive because it does not specify onsite or offsite, (2) offsite exercise objectives must be met or deficiencies addressed prior to operation above 5 percent power, and (3) FEMA's findings will be the determining factor for the NRC to authorize fuel loading and operation above 5 percent power – referencing 10 CFR 50.54(gg).

The applicant neither provided an appropriate acceptance criterion in Table 2.3-1 that reflects generic ITAAC 14.1.3, nor adequately explained why it is not required. The referenced acceptance criterion 8.1.1.2, which addresses ITAAC acceptance criterion 14.1.1 of Table C.II.1, is associated with onsite exercise objectives and deficiencies, and not offsite exercise objectives and deficiencies. In addition, the statements that offsite exercise objectives must be met or deficiencies addressed prior to operation above 5 percent power, and that the FEMA findings will be the determining factor for the NRC to authorize fuel loading and operation above 5 percent power, merely restate what's in ITAAC acceptance criterion 14.1.3 and 10 CFR 50.54(gg). Finally, the applicant's reference to 10 CFR 50.54(gg) does not include an explanation regarding its relationship to generic ITAAC acceptance criterion 14.1.3.

The applicant is requested to clarify how the COL application has fully addressed the requirements associated in acceptance criterion 14.1.3, such that generic ITAAC acceptance criterion 14.1.3 is not required in COL application Table 2.3-1, or to provide an ITAAC consistent with acceptance criterion 14.1.3.

13.03-8

Part 5, Emergency Plan, Section II.H.9, “Operational Support Center”, addresses the Operational Support Center (OSC) but does not identify the specific location of the OSC. The applicant is requested to clearly describe the planned location of the primary OSC, in support of Unit 3, and alternate OSC, if applicable.