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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Commission

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OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

In the Matter of	)	
	)	
DOMINION NUCLEAR NORTH ANNA, LLC	)	Docket No. 52-008
	)	
(Early Site Permit for North Anna ESP Site)	)	ASLBP No. 04-822-02-ESP

**DOMINION'S BRIEF IN RESPONSE TO CLI-07-23**

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**DOMINION'S BRIEF IN RESPONSE TO CLI-07-23**

Dominion Nuclear North Anna, LLC ("Dominion") hereby submits this brief in response to the Order, CLI-07-23, of the U.S. Nuclear Regulatory Commission ("NRC" or "Commission") in the North Anna early site permit proceeding. The Commission's Order invited briefs on three specific questions posed in Initial Decision, LBP-07-09, of the Atomic Safety and Licensing Board's ("Board") approving Dominion's application for an Early Site Permit ("ESP"):

- (i) Did the Staff's environmental justice analysis in the FEIS follow the "greater detail" guidance set forth in the Commission's Environmental Justice Policy Statement?
- (ii) How do the NRC's multiple radiation protection standards (and the ALARA concept) apply to new reactors that are proposed to be added at a site with pre-existing nuclear reactors and radiological effluents?
- (iii) How should the Commission apply its statement prohibiting partial ESPs and ESPs where adequate information is not available to a situation where significant elements of the plant parameter envelope for the ESP are missing and numerous siting issues are unresolved due to lack of information?

CLI-07-23, slip op. at 1-2.

The Commission's Order also solicits views on: "the issues of alternative sites and alternative design features raised in Judge Karlin's dissent, the suggestions in LBP-07-09 regarding perceived deficiencies in the NRC Staff's and Dominion's evidence and arguments, and any other issues that, in the parties' view, warrant comment." Id.

As discussed below, the sufficiency of Dominion's Application and of the NRC Staff's review is demonstrated by substantial evidence supporting issuance of the ESP. As the majority of the Board correctly determined, the evaluation of alternatives fully complied with the National Environmental Policy Act ("NEPA"). Accordingly, the majority opinion should be affirmed and the ESP issued.

As requested by the Commission, this brief addresses the three questions raised by the Board, and the consideration of alternatives raised by the dissent. Dominion does not believe that it is necessary to brief any other issues, but refers the Commission to Dominion's Proposed Findings of Fact and Conclusions of Law (May 11, 2007) ("Dominion's Proposed Findings") if the Commission has questions about other portions of the record.<sup>1</sup>

## **STATEMENT OF THE CASE**

### **A. Dominion's Early Site Permit Application**

This proceeding involves Dominion's Application, submitted in September 2003, seeking an early site permit for a location in central Virginia identified as the North Anna ESP Site (the "ESP Site"). The ESP Site is a parcel of land on the North Anna Power Station ("NAPS") in Louisa County, Virginia, approximately 40 miles north-northwest of Richmond. NAPS Units 1 and 2 and an independent spent fuel storage installation ("ISFSI") are already located on the NAPS site. The ESP Site would be adjacent to, and generally west of the existing units.

An ESP proceeding is not intended to resolve design issues or approve the construction or operation of new facilities. Rather, design parameters are postulated by the applicant, and the

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<sup>1</sup> For example, the Licensing Board's Summary of Key Evidence contains various statements concerning Surface Water Impacts (LBP-07-09 at 22-28); groundwater, isotope transportation and tritium (*id.* at 28-47); and seismic safety (*id.* at 62-67). The evidence and Dominion's positions on these issues are set out in Dominion's Proposed Findings ¶¶ 31-34, 60-76, 185-90 (groundwater, isotope transport and tritium); ¶¶ 77-104 (seismic safety); and ¶¶ 159-184 (surface water impacts).

ESP proceeding then determines whether the site is suitable for one or more reactors falling within the bounds of those postulated characteristics.<sup>2</sup> This approach is reflected in the NRR Review Standard RS-002, “Processing Applications for Early Site Permits” (May 3, 2004), which the NRC Staff issued with the Commission’s approval.<sup>3</sup>

Similarly, under the 10 C.F.R. Part 52, Subpart A rules, an ESP applicant must submit an environmental report “focus[ing] on the environmental effects of construction and operation of a reactor, or reactors, which have characteristics that fall within the postulated site parameters. . . .” 10 C.F.R. § 52.17(a)(2). As discussed in RS-002, the PPE approach can serve as the foundation for the environmental report. Staff Exh. 14 (RS-002), Att. 3 at 1. In such cases, detailed design information called for by the Environmental Standard Review Plan (“ESRP”)<sup>4</sup> need not be submitted. *Id.* at 2. If PPE values are used as a surrogate for design-specific values, the ESP applicant need not provide a one-to-one replacement of the design specific values, but should provide sufficient information for the NRC Staff to develop a reasonable independent assessment of potential impacts to specific environmental resources. *Id.*

## **B. NRC Staff’s Review**

Upon receipt of Dominion’s Application, the NRC Staff conducted an initial sufficiency review of the Application, and after finding Dominion’s Application sufficiently complete,

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<sup>2</sup> The Part 52 regulations formalized an early site approval process that had been in partial use for a number of years before the regulations were adopted. 53 Fed. Reg. 32,060, 32,062 (Aug. 23, 1988). In establishing early site review procedures in the mid-1970’s, the Commission explained:

[T]he conduct of an early review of one or more site suitability issues will require a “decoupling” of site suitability issues from issues concerning the detailed facility design. However, some information about the nature of the proposed facility will clearly be required for the conduct of the review. Accordingly, some facility design parameters (or reasonable range of facility design parameters) must be postulated for purposes of review.

41 Fed. Reg. 16,835 (Apr. 22, 1976).

<sup>3</sup> See Memorandum from Annette L. Vietti-Cook to William D. Travers, “Staff Requirements - SECY-03-0227 – Review Standard RS-002, ‘Processing Applications for Early Site Permits’” (Mar. 15, 2004).

<sup>4</sup> “Standard Review Plans for Environmental Reviews for Nuclear Power Plants,” NUREG-1555 (Oct. 1999) (“NUREG-1555”).



accepted the Application for docketing and review. 68 Fed. Reg. 61,705 (Oct. 29, 2003). The NRC Staff then performed both a comprehensive, three-year safety review and an environmental review.

The NRC Staff's safety review is documented in an over 400-page-page Safety Evaluation Report ("SER") – NUREG-1835, "Safety Evaluation Report for an Early Site Permit (ESP) at the North Anna ESP Site" (Sept. 2005) ("SER") (admitted into evidence as Staff Exh. 1), and an approximately 100-page SER, Supplement 1 ("SER Supp.") (Nov. 2006) (admitted into evidence as Staff Exh. 2). The SER Supplement evaluates the changes in the proposed cooling system and power level that were made in Revision 6 of Dominion's Application. As stated therein:

On the basis of its evaluation and independent analyses as discussed in this supplement and NRC technical report NUREG-1835, "Safety Evaluation Report for an Early Site Permit (ESP) at the North Anna ESP Site," the staff concludes that the North Anna ESP site characteristics comply with the requirements of 10 CFR Part 100, "Reactor Site Criteria," with the limitations and conditions proposed by the staff in this supplement and NRC technical report NUREG-1835 for inclusion in any ESP that might be issued. Further, for the reasons set forth in this supplement and NRC technical report NUREG-1835, the staff concludes that, taking into consideration the site criteria contained in 10 CFR Part 100, a reactor, or reactors, having characteristics that fall within the parameters for the site, and which meets the terms and conditions proposed by the staff in this supplement and NRC technical report NUREG-1835, can be constructed and operated without undue risk to the health and safety of the public. For the same reasons, the staff also concludes that issuance of the requested ESP will not be inimical to the common defense and security or to the health and safety of the public.

SER Supp. at 19-1.

Dominion's Application and NRC Staff's SER were reviewed by the Advisory Committee on Reactor Safeguards ("ACRS"). The ACRS Report, which is provided as Appendix E to the SER, states, "[t]he staff has prepared a high-quality, detailed, yet readable, safety evaluation report on the Dominion application." SER, App. E at E-3. The ACRS concurs with the NRC Staff's conclusions (id. at E-4) and states:

The proposed site, subject to the permit conditions recommended by the NRC staff, can be used for up to two nuclear power units each of up to 4300 MW<sub>th</sub> without undue risk to the public health and safety.

Id. at E-1.<sup>5</sup>

The NRC Staff's environmental review began with a scoping process, which included public meetings and opportunities for the public to submit comments on the scope of environmental review. Staff Exh. 16 (Cushing Test.) at 3. The results of this scoping process were documented in a June 24, 2004 report. See Dom. Exh. 10 (Dom. Env. Test.) at 9. See also NUREG-1811, Environmental Impact Statement for an Early Site Permit (ESP) at the North Anna Site, Final Report (Dec. 2006) ("FEIS"), App. D (admitted into evidence as Staff Exh. 3). The NRC Staff then prepared a draft environmental impact statement and solicited comments from other agencies and the public. Staff Exh. 16 (Cushing Test.) at 3; Dom. Exh. 10 (Dom. Env. Test.) at 9. After Dominion revised its proposed cooling system for a third unit, the NRC Staff prepared a supplemental draft environmental impact statement and again sought comments from other agencies and the public. Staff Exh. 16 (Cushing Test.) at 4; Dom. Exh. 10 (Dom. Env. Test.) at 10. Twenty-eight members of the NRC Staff and thirty-one scientists and other personnel from the Pacific Northwest National Laboratory participated in the preparation of the environmental impact statement. See FEIS, App. A. During its independent review, the NRC Staff contacted approximately 60 organizations, including Federal, State, regional, Tribal and local agencies. See id., App. B.

After considering all comments, the NRC Staff issued its two-volume, over 1,200-page FEIS. Therein, the NRC Staff concluded:

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<sup>5</sup> In an October 13, 2006 memorandum included as Appendix E to the SER Supplement, the ACRS determined that the change in cooling water system and change in power level do not affect its conclusions and recommendation. SER Supp., App. E at E-1.

The staff's recommendation, after consideration of the environmental impacts described in this Final EIS, is that an ESP for North Anna Units 3 and 4 should be issued. This recommendation is based on (1) the ER submitted by Dominion; (2) consultation with Federal, State, Tribal and local agencies; (3) the staff's independent review; (4) the staff's consideration of public comments related to the environmental review that were received during the review process; and (5) the assessments summarized in this Final EIS, including the potential mitigation measures identified in the ER and in this Final EIS. In addition, in making its recommendation, the staff has concluded that the alternative sites considered are not obviously superior to the proposed site. Finally, the staff concludes that the site preparation and preliminary construction activities enumerated in 10 CFR 50.10(e)(1) would not result in any significant adverse environmental impact that cannot be redressed.

A comparative summary showing the environmental impacts of constructing and operating two new units at the North Anna ESP site or at any of the alternative sites is shown in Table 10-1. The estimated environmental significance of the no-action alternative, or denial of the ESP application, is also shown. Table 10-1 shows that the significance of the environmental impacts of the proposed action is SMALL for all impact categories at all sites with the exception of certain land use, ecology, water use and quality, socioeconomic, and historic and cultural resource impacts. The alternative sites may have adverse environmental effects in at least some categories that reach MODERATE to LARGE significance.

The range of impacts estimated by the NRC staff for resolved issues is predicated on certain assumptions that are identified in each section. Should the Commission issue an ESP for the North Anna ESP site, and it is referenced in an application for a CP or COL, the staff will verify that the assumptions identified in this Final EIS remain applicable. In addition, certain issues are not resolved because of a lack of information. An applicant for a CP or COL referencing an ESP for the North Anna ESP site would need to provide the necessary information to resolve these issues, if the proposed action ultimately would affect the resources associated with these issues.

FEIS at 10-11. See also Staff Exh. 16 (Cushing Test.) at 5.

### **C. The Mandatory Hearing**

Upon completion of the NRC Staff's review and publication of Supplement 1 to the SER and FEIS, the Board commenced the mandatory hearing on uncontested issues. After reviewing the SER, including Supplement 1, the Board issued an Order on January 18, 2007, requiring both Dominion and the NRC Staff to respond to 116 safety questions. Similarly, after reviewing the FEIS, the Board issued an Order on February 7, 2007, requiring both Dominion and the NRC

Staff to respond to 132 questions on environmental matters. The responses filed by Dominion and the NRC Staff, which were coordinated at the Board's request to avoid duplication, amounted to approximately 450 pages of technical responses and briefs.

After considering the responses of the parties, the Board issued a scheduling order requiring Dominion and the NRC Staff to prefile such testimony and exhibits as each deemed necessary to present its case. Dominion and the NRC Staff both submitted prefiled testimony on safety and environmental issues. Dominion's prefiled testimony on safety issues provided a detailed explanation by five experts regarding how the Application and NRC Staff review satisfied each of the NRC's siting criteria. Dom. Exh. 9. Dominion's prefiled testimony on environmental issues presented a detailed explanation by three experts regarding how the Application and NRC Staff review satisfied the NRC's environmental regulations and NEPA. Dom. Exh. 10. In addition, Dominion and the NRC Staff also provided thirteen panels of experts (twenty-nine expert witnesses in all) who testified at the evidentiary hearing concerning the seven topics designated by the Board for oral presentation. The Board questioned those experts at the evidentiary hearing.

Three days of evidentiary hearings on the uncontested issues were held in Louisa County, Virginia, from April 24 through April 26, 2007. At the hearing, the NRC Staff presented a number of exhibits that were admitted into evidence, including: (1) the SER and SER Supplement. (Staff Exhs. 1 and 2); (2) the FEIS (Staff Exh. 3); (3) the ACRS Report (Staff Exhs. 4 and 5); (4) the Staff's answers to the Board's safety questions (Staff Exhs. 6 – 9); (5) the Staff's answers to the Board's environmental questions (Staff Exhs. 10-13); (6) Prefiled Direct Testimony of George Wunder on Health and Safety Issues (Staff Exh. 15) ("Wunder Test."); and (7) Prefiled Direct Testimony of John Cushing on Environmental Issues (Staff Exh. 16)

("Cushing Test."). Dominion also presented a number of exhibits that were admitted into evidence, including (1) Dominion's Application (Dom. Exh. 11); (2) prefiled testimony on safety matters (Dom. Exh. 9) ("Dom. Safety Test."); (3) prefiled testimony on environmental matters (Dom. Exh. 10) ("Dom. Env. Test."); (4) Dominion's answers to the Board's safety questions (Dom. Exhs. 1 and 2); and (5) Dominion's answers to the Board's environmental questions (Dom. Exhs. 3-8). In addition, the presentation materials used by the panels of NRC Staff and Dominion witnesses during their oral testimony on the seven topics specified in the Board's scheduling order were admitted as exhibits. Thus, there is considerable, detailed evidence in the record supporting issuance of the ESP, including the Application and NRC review documents, and the responses to every question posed by the Board.

At the end of the evidentiary hearing, Dominion requested leave to submit additional information relating to questions that the Board had asked at the hearings concerning the alternative site review. The Board granted Dominion's request, allowing Dominion to provide this information supplementing the record by May 7, 2007, and the NRC Staff to provide any response by May 11, 2007. Tr. 790, 799. With this exception and with corrections to the transcript submitted on May 9, 2007, the record was closed.

On June 29, 2007, the Board issued its Initial Decision (LBP-07-09) finding that the ESP should be issued by the Commission.

## **ARGUMENT**

### **I. THE NRC STAFF'S ENVIRONMENTAL JUSTICE ANALYSIS COMPLIED WITH THE COMMISSION'S ENVIRONMENTAL JUSTICE POLICY STATEMENT**

In its Initial Decision, the Board suggests that "the Commission consider addressing the somewhat novel question as to what it expects the Staff to do when, under the NRC EJ Policy, an

EJ analysis ‘in greater detail’ is required.” LBP-07-09, slip. op. at 97. The Initial Decision focused on whether the “middle paragraphs” of §§ 4.7 and 5.7 of the FEIS satisfied the Commission’s policy statement on environmental justice (“EJ”). See id. at 96. Unfortunately, the Board’s question apparently stems from its focus on the length of the EJ sections in the FEIS, rather than on the substance of EJ review conducted by the NRC Staff, which clearly satisfied the Commission’s policy statement.

The Commission’s Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions, 69 Fed. Reg. 52,040 (Aug. 24, 2004) (“Policy Statement”), states: “[i]f the percentage in the impacted area significantly exceeds that of the State or the County percentage for either the minority or low income population, then [Environmental Justice] will be considered in greater detail.” Id. at 52,048. This statement in the Policy Statement is derived from the NMSS guidelines on EJ review. See NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (Aug. 2003), App. C, Environmental Justice Procedures, at p. C-5. Tr. 753. The NMSS guidelines go on to state:

If no minorities or low-income populations are identified in the potentially affected area or environmental impact area, then document the conclusion. The environmental justice review is complete.

NUREG-1748, App. C at C-5. The NRR guidelines similarly state:

If there are no minority or low-income populations within the impact area(s) or if there are no potentially significant environmental impacts, then these results should be documented and the environmental justice review is complete.

LIC-2003, “Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues” (Rev. 1, May 24, 2004), App. D, “Environmental Justice Guidance and Flow Chart,” at D-10. Thus, in context, consideration of EJ in “greater detail” simply refers to

performing further analysis when low income or minority populations are present, as opposed to simply documenting that no such populations are present.

The NRC Staff's environmental review complied with this guidance and with the Policy Statement. For the construction or operation of the new units at North Anna to disproportionately affect minority/low-income populations, three things must be present: (1) minority/low income populations that might be affected in the environmental impact area, (2) pathways that could introduce impacts to the population, and (3) adverse impacts. Because there were a few census blocks that contained low-income or minority populations exceeding the threshold criterion, the FEIS did examine the potential impacts on those populations to determine whether there were disproportionately high adverse impacts, and the EJ review described in Section 4.7 (for construction impacts) and Section 5.7 (for operational impacts) of the FEIS thus fully complied with the NRC's Policy Statement. .

First, the NRC Staff located minority and low income populations in the area, though none were in close proximity to the ESP Site. FEIS at 2-76 to 2-79.

Second, the NRC Staff first identified pathways by which human populations could be impacted and then interviewed resource agencies to determine if there were any populations that had dependencies or practices by which the identified pathways could introduce disproportionately high adverse impacts to receptors in those populations. Based on the interviews, no such dependencies or practices were identified. Finally, the NRC Staff determined that there would be no health-related or location-dependent adverse impacts as a result of the proposed ESP. FEIS at 4-36 and 5-52. The NRC Staff documented the results of its review in the FEIS. Id.

This approach complies with The Council on Environmental Quality (“CEQ”)’s regulations, which advise agencies to reduce excessive paperwork by providing “only brief discussion of other than significant issues.” 40 C.F.R. § 1502.2(b). Because no disproportionately high adverse impacts were identified in the NRC Staff’s analysis, the discussion in sections 4.7 and 5.7 of the FEIS is properly brief. This does not signify any failure by the NRC Staff to take the hard look at environmental impacts required by NEPA.

## **II. DOMINION AND THE NRC STAFF’S RADIOLOGICAL DOSE ESTIMATES DEMONSTRATE THAT THE ESP MEETS NRC’S SITING CRITERIA**

The Board raises several questions for the Commission’s consideration regarding operational dose limits:

- (1) How do the per-reactor, per-licensee, and per-site radiological limits apply when there are multiple reactors and multiple licensees being added to a site? Are they additive, increasing the amount of dose and exposure to the public? If not, how should they be applied?
- (2) How is ALARA satisfied under these circumstances?
- (3) How can the gas-cooled reactor designs in the ESP application be deemed to meet the NRC safety regulations, when there are no specific standards for them and most of the standards apply only to light-water-cooled reactors?
- (4) How should the 25 mrem dose limit imposed by 10 C.F.R. § 20.1301(e) and 40 C.F.R. § 190.10 be allocated as between pre-existing reactor effluents and new reactor licensees on the same site?

LBP-07-09 at 103. As an initial matter, the Board questions relate primarily to the operational limits that should be imposed in the Technical Specifications established in a COL proceeding.

In particular, there is no need to determine what dose objective needs to be met in order to determine that the design of gas-cooled reactors will result in doses that are ALARA. This issue is a reactor design objective that is properly left to a design certification or COL proceeding.



A. **The NRC Staff's Radiological Dose Estimates Demonstrate that the ESP Site Complies with Applicable NRC Siting Criteria (Board Questions 1 and 4)**

With respect to the substance of the Board's questions, 40 C.F.R. Part 190 establishes limits on the combined annual dose that any member of the public may receive from uranium fuel cycle operations, which is defined as including generation of electricity by a light-water-cooled nuclear power plant. See 40 C.F.R. §§ 190.02(b), 190.10. These limits apply to the combined annual dose from nearby units or facilities within the definition of uranium fuel cycle operations, regardless of whether they are on the same site or on nearby sites. NRC Health Physics Position 140 suggests that units within 8 kilometers of each other would contribute to the 40 C.F.R. Part 190 limit. See <http://www.nrc.gov/about-nrc/radiation/hppos/hppos140.html>. It would be a violation of 10 C.F.R. § 20.1301(e) to exceed the limits of 40 C.F.R. Part 190 during operations.

Dominion demonstrated, and the NRC Staff independently verified, that the combined dose from the existing units and new units would meet the 40 C.F.R. Part 190 limit. The estimated total doses from the liquid and gaseous effluents to the maximally exposed individual from both the current operating units and the two proposed units were shown to be well within the regulatory standards of 40 C.F.R. Part 190. The calculated whole body dose from the two existing units and two new units is 6.8 millirem per year compared with the 25 millirem per year limit on whole body dose in 40 C.F.R. Part 190. The calculated dose to the thyroid from all four units is 27 millirem per year, compared with 40 C.F.R. Part 190 limit of 75 millirem per year. Tr. 469-71 (Stoetzel); SER Supp. at 11-4, 11-6; Staff Exh. 6 at 75 (response to safety question 85). This demonstration fully satisfied the siting criterion in 10 C.F.R. § 100.21(c)(1) (radiological effluent release limits associated with normal operations can be met). Determining

whether or how the 40 C.F.R. Part 190 limit should be allocated among units is not pertinent at this stage, and should properly be left to a COL proceeding.

Similarly, by demonstrating that the combined dose from the existing and new units would meet the 25 mrem standard in 40 C.F.R. Part 190, Dominion and the NRC Staff also demonstrated that the 100 mrem safety limit in 10 C.F.R. § 20.1301(a)(1) would be met. Again, this was sufficient to address the siting criterion in 10 C.F.R. Part 100.21(c)(1). How the Section 20.1301(a)(1) limit should be allocated between units or controlled in technical specifications is an operational issue that is well within the NRC Staff's capability to address at the COL stage.

**B. The ALARA Requirements Are Design Objectives That Are Appropriately Left to the COL Stage (Board Question 2)**

The NRC's Appendix I design objectives apply under the express terms of the NRC rules on a per unit basis. See 10 C.F.R. Part 50, App. I, Section II, establishing the design objectives for "each light-water-cooled nuclear power reactor." In promulgating Appendix I, the Commission stated:

We have chosen to express the design objectives on a per light-water-cooled nuclear power reactor basis, rather than on a site basis, as was originally proposed. While no site limits are being adopted, it is expected that the dose commitment from multi light-water-cooled reactor sites should be less than the product of the number of reactors proposed for a site and the per-reactor design-objective guides because there are economies of scale due to the use of common radwaste systems for multi-reactor sites, which are capable of reducing exposures.

40 Fed. Reg. 19,439 19,441 (May 5, 1975).

Thus, the Appendix I design objectives apply and refer to the release from each new unit. However, any reactor design will have to show that effluent releases are as low as reasonably achievable (10 C.F.R. § 50.34a(a)), and this demonstration could result in actual design limits below the design objectives.

In the ESP proceeding, Dominion derived conservative PPE values for liquid and gaseous effluents (Dom. Exh. 11, SSAR § 1.3.1; Tr. 311 (Stoetzel)); and both Dominion and the NRC Staff performed independent evaluations using the LADTAP II and GASPARI codes to calculate the liquid and gaseous effluent doses to the maximally exposed individual on a per unit basis. The Staff compared these calculated doses against the design objectives in 10 C.F.R. Part 50, Appendix I. The calculated doses were determined to be well within the Appendix I design objectives. Tr. 464, 468-69 (Stoetzel); SER Supp. at 11-4, 11-5. This showing satisfied the siting criterion in 10 C.F.R. Part 100.21(c)(1).

As the NRC Staff testified, the actual ALARA analysis required by Appendix I to 10 C.F.R. Part 50 will be addressed at the COL stage, when the applicant has defined the reactor technology and radioactive waste processing system. Tr. 529-30 (Dehmel); see also 10 C.F.R. § 50.34(2)(a); 10 C.F.R. Part 50, App. I, § II. Thus, the design and operational limits to meet the ALARA requirement are a matter that will be appropriately addressed at the COL stage.

**C. Gas-Cooled Reactors (Board Question 3)**

As the Board noted, the numerical design objectives in 10 C.F.R. Part 50, Appendix I, apply on their face to light-water reactors (“LWR”), and do not address gas-cooled reactors. However, the numerical limits in Appendix I are very small doses – far below the 100 mrem safety limit or the 25 mrem standard in 40 C.F.R. Part 190, and therefore, are reasonably used as surrogate values when assessing the suitability of a site using a PPE that bounds light-water and gas-cooled designs. Again, actual dose limits that any specific design must meet to satisfy the ALARA requirement can and will be addressed appropriately at the COL stage.

### III. THE ESP DOES NOT CONSTITUTE A PARTIAL ESP

As discussed below, the North Anna ESP does not constitute a “partial ESP” because Dominion and the NRC Staff determined that the ESP Site meets all siting criteria, and examined all environmental impacts of construction and operation in sufficient detail to conclude that there are no obviously superior alternative sites. Although the Board characterizes the FEIS as having “numerous” and “over thirty-five instances” where the FEIS specifies matters as unresolved (LBP-07-09), this characterization is unfortunate, because it fails to make clear that the “thirty-five instances” are simply multiple references in the FEIS to a very small number of issues that were in fact analyzed. Indeed, other than need for power,<sup>6</sup> alternative energy sources,<sup>7</sup> and severe accident mitigation alternatives,<sup>8</sup> which are not issues required to be considered in an ESP proceeding, there were only six issues that were described in the FEIS as unresolved: (1) water quality; (2) design and severe accident impacts for gas-cooled reactors; (3) fuel cycle and solid waste impacts for gas-cooled reactors; (4) transportation impacts for gas cooled reactors, (5) decommissioning; and (6) chronic effects of electromagnetic fields.<sup>9</sup> With respect to each of these six issues, Dominion and/or the NRC Staff evaluated the impacts based either on bounding information or the best information available.

The Board stated:

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<sup>6</sup> See 10 C.F.R. § 52.17(a)(2).

<sup>7</sup> Exelon Generation Company, LLC et al., CLI-05-17, 62 N.R.C. 5, 48 (2005).

<sup>8</sup> See CLI-05-17, 65 N.R.C. at 48 (“At the ESP stage of the construction permit process, the boards’ ‘reasonable alternatives’ responsibilities are limited because the proceeding is focused on an appropriate *site*, not actual construction of a reactor. Thus, boards must merely weigh and compare alternative sites, not other types of alternatives (such as alternative energy sources).”) (emphasis added) (footnote omitted). See also NRC letters dated Feb. 12, 2003 (ML030280518) and June 25, 2003 (ML031430282).

<sup>9</sup> This list is comparable to the list of unresolved items in other early site permit proceedings where the Commission has granted the ESP. For example, in the Clinton proceeding the (1) chronic effects of electromagnetic fields (see, e.g., NUREG-1815 at 5-46), (2) design and severe accident impacts for gas-cooled reactors (see, e.g., NUREG-1815 at 5-67 and 5-77); (3) fuel cycle and solid waste impacts for gas-cooled reactors (see, e.g., NUREG-1815 at 6-1 and 6-21); (4) transportation impacts for gas-cooled reactors (see, e.g., NUREG-1815 at 6-31 and 6-37 to 6-38); and (5) decommissioning (see, e.g., NUREG-1815 at 6-43).

While we see no regulatory prohibition to this approach, we are not sure that it comports with the Commission's stated policy prohibiting the issuance of partial ESPs and indicating that ESPs will not be issued unless adequate information is available. How many holes or "unresolved issues" can there be in a PPE before it runs afoul of the Commission's policy? When should the Staff decline to issue an ESP and advise the applicant to instead consider an Early Partial Decision on Site Suitability?

LBP-07-09 at 107. The Commission's statement declining to follow the suggestion that partial site permits be issued referred to the type of partial approval that may be obtained under Appendix Q to Part 52, which allows an applicant to request early review of one or more site suitability issues. See 54 Fed. Reg. 15,372, 15,378 (Apr. 18, 1989). In contrast, Dominion's ESP Application and the NRC Staff's review documents address all of the siting criteria set forth in 10 C.F.R. Part 100, address all reasonably foreseeable environmental impacts of construction and operation of reactors with characteristics within postulated parameters, and include an evaluation of alternative sites to determine whether there is an obviously superior alternative. The NRC Staff simply characterized a few environmental issues as unresolved, thereby allowing assumptions to be validated at the COL stage. This does not constitute a prohibited "partial ESP."

With respect to water quality, Dominion's PPE provided the maximum concentrations of anticipated constituents in the blowdown discharges for the Unit 3 Closed-Cycle, Dry and Wet Tower and for the UHS Mechanical Draft Cooling Towers. Dominion also identified typical chemicals that might be present in other, smaller-volume plant discharges that would be controlled to meet water quality standards. These are defined in Table 3.1-9 of the Environmental Report ("ER") (pages 3-3-40 and 41). As stated in Section 5.5.1.1 of the Environmental Report, there would be other, smaller volume discharges associated with auxiliary systems, which would be discharged in accordance with a VPDES permit to meet applicable water quality standards. Table 3.3-1 of the Environmental Report (page 3-3-52)

shows that the estimated combined volume of other plant releases is an order of magnitude smaller than the release from cooling tower blowdown. As noted in Section 3.6.1 of the Environmental Report (page 3-3-81), the other discharges would be treated, but might still contain low-level chemicals or biocides similar to effluents from the existing units. Section 3.6.1 of the Environmental Report identifies the typical chemicals that might be present. Thus, other waste streams are minor in comparison to the blowdown, and their constituents are unlikely to exceed the values and parameters provided for the cooling tower blowdown in Table 3.1-9 of the Environmental Report. Based on this information, Dominion concluded that potential impacts of constituents in plant effluents would be small as noted in ER §§ 5.3.2.2.2b (page 3-5-61) and 5.5.1.1 (page 3-5-152). The NRC Staff in Section 5.3.3 of the FEIS agreed that water quality impacts are likely to be small, but characterized this issue as unresolved because the specific design of the ultimate water treatment system and resultant concentrations are not yet specifically defined. FEIS at 5-12 to 5-13.

With respect to Fuel Cycle Impacts and Solid Waste Management, the impacts relating to gas-cooled reactors were estimated in Section 6.1.2 of the FEIS based on the currently available information. See FEIS at 6-17, Table 6-3 (“Fuel Cycle Environmental Impacts from Gas-Cooled Reactor Designs for the North Anna ESP Site”). The environmental impacts of fabrication and enrichment of fuel for gas-cooled reactors are clearly related to the impacts of those activities for LWRs. In fact, mining, milling and enrichment are nearly identical to that for LWRs. Id. The FEIS concluded that the impacts from mining, milling and conversion for gas-cooled reactors would be small. Id. at 6-18 - 6-20. The FEIS also concluded that the impacts from fuel fabrication, enrichment and waste management would likely be small, but characterized this

issue as unresolved because of uncertainty in the final design of gas-cooled reactors and changes that could be applied to uranium fuel cycle activities. Id.

Similarly, with respect to transportation associated with gas-cooled reactors, Dominion provided a full description and detailed analysis as stated in the FEIS at 6-23, and Section 6.2 of the FEIS included an assessment of these impacts. See FEIS at 6-27, Table 6-5 (showing, among other things, radiological impacts of transporting gas-cooled reactor fuel); 6-29 (“the staff concludes that the impacts of [transportation] accidents involving unirradiated gas-cooled reactor fuel would likely not be significantly different than for unirradiated LWR fuel and will be within the impacts listed in Table S-4 for current generation LWRs.”); 6-32, Table 6-6 (providing, among other things, radiation doses associated with the transportation of spent fuel for gas-cooled reactors); 6-38, Table 6-9 (providing, among other things, annual spent fuel accident impacts for gas cooled reactors); and 6-40, Table 6-10 (summarizing, among other things, waste shipments for gas-cooled reactors). By categorizing these issues as unresolved, the NRC Staff has simply preserved its ability to consider these issues anew if a COL application is filed seeking a license for a gas-cooled reactor.

With respect to decommissioning impacts, both the ER and FEIS reference NUREG-0586, Supplement 1, which provides a generic evaluation of the environmental impacts of decommissioning. See ER § 5.9 and FEIS § 6.3 (pages 6-41 – 6-42). The NRC Staff concludes that decommissioning impacts are likely to be bounded by NUREG-0586 and are likely small, but will require Dominion to address this issue again at the COL stage. FEIS at 6-42.

With respect to EMF, both Dominion’s ER and the NRC’s FEIS discussed the current state of scientific knowledge with respect to whether any such chronic effect exists. This issue is not resolved because the scientific evidence is currently inconclusive as to whether any chronic

effects from EMF occur. In October 1996, a National Research Council committee of the National Academy of Sciences (“NAS”) released its evaluation of research on potential associations between EMF exposure and cancer, reproduction, development, learning, and behavior. As discussed in ER Section 5.6.3.2, NAS concluded:

Based on a comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects.

More recently, a report by the National Institute of Environmental Health Sciences (“NIEHS”) in 1999 concluded that EMF cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The report stated that this finding was insufficient to warrant aggressive regulatory concern, and that the NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern. The NRC Staff evaluated this statement and determined that the potential impact should not be considered significant. See FEIS § 5.8.5 (pages 5-57 – 5-58). However, because the evidence is not conclusive, the NRC Staff categorized the issue as unresolved, so that the state of scientific evidence will be considered again in any COL proceeding.

Therefore, in each of these instances, sufficient information was provided for an evaluation of the impacts. Categorizing these impacts as unresolved does not imply that these impacts have been ignored, but instead preserves the NRC’s ability to evaluate these issues again in any COL proceeding.



Further, it is permissible under NEPA to defer final resolution of appropriate issues to the COL stage. As the U.S. Court of Appeals for the 7<sup>th</sup> Circuit has recently held:

Because an ESP does not authorize construction, the evaluations conducted at the ESP stage are intended to provide early resolution of some – but not all – environmental issues. 10 C.F.R. §§ 52.79(a)(1) and 52.89 (stating that “any significant environmental issue not considered” at the ESP stage must be addressed when the holder of an ESP applies to commence construction)... [T]he agency regulations at issue are not inconsistent with environmental law, because all relevant issues will eventually be considered. Courts have permitted agencies to defer certain issues in an EIS for a multistage project when detailed useful information on a given topic is not “meaningfully possible” to obtain, and the unavailable information is not essential to determination at the earlier stage. *See, e.g., County of Suffolk v. Sec’y of the Interior*, 562 F.2d 1368, 1378 (2d Cir. 1977).

Envtl. Law & Policy Ctr. v. NRC, 470 F.3d 676, 684 (7th Cir. 2006).

In some cases, there may be aspects of plant design and operations that cannot be bounded with great certainty because they are not contained in design certification documents for the plants on which the PPE is based, but instead depend on plant-specific engineering or operational decisions that have not yet been made. In such cases, NEPA is satisfied by considering and disclosing the uncertainties, and evaluating the impact conservatively based on the best information available. Baltimore Gas & Elec. Co. v. NRDC, 462 U.S. 87, 88, 98-100, 101-02 (1983) (NRC complied with NEPA’s requirements of consideration and disclosure where it summarized major uncertainties and found the evidence tentative but favorable).<sup>10</sup> Indeed, as one court has stated, “[i]f we were to impose a requirement that an impact statement can never be prepared until all relevant environmental effects were known, it is doubtful that any project could

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<sup>10</sup> In holding that the NRC’s promulgation of Table S-3 did not violate NEPA, the Supreme Court noted:

[T]he Commission’s staff did not attempt to evaluate the environmental effects of all possible methods of disposing of waste. Rather, it chose to analyze intensively the most probable long-term waste disposal method – burial in a bedded-salt repository several hundred meters below ground – and then “estimate its impacts conservatively, based on the best available information and analysis.”

462 U.S. at 102 (citation omitted).

ever be initiated.” Jicarilla Apache Tribe of Indians v. Morton, 471 F.2d. 1275, 1280 (9th Cir. 1973). See also NRDC v. NRC, 685 F.2d 459, 486 (D.C. Cir. 1982).

The CEQ regulations at 40 C.F.R. § 1502.22 provide guidance for addressing incomplete or unavailable information in an EIS. The CEQ regulations advise that when information is incomplete or unavailable (because the overall costs of obtaining it are exorbitant or the means to obtain it are not known), an EIS should include a statement that the information is incomplete or unavailable, explain the relevance of the missing information, summarize the existing evidence, and evaluate the impacts using generally accepted methods. See 40 C.F.R. § 1502.22(b).

This CEQ regulation “requires that analysis of impacts in the face of unavailable information be grounded in the ‘rule of reason.’” 51 Fed. Reg. 15,618, 15,621 (Apr. 25, 1986).

As CEQ explained:

The “rule of reason” is basically a judicial device to ensure that common sense and reason are not lost in the rubric of regulation. The rule of reason has been cited in numerous NEPA cases for the proposition that, “An EIS need not discuss remote and highly speculative consequences. . . . This is consistent with the (CEQ) Council on Environmental Quality Guidelines and the frequently expressed view that adequacy of the content of the EIS should be determined through use of a rule of reason.” Trout Unlimited v. Morton, 509 F.2d 1276, 1283 (9th Cir. 1974). In the seminal case which applied the rule of reason to the problem of unavailable information, the court stated that, “[NEPA’s] requirement that the agency describe the anticipated environmental effects of a proposed action is subject to a rule of reason. The agency need not foresee the unforeseeable, but by the same token, neither can it avoid drafting an impact statement simply because describing the environmental effects of alternatives to particular agency action involves some degree of forecasting . . . . ‘The statute must be construed in the light of reason if it is not to demand what is, fairly speaking, not meaningfully possible . . . .’” Scientists’ Institute for Public Information, Inc. v. Atomic Energy Commission, 481 F.2d 1079, 1092 (D.C. Cir. 1973), citing Calvert Cliffs’ Coordinating Committee v. Atomic Energy Commission, 449 F.2d 1109, 1114 (D.C. Cir. 1971).

Id.

These standards have been met in Dominion’s ESP proceeding. The likely impacts from the unresolved issues are in fact discussed, based on either bounding or reasonably available

information, and the only thing that is being deferred is a final resolution. More definitive information is not essential at this stage to determine that the ESP site meets the NRC's site suitability criteria or support the findings required for issuance of the ESP.

With respect to this proceeding, the uncertainties described above are largely the result of the absence of plant-specific engineering (particularly with regard to gas-cooled reactor designs that are still conceptual) or operational decisions that have not yet been made. Dominion and the NRC Staff have assessed each of the issues based on the information that is currently available. The FEIS contains a discussion of the relevance of the issues to the environmental impacts analysis and evaluates the available information using generally accepted methods. It clearly comports with the rule of reason and thus is both complete under NEPA and complete under the NRC's rules.

The Commission's recent decision in the Grand Gulf ESP proceeding also indicates that it is permissible to defer final resolution of issues.

[A]n assessment of the irretrievable commitment of resources – *i.e.*, construction resources – will not be known until a particular reactor design is selected. Because the Staff merely deferred these narrow questions to a time when they can be accurately assessed, we find the Staff's actions consistent with NEPA's requirements.

System Energy Resources, Inc. (Early Site Permit for Grand Gulf ESP Site), CLI-07-14, 65 N.R.C. 216, 218-19 (2007).

Moreover, the Commission has recently approved a final rule to amend Part 52,<sup>11</sup> and the Statement of Considerations approved by the Commission "clarifies" the Commission's intent regarding the scope of environmental review in ESP proceedings.

The NRC is making additional changes to § 51.50(b) to further clarify the scope of the environmental review at the early site permit stage. . . . The purpose of

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<sup>11</sup> Staff Requirements Memorandum (Apr. 11, 2007)

this change is to clearly delineate that the scope of the environmental review at the early site permit stage is, at a minimum, to address all issues needed for the NRC to perform its evaluation of the alternative sites. In addition, the applicant may choose to address one or more issues related to construction and operation of the facility with the goal of achieving finality on those issues at the early site permit stage.

SECY-06-0220, Encl. 1 at 281-82. Thus, environmental information in an ESP proceeding should be deemed sufficient if it allows evaluation of alternative sites.

Similarly, in its response to public comments in this rulemaking, the Commission explained the relationship between environmental reviews at the ESP and COL stage:

[T]he Part 52 licensing model, with respect to ESPs and COLs referencing them, is akin to evaluation of a project at an early stage, with subsequent evaluation at a later stage, as described in the CEQ regulations at 40 C.F.R. § 1508.28(b). As indicated in § 1508.28(b), such a process is appropriate when it helps the agency to focus on the issues that are ripe for decision and exclude from consideration issues already decided or not yet ripe. The Commission intends to focus its environmental reviews in a similar manner. Accordingly, the Commission concludes that the final rule will ensure compliance with NEPA.

SECY-06-0220, Enclosure 3 at 133-34.

Further analysis of the issues characterized as unresolved is not essential to the evaluation of alternative sites. The NRC Staff was able to evaluate the alternative sites based on the information presented in the ER and FEIS. It should be noted that two of the unresolved issues – fuel cycle and solid waste impacts for gas-cooled reactors, and transportation impacts for gas-cooled reactors – are generic impacts common to all plants. Therefore, they can have no effect on the evaluation of alternative sites. The NRC Staff also determined that non-radiological health impacts and environmental impacts from postulated accidents do not influence the comparison of impacts between North Anna and the alternative sites. FEIS at 9-2. Similarly, the NRC Staff concluded that the impacts from decommissioning are likely to be not only small but to affect all sites in a similar manner. Id.

Indeed, all of the unresolved issues were estimated to be likely small. In Izaak Walton League of Am. v. Marsh, 655 F.2d 346, 377 (D.C. Cir.), cert. denied, 454 U.S. 1092 (1981), the Court held that an agency was not required to conduct a major study to better quantify biological impacts when it had concluded that the impacts were minor. As the Court explained:

Detailed analysis is required only where impacts are likely. . . . Where adverse impacts are not likely, expensive and time-consuming studies are unnecessary. So long as the environmental impact statement identifies areas of uncertainty, the agency has fulfilled its mission under NEPA.

Id.

**IV. THE NRC STAFF ADEQUATELY CONSIDERED ALL REASONABLE ALTERNATIVES UNDER SECTIONS 102(2)(C)(iii) AND 102(2)(E) of NEPA**

Consistent with NEPA Section 102(2)(E), the NRC studied, developed, and described alternatives to the ESP Site, alternatives to the cooling system, and the no action alternative. FEIS, Chs. 8 and 9. Dominion's expert witnesses Patterson and Cudworth testified that the NRC Staff considered a reasonable range of alternatives and thus met its obligations pursuant to Section 102(2)(E) of NEPA. Dom. Exh. 10 (Dom. Env. Test.) at 13. These witnesses each have 30 years of experience in environmental reviews, including preparation not only of numerous environmental reports supporting NRC licensing actions but also numerous environmental impact statements for the Department of Energy and other federal agencies. See id. at 2. Their expert opinion was uncontroverted.

The dissent contends that the NRC Staff did not adequately consider all reasonable alternatives to Dominion's proposed ESP as required by sections 102(2)(C)(iii) and 102(2)(E) of NEPA in two regards: (1) alternative sites; and (2) system design alternatives for cooling water. LBP-07-09, Dissent at 1-2. With regard to both issues, Dominion respectfully submits that the dissent failed to fully consider the evidence and expert opinion in the record and misapplied the requirements of NEPA.

**A. Alternative Sites**

As described in Section 9.3.1 of Dominion's Environmental Report, Dominion applied the candidate site criteria in Section 9.3 of NUREG-1555 to screen for candidate sites in the Region of Interest ("ROI"). Dom. Exh. 11 at 3-9-2; LPB-07-09 at 54. The criteria for identifying candidate sites focused on existing nuclear sites because of the obvious benefits offered by locating a nuclear power plant site at an existing nuclear site, rather than at a non-nuclear site. Declaration of Marvin L. Smith (May 7, 2007) ("Smith Decl."), ¶ 3, citing ER at 3-9-4. The benefits included: (1) the greater knowledge of environmental conditions at existing nuclear sites; (2) the ability to avoid constructing additional transmission corridors; (3) the sufficiency of the size of existing nuclear sites; and (4) the substantial advantages of nuclear infrastructure present at existing nuclear sites. Id. (citing ER at 3-9-5). As Dominion explained, these criteria are extremely important to the viability of developing new nuclear units and are therefore necessary to meet Dominion's needs and objectives. Id. As described in Section 9.3.3 of Dominion's ER, Dominion also conducted a generic evaluation of greenfield sites, demonstrating that developing a greenfield site would not be environmentally preferable. Id. at 3-9-4. The majority carefully considered the reasonableness of these selection criteria and correctly found the list "compelling." LBP-07-09 at 84.

This screening process led to the identification of two existing nuclear sites (North Anna and Surry) owned by affiliates of Dominion, and two DOE sites (Portsmouth and Savannah River) as the candidate sites for further evaluation. ER at 3-9-6.<sup>12</sup> Dominion's identification of four alternate candidate sites was consistent with NUREG-1555. See NUREG-1555 at 9.3-10

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<sup>12</sup> A fifth site, the Millstone Power Station, was identified but screened out. Dom. Exh. 11 at 3-9-6; LBP-07-09 at 54 n.79.

(“In general, however, the identification of two or more different areas and three to five alternative sites in addition to the proposed site could be viewed as adequate.”)

As the majority of the Board found (LBP-07-09 at 83), following the approach described in NUREG-1555, the NRC Staff reviewed the process used by Dominion to determine whether Dominion had used a reasonable process to identify candidate sites, to identify the proposed site and the alternatives, and then to compare those sites. Tr. 572 (Kugler). The NRC Staff determined that the process that Dominion used to identify the candidate sites was reasonable, and that the slate of sites was reasonable. Id. The majority of the Board considered this process carefully and correctly found that the analysis satisfies NEPA. LBP-07-09 at 82, 85.

The dissent’s principal complaint appears to be that “Dominion did not comply with the NUREG[-1555] requirement that all nuclear sites within the ROI be considered.” LPB-07-09, Dissent at 8 (emphasis added). As the majority opinion correctly points out, NUREG-1555 is merely guidance that is neither binding on the staff nor the Board. LBP-07-09 at 85. See, e.g., Curators of University of Missouri, CLI-95-1, 41 N.R.C. 71, 98, 100 (1995). As the majority of the Board correctly observed, NEPA does not require consideration of alternatives that are unreasonable, unfeasible, or inconsistent with a private applicant’s business objectives. LBP-07-09 at 85.

The uncontroverted evidence in this proceeding is that “the possibility of Dominion building new nuclear units at an unaffiliated utility’s site is neither reasonable, feasible, nor consistent with Dominion’s business purposes.” Dom. Exh. 3 at 68; LBP-07-09 at 84. The dissent would simply substitute its own judgment instead of accepting the uncontroverted evidence and expert judgment of Dominion and the NRC Staff.

First, as Dominion explained, nuclear power plant sites owned by unaffiliated utilities would be direct competitors to Dominion, and those sites are located in present or former service territories in which such unaffiliated utilities have the greatest business interest. Dom. Exh. 3 at 68. In Dominion's estimation, there was and is no reasonable prospect that such utilities would allow a substantial competitor like Dominion to build a large generating unit at their sites. Id. The NRC Staff similarly explained that applicants typically limit their consideration to sites that they own or could reasonably be expected to control, and this approach comports with the Commission's guidance in Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-77-8, 5 N.R.C. 503 (1977). Staff Exh. 11 at 94 (response to environmental question 119); Tr. 567 (Kugler).<sup>13</sup> As the Staff stated and the majority opinion observed, "siting a new nuclear power station at the site of an existing nuclear power station operated at another utility would likely present logistical, competitive, and regulatory complications." Staff Exh. 10 at 96 (NRC Staff response to Board's environmental question 121); LBP-07-09 at 84.

It is well established that NEPA's requirement to examine alternatives is subject to a "rule of reason." NRDC v. Morton, 458 F.2d 827, 834 (D.C. Cir. 1972). In Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519 (1978), the Supreme Court explained that alternatives are not self-defining and must be bounded by some notion of feasibility. 435 U.S. at 551. An EIS cannot be found wanting simply because the agency failed to include every alternative device and thought conceivable to the mind of man. Id. Thus, only reasonable alternatives – alternatives that are ascertainable and reasonably within reach – need be examined. City of Angoon v. Hodel, 803 F.2d 1016, 1022 (9th Cir. 1986), cert. denied, 484 U.S. 870

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<sup>13</sup> By way of example, the applicants in both the Clinton and the Grand Gulf ESP proceedings selected only their own nuclear stations for evaluation as alternative sites. See, e.g., NUREG-1817, "Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf ESP Site: Final Report," (Apr. 2006) at 8-31 – 8-33; NUREG-1815, Vol. 1, "Environmental Impact Statement for an Early Site Permit (ESP) at the Exelon ESP Site: Final Report," (July 2006) at 8-27.



(1987); Druid Hills Civic Ass'n v. Fed. Highway Admin., 772 F.2d 700, 712 (11th Cir. 1985), cert. denied, 488 U.S. 819 (1988). Indeed, as the 7<sup>th</sup> Circuit has recently held, NEPA does not require consideration of alternatives that an ESP applicant is in no position to implement. Envtl. Law & Policy Ctr., 470 F.3d at 684.

In addition, as Dominion explained, Dominion shares a business interest with its parent, DRI, to leverage its existing nuclear facilities in order to maximize the competitiveness of its generating costs and rates. Dom. Exh. 3 at 68-69. Building a new unit at an unaffiliated utility's site would not achieve this objective. Id. at 69. Instead, some of the benefits of adding new units at an existing site would flow to the unaffiliated utility (such as lease payments, or reduced costs from shared services). Id. Dominion stated that providing a benefit to a competitor is inconsistent with Dominion's purposes and goals.<sup>14</sup> Id.

Where the reviewing agency is considering a private applicant's proposal rather than a government project, it is the private applicant's goals that shape the scope of alternatives to be considered.

The scope of alternatives considered by the sponsoring Federal agency, where the Federal government acts as a proprietor, is wide ranging and comprehensive. Where the Federal government acts, not as proprietor, but to approve and support a project being sponsored by a local government or private applicant, the Federal agency is necessarily more limited. In the latter instance, the Federal government's consideration of alternatives may accord substantial weight to the preferences of the applicant and/or sponsor in the siting and design of the project.

Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 197 (D.C. Cir.), cert. denied, 502 U.S. 994 (1991); City of Grapevine v. DOT, 17 F.3d 1502, 1506 (D.C. Cir.), cert. denied, 513 U.S. 1043 (1994); Envtl. Law & Policy Ctr., 470 F.3d at 683-84. See also Hydro Resources, Inc. (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 N.R.C. 31, 55 (2001).

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<sup>14</sup> The two DOE sites evaluated as alternatives would not involve dealing with or benefiting a competing utility.

The dissent quarrels with the Staff's consideration of alternative sites, but none of the dissent's objections withstand scrutiny. First, the dissent suggests that the NUREG-1555 requires the NRC Staff to prove that the candidate sites represented the "best that can be reasonably found for the siting of a nuclear power plant within the ROI." LBP-07-09, Dissent at 3. Again, NUREG-1555 is merely guidance, not a regulation. Further, the dissent truncates the guidance from NUREG-1555, which only states that candidate sites should be "among" the best reasonably found with the ROI. By suggesting that the NRC Staff had to provide that the candidate sites are the "best," the dissent has created a new standard that is neither consistent with NRC guidance nor possible to meet. Finally, the guidance in NUREG-1555 cannot be construed as overriding the case law holding that NEPA requires consideration only of alternatives that are reasonable, feasible and consistent with the applicant's business objectives.

Second, the dissent attempts to distinguish Seabrook on the basis of the size of the ROI being considered, but the size of the ROI is immaterial to whether building on an unaffiliated utility's site is reasonable, feasible, or consistent with Dominion's business purposes. As the majority opinion observes, the dissent's argument ignores both the rule of reason and the Commission case law instructing the agency to be guided by the applicant's goals. See LBP-07-09 at 83-84.

Third, the dissent refers to a recent newspaper article in which another utility, PPL Corp., is reported to state that "it might someday want to form a joint venture to build a third nuclear unit at its Susquehanna nuclear power plant. . . ." LBP-07-09, Dissent at 5-6, citing Tim Meekel, "PPL aims to keep option to build nuclear reactor," Lancaster New Era, June 13, 2007, *available at* <http://local.lancasteronline.com/4/205598>. This article was not part of the evidentiary record, and in any event does not indicate that it would be reasonably feasible or consistent with

Dominion's objectives to form a joint venture to build a new reactor at a competitor's site. Indeed, the article cited by the dissent does state that PPL Corp. is considering entering into a joint venture with a competing utility, but could equally well be referring to the possibility of entering into a joint venture with a reactor vendor. Similarly, the dissent's assertion that "joint ventures are common within the nuclear industry" (LBP-07-10, Dissent at 5) is unsupported by any evidence in the record.<sup>15</sup> Further, that some utilities may have entered into joint ventures many years ago, when their sales were confined to specific service territories prior to the advent of competitive wholesale markets, provides no indication that a competing utility would make its site available to Dominion, or that it would be consistent with Dominion's business objective to build a reactor at a competitor's site. In this proceeding, the record is uncontroverted that Dominion building new nuclear units at an unaffiliated utility's site is not within Dominion's control or reach, or consistent with Dominion's business purposes, and therefore consideration of such alternative sites is not required by NEPA. See, e.g., Dom. Exh. 3 at 68. No record evidence suggests that the site selection process used by Dominion and independently evaluated by the NRC Staff was insufficient or unreasonable.

Finally, the dissent cautions against blindly adopting an applicant's goals when artificially narrowed to circumvent the NEPA alternative analysis. LPB-07-09, Dissent at 9-10. However, the dissent points to no evidence even remotely suggesting that Dominion has artificially narrowed its business objectives, or that Dominion is seeking to circumvent NEPA's requirements. To the contrary, in addition to evaluating its own sites, Dominion also analyzed

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<sup>15</sup> The dissent states that NRC cases "often dealing with anti-trust considerations" address the option of joint ventures by two or more utilities. LBP-07-09, Dissent at 5. While antitrust reviews that were previously required under the Atomic Energy Act could result in a utility being required to offer participation to cooperatives and municipal power systems (see, e.g., Florida Power & Light Co. (St. Lucie Plant, Unit 2), CLI-78-12, 7 N.R.C. 939, 946 (1978), the antitrust review provision in section 105.c of the Atomic Energy Act ("AEA") was amended by the Energy Policy Act of 2005 ("EPAct") so as not to apply to applications filed after EPAct's date of enactment. 42 U.S.C. § 2135(c)(9).

DOE sites that shared many of the same advantages and did not involve subsidizing or being dependent upon competing utilities. In sum, the dissent simply seeks, without any evidentiary support, to substitute his judgment in lieu of the record evidence on what is reasonable, feasible, and consistent with Dominion's business purposes.

The dissent also faults the NRC Staff for "not [taking] even a serious look at other non-nuclear power plant sites owned by Dominion and its affiliates." LBP-07-09, Dissent at 8. This criticism simply ignores the criteria selected to identify candidate sites, which recognized the advantages and preferrability of existing nuclear sites over non-nuclear brownfield sites, and which the Staff determined were reasonable. Affidavit of Andrew J. Kugler in Response to "Dominion's Supplement to the Record on Alternative Sites" and to Supplement the Record in this Proceeding with respect to Alternative Sites (May 11, 2007) ("Kugler Aff.").

Further, the dissent's assertion that short shrift was given to Dominion's non-nuclear sites (LPB-07-09, Dissent at 11) is unfounded. The focus on existing nuclear sites reflected Dominion's knowledge that non-nuclear generating stations generally are not reasonable alternatives for siting new nuclear units. Kugler Aff. ¶ 6. Dominion explained that there are a number of factors why such sites are generally not reasonable alternatives. Id. ¶¶ 6-11.

First, non-nuclear power plants owned by Dominion typically lack the land needed to meet the exclusion area requirements for a nuclear power plant. Gas-fired plants are usually located on small sites. While coal-fired plants may be on larger sites, there is usually limited developable acreage because the land is used for either storage of coal or disposal of ash. Thus, developing new nuclear units at an existing non-nuclear site would typically involve developing an adjacent, greenfield property. As discussed in Section 9.3.3.3 of the Environmental Report, Dominion performed a generic analysis demonstrating that a greenfield property would not be a

reasonable candidate site compared to existing nuclear sites. Kugler Aff. ¶ 7. Contrary to the dissent's assertion that "concrete, practical, and feasible options," such as purchasing additional land adjacent to brownfield sites "were not considered" by Dominion with regard to other sites that its affiliates owned (LBP-07-09, Dissent at 11), the purchase of greenfield property adjacent to brownfield property was considered and determined to not be reasonable. Smith Decl., ¶ 7.

Second, non-nuclear power plants typically do not have excess transmission capacity beyond that required for the operating units at those sites (as compared to Dominion's nuclear sites that were originally intended for additional units). Id., ¶ 8.

Third, non-nuclear power plants are often sited in locations that are more urban than is appropriate for a nuclear unit. Non-nuclear generating units are not subject to the same accident considerations and population density restrictions and therefore can be located in urban areas closer to load centers. Id., ¶ 9. Beyond these considerations, Dominion stated that the likelihood that a non-nuclear site would meet all the NRC's siting criteria when these criteria were not part of the original site selection is unlikely. Id., ¶ 10.

Moreover, to demonstrate that the judgments reflected in its selection criteria were correct, Dominion examined the characteristics of the non-nuclear power plant sites owned by its affiliates. This examination revealed that there is only one site that would be big enough to provide an appropriate exclusion area. This site is in a mountainous location, and an initial evaluation indicates that the site would not have sufficient available water resources to support even one nuclear unit employing a reduced water consumption wet/dry cooling system as proposed for the third unit at the ESP Site. Id., ¶ 11. Thus, the uncontroverted evidence in this proceeding demonstrates that the non-nuclear generating stations owned by Dominion's affiliates

are not reasonable candidate sites and are not reasonable alternatives to the proposed ESP Site. Accordingly, there was no need for the FEIS to discuss such sites.

In sum, the record evidence, including expert testimony by Dominion and the NRC Staff demonstrates that the site selection process and evaluation of alternative sites satisfied the obligations of NEPA. There is no evidence in the record that contradicts Dominion's and the NRC Staff's expert opinion. It should be noted that Dominion's objective was to develop a list of candidate sites that represented realistic options reasonably available to Dominion. Id., ¶ 5. Contrary to the dissent's suggestion that the result was "predetermined" (LBP-07-09, Dissent at 1), the study that Dominion performed under a Cooperative Agreement with the U.S. Department of Energy (ER, Section 9.3, Reference 2) was specifically intended to enable all of the sites to be considered suitable for the development of new nuclear generation. Thus, the candidate sites were not selected with any intent to bias the results toward North Anna. Smith Decl., ¶ 5. As described above, the NRC Staff took the necessary hard look at alternative sites and satisfied its NEPA obligations.

**B. Alternative Cooling Systems**

The majority opinion correctly concluded that it was not reasonable or necessary to consider, as a system design alternative, the imposition of water conservation measures on pre-existing units 1 and 2. LBP-07-09 at 87. This finding was supported by the testimony and evidentiary responses of both Dominion and the NRC Staff. In contrast, the dissent's assertion that NEPA requires that water conservation measures on the existing Units 1 and 2 at the NAPS site be considered is unsupported.

Prior to the hearing, the Board asked whether the possibility of additional equipment or operating procedures at existing Units 1 and 2 had been considered as an alternative for

mitigating the incremental adverse impacts of proposed Units 3 and 4. Both Dominion and the NRC Staff responded that this was not a reasonable alternative. Staff Exh. 10 at 86 (response to environmental question 112A); Dom. Exh. 3 at 62 (response to environmental question 112A). See also Dominion's Memorandum Responding to the Legal Questions in the Licensing Board's February 7, 2007 Order (Mar. 1, 2007) at 17 ("As a factual matter, Dominion has not identified any modifications to the design or operation of the existing units that would constitute effective or reasonable means of mitigating the consumptive use of water by new units.").

These responses were supported by the testimony during the evidentiary hearing. The testimony indicated that the installation of wet cooling towers on the existing units would not mitigate consumptive use of water. The use of wet cooling towers consumes more water than the once-through cooling currently used for Units 1 and 2. See Tr. 116-17, 125 (Vail).

Although the water consumption of the existing units could be reduced by installing dry cooling, the testimony demonstrated that such a modification is not a reasonable alternative to mitigate the consumption from new units. NAPS Units 1 and 2 were designed and built with once-through cooling water systems. Tr. 189 (Waddill). The record is clear that nuclear power plants designed with once-through cooling water systems have different condenser and turbine designs, predicated on different flows and specific temperatures, than plants designed to use cooling towers. Tr. 189-90 (Waddill). As a result, NAPS Units 1 and 2 cannot be reasonably modified to use cooling towers without rebuilding large portions of those units. Tr. 189-90 (Waddill). The addition of dry cooling towers to Units 1 and 2 would also reduce the generating capacity of the existing units. Staff Exh. 10 at 86 (response to environmental question 112A).

Because rebuilding NAPS Units 1 and 2 to use dry cooling towers would be costly and involve rebuilding large portions of those Units, it is not a reasonable alternative to mitigate the

impacts of the new units. Tr. 189-90 (Waddill); Dom. Exh. 3 at 30, 62 (response to environmental questions 45 and 112A). If it were desirable to reduce water consumption further with dry cooling, it would obviously be simpler to install such dry cooling on the new units when they are built, rather than taking the existing units out of service and extensively redesigning and modifying their cooling system. Because the same effect can always be accomplished in the design of the new units, a much more complex and costly modification of the existing units to install dry cooling can never be a reasonable alternative to mitigate the impact of the new unit.

To reduce water consumption, other than through the redesign and rebuilding of the Units to add dry cooling towers, Units 1 and 2 would have to be de-rated, i.e., reducing the generating capacity of those units. Staff Exh. 10 at 86 (response to environmental question 112A); Dom. Exh. 3 at 30, 62 (response to environmental questions 45 and 112A); Tr. 124-25 (Vail), 191 (Waddill). Reducing the generating capacity of Units 1 and 2 is not considered a reasonable alternative mitigation measure where the purpose of the proposed action is increasing generating capacity. Staff Exh. 10 at 86 (response to environmental question 112A); Dom. Exh. 3 at 62 (response to environmental question 112A). Derating would result in lost generation and the need to provide power from other sources with associated environmental impacts. Dom. Exh. 3 at 62 (response to environmental question 112A).

In contrast, there is not evidence supporting the dissent's opinion that modifying the existing units might be reasonable. Both the NRC Staff's experts and Dominion's experts testified that it would not be reasonable to do so. Instead, the dissent is just speculation. See, e.g., LBP-07-09, Dissent at 12 ("It seems to me that creative nuclear engineers and environmental scientists, if properly motivated, might very well propose realistic offsets or mitigation measures that could be applied to the pre-existing reactors on the same site.") Here,



the two technical members of the Board, including Judge Cole who holds a Ph.D. in Civil Engineering and is a diplomat of the American Academy of Environmental Engineers (Tr. 6), have considered the evidence and determined that modifying the existing units is not reasonable. The dissent's contrary opinion provides no basis to overturn this expert judgment.

### CONCLUSION

For all of the foregoing reasons, the Commission should affirm the granting of the ESP.

Respectfully submitted,



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Dated: August 23, 2007

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

Before the Commission

In the Matter of	)	
	)	
DOMINION NUCLEAR NORTH ANNA, LLC	)	Docket No. 52-008
	)	
(Early Site Permit for North Anna ESP Site)	)	ASLBP No. 04-822-02-ESP

CERTIFICATE OF SERVICE

I hereby certify that copies of Dominion's Brief in Response to CLI-07-23, dated August 23, 2007, were served on the persons listed below by deposit in the U.S. mail, first class, postage prepaid, and where indicated by an asterisk electronic mail, this 23<sup>rd</sup> day of August, 2007.

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