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Date: 2/7/05 8:40AM
Subject: Information to Support Upcoming Meeting to Discuss North Anna ESP DSER

Mike,

Attached is a table with our comments on the North Anna ESP DSER that could aid us in our discussions regarding the agenda for the proposed meeting between Dominion and the NRC staff.

Joe H.

(See attached file: North Anna Early Site Permit - Dominion Comments on DSER -..pdf)

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Mail Envelope Properties (42076FBD.CBF : 22 : 11455)

Subject:	Information to Support Upcoming Meeting to Discuss North Anna ESP DSER
Creation Date:	2/7/05 8:39AM
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Files	**Size**	**Date & Time**	
MESSAGE	285	02/07/05 08:39AM	
North Anna Early Site Permit - Dominion Comments on DSER -..pdf			196145
Mime.822	270298		

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Priority:	Standard
Reply Requested:	No
Return Notification:	None
Concealed Subject:	No
Security:	Standard

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
1	Throughout the DSER. General	Various.	Dominion would like to discuss what criteria the NRC used for Permit Conditions versus COL Action Items.
2	Throughout the DSER. Pages 2-23 and 2-24, for example. General	Throughout the DSER, various site characteristics are described as "design-basis site characteristics." See, for example DSER Table 2.3.1-1 on page 2-23 and DSER Table 2.3.1-3 on page 2-24.	▪ Use of the wording "design-basis" is not appropriate. ▪ The design bases for a future plant or plants that could be constructed and operated on the ESP site has not been established in Dominion's SSAR. ▪ The design bases for a future plant or plants would be established as part of detailed engineering and described in the COL application. ▪ Further, if a certified design is chosen, the design bases for structures, systems, and components within the scope of the certified design would be established in the Design Control Document.
3	Page 2-3 Top of page 2.1.1	**COL Action Item 2.1-1**. "The staff will review the exact coordinates of the new units at the time of a combined license (COL) application when the applicant selects new units in the proposed ESP site. This is **COL Action Item 2.1-1**, "Latitude and longitude and Universal Transverse Mercator coordinates for new units in the proposed ESP site."	Dominion agrees with this COL Action Item.
4	Page 2-6 1st full paragraph 2.1.2.3	**Open Item 2.1-1**. "As noted in Section 2.1.2.1 of this SER, the applicant intends to reach appropriate legal terms with the present owners of the ESP site at such time as the applicant elects to construct a nuclear power plant on the site. The applicant has therefore not attempted to demonstrate that it currently has the authority to determine all activities, including exclusion or removal of personnel and property from the area, as required by 10 CFR 100.3. To meet the exclusion area control requirement of 10 CFR 100.21(a), "Non-Seismic Site Criteria," and 10 CFR 100.3, the applicant does not need to demonstrate total control of the property before issuance of the ESP. However, the applicant must provide reasonable assurance that it can acquire the required control, i.e., that it has the legal right to obtain control of the exclusion area. The applicant should demonstrate that it has the legal right to control the	Dominion would like to discuss our planned response to this Open Item.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		exclusion area, or has an irrevocable right to obtain such control. This is **Open Item 2.1-1.**"	
5	Page 2-6 2nd full paragraph 2.1.2.3	**Permit Condition 2.1-1**. "Should the NRC grant the ESP and the ESP holder decide to perform the activities authorized by 10 CFR 52.25, the ESP holder will need to obtain the authority to undertake those activities on the ESP site. In obtaining such a right, the ESP holder will also need to obtain the corresponding right to implement the site redress plan described in the staff's final environmental impact statement in the event no plant is built on the ESP site. This issue might be resolved through the applicant's actions to obtain control over the exclusion area or the legal right to obtain such control in addressing Open Item 2.1-1. If this issue is not resolved by the time the staff completes the FSER, the staff will include this item in any ESP that might be issued for the proposed site as **Permit Condition 2.1-1.**"	Dominion would like to discuss this Permit Condition based on our planned response to Open Item 2.1-1.
6	Page 2-6 3rd full paragraph 2.1.2.3	**COL Action Item 2.1-2**. "The North Anna exclusion area extends into Lake Anna and the Waste Heat Treatment Facility (WHTF). Should the NRC grant the ESP and the ESP holder decide to apply for a COL (or for a construction permit [CP] and operating license [OL]), the ESP holder will need to make arrangements with the appropriate local, State, Federal, or other public agencies to provide for control of the portions of Lake Anna and the WHTF that are within the exclusion area. These public agencies, together with the ESP holder, will need authority over these bodies of water sufficient to allow for the exclusion and ready removal, in an emergency, of any persons present on them. This is **COL Action Item 2.1-2.** No State or county roads, railways, or waterways traverse the North Anna ESP exclusion area."	Dominion would like to discuss our planned response to this Open Item.
7	Page 2-10 3rd full paragraph 2.1.3.3	"The applicant evaluated design-basis accidents in Chapter 15 of the SSAR, and the staff independently verified the applicant's evaluation in Section 15 of this SER to demonstrate that the radiological consequences of design-basis reactor accidents..."	The DSER wording in these 2 sections is not consistent with SSAR Chapter 15, which evaluated representative design basis accidents.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
	Page 2-11 Last paragraph on page 2.1.3.4	"In Section 15 of this SER, the staff documents that the radiological consequences of bounding design-basis accidents..."	
8	Page 2-16 1st full paragraph on page 2.2.1.3-2.2.2.3	**COL Action Item 2.2-1**. "The staff evaluated the information on the nearby 620-acre development that the applicant provided in its response to RAI 2.2.1-1. Included among the 30 industrial uses permitted for this area are "acetylene gas manufacture on a commercial scale," "fireworks or explosives manufacture," ...Given these provisions, the staff finds that potentially incompatible uses may be permitted to locate adjacent to the ESP site... Therefore, these conditions will require further evaluation at the time of the COL application. This is **COL Action Item 2.2-1.**"	This COL Action Item is unnecessary considering the requirements of 10 CFR 52.79 and 10 CFR 50.9.
9	Page 2-18 Near bottom of page 2.2.3.3	**COL Action Item 2.2-2**. "The staff independently reviewed possible hazards posed by the existing NAPS units. This review did not identify any hazards that would preclude the provision of protective or mitigative design features for a nuclear power plant or plants to be constructed on the ESP site. This view is supported by the fact that the staff found, during the licensing review for NAPS Units 1 and 2, that design features of those units would adequately protect the NAPS units against identified hazards (e.g., release of toxic or flammable materials, internal and external missiles, etc.). Design-specific interactions between the existing and new units would need to be evaluated and, if necessary, addressed at the COL stage. The need for consideration of design-specific hazards interactions is **COL Action Item 2.2-2.**"	Dominion agrees with this COL Action Item.
10	Page 2-18 Last paragraph on page 2.2.3.4	"The staff finds that the applicant has selected those potential accidents which should be considered as design-basis events at the COL stage, in accordance with 10 CFR Part 100, and has identified and evaluated hazards from nearby facilities such that the staff concludes such facilities pose no undue risk to the type of facility proposed for the	Dominion would like to discuss the wording "design-basis events."

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		site, subject to confirmation at COL regarding design-specific hazards interactions."	
11	Page 2-21 3rd bullet under Section 2.3.1.1	"meteorological conditions used as design and operating bases, including the following..."	Dominion would like to discuss the wording "design and operating bases."
12	Page 2-30 3rd full paragraph 2.3.1.3	Open Item 2.3-1. "The applicant proposed a design-basis site characteristic wind speed of 64 mi/h, which the applicant stated represents a "fastest mile of wind" at 10 m (33 ft) above the ground with a 100-year return period. This value is presented in Table A-7 of ANSI A58.1-1982, "Minimum Design Loads for Buildings and Other Structures," as the extreme fastest-mile wind speed having a 0.01 annual probability of being exceeded at Richmond. The applicant's chosen 100-year return period fastest-mile design-basis wind speed of 64 mi/h is not conservative when compared to the minimum 50-year return period fastest-mile basic wind speed of 70 mi/h specified in Section 6.5.2 of ANSI A58.1-1982. The applicant's chosen value is also not conservative when compared to the highest fastest-mile wind speed of 68 mi/h recorded at Richmond during the 32-year period of record, 1958–1989. The applicant needs to justify an acceptable design basis wind speed. This is **Open Item 2.3-1.**"	Dominion would like to discuss our response this Open Item and the following issues: ▪ RS-002 guidance, which identifies ANSI A58.1-1982. ▪ Use of the wording "design basis wind speed." ▪ Possible derivation of wind speed from 3-second wind gust wind speed. ▪ Possible identification of 3-second gust wind speed as a site characteristic in lieu of wind speed.
13	Page 2-30 4th full paragraph 2.3.1.3 Page 2-34 Table 2.3.1-7, "Basic Wind Speed (3-second gust)	"The applicant has also defined a 3-second gust wind speed site value of 96 mi/h, based on a 100-year return period at 10 m above the ground. The applicant determined this value in accordance with the guidance provided by ASCE and SEI ("Minimum Design Loads for Buildings and Other Structures," SEI/ASCE 7-02). Therefore, the staff concludes that a 3-second gust wind speed site characteristic of 96 mi/h is acceptable."	This DSER wording is not consistent with SSAR Table 1.9-1. SSAR Table 1.9-1 does not identify the 3-second gust wind speed as a site characteristic value.
14	Page 2-32 1st and 2nd paragraphs on page 2.3.1.3	Open Item 2.3-2. "The applicant has identified a 48-hour winter probable maximum precipitation (PMP) value of 20.75 in. for the North Anna ESP site. The winter PMP value is specified in RG 1.70 to assess the potential snow loads on the roofs of safety-related structures. However, the applicant	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ The DSER wording in the 1st paragraph on page 2-32 is not consistent with SSAR Section 2.4.7.6 (page 2-2-130). See also other locations in the DSER, for example, page

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
	(Other locations in DSER such as Page 2-35 Table 2.3.1-7, "Ground Snow Load", Page 2-95 1st paragraph, Page 2-99 4th full paragraph)	has proposed an alternative approach (as discussed in the following paragraph) for defining the site characteristic snow load that does not rely on the winter PMP value. Consequently, the staff did not evaluate or accept the applicant's winter PMP value." "As noted above, the applicant has proposed a site characteristic ground snow load value of 30.5 lbf/ft2, which is based on the 100-year return period snowpack for the North Anna ESP site. Section 2.3.1.2 of RG 1.70 states that the weight of snow and ice on the roof of each safety-related structure should be a function of the weight of the 100-year return period snowpack and the weight of the 48-hr winter PMP for the site vicinity. The combined 100-yr return snowpack and the estimated winter PMP may be an unreasonable snow/ice roof loading for a structure at the North Anna ESP site, given that snow generally remains on the ground for only 1 or 2 days. As an alternative, a combination of the 100-year return snowpack and the maximum-recorded monthly snowfall in the North Anna ESP site region may be a reasonably conservative site-characteristic ground snowload for designing the roofs of safety-related structures. The applicant needs to justify the exclusive use of snowpack weight or provide an alternative method. This is **Open Item 2.3-2.**"	2-95, 1st paragraph and page 2-99, 4th full paragraph. ▪ Guidance contained in RG 1.70. ▪ Determination of the regulation or regulatory guidance document that identifies the need to specify a ground snow load. ▪ Possibility of identifying winter PMP value of 20.75 inches of rain as a site characteristic in SSAR Table 1.9-1. ▪ Roof design and design bases for safety-related structures would be determined as part of detailed engineering and described in the COL application.
15	Page 2-33 2nd to last paragraph on page 2.3.1.3	<u>Open Item 2.3-3</u>. "The staff believes that the applicant needs to identify an additional UHS design-basis site characteristic for use in evaluating the potential for water freezing in the UHS water storage facility, a phenomenon which would reduce the amount of water available for use by the UHS. The lowest 7-day average air temperature recorded in the site region may be a reasonably conservative site-characteristic for evaluating the potential for water freezing in the UHS water storage facility. This item is unresolved and is **Open Item 2.3-3.**"	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ Determination of the regulation or regulatory guidance document that identifies the need to specify a minimum UHS temperature. ▪ Possibility of identifying 200 degree Fahrenheit-days based on Richmond weather data as a site characteristic in SSAR Table 1.9-1.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
16	Page 2-40 4th full paragraph on page 2.3.2.3	Open Item 2.3-4. "Because of the limited and localized nature of the expected terrain modifications associated with the development of the ESP facility, the staff finds that these terrain modifications, along with the resulting plant structures and associated improved surfaces, will not have enough of an effect on local meteorological conditions to affect plant design and operation. Similarly, because the operation of an open-cycle cooling system for the applicant's proposed unit 3 is not expected to significantly impact either atmospheric temperature extremes or increase the occurrence of local fog, the staff finds that the atmospheric impact of the operation of an open-cycle cooling system for proposed unit 3 will not affect plant design and operation. However, the applicant has not described how potential increases in atmospheric temperature resulting from the operation of closed-cycle dry cooling towers associated with proposed unit 4 would impact plant design and operation. This item is unresolved and is **Open Item 2.3-4.**"	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ Intention would be to perform a semi-quantitative evaluation in response to the Open Item. ▪ Need for a COL Action Item to perform detailed analysis.
17	Page 2-45 Middle of page 2.3.4.1	COL Action Item 2.3-1. " Section 2.2 of this SER addresses potential nonradiological accidents on or in the vicinity of the site that could affect control room habitability (such as toxic chemical releases). However, in order to evaluate atmospheric dispersion characteristics with respect to radiological releases to the control room, detailed design information (e.g., vent heights, intake heights, distance and direction from release vents to the room) is necessary. Because little detailed design information is available for the nuclear power plant(s) that might be constructed on the proposed site, the staff will evaluate the dispersion of airborne radioactive materials to the control room at the COL or CP stage. This is **COL Action Item 2.3-1.**"	This COL Action Item is unnecessary considering the requirements of GDC 19.
18	Page 2-50 1st paragraph on page 2.3.4.4	"Therefore, the staff concludes that the applicant's atmospheric dispersion estimates are appropriate for the assessment of consequences from radioactive releases for design-basis accidents, in accordance with 10 CFR 100.21."	This DSER wording is not consistent with 10 CFR 100.21(c)(2) which states: "...postulated accidents..."

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No.	DSER Page/Location DSER Section	DSER Wording	Comment
19	Page 2-53 Near bottom of page 2.3.5.3	COL Action Item 2.3-2: "Any COL or CP applicant referencing this information will need to confirm that the specific release point characteristics and specific locations of receptors of interest used to generate the ESP long-term atmospheric dispersion site characteristics bound the actual values provided at the COL or CP stage. This is **COL Action Item 2.3-2.**"	This COL Action Item is unnecessary considering the requirements of 10 CFR 52.79 and 52.89.
20	Page 2-57 End of 2nd paragraph 2.4	"The ultimate heat sink (UHS) for each of the proposed units would consist of mechanical draft cooling towers over a buried engineered water storage basin."	The DSER wording should recognize that some advanced reactor designs do not require a conventional UHS to provide safety-related cooling during emergency shutdown.
21	Page 2-61 2nd full paragraph on page 2.4.1.3	"The applicant stated in SSAR Section 2.4.1.2.1 that the discharge measured at the Partlow streamflow gauge reflects the regulated outflow from Lake Anna for the entire period of record since the dam was completed in 1972. The staff determined that this statement is inaccurate because measurements of discharge from the dam are not available from the closure of the dam sometime in 1972 until October 1, 1978."	The wording in SSAR Section 2.4.1.2.1 (page 2-2-114) is accurate which states: "Outflows from Lake Anna have been measured on the North Anna River near Partlow, Virginia, which is located just downstream of the dam at the Virginia Route 601 bridge. The drainage area at this stream gauge is 344 square miles. The daily streamflow record for this gauging station extends from October 1978 through September 1995. The discharge at this station reflects the regulated outflow from Lake Anna for the entire period of record since the dam was completed in 1972. " The SSAR accurately states the period of record for the North Anna River, which the USGS states as beginning October 1, 1978 and ending October 9, 1995 for USGS 01670400 North Anna River Near Partlow VA. The streamflows recorded during period of record for this station do reflect the regulated outflow from Lake Anna. No data was recorded between dam closure and October 1, 1978.
22	Page 2-61 Last paragraph on page 2.4.1.3	Open Item 2.4-1. "The applicant's response to RAI 2.4.1-1 included a figure that listed the coordinates of the corners of the ESP PPE (ESP site footprint). However, the applicant did not identify the coordinate system. The staff needs information regarding the coordinate reference system and the units of these coordinates to fully define the boundaries of the ESP site footprint. This is **Open Item 2.4-1.**	Dominion would like to discuss our planned response to this Open Item, which would provide a cross-reference to the Virginia State coordinate system.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
23	Page 2-62 2nd full paragraph 2.4.1.3	Open Item 2.4-2. Permit Condition 2.4-1. "The applicant provided a figure that contains a layout of the ESP intake and discharge tunnels. Based on SSAR Figure 1.2-4, the staff determined that parts of the ESP intake and discharge tunnels will be located outside the PPE (ESP footprint). The applicant needs to specify minimum distances from the SSCs of the existing units to the ESP intake and discharge tunnels to ensure no interference will occur. This is **Open Item 2.4-2.** Once these distances are provided, and assuming the staff agrees with them, the staff plans to impose these distances as **Permit Condition 2.4-1** to ensure that no such interference will occur if a COL or CP is ultimately granted."	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ Determination of the regulation or regulatory guidance document that identifies the need to specify a minimum distance between intake and discharge tunnels and adjacent unit SSCs. ▪ COL Action 2.2-2 already addresses this issue. ▪ Existing requirements of 10 CFR 50 licenses for Units 1 and 2 (e.g., 10 CFR 50.59, maintenance rule, etc.).
24	Page 2-62 3rd full paragraph on page 2.4.1.3	Open Item 2.4-3. "The applicant estimated a margin of 5.9 m3/s (209 cfs) in the water budget, assuming that the average net inflow of 10.5 m3/s (370 cfs) would always be available. Nonsafety-related cooling water needs for all units, including the proposed additional units, are 3.4 m3/s (121 cfs), and a minimum release of 1.1 m3/s (40 cfs) from Lake Anna is required by the State of Virginia. However, during periods of low flow, the expected inflow into Lake Anna can be substantially lower than the average inflow. These periods may be critical for nonsafety-related cooling needs. The applicant needs to describe the potential impacts of low-flow conditions on the operation of all units. This is **Open Item 2.4-3.**"	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ SSAR Section 2.4.11.4 contains a description of impacts through reference to ER Section 5.2.2. ▪ Recent modifications to the Units 1 and 2 intakes.
25	Page 2-63 Top of page 2.4.1.3	Permit Condition 2.4-2. "SSAR Section 2.4.1.1 reports an estimated consumptive water use of 71.9 m3/s (2540 cfs) for Unit 3, and 1.2 m3/s (44 ft3/s) for the proposed Unit 4. A subsequent letter from the applicant to the NRC dated March 31, 2004, stated that the proposed Unit 4 would use a dry cooling tower. In RAI 2.4.1-4, the staff requested the applicant to clarify whether or not the cooling water flow values are annual averages or maximums. If they are annual averages, estimates for daily maximums are needed. In its response, the applicant stated that the cooling water	Dominion would like to discuss this Permit Condition and the following issues: ▪ The DSER wording is not consistent with SSAR Section 2.4.1.1 (page 2-2-112), which states: "The new units would also use the North Anna Reservoir as the source of cooling water. New Unit 3 would use a once-through cooling system that would withdraw water at rate of about 2540 cubic feet per second (cfs) from the North Anna Reservoir, circulate it through the condensers, and return the water to the reservoir via the WHTF." The 2540 cfs

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		flow rate for the proposed Unit 3 of 71.9 m3/s (2540 cfs) is a nominal value, and that the daily maximum flow rate would be within a few percent of this nominal value. In addition, a sm all amount of water, on the order of 6.3x10-5 m3/s (1 gpm), will be consumed by the proposed Unit 4 secondary cooling loop evaporative losses. Based on information provided in the SSAR and the applicant's response to the RAIs discussed in this section of this SER, the staff concludes that the additional water budget available for use by the new units is 71.9 m3/s (2540 cfs). The staff intends to identify this maximum water use as **Permit Condition 2.4-2.** "	value does not represent consumptive use. All 2540 cfs is returned to Lake Anna. The water lost to evaporation in the lake (about 29 cfs) is the consumptive use. ▪ SSAR Table 1.9-1 identifies the maximum Unit 3 cooling water flow rate as 1,140,000 gpm, nominal versus cfs, maximum.
26	Page 2-63 End of 2nd paragraph 2.4.1.3	"The PPE table (SSAR Table 1.3-1) states that the maximum inlet temperature is limited to 32.8 °C (91 °F); the staff intends to include this parameter value in any ESP that the NRC might issue for the site."	This DSER wording is not consistent with SSAR Table 1.9-1. SSAR Table 1.9-1 does not specify a maximum inlet temperature as a design parameter.
27	Page 2-68 3rd full paragraph 2.4.2.3 Page 2-105 1st full paragraph	**Permit Condition 2.4-3**. **Permit Condition 2.4-4**. **Permit Condition 2.4-9**. "Drainage systems, such as storm drains or culverts, may become blocked during a flooding event. To preclude the possibility of a safety concern for this reason, the staff intends to specify in **Permit Condition 2.4-3** that any COL or CP applicant would be required to design the ESP site grade in such a way as to ensure that flooding caused by local intense precipitation on the ESP site will be discharged to Lake Anna without relying on such systems. In addition, the staff intents to specify in **Permit Condition 2.4-4** that the COL or CP applicant will also be required to locate any safety-related facility at an elevation above the maximum water surface elevation produced by local, intense precipitation (PMP) expected on the ESP site." "In SSAR Sections 2.4.2 and 2.4.3, the applicant estimated the design-basis flood elevation at the ESP site to be 81.5 m	Dominion would like to discuss these Permit Conditions and the following issues: ▪ The need for Permit Conditions versus COL Action Items. ▪ This DSER wording is not consistent with the wording in SSAR Sections 2.4.2.3 and 2.4.7.7. See also the DSER wording on Page 2-105, 1st full paragraph, and Page 2-106, 3rd paragraph. ▪ Determination of the regulation or regulatory guidance document that requires local intense precipitation to be discharged to "Lake Anna without relying on such systems." ▪ Safety-related structures will extend significantly below grade and below surface water elevation, as is typical with most nuclear plant designs. ▪ The grade elevation is not identified as a site characteristic or design parameter in SSAR Table 1.9-1. ▪ Use of the wording on DSER page 2-106, 3rd paragraph. "include the grade elevation as a PPE in any ESP."

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
	2.4.10.1 Page 2-106 3rd paragraph 2.4.10.3	(267.4 ft) MSL. This elevation includes effects of flooding caused by a PMF resulting from a PMP over the North Anna Dam's drainage area, wind setup, and wave runup. The applicant stated that all safety-related SSCs for the proposed additional units would be placed at or above the existing site grade of 82.6 m (271.0 ft) MSL. The applicant therefore concluded that no safety-related flood-protection facilities are required for the ESP site." "Since the ESP site grade (at an elevation of 83 m (271.0 ft) above MSL) is higher than the design-basis flood elevation (82.3 m (270 ft) MSL), there are no applicable flood protection requirements. However, to ensure that safety-related SSCs that may be constructed on the proposed site are protected from flooding, they must be constructed with ingress and egress openings located above the elevation of 83 m (271 ft) MSL. This is **Permit Condition 2.4-9.** The staff plans to include the grade elevation as a PPE in any ESP that might be issued for the proposed site."	
28	Page 2-78 2nd full paragraph 2.4.3.3 Page 2-122 Table 2.4.14-1	"The staff estimated the maximum water surface elevation at the ESP site by adding wave height [1.3 m (4.3 ft)) and wind setup (0.14 m (0.46 ft)] to the maximum water surface elevation at the dam [80.7 m (264.6 ft) MSL]. The staff estimated the maximum water surface elevation at the ESP site to be 82.14 m (269.5 ft) MSL. This conservatively estimated maximum water surface elevation at the ESP site is 0.46 m (1.5 ft) below the plant grade. Two small lakes exist upstream from Lake Anna. Lake Louisa was formed by the construction of Louisa Dam on Hickory Creek in 1960, and Lake Orange was formed by the construction of Lake Orange Dam on Clear Creek in 1964. The combined capacity of these two lakes is 9.46 million m^3 (7,671 ac-ft), approximately equal to 3 percent of Lake Anna's storage capacity between normal pool and the top of the North Anna Dam. In Section 2.4.4 of this SER, the staff	Dominion would like to discuss the value for the site characteristic for flood elevation. Dominion has not confirmed the staff's SER analysis and, thus, the 270 ft MSL elevation cannot be included in SSAR Table 1.9-1.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
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		estimated that an increase in inflow volume of 9.46 million m_3 (7,671 ac-ft) to Lake Anna would result in an increase of 0.2 m (0.9 ft) in water surface elevation, if the starting elevation were 76.2 m (250 ft) MSL. The water surface elevation would increase 0.15 m (0.5 ft), if the starting water surface elevation were 80.8 m (265 ft) MSL. Therefore, the staff estimated the water surface elevation corresponding to the PMF, coincident wind wave action, and breach of Lakes Louisa and Orange to be 82.3 m (270 ft) MSL. The staff concluded from this information that the maximum water surface elevation caused by the PMF and the coincident wind effects will not result in flooding of the ESP site. The staff's estimate of the PMF level is slightly higher than the applicant's (270 ft MSL vs 267.39 ft MSL)."	
29	Page 2-83 1st full paragraph 2.4.4.3	**Permit Condition 2.4-5**. "In the event of failure of the North Anna Dam, the proposed new nuclear power plants would rely on the UHS for essential cooling. The applicant intends to use underground reservoirs for the UHS, approximately 15.2 m (50 ft) deep. The maximum elevation of ground water at the proposed site is 82.3 m (270 ft) MSL. It is essential for ensuring the integrity of the UHS reservoirs that any uplift of the reservoirs caused by buoyancy, either during construction or during the life of the proposed plants, is precluded. Therefore, the free surface elevation of the UHS may not fall below 82.3 m (270 ft) MSL. This is **Permit Condition 2.4-5**."	Dominion would like to discuss this Permit Condition and the following issues: ▪ This Permit Condition is unnecessary because COL Action Item 2.5-4 already addresses this issue. ▪ As worded, the 270 ft MSL minimum free surface elevation would apply after 30 days of UHS usage and associated evaporation. Given that site grade is 271 ft MSL, most of a UHS basin would have to be above ground to meet this condition. ▪ This Permit Condition ignores the forces resisting hydrostatic uplift (weight of the basin, weight of cooling towers, friction) and precludes the use of engineered measures to mitigate uplift potential. ▪ The DSER wording should identify that some reactor designs would not require a UHS. ▪ The UHS would be designed as part of detailed engineering and described in the COL application.
30	Page 2-83 2nd full paragraph 2.4.4.3 Other locations	**Permit Condition 2.4-6** "Based on the applicant's dimensions of the underground UHS basin, the staff estimated the storage capacity of the UHS basins to be 116,453 m^3 (4.1 million ft^3). Based on its review of site water availability, the staff concludes that the specified UHS	Dominion would like to discuss this Permit Condition and the following issues: ▪ This DSER wording is not consistent with SSAR Table 1.9-1. SSAR Table 1.9-1 does not specify a minimum UHS capacity as a design parameter.

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
	throughout the DSER.	storage capacity should be treated as a minimum acceptable capacity. This is **Permit Condition 2.4-6.**"	▪ For those units that require a conventional UHS, a mechanical draft cooling tower over an underground basin would be used. A separate cooling tower and basin would be provided for each unit. Each basin would be sized to store a 30-day supply of emergency cooling water to maintain the unit in a safe shutdown mode. The bounding storage volume from SSAR Section Table 1.3-1, Item 3.3.16 for each basin is 30,600,000 gallons (4,090,625 ft^3). The estimated dimensions of the UHS cooling tower basin are approximately 235 ft wide by 350 ft long by 50 ft deep. The PPE value for UHS water basin capacity is based on providing 30 days of water storage for the ABWR/ESBWR reactor and represents a maximum, not a minimum. Storage requirements for other reactors using a conventional UHS are less. ▪ The design of an UHS is not included in the ESP SSAR. The minimum size of the UHS, if required by the reactor design, would be determined as part of detailed engineering and described in the COL application.
31	Page 2-83 Middle of page 2.4.4.4	"As set forth above, the applicant has provided sufficient information pertaining to dam failures. Therefore, the staff concludes that the applicant has met the requirements relating to dam failures, with respect to 10 CFR 52.17(a) and 10 CFR 100.20(c), and the applicant has considered the most severe natural phenomena that have been historically reported for the site and surrounding area in establishing the design basis dam failure, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated."	Dominion would like to discuss the wording "design basis dam failure."
32	Page 2-97 1st paragraph 2.4.7.3	**Open Item 2.4-4**. "Because there is an historical record of ice jams on the North Anna River, the staff determined that the applicant should address the possibility of an ice jam or an ice dam formation upstream of the ESP site, and should estimate the effect of a flood wave generated from the breakup of such an ice formation. This is **Open Item 2.4-4.**"	Dominion would like to discuss our planned response to this Open Item.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
33	Page 2-98 Middle of page 2.4.7.3	Open Item 2.4-5. "The maximum accumulated degree-days below freezing during the period of December 1, 1976, to March 31, 1977, were 178.8 °C (321.8 °F), as shown in Figure 2.4.7-1. The staff used Assur's method to estimate a maximum ice thickness of 43.4 cm (17.1 in.). The staff's estimate is higher than the applicant's estimate of 34.3 cm (13.5 in). However, this difference does not have any safety impact because, as explained below, the increase in ice thickness does not affect the intake for the proposed additional units. The staff intends to include a site characteristic value regarding intake water temperature as discussed in the following paragraph. The ice sheet could be in place for several weeks. The staff determined, based on Figure 3.4-4 of the applicant's Environmental Report and the applicant's commitment to a minimum water level of 73.8 m (242 ft) MSL, that the intake structure for the proposed additional units is at least 6.4 m (20 ft) below the minimum allowable low water level. The staff therefore concluded that the staff-calculated maximum estimated ice thickness of 43.1 cm (17.1 in) would not hamper operation of the proposed additional units. However, the staff also determined that extended periods of water temperatures at freezing are possible near the intake structure. In response to RAI 2.4.7-2, the applicant stated that formation of frazil and anchor ice is an extremely rare condition that can only happen when all units are shut down and prolonged, wintry conditions prevail. The applicant stated that this issue would be addressed during design of the intake structures. However, the staff has determined that minimum lake temperature is a site characteristic important as a design basis for a nuclear power plant that might be constructed on the site, and therefore this is **Open Item 2.4-5.** The staff intends to include this as a site characteristic value in any ESP that the NRC may issue for this ESP application."	Dominion would like to discuss our planned response to this Open Item including the following issues: ▪ Determination of the regulation or regulatory guidance document that identifies the need to specify a minimum lake temperature. ▪ Possibility of identifying 200 degree Fahrenheit-days based on Richmond weather data as a site characteristic in SSAR Table 1.9-1.

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No.	DSER Page/Location DSER Section	DSER Wording	Comment
34	Page 2-99 3rd full paragraph 2.4.7.3	Permit Condition 2.4-7. "In response to RAI 2.4.7-4, the applicant stated that the minimum storage capacity of the UHS basins would be maintained by either providing sufficient depth, such that the minimum water volume would be available below the ice sheet, or by adopting measures that would preclude the formation of an ice sheet on the surface of the UHS basins. In order to obviate the need for any limits on the operation of the proposed units, the UHS storage capacity must be large enough to accommodate ice formation. This is **Permit Condition 2.4-7**. The applicant needs to identify an additional UHS design-basis site characteristic for use in evaluating the potential for water freezing in the UHS water storage facility. This information need is identified as an open item in Section 2.3 of this DSER."	This permit condition is not appropriate and Dominion would like to discuss the following issues: ▪ The need for a Permit Condition versus a COL Action Item. ▪ The design of an UHS is not included in the ESP SSAR. The design of the UHS would be performed as part of detailed engineering and described in the COL application. ▪ Some reactor designs would not need a conventional UHS.
35	Page 2-102 4th paragraph and 7th paragraph 2.4.8.3	"The applicant suggested that the proposed Unit 3 would use a once-through cooling system during normal plant operation. The applicant also suggested that the proposed Unit 4 would use a closed-cycle cooling system with dry towers during normal plant operation. The limitation on the quantity of cooling water and other attributes of the cooling system design for the proposed Units 3 and 4 are site constraints. Consequently, the staff intends to identify these items as site characteristics in any ESP the NRC might issue for the proposed ESP site. "The details provided in SSAR Section 2.4.8 associated with cooling water canals and reservoirs specific to the proposed Units 3 and 4 are design constraints for the COL or CP applicant."	Dominion would like to discuss the wording "site constraints" and "design constraints."
36	Page 2-102 5th paragraph 2.4.8.3	Open Item 2.4-6. "The applicant did not provide details of the location and construction of the UHS buried water storage basin. These details are needed because they relate to the reliability and stability of the UHS under the pressure head of ground water, which is at the grade level at certain locations of the ESP site. Therefore, the staff could	Dominion would like to discuss our planned response to this Open Item and the following issues: ▪ COL Action Item 2.5-4 already addresses this issue. ▪ The design of an UHS is not included in the ESP SSAR. ▪ The design of the UHS would be performed as part of detailed engineering and described in the COL

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		not review these details. These data are needed and are part of RAIs 2.4.1-1 and 2.4.4-2. The need for location and construction details to determine differential head between groundwater and the UHS is **Open Item 2.4-6."**	application. ▪ Some reactor designs would not need a conventional UHS.
37	Page 2-102 6th paragraph 2.4.8.3	**Permit Condition 2.4-8**. "Lake Anna and the WHTF are not safety-related facilities, as described in the application. Consequently, any future design at the ESP site must not rely on the WHTF or on the North Anna Reservoir for any safety-related water use. This is **Permit Condition 2.4-8."**	This Permit Condition is not appropriate and Dominion would like to discuss it.
38	Page 2-106 4th paragraph 2.4.10.3	**Permit Condition 2.4-10**. "The need to protect the slope embankment at the intake location is based on the potential for degradation resulting from water and wave action. The requirement to provide erosion protection to protect the slope embankment is **Permit Condition 2.4-10."**	This Permit Condition is not appropriate and Dominion would like to discuss it and the following issues: ▪ The need for a Permit Condition versus a COL Action Item. ▪ The DSER wording is not consistent with SSAR Section 2.4.10 (page 2-2-133) which states: "Rip-rap protection of the slope embankment at the circulating water intake location on Lake Anna would be provided to prevent wave activity from eroding the embankment near the on-shore intake structure. It should be noted that although protection would be provided for this structure, the intake is not a safety-related facility." ▪ Determination of the regulation or regulatory guidance document that identifies the need to specify such a requirement for the life of any facility.
39	Page 2-106 5th paragraph 2.4.10.3	**Permit Condition 2.4-11**. "Any COL or CP applicant will be required to ensure that the flood control measures protecting the safety-related facilities of the existing units will not be compromised during construction or operation of the proposed units. This is **Permit Condition 2.4-11."**	This Permit Condition is not appropriate and is already addressed by COL Action Item 2.2-2.
40	Page 2-111 5th and 6th paragraphs 2.4.11.3	"The staff determined the minimum water surface elevation to be 74.4 m (244 ft) MSL when the existing units and the proposed Unit 3 are operating. The staff estimated that water surface elevation in the lake would fall to this minimum elevation only infrequently during low-water years. The applicant has proposed a minimum water surface elevation of 73.8 m (242 ft) MSL in SSAR Section 2.4.11.1."	This DSER wording is not consistent with SSAR Table 1.9-1. SSAR Table 1.9-1 does not identify minimum surface water elevation as a site characteristic. Dominion would like to understand the regulation or regulatory guidance document that identifies the need to specify a minimum lake water level elevation.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		"Since the applicant's proposed minimum water surface elevation is lower than the staff's estimate, the applicant's value is acceptable. The staff intends to include this value as a site characteristic in any ESP the NRC might issue for the proposed site."	
41	Page 2-112 2nd full paragraph 2.4.11.3	COL Action Item 2.4-1. "In its response to RAI 2.4.11-2, the applicant indicated that upstream development is expected to be small compared to the size of the watershed and will have only a small effect on low-flow conditions. Based on this response, the staff determined that the applicant has adequately discussed the effects of upstream land-use change in the drainage area. The applicant identified cooling water needs that may lead to restrictions on the operation of future plants because of changes in the frequency of low-flow conditions and related minimum water elevation in Lake Anna. Any COL or CP applicant should identify the limiting conditions and propose the corresponding action. This is **COL Action Item 2.4-1.**"	Dominion agrees with this COL Action Item.
42	Page 2-116 2nd paragraph 2.4.12.3	Open Item 2.4-7. "Observed increases in water levels in the new wells ranged from less than 0.3 m (1 ft) to more than 1 m (3 ft) over the period of December 17, 2002, through June 17, 2003. The applicant included previously existing wells monitored at the same time in the analysis. The observed variation in water levels in wells could be significant, but represented only a 6-month period. The staff evaluated additional information the applicant provided in response to RAI 2.4.12-1, but found that it needed additional data to determine whether the new ground water level measurements correlate with data from the long-term piezometers. Groundwater measurements should contain at least one full year of data to determine recent seasonal fluctuation in ground water levels at the ESP site. This is **Open Item 2.4-7.**"	Dominion would like to discuss our planned response to this Open Item.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
43	Page 2-116 5th paragraph 2.4.12.3	Open Item 2.4-8. "The applicant used the geometric mean of the measured hydraulic conductivity values (0.4 m/d (1.3 ft/d)). Use of the geometric mean is not conservative because it results in slower ground water velocity and increased travel time to the environment. Using 1.0 m/d (3.4 ft/d) as the conservative value for hydraulic conductivity, 0.03 m/m (3 ft/100 ft) as the hydraulic gradient, and 0.33 as the effective porosity, the staff estimated the ground water velocity to be 0.09 m/d (0.31 ft/d), as opposed to 0.04 m/d (0.12 ft/d) as reported by the applicant. The staff's calculated travel time from the powerblock to the lake, using 548.6 m (1800 ft) as the distance to the environment, is approximately 16 years, as opposed to the applicant's estimate of 40 years. The applicant needs to explain why a more conservative hydraulic conductivity was not used. This is **Open Item 2.4-8.** The staff intends to identify hydraulic conductivity as a site characteristic in any ESP that might be issued for this application."	Dominion would like to discuss our planned response to this Open Item.
44	Page 2-117 1st paragraph 2.4.12.3	Permit Condition 2.4-12. "The applicant proposes a site characteristic of ground water elevation less than 82.3 m (270 ft) MSL, and it proposes an ESP plant grade (PPE value) of 82.6 m (271 ft) MSL. The applicant identified the general location of the proposed additional units in Figure 2.4-16. Based on the ground water level data presented in SSAR Figure 2.4.16 and the updated final safety analysis report, the staff concludes that the applicant's design elevations are adequate from the perspective of the location of the water table, if the proposed additional units are constructed within the area where the ground water levels do not exceed 82.3 m (270 ft) MSL. This requirement constrains the location of the proposed units toward the northeast corner of the proposed footprint and is **Permit Condition 2.4-12.**"	This Permit Condition is not appropriate. Dominion would like to discuss it and the following issues: ▪ COL Action Item 2.5-4 already addresses this issue. ▪ This DSER wording is not consistent with SSAR Section 2.4.12.4 (page 2-2-148) which states: "Based on the preceding information, a design groundwater level ranging from Elevation 265 to 270 feet in the plant area of the ESP site appears to be reasonable. For other structures that may be constructed at higher elevations in support of new units on the ESP site, a higher design groundwater level may be justified." The groundwater level data presented in SSAR Figure 2.4-16 are representative of the site in its current condition. Because the water table generally conforms with the ground surface topography, groundwater levels are higher and above Elevation 270 ft MSL where the ground surface is higher in the western portions of the ESP footprint. The location of the proposed

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			units should not be constrained toward the northeast corner of the ESP footprint based on currently observed groundwater levels. Groundwater levels will change (lower) as the site is brought to a grade of 271 ft MSL.
45	Page 2-121 2nd full paragraph 2.4.13.3	Open Item 2.4-9. "The applicant reported that the only observation of piezometric head difference made between the saprolite and the bedrock indicated an upward hydraulic gradient. The staff needs to understand the implications of an upward hydraulic gradient, with respect to the transport of effluents to the environment. The applicant therefore needs to provide more details about the magnitude, frequency, and spatial location of these upward hydraulic gradients at the ESP site. This is **Open Item 2.4-9.** The staff intends to identify upward hydraulic gradient as a site characteristic in any ESP that might be issued for this application."	Dominion would like to discuss our planned response to this Open Item.
46	Page 2-121 3rd full paragraph 2.4.13.3	Open Item 2.4-10. "The applicant stated that the typical hydraulic gradient of ground water flow across the ESP site to Lake Anna and the WHTF is 0.03 m/m. The applicant based this estimate on only one piezometric head contour map constructed using ground water level observations from March 2003. The applicant stated that this hydraulic gradient is typical of the ESP site, despite seasonal and long-term variation in the ground water regime. However, the applicant should provide data to support this statement and to define the range of seasonal and long-term variation in hydraulic gradient from the ESP site into Lake Anna and the WHTF. This is **Open Item 2.4-10.** The staff intends to identify hydraulic gradient from the ESP site to Lake Anna and the WHTF as a site characteristic in any ESP that might be issued for this application."	Dominion would like to discuss our planned response to this Open Item.
47	Page 2-121 4th full paragraph 2.4.13.3	Open Item 2.4-11. "The site suitability evaluation with respect to radionuclide transport characteristic as defined by 10 CFR Part 100.20(c)(3) requires the use of observed site specific parameters important to hydrological radionuclide transport (such as soil, sediment, and rock characteristics,	Dominion would like to discuss our planned response to this Open Item. Further information is needed from the staff.

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		adsorption and retention coefficients, ground water velocity, and distances to the nearest surface body of water) obtained from on-site measurements. The applicant has not provided the onsite measured values of adsorption and retention coefficients for radioactive materials. This is **Open Item 2.4-11.** The staff intends to identify onsite measured values of adsorption and retention coefficients for radioactive materials as a site characteristic."	
48	Page 2-122 Table 2.4.14-1 2.4.14	Site characteristics identified for Proposed Facility Boundaries, Site Grade, Low Water Elevation, Minimum Lake Water Temperature, Lake Surface Icing, and Minimum Intake Water Temperature.	Dominion would like to discuss these items. Site characteristics for these items are not specified in SSAR Table 1.9-1. Dominion would like to understand the regulation or regulatory guidance document that identifies the need to specify these items as site characteristics.
49	Page 2-122 Table 2.4.14-1 2.4.14	Site characteristic for local intense precipitation is identified as 18.35 in/hour.	This DSER value is not consistent with SSAR Table 1.9-1.
50	Page 2-131 Prior to 2nd full paragraph 2.5.1.1.1	None.	The Giles County Seismic Zone and the Pembroke fault (class B), which are located in SW Virginia and within 200 miles of the ESP site, should be described in the DSER. A possible location for that description would be on DSER page 2-131 prior to the discussion of tectonic features and seismic sources outside the site region.
51	Page 2-144 3rd full paragraph 2.5.1.3.2	**Permit Condition 2.5-1.** **Permit Condition 2.5-2.** "In SSAR Section 2.5.1.2.3 the applicant described the soil and rock layering beneath the ESP site. The applicant based its description of the site stratigraphy on several borings performed for the existing NAPS Units 1 and 2 and the abandoned NAPS Units 3 and 4, and as part of the ESP application subsurface program. The applicant stated in SSAR Section 2.5.1.3.1 that the borings drilled as part of the ESP application subsurface program revealed "severely weathered, fractured and jointed intervals in Zone III-IV and Zone IV rock," and that these fracture zones ranged in thickness from about 0.5 to 1 foot thick. The applicant encountered these fracture zones in four of the seven new	Dominion would like to discuss these Permit Conditions and the following issues: ▪ SSAR Section 2.5.4.10.1 (page 2-2-323) states: "If excavation during construction reveals any weathered or fractured zones at foundation level, such zones would be overexcavated and replaced with lean concrete." DSER should include "at foundation level" wording. Note that DSER Section 2.5.4.3.2 (middle of page 2-205) does refer to "at the foundation level." ▪ The Permit Conditions cover commitments made by Dominion in the SSAR. COL Action Items would seem more appropriate. ▪ Permit Condition 2.5-2 is the same as COL Action Item 2.5-1.

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		borings performed as part of the ESP subsurface program. In RAI 2.5.4-2, the staff asked the applicant to describe the impact of the fracture zones on the suitability of the site to host safety-related structures. In response to RAI 2.5.4-2, the applicant stated that it would excavate and replace any weathered or fractured zones encountered at the foundation level with lean concrete. In addition, the applicant stated that it would perform multiple borings once the building locations are chosen. These borings would identify whether there are any fracture zones beneath the foundation thicker than those encountered in the ESP borings. The staff concludes that the applicant's proposal to excavate and replace weathered or fractured zones with lean concrete is an adequate method to ensure the stability of the foundation. The replacement of fractured rock with lean concrete is well understood and commonly done to enhance the strength and stability of the rock to support building loads. Accordingly, replacement of weathered or fractured rock below the new building foundations with lean concrete is **Permit Condition 2.5-1.** Also, the applicant's proposal to perform additional borings, once it has selected building locations, is necessary to ensure that any significant weathered or fractured zones are identified. The need for additional borings to identify any weathered or fractured rock beneath the new foundations is **Permit Condition 2.5-2.** Further discussion of these two permit conditions and the engineering properties of the soil and rock beneath the ESP site is provided in Section 2.5.4 of this SER."	
52	Page 2-146 2nd full paragraph 2.5.1.3.2	**Permit Condition 2.5-3.** "SSAR Section 2.5.1.2.6 describes the engineering behavior of soil and rock at the ESP site. In addition, SSAR Section 2.5.1.2.6 addresses prior earthquake effects, effects of human activities (mineral extraction and ground water withdrawal), construction ground water control, and unforseen geologic features. In its description of the soil engineering behavior, the applicant stated that the high compressibilities and low maximum	Dominion agrees with this Permit Condition.

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		densities of the saprolite preclude its use as engineered fill at the ESP site. Because of the relatively high initial settlement of the NAPS pumphouse structure, constructed on about 65 ft of saprolite fill, the staff agrees with this conclusion. The prohibition on the use of saprolite as engineered fill at the ESP site is **Permit Condition 2.5-3.**"	
53	Page 2-147 3rd paragraph 2.5.2	"In addition, the applicant based its seismic ground motion calculations on the EPRI seismic source model for the CEUS."	The DSER wording implies that the seismic hazard calculations of EPRI were the sole basis for the ground motion recommendations contained in the SSAR. This is not consistent with SSAR Section 2.5.2 (page 2-2-245), which states, "The procedure described in RG 1.165...has been used with certain modifications presented below, and has its basis in the seismic hazard calculations presented by EPRI..."
54	Page 2-148 Middle of 1st paragraph 2.5.2.1.1	"The VT seismic catalog is complete through 2001 for Virginia, Maryland, Delaware (south of latitude 40B N), West Virginia (south of latitude 40B N), North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee (east of longitude 88B W), and Kentucky (east of longitude 88B W). However, the VT seismic network and database do not completely cover the region (i.e., within 200 miles) surrounding the ESP site. To supplement the VT catalog, the applicant used the seismic catalog from the Advanced National Seismic System (ANSS) for latitudes of 39.7B N and higher."	The description of the completeness of the VT catalog is not consistent with SSAR Section 2.5.2.1.2 (middle of the page), which states: "This catalog is available through 2001 for the states of Virginia, Maryland, Delaware (south of 40°N), West Virginia (south of 40°N)... North of the southern border of Pennsylvania (approximately 39.7°N) the VT catalog is not complete."
55	Page 2-148 End of 1st paragraph 2.5.2.1.1	"The updating of seismicity in the ESP site region resulted in the identification of 30 additional earthquakes (24 from the VT catalog and 6 from the ANSS catalog)."	DSER Section 2.5.2.1.1 describes the ESP site region as the circular region within 200 miles of the site. The updated catalog was defined for a square region as described in SSAR Section 2.5.2.1.2 (page 2-2-248), which states: "The result of the above process was a catalog of 30 earthquakes (24 from the VT catalog, 1985 through 2001, and 6 from the ANSS catalog, 1985 through May 15, 2003) within the region bounded by 35°—41°N and 74°—82°W...."
56	Page 2-149 Middle of page 2.5.2.1.2	"...it is unlikely that any earthquakes have occurred in central Virginia in excess of M-7."	The DSER wording is not consistent with the wording in SSAR Section 2.5.2.2.8 (page 2-2-259) which states: "...it is unlikely that any earthquakes have occurred in the area investigated in excess of M~7 during the Holocene."

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57	Page 2-151 Near beginning of 1st full paragraph 2.5.2.1.4	"The applicant found about a 1.1 percent change in the probability of ground motion exceedance..."	The DSER wording is not consistent with SSAR Section 2.5.2.4 (page 2-2-262 bottom), which states: "... the average difference in annual probability of exceedance was +1.1 percent."
58	Page 2-151 End of 1st full paragraph 2.5.2.1.4	"The low-frequency controlling earthquake magnitude and distance are M_w 5.9 and 29 km, respectively, and the high-frequency controlling earthquake magnitude and distance are M_w 5.5 and 20 km, respectively."	The DSER wording is not consistent with the current values in SSAR Table 2.5-20.
59	Page 2-152 End of 2nd to last paragraph 2.5.2.1.6	"The applicant examined recent seismic activity rates using earthquakes recorded in the region since 1984 and compared these rates to those used in the 1989 EPRI PSHA. The results of this comparison showed that recent seismicity, recorded from 1985 to 2001, does not indicate that seismic activity rates have increased for the sources contributing most to the ESP site."	The DSER wording is not consistent with the wording in SSAR Section 2.5.2.6.5 (page 2-2-269 middle of page), which states: "The seismicity...was investigated by running program EQPARAM...first for the original EPRI catalog to replicate the results obtained in the 1989 study...Then an equivalent analysis was run using the augmented earthquake catalog (through 2001)...the augmented catalog indicates that seismicity rates have decreased." The seismicity from 1985 to 2001 was not used independently, but was used to augment the EPRI seismicity catalog. The SSAR concludes that seismicity rates have decreased since the 1984 EPRI study, not that it has not increased.
60	Page 2-153 Near the top of the page 2.5.2.1.6	"The Charleston source M_{max} values used by the six EPRI teams for the 1989 PSHA range from about 6.5 to 7.5."	The DSER wording is not consistent with the magnitude scale information in SSAR Section 2.5.2.6.2 (table on page 2-2-266), which shows Charleston source M_{max} values for EPRI teams of m_b 6.6 to 7.5, or M 6.5 to 8.0.
61	Page 2-154 Middle of top paragraph 2.5.2.1.6	"The ECFS-N fault segment, for which the applicant assigned only a 1 percent probability of existence and activity, does not contribute to overall hazard."	The DSER wording that a 1% value was assigned is not consistent with the wording in SSAR Section 2.5.2.6.5 (page 2-2-270). A 10% value was assigned to both existence and activity (given existence), and the product is 1%. The DSER phrasing: "assigned only" suggests (without explanation) that 1% is too low.
62	Page 2-154 Middle of page 2.5.2.1.6	"For lower frequency ground motion (i.e., 1-Hz spectral acceleration), the effect of the new ground motion models is relatively minor compared to the hazard results derived using the 1989 ground motion models."	The DSER wording is not consistent with SSAR Section 2.5.2.6.5 (page 2-2-271), which states: "Figure 2.5-45 shows a similar comparison for 1 Hz. For this spectral frequency the 1989 and 2003 models indicate about the same median hazard at all annual frequency levels, but the 2003 mean hazard is significantly lower than the 1989 mean hazard." The

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
			DSER wording overstates the similarity in seismic hazard for 1 Hz and does not differentiate between the median and mean hazard results.
63	Page 2-155 Middle of page 2.5.2.1.6	"...RG 1.165 recommends a procedure to determine the seismic design basis for future plants. The reference probability is the average probability of exceeding the SSE ground motion at 5 Hz and 10 Hz, ...the average probability for these 29 sites, using median hazard results..."	The DSER wording is not consistent with the wording in RG 1.165, Appendix B, Section B.2, which states: "The reference probability is the annual probability level such that 50% of a set of currently operating plants...has an annual median probability of exceeding the SSE that is below this level." The reference probability defined in RG 1.165 is based on a median annual probability level, not an average annual probability level.
64	Page 2-156 1st full paragraph 2.5.2.1.6	"The applicant decided to use the mean hazard PSHA results rather than the median results because the mean result conservatively incorporate the uncertainty in ground motion estimates."	The DSER wording is not consistent with SSAR Section 2.5.2.6.8 (page 2-2-281), which states: "If either or both of the assumptions...were adopted, the selected SSE spectrum based on the mean $5x10^{-5}$ amplitudes would decrease. This gives considerable credibility and justification to the selected SSE spectrum as an appropriate spectrum for design." The choice of the mean for the selected SSE spectrum using the reference probability approach was not based on ground motion uncertainty estimates. It was based on comparisons such as SSAR Figures 2.5-54A and 2.5-54B that show that the mean $5x10^{-5}$ spectrum is consistent with other derivations of the SSE.
65	Page 2-160 1st two paragraphs 2.5.2.1.6	"SSAR Figure 2.5-52 shows the performance-based ground motion spectrum resulting from a higher minimum magnitude value...SSAR Figure 2.5-54 shows the resulting ground motion spectrum using the lower aleatory uncertainty values."	The DSER figure references (2.5-52 and 2.5-54) are not consistent with the current SSAR.
66	Page 2-162 End of 3rd full paragraph 2.5.2.3.1	"The staff...concurs with the applicant's assertion that the rate of seismic activity in the region has not increased since the completion of the original EPRI study in 1984."	The DSER wording is not consistent with SSAR Section 2.5.2.6.5 (page 2-2-269 middle of page), which states: ""The seismicity...was investigated by running program EQPARAM...first for the original EPRI catalog to replicate the results obtained in the 1989 study...Then an equivalent analysis was run using the augmented earthquake catalog (through 2001)...the augmented catalog indicates that seismicity rates have decreased." The seismicity from 1985 to

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
			2001 was not used independently, but was used to augment the EPRI seismicity catalog. The SSAR concludes that seismicity rates have decreased since the 1984 EPRI study, not that it has not increased.
67	Page 2-165 5th paragraph 2.5.2.3.4	Open Item 2.5-1. "In RAI 2.5.2-2, the staff asked the applicant to provide additional details on the 2003 EPRI ground motion evaluation that it used for the ESP PSHA. To update PSHAs in the CEUS, EPRI sponsored a Senior Seismic Hazard Advisory Committee Level 3 analysis. NUREG/CR-6372 provides the guidelines for performing this analysis. The EPRI ground motion study used 13 different ground motion attenuation relationships grouped into four clusters. In RAI 2.5.2-2(c), the staff asked the applicant to provide the weight assigned to each of the 13 ground-motion relationships within their respective cluster. For cluster 1, EPRI gave the highest weight (0.90) to the three attenuation relationships reported by Silva et al. The staff inferred from this higher weight that these relationships must have fit the data much better than other relationships. However, the applicant did not provide plots or tables of the residuals as a function of attenuation relation, magnitude, distance, and frequency. Therefore, the staff was unable to evaluate the weighting EPRI selected for cluster 1. Similarly, for clusters 2 and 3, the ground motion experts applied higher weights to different attenuation relationships within each cluster. Neither the EPRI 2003 ground motion report or the applicant's response to RAI 2.5.2-2 provided the rationale for these weights. In RAI 2.5.2-2(b), the staff asked the applicant to provide additional information on the Silva et al. cluster 1 attenuation relationships. In response, the applicant provided additional documentation on these attenuation relationships. The Silva et al. cluster 1 relationships use an expression for the	Dominion's response to this Open Item was submitted to the NRC by letter dated January 25, 2005.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		seismic attenuation parameter, Q, that is frequency dependent. This frequency-dependent Q value was derived from an inversion of the data from the 1988 Saguenay earthquake. This inversion solves for Q, as well as the local site attenuation parameter kappa and the stress drop, which is the difference between the initial stress before and earthquake and the final stress. The staff was unable to determine how the recordings from a single earthquake can provide well-resolved values of both crustal Q and site kappa. In addition, the Q value of 317 at 1 Hz is much lower than values found in other studies of eastern North American earthquakes. In addition, other studies have found less frequency dependence of Q in the east than in the west, which is contrary to the findings of Silva et al. In RAI 2.5.2-2(d), the staff asked the applicant to explain the weights given to each of the four clusters. In response to RAI 2.5.2-2, the applicant stated that the expert panel members, convened for the EPRI ground motion study, were asked to subjectively evaluate how well the alternative ground motion models relied on seismological principles. The staff considers the applicant's response to of RAI 2.5.2-2(d) to be somewhat indirect. The applicant has provided additional information, but the details still remain abstract in terms of specific "seismological principles." The response emphasizes the ranking of model clusters and the judgments involved in balancing data consistency and adherence to seismological principles. However, the applicant provided only abstract and very general references to these seismological principles. As a result, the staff was unable to evaluate the criteria or the weights applied to the four clusters. The staff does not consider that the applicant's responses to the three issues outlined above provide sufficient justification for applying the EPRI 2003 ground motion	

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	***Comment***
		results in developing SSEs for nuclear power plants. This is **Open Item 2.5-1."**	
68	Page 2-167 5th paragraph 2.5.2.3.5	**Open Item 2.5-2**: "This shear wave velocity value is well below that of the hard rock conditions (Vs = 9200 ft/sec) assumed by the EPRI 2003 study for CEUS ground motion models. In addition, the applicant did not make shear wave velocity measurements at a depth greater than 65 feet. Thus, the hard rock shear wave velocity value of 9200 ft/s may not be reached at the ESP site until a considerable depth below the ground surface. According to SSAR Figure 2.5-62, from the ground surface to a depth of 30 feet, the shear wave velocity at the ESP site varies from 600 ft/s to about 1300 ft/s. The applicant needs to incorporate these lower shear wave velocities, as well as other subsurface material properties and their uncertainties, into the determination of the ESP site SSE. In addition, the applicant should provide the site amplification or transfer function for the staff to review. The staff needs this information to determine that the applicant has provided an SSE that meets the requirements of Appendix S to 10 CFR Part 50 and 10 CFR 100.23, which define the SSE as "free-field ground motion response spectra at the free ground surface." This is **Open Item 2.5-2."**	Dominion would like to discuss our planned response to this Open Item.
69	Page 2-176 2nd full paragraph 2.5.3.3.1	"In SSAR Table 1.9-1, "ESP Site Characteristics and Design Parameters," the applicant identified the item "Capable Tectonic Structures or Sources" as an ESP site characteristic and design parameter. This item specifies that no fault displacement potential exists within the investigative area. As described above, the staff reviewed the applicant's description of unnamed fault "a" in SSAR Section 2.5.3.2.2 and concludes that the ESP site has no fault displacement potential."	This DSER wording is not consistent with SSAR Table 1.9-1, which identifies Capable Tectonic Structures or Sources as a site characteristic, not a design parameter.
70	Page 2-181 3rd paragraph 2.5.4.1.2	"The tests include (1) cyclic triaxial tests to provide input for liquefaction potential of the soils ..."	Consistent with the description in SSAR Section 2.5.4.2.4, the DSER wording should be clarified to indicate that the triaxial tests provide input for analysis of liquefaction potential.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
71	Page 2-181 Middle of 4th paragraph 2.5.4.1.2	"Appendix B to SSAR Section 2.5.4 presents the results of the ESP laboratory tests, summarized in SSAR Table 2.5-43."	Consistent with the description in SSAR Section 2.5.4.2.4, the DSER wording should identify that Table 2.5-43 is for soil and Table 2.5-44 is for rock.
72	Page 2-181 4th paragraph 2.5.4.1.2	"Engineering properties listed in SSAR Table 2.5-43 include (1) Atterberg Limits...."	Consistent with the description in SSAR Section 2.5.4.2.4, the DSER statement should be clarified to replace "engineering properties" with "results."
73	Page 2-184 Last paragraph 2.5.4.1.3	"The licensee performed an additional 22 borings in 1975 and 1976, as well as 9 borings in 1994 for the ISFSI."	Consistent with the description in SSAR Section 2.5.4.3.1, the DSER wording should be clarified to indicate the 22 boring were in the SWR area after 1976.
74	Page 2-190 3rd paragraph 2.5.4.1.4	"According to the applicant, it provided only average values for Zones IIB, III, and III-IV because the ESP borings did not sample these zones as abundantly as Zones IIA and IV. In response to this RAI, the applicant also provided its method for determining the average shear wave velocity values for Zones IIB (1600 ft/s), III (2000 ft/s), and III-IV (3300 ft/s)."	The DSER wording should reflect that SSAR Table 2.5-45 now contains these ranges.
75	Page 2-203 Last paragraph 2.5.4.3.2	COL Action Item 2.5-1. "Normally, an applicant performs a complete field investigation and sampling program to evaluate the engineering properties and stability of the soil and rock underlying the site. However, since the applicant relied on the licensee's previous field and laboratory investigations for the existing and abandoned units, the applicant's ESP investigations were used to confirm previously established soil and rock properties. In RAI 2.5.4-1, the staff asked the applicant to provide its basis for concluding that the subsurface conditions in the southeast portion of the ESP footprint (an area of about 500 ft by 1000 ft, in which there are no borings) do not materially differ from conditions in adjacent areas, where borings were made. In response to RAI 2.5.4-1, the applicant stated that the North Anna site is underlain by a consistent geologic profile, which extends to a depth of several thousand feet. The applicant stated that the 145 borings performed throughout the North Anna site (including 7 borings for the ESP) indicated a consistent overall subsurface profile, with expected variations in the thickness of the various strata. As such, the applicant concluded that the southeast portion of the ESP	Dominion agrees with this COL Action Item.

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No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		footprint (see SER Figure 2.5.4-3) should be similar to the rest of the site. Because of the consistency of the soil and rock engineering properties across the NAPS and ESP sites, the staff has determined that the licensee's past investigations, combined with the ESP applicant's explorations, are adequate to characterize the subsurface conditions in the locations where data were collected. Further, based on its review of the NAPS and ESP borings, the staff has determined that a consistent geologic profile underlies the North Anna ESP site. The staff concludes, therefore, that the uncharacterized southeast portion of the site should have subsurface conditions similar to those found at the rest of the site. Accordingly, the site staff concludes that the applicant has provided an adequate description of the subsurface profile. The applicant's commitment to perform additional borings to confirm its conclusions regarding engineering properties and the stability of soil and rock underlying future plant SSCs is **COL Action Item 2.5-1."**	
76	Page 2-206 2nd full paragraph 2.5.4.3.3	**COL Action Item 2.5-2**. "Section 2.5.4.3 in RS-002 directs the staff to compare the applicant's plot plans and the profiles of all seismic Category I facilities with the subsurface profile and material properties. Based on this comparison, the staff can determine if (1) the applicant performed sufficient exploration of the subsurface and (2) the applicant's foundation design assumptions contain adequate margins of safety. The applicant decided to provide this information as part of its COL submittal. Submission of the applicant's plot plans and the profiles of all seismic Category I facilities for comparison with the subsurface profile and material properties is **COL Action Item 2.5-2."**	Dominion agrees with this COL Action Item.
77	Page 2-207 2nd full paragraph 2.5.4.3.5	**COL Action Item 2.5-3**. **Permit Condition 2.5-4**. "In SSAR Section 2.5.4.5, the applicant provided a general description of (1) the extent (horizontally and vertically) of	Dominion would like to discuss this COL Action Item and Permit Condition and the following issues: ▪ The Permit Condition covers commitments made by Dominion in the SSAR. COL Action Items would seem

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
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		anticipated safety-related excavations, fills, and slopes, (2) excavation methods and stability, (3) backfill sources and quality control, and (4) control of ground water during excavation. The staff found this general description to be useful. However, the applicant has not selected a reactor design or location within the ESP site, and it did not provide detailed excavation and backfill plans or plot plans and profiles as outlined in Section 2.5.4 of RS-002. Therefore, the staff could not adequately evaluate the applicant's excavation and backfill plans and will await the future submittal of these plans as part of the COL or CP application. This is **COL Action Item 2.5-3.** The staff notes that in SSAR Section 2.5.4.5, the applicant stated that it would (1) geologically map future excavations for safety-related structures, and (2) evaluate any unforseen geologic features that are encountered. In addition, the applicant stated that it would notify the NRC "when any excavations for safety-related structures are open for their examination and evaluation." This is **Permit Condition 2.5-4."**	more appropriate. ▪ The relationship of the COL Action Item and Permit Condition with DEIS Section 4.11 and the activities permitted by 10 CFR 50.10(e)(1).
78	Page 2-207 3rd full paragraph 2.5.4.3.6	COL Action Item 2.5-4. "In SSAR Section 2.5.4.6, the applicant provided a general description of (1) ground water measurements and elevations and (2) construction dewatering plans. The staff found this general description to be useful. However, the applicant has not selected a reactor design or location within the ESP site and did not provide an evaluation of ground water conditions as they affect foundation stability or detailed dewatering plans as outlined in Section 2.5.4 of RS-002. Therefore, the staff could not evaluate the ground water conditions as they affect the loading and stability of foundation materials or the applicant's dewatering plans during construction as well as ground water control throughout the life of the plant. As such, the staff will await the future submittal of these evaluations and plans as part of the COL or CP application.	Dominion would like to discuss the relationship of the COL Action Item with DEIS Section 4.11 and the activities permitted by 10 CFR 50.10(e)(1).

Table 1 North Anna Early Site Permit Technical Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		The need to evaluate ground water conditions as they affect foundation stability or detailed dewatering plans is **COL Action Item 2.5-4.**"	
79	Page 2-209 1st full paragraph 2.5.4.3.7	**COL Action Item 2.5-5**. "Based on its review of SSAR Section 2.5.4.7 and the applicant's responses to the RAIs noted above, the staff concludes that the applicant adequately determined the response of the soil and rock underlying the ESP site to dynamic loading. The staff notes the applicant's commitment in response to RAI 2.5.4-9 to perform further soil column amplification/attenuation analyses at the COL stage, once it selects specific locations for the nuclear power plant structures. This is **COL Action Item 2.5-5.** The applicant stated that this analysis would involve subsurface investigations to determine actual strata thicknesses and confirm the subsurface material properties at each location."	Dominion agrees with this COL Action Item.
80	Page 2-209 2nd full paragraph 2.5.4.3.8	"The applicant concluded that soil Profile 1, which has 30 ft of unimproved Zone IIA saprolite, is susceptible to liquefaction in most of the upper portions."	• This DSER wording is not consistent with SSAR Section 2.5.4.8.5, which states: "Based on the above analysis results, it can be concluded that some of the Zone IIA saprolitic soils have a potential for liquefaction based on the low and high frequency ESP seismic parameters. The liquefaction analysis did not take into account the beneficial effects of age, structure, fabric and mineralogy." • Profile 1 was used to generate the acceleration values used in the liquefaction analysis. However, Profile 1 is an idealized profile that incorporates average Zone IIA soil properties, with the G_{max} values ranging from 0.67 to 1.5 times the best-estimate value. The liquefaction analyses were performed using the results from the actual borings, CPTs, and shear wave velocity tests performed for the ESP investigation. Thus, the applicant did not conclude that soil Profile 1 is susceptible to liquefaction in most of the upper portions.
81	Page 2-210 1st paragraph 2.5.4.3.8	**Permit Condition 2.5-5**. "Based on its review of SSAR Section 2.5.4.8 and the applicant's response to RAI 2.5.4-10, described above, the staff concludes that the applicant	The DSER wording should replace Zone II with Zone IIA.

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No.	DSER Page/Location DSER Section	DSER Wording	Comment
		has employed an acceptable methodology to determine the liquefaction potential of the soil underlying the ESP site. Because portions of the Zone IIA saprolite are susceptible to liquefaction, the applicant stated that if safety-related structures are founded on the Zone II saprolitic soils, these soils would be improved to reduce any liquefaction potential. This is **Permit Condition 2.5-5.** The applicant described techniques for improving the Zone IIA saprolitic soils in SSAR Section 2.5.4.12."	
82	Page 2-210 Last paragraph 2.5.4.3.10	**COL Action Item 2.5-6.** "Based on its review of SSAR Section 2.5.4.10, the staff concludes that the applicant provided an adequate preliminary assessment of the static stability of the ESP site. However, as described in RS-002, for the staff to perform a complete review of the static stability, the COL or CP applicant will need to provide an analysis of the stability of all planned safety-related facilities when the locations of the plant structures are finally specified. This analysis should include bearing capacity, rebound, settlement, differential settlements, as well as lateral loading conditions for all safety-related facilities. Therefore, the staff concludes that the applicant's description of the static stability is adequate to provide an assurance of the stability of the ESP site, but additional information is needed to support any finding regarding detailed structure-specific stability. The need to provide an analysis of the stability of all planned safety-related facilities, including bearing capacity, rebound, settlement, and differential settlements under deadloads of fills and plant facilities, and lateral loading conditions is **COL Action Item 2.5-6."**	Dominion agrees with this COL Action Item.
83	Page 2-211 3rd paragraph 2.5.4.3.11	**COL Action Item 2.5-7.** "Based on its review of SSAR Section 2.5.4.11 and the applicant's response to the RAI, the staff concludes that the applicant adequately presented the necessary design criteria for the ESP site. The need to	Dominion agrees with this COL Action Item.

Table 1 North Anna Early Site Permit *Technical Comments on NRC Draft Safety Evaluation Report*			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		provide design-related criteria that pertain to structural design (such as wall rotation, sliding, and overturning) is **COL Action Item 2.5-7."**	
84	Page 2-211 4th paragraph 2.5.4.3.12	**COL Action Item 2.5-8**. "In SSAR Section 2.5.4.12, the applicant presented a general description of the ground improvement techniques it may employ so that the Zone IIA saprolitic soils could be used to support safety-related foundations. Although this general description was useful to the staff in performing a complete review, the COL or CP applicant will need to provide specific plans for each proposed ground improvement technique it plans to employ so that the Zone IIA saprolitic soils will be able to support safety-related foundations. This is **COL Action Item 2.5-8."**	Dominion agrees with this COL Action Item.
85	Page 2-212 1st full paragraph 2.5.4.4	**COL Action Item 2.5-9**. "In SSAR Table 1.9-1, "ESP Site Characteristics and Design Parameters," the applicant identified three subsurface material properties as ESP site characteristics and design parameters. The first design parameter specifies that there is no potential for liquefaction at the ESP site. The applicant demonstrated, in SSAR Section 2.5.4.1.8, that any liquefaction at the ESP site would be limited to the Zone IIA saprolites, and if any safety-related structures are founded on the Zone IIA saprolites, these soils would be improved to reduce potential settlements and to ensure an FS greater than or equal to 1.1. The second design parameter specifies a minimum bearing capacity value of 15 ksf. The bearing capacities for rock of Zones III and above underlying the ESP site are greater than 15 ksf (see SSAR Table 2.5-45). Finally, the third design parameter specifies a minimum shear wave velocity of 3500 ft/s for the material underlying the foundation. The applicant stated that the reactor containment would be founded on Zone III-IV or IV bedrock. Because the average shear-wave velocity (Vs) of the Zone III-IV bedrock is slightly less (3300 ft/sec) than this postulated design value (3500 ft/sec), the COL or CP applicant will need to determine the Vs of the actual material	Dominion would like to discuss this COL Action Item and its relationship to the requirements of 10 CFR 52.79(a).

Table 1 North Anna Early Site Permit *Technical Comments on NRC Draft Safety Evaluation Report*			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
		underlying the foundation for the reactor containment to ensure that Vs equals or exceeds that of the chosen design. This is **COL Action Item 2.5-9."**	
86	Page 2-216 3rd paragraph 2.5.5.4	**COL Action Item 2.5-10.** **COL Action Item 2.5-11.** "Based on its review of SSAR Section 2.5.5 and the applicant's response to RAI 2.5.5-1, described above, the staff concludes that the applicant sufficiently demonstrated the stability of the existing slope for the purposes of the ESP application. However, because of the susceptibility of the Zone IIA saprolites to liquefaction, the staff concludes that the COL or CP applicant will need to conduct a more detailed dynamic analysis of the stability of the existing slope and any new slopes using the SSE ground motion. **This is COL Action Item 2.5-10.** A more extensive dynamic analysis would be appropriate at the COL or CP stage, since the applicant will have determined the locations of safety-related structures relative to the existing or new slopes. In addition, the COL or CP applicant will need to provide plot plans and cross sections/profiles of all of the safety-related slopes, and will need to specify the measures that it will take to ensure the safety of the slopes and any structures located adjacent to the slopes. This is **COL Action Item 2.5-11."**	Dominion would like to discuss the relationship of these COL Action Items with DEIS Section 4.11 and the activities permitted by 10 CFR 50.10(e)(1).
87	Page 2-214 Last paragraph 2.5.5.1.1	"Since the FS is below 1.0 using Kramer's method, the applicant stated that it could not rule out the possibility of some liquefaction in the slope area."	▪ This DSER wording is not contained in SSAR Section 2.5.5.2.3. ▪ The liquefaction analysis concluded that some of the Zone IIA saprolitic soils have a potential for liquefaction based on the low and high frequency seismic parameters, although this analysis did not take into account the beneficial effects of age, structure, fabric and mineralogy of the soil. This conclusion about liquefaction is not based the results of the slope stability analysis using Kramer's method, as stated in the DSER.
88	2.5 General	None	Unlike DSER Sections 2.1-2.4, no tables of site characteristics are included in DSER Section 2.5.

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89	Page 3-3 Last paragraph 3.5.1.6.3	"The staff concludes that the probability of an aircraft crash on the ESP site having radiological consequences..."	The DSER wording in this paragraph should use the wording in the previous DSER paragraph, "sufficient to cause the potential for radiological consequences..."

Table 2. North Anna Early Site Permit Editorial Comments on NRC Draft Safety Evaluation Report			
No.	**DSER Page/Location DSER Section**	**DSER Wording**	**Comment**
1	Table 1.7-2 COL Action Item 2.3-1	Reference is made to DSER Section 2.3.3.	Reference should be made to DSER Section 2.3.4.
2	Page 2-24 Table 2.3.1-2	"Operation basis wind velocity..."	This DSER wording is not consistent with SSAR Table 1.9-1 (page 2-1-79), which uses "operating basis wind velocity."
3	Page 2-86 1st full paragraph	"The ESP site is at an elevation of 82 m (270 ft) MSL.	The grade elevation is 271 ft MSL.
4	Page 2-182 1st paragraph 2.5.4.1.2	"The ESP rock strength results shown in SSAR Table 2.5-44 and the rock strengths from the investigation for the existing units form the basis for the unconfirmed compressive strength."	"Unconfirmed" should be "unconfined."
5	Page 2-185 Last paragraph 2.5.4.1.3	"The applicant stated that, after removal from the SPT split inner barrel, it carefully placed the recovered rock in wooden core boxes."	Consistent with the description in SSAR Section 2.5.4.3.2, the DSER wording should delete "SPT."
6	Page 2-189 Middle of last paragraph 2.5.4.1.4	"The applicant performed tests in boring B-802 at 5-ft intervals in the rock at depths ranging from 27 to 90 feet;.."	Consistent with the description in SSAR Section 2.5.4.4.2, the DSER statement should replace "boring B-802" with "borings B-802A, B, and C".
7	Page 2-201 3rd full paragraph 2.5.4.1.10	"The applicant found that the foundation has an average bearing pressure of 6 ksf."	Consistent with the description in SSAR Section 2.5.4.10.2, the DSER wording should replace "found" with "assumed."
8	Page 15-2 1st full paragraph 15.1	"The applicant calculated site-specific DBA doses by first obtaining DBA dose information from the certified ABWR design control document (DCD) and from the proposed AP1000 DCD. (The reactor designers had obtained such values using assumed atmospheric dispersion factors [χ/Q values].) The applicant then calculated site-specific χ/Q values using onsite meteorological information. (The applicant provided the site-specific χ/Q values used in its radiological consequence analyses in Table 1.9-1, "Site Characteristics and Design Parameters," of the SSAR.) Finally, it multiplied the doses from the two designs by the ratio of the site-specific χ/Q values to the assumed χ/Q values from the DCDs."	Per SSAR Section 15.4, the ABWR SSAR (not DCD) is cited as the source of the ABWR design certification information in the SSAR.