North Anna 3 COLA Orientation

November 29, 2007

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FSAR Chapter 10 Example Pages

Chapter 10 Steam and Power Conversion System

10.1 Summary Description

This section of the referenced DCD is incorporated by reference with no departures or supplements.

10.2 Turbine Generator

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

10.2.3.4 **Turbine Design**

Insert the following as the first paragraph:

STD SUP 10.2-1

The General Electric Company manufactures the turbine and generator. The model N1R turbine is from General Electric's N series nuclear steam turbines.

10.2.3.8 **Turbine Missile Probability Analysis**

Replace the last paragraph with the following.

STD COL 10.2-1-H

The probability of turbine missile generation will be calculated for the specific turbine selected. Final information on TGS material properties, fabrication, and design features will also be provided in the turbine missile analysis. This analysis will be completed no later than one year prior to fuel load. The FSAR will be revised, as necessary, to reflect this analysis as part of a subsequent FSAR update.

10.2.5 **COL Information**

10.2-1-H **Turbine Missile Probability Analysis**

STD COL 10.2-1-H

This COL Item is addressed in Section 10.2.3.8.

10.3 Turbine Main Steam System

This section of the referenced DCD is incorporated by reference with no departures or supplements.

10.4 Other Features of Steam and Power Conversion System

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

10.4.5.2.1 **General Description**

Replace the text with the following.

NAPS CDI

The CIRC is depicted in Figures 10.4-201 through 10.4-203. The CIRC consists of the following components:

- Condenser water boxes, piping, and valves
- Condenser tube cleaning equipment
- Water box drain subsystem
- Four 25 percent capacity pumps and pump discharge valves
- A removable assembly of coarse and fine screens that separate the pump forebay (suction) from the hybrid cooling tower basin
- An array of dry, mechanical draft cooling tower cells arranged in banks
- One combination (hybrid) wet/dry, mechanical draft cooling tower

Table 10.4-3R includes the temperature range of the water delivered by the CIRC pumps to the main condenser.

The CIRC water is normally circulated by four motor-driven pumps through the condenser and back to the cooling towers. Depending on ambient conditions, system configuration, and heat load, one CIRC pump may be taken out of operation with the flow of the remaining three CIRC pumps providing sufficient water for condenser heat removal.

The four pumps are arranged in parallel. Discharge lines combine into two parallel main circulating water supply lines to the main condenser. Each main circulating water supply line connects to a low pressure condenser inlet water box.

Two interconnecting lines are provided between the two main circulating water supply lines. The first interconnecting line is located near the discharge of the circulating water pumps and is used for flow balancing. The second interconnecting line is near the location where the CIRC pipes enter the turbine building and is used as a blowdown point. A motor operated isolation valve is provided on the flow balancing line. Two motor operated valves are located on the blowdown cross-connect line, one on either side of the blowdown line. These valves allow operation of the CIRC with one main circulating water supply line out of service.

The discharge of each pump is fitted with a remotely operated valve. This arrangement permits isolation and maintenance of any one pump while the others remain in operation and minimizes the backward flow through an out-of-service pump.

The CIRC and condenser are designed to permit isolation of half of the three series connected tube bundles to permit repair of leaks and cleaning of water boxes while operating at reduced power.

The CIRC includes water box vents to help fill the condenser water boxes during startup and remove accumulated air and other gases from the water boxes during normal operation. The dry and hybrid cooling towers have air releases and vacuum relief valves located at strategic points to help fill the cooling tower sections, remove accumulated air and other gases during normal operation, and minimize CIRC pressure transients by providing vacuum relief. Each pump discharge is also fitted with an air release valve.

Circulating water chemistry is maintained by the Chemical Storage and Transfer System and with blowdown. Circulating water chemical equipment injects the required chemicals into the circulating water pump bay before entering the circulating water pumps.

10.4.5.2.2 Component Description

Replace the text with the following.

NAPS CDI

Codes and standards applicable to the CIRC are listed in DCD Section 3.2 with the exception of large bore piping (piping with a nominal diameter of 700 mm (27.6 in) and larger). Large bore CIRC piping is constructed using AWWA standards. The system is designed and constructed in accordance with Quality Group D specifications.

Table 10.4-3R provides reference parameters for the major components of the CIRC.

10.4.5.2.2.1 CIRC Chemical Injection

Circulating water chemistry is maintained by the Chemical Storage and Transfer System. Chemical feed equipment injects the required chemicals into the circulating water at the pump bay before water enters the circulating water pumps.

10.4.5.8 Normal Power Heat Sink

Replace the text with the following.

NAPS CDI

The cooling tower arrangement includes a dry cooling tower array and a round, wet/dry (hybrid) cooling tower that may operate independently or in series. The towers may be bypassed or partially or fully utilized as required, depending on desired operating configuration, heat load, and ambient conditions.

The dry tower array is arranged in rectangular banks of multiple cells. Each cell includes air cooled heat exchange surfaces, a motor-driven mechanical draft fan, and inlet and outlet isolation valves. The round, hybrid cooling tower includes a dry upper section and a wet lower section. Both the wet and dry sections of the hybrid tower include mechanical draft fans to provide air flow. The combination of dry and hybrid cooling tower arrangements supports a condenser maximum cold water temperature of 35°C (100°F).

Both the dry and hybrid cooling towers are located at least a distance equal to their height away from any seismic Category 1 or 2 structures. Thus, if there were any structural failure of the cooling towers, no Seismic Category 1 or 2 structures or any safety-related systems or components would be affected or damaged.

Both the dry and hybrid cooling towers have multiple fans with associated motors, couplings, and gearboxes. The fans rotate at relatively slow speeds and the fan blades are made of relatively low-density material. A failure of a fan could result in the generation of missiles. However, due to the site arrangement and construction of the respective towers, any damage would be confined to the cooling towers. Therefore, there would be no damage to any Seismic Category 1 or 2 structures or any safety-related systems or components.

10.4.6.3 Evaluation

Replace the second sentence in the third paragraph with the following.

STD COL 10.4-1-A

A table summarizing the manufacturer's recommended threshold values of key chemistry parameters and associated operator actions is provided as Table 10.4-201.

10.4.10 COL Information

10.4-1-A **Leakage (of Circulating Water Into the Condenser)**

STD COL 10.4-1-A This COL Item is addressed in Section 10.4.6.3.

Table 10.4-201 Recommended Water Quality and Action Levels [STD COL 10.4-1-A]

Reactor Water Quality-Power Operation

	Action Levels			
Control Parameter	0	1	2	3
Conductivity, S/cm at 25ºC*	$\leq$ 0.100	> 0.300	> 1	$\geq$ 2
Chloride, ppb	$\leq$ 0.3	> 5	> 50	$\geq$ 200
Silica, ppb	$\leq$ 200	> 500	N/A	N/A
Sulfate, ppb	$\leq$ 2	> 5	> 50	$\geq$ 200

Feedwater Quality—Power Operation***

	Action Levels		
Control Parameter	0	1	2
Conductivity, S/cm at 25ºC**	< 0.057	> 0.065	> 0.100
Dissolved Oxygen, ppb as O_2**	30-50	< 20 or > 200	N/A

* Value depends on Hydrogen Water Chemistry System operation
** Applicable when Reactor Power >10%
*** Also Condensate Purification System Effluent

Action Level 0: Target Value. The parameter may be outside the Action Level 0 value and not in Action Level 1, 2, or 3. In this case, efforts should be made to return the parameter to the Action Level 0 value.
Action Level 1: Lowest Severity. The parameter should be brought below this value within 96 hours. A technical review should be performed to determine the appropriate response.
Action Level 2: Moderate Severity. If the parameter is not reduced below this level within 24 hours, an orderly shutdown should be initiated.
Action Level 3: Highest Severity. If the parameter is not reduced below this level within 6 hours, an orderly shutdown should be initiated.

Table 10.4-3R Circulating Water System [NAPS CDI]

Parameter	Value
Circulating Water Pumps	
Number of pumps	4
Pump type	Vertical, wet pit, turbine
Unit flow capacity**, m^3/hr (gpm)	Approx. 38,500 (169,600)
Driver Type	Electric motor
Normal Power Heat Sink	
Normal Heat Removal Duty @35°C (95°F) CIRC Supply Temperature, MW (BTU/hr)	2930 (1.00×10^{10})
Dry Cooling Tower Array	
Array Length*, m (ft)	223 (731)
Array Width*, m (ft)	114 (375)
Array Height*, m (ft)	20 (65)
Wet/Dry (Hybrid) Cooling Tower	
Outside Base Diameter*, m (ft)	150 (492)
Height*, m (ft)	55 (180)
Operating Temperatures	
Normal Power Heat Sink cold water temperature range, °C (°F)	0*** to 37.8 (32 to 100)
Temperature range of water delivered to the main condenser, °C (°F)	0*** to 37.8 (32 to 100)
CIRC temperature for rated turbine performance, °C (°F)	30 (86)
Maximum CIRC temperature for 100% turbine bypass capability, °C (°F)	35.6 (96)

* Cooling tower dimensions and specifications are approximate.

** This capacity is for condenser cooling and blowdown at design temperature of 37.8°C (100°F).

*** If the Normal Power Heat Sink does not maintain temperatures above the minimum temperature, then the minimum temperature is maintained by warm water recirculation and cooling tower bypass.

Figure 10.4-201 Circulating Water Pumps

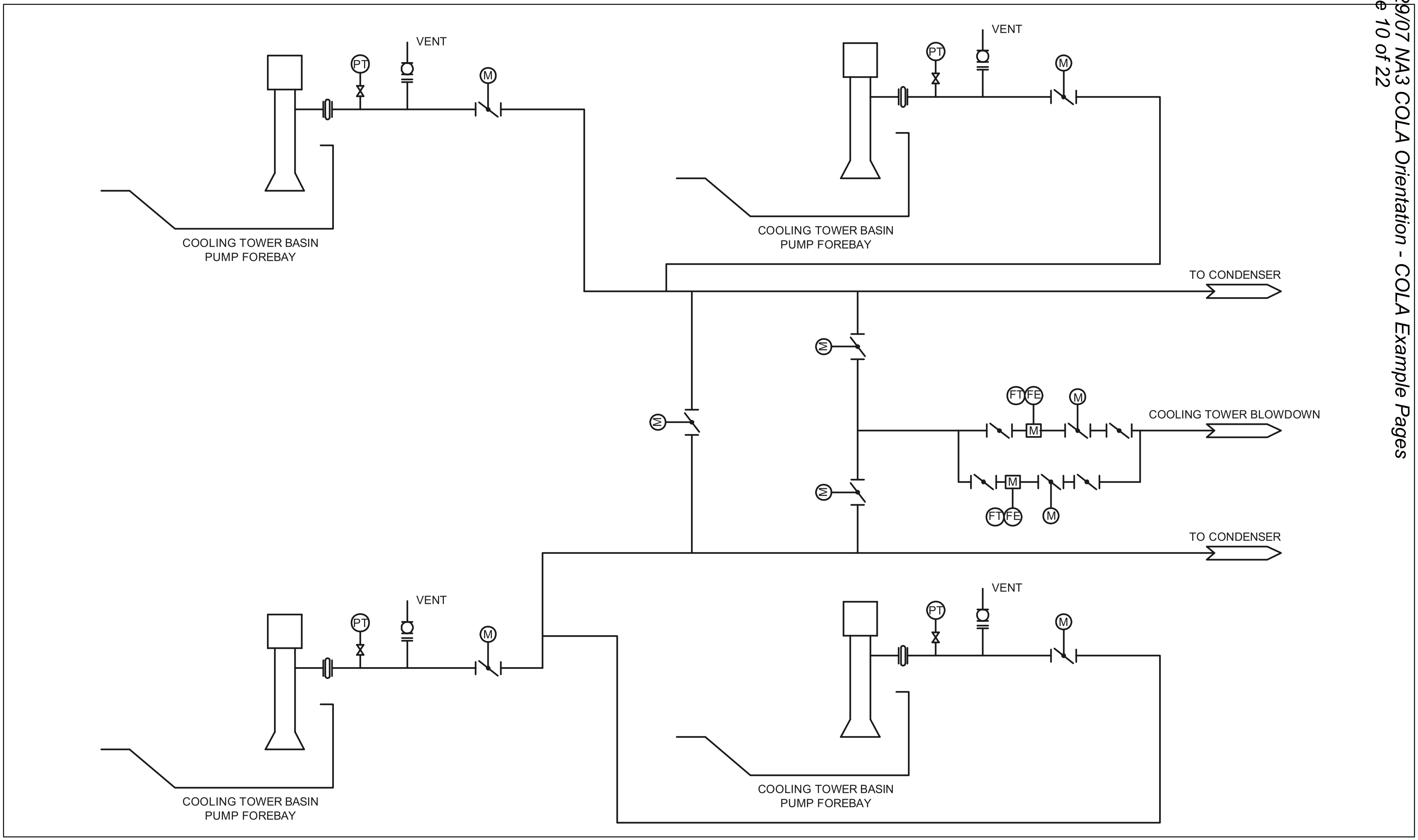

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Table 2.0-2R Limits Imposed on Acceptance Criteria in Section II of SRP by ESBWR Design

	Section	Subject	ESBWR DCD Parameters, Considerations and/or Limits	COL Information
NAPS COL 2.0-2-A	2.1.1	Site Location and Description	None	COL Item 2.0-2-A is addressed in Section 2.1.1.
NAPS COL 2.0-3-A	2.1.2	Exclusion Area Authority and Control	None	COL Item 2.0-3-A is addressed in Section 2.1.2.
NAPS COL 2.0-4-A	2.1.3	Population Distribution	ESBWR PRA offsite consequence analysis in DCD Reference 2.0-1 is based on a population density of 305 people per square kilometer (790 per square mile).	COL Item 2.0-4-A is addressed in Section 2.1.3. The population density for offsite analysis provided in Section 2.1.3 fall within (is less than) the density used in DCD Reference 2.0-1.
NAPS COL 2.0-5-A	2.2.1–2.2.2	Identification of Potential Hazards in Site Vicinity	Per DCD Table 2.0-1	COL Item 2.0-5-A is addressed in Section 2.2.
NAPS COL 2.0-6-A	2.2.3	Evaluation of Potential Accidents	None considered in vicinity of plant	COL Item 2.0-6-A is addressed in Section 2.2.3.
NAPS COL 2.0-7-A	2.3.1	Regional Climatology	Per DCD Table 2.0-1	The portion of COL Item 2.0-7-A to provide information in accordance with SRP 2.3.1 is addressed in Section 2.3.1. The wind speed used in design of nonsafety-related structures that are not included as part of the ESBWR Standard Plant design is 40 m/s (90 mph).
NAPS COL 2.0-8-A	2.3.2	Local Meteorology	None	COL Item 2.0-8-A is addressed in Section 2.3.2.
NAPS COL 2.0-9-A	2.3.3	Onsite Meteorological Measurements Programs	None	COL Item 2.0-9-A is addressed in Section 2.3.3.

Table 2.0-201 Evaluation of Site/Design Parameters and Characteristics

Subject [16]	DCD Site Parameter Value [1][16]	Site Characteristic	Evaluation
Part 1 – Evaluation of DCD Site Parameters			
Maximum Groundwater Level	0.61 m (2 ft) below plant grade		The DCD site parameter of maximum groundwater level of 0.61 m (2 ft) below plant grade is the same as the design groundwater level in DCD Table 3.4-1. The design plant grade elevation identified in DCD Table 3.4-1 is at 4650 mm, which corresponds to 88.4 m (290 ft) msl for the Unit 3 site as shown in Figure 2.1-201. Therefore, the DCD site parameter value of 0.61 m (2 ft) below plant grade corresponds to a maximum groundwater level no higher than 87.8 m (288 ft) msl for the Unit 3 site.
		ESP 82.3 m (270 ft) msl or 0.3 m (1 ft) below the free surface, whichever is higher	The ESP site characteristic value for maximum groundwater level is defined in FSER Supplement 1, Appendix A, as the maximum elevation of groundwater at the ESP site. The ESP value of 82.3 m (270 ft) msl is based on the proposed site grade in the SSAR of 82.6 m (271 ft) msl. With design plant grade for Unit 3 at 88.4 m (290 ft) msl, the operative ESP site characteristic value becomes 0.3 m (1 ft) below the free surface which is higher than 82.3 m (270 ft) msl. With a free surface at 88.4 m (290 ft) msl, the ESP site characteristic corresponds to 88.1 m (289 ft) msl which does not fall within (is higher than) the value established by the DCD site parameter. SSAR Table 1.9-1 provides a value of < 82.3 m (270 ft) msl from SSAR Section 2.4.12.4 which is based on the proposed site grade in the SSAR of 82.6 m (271 ft) msl.
		Unit 3 2.1 m (7 ft) below design plant grade	The Unit 3 site characteristic value for maximum groundwater level below design plant grade is 2.1 m (7 ft) in the power block area based on the maximum groundwater elevation of 86.3 m (283 ft) msl from Section 2.4.12 and the design plant grade elevation of 88.4 m (290 ft) msl. Therefore, the Unit 3 site characteristic value for maximum groundwater level below design plant grade falls within (is lower than) the DCD site parameter value. The maximum groundwater level in the power block area is 2.1 m (7 ft) below design plant grade, which meets the DCD site parameter limit of not higher than 0.61 m (2 ft) below design plant grade. The Unit 3 site characteristic value falls within (is lower than) the ESP site characteristic value.

Table 2.0-201 Evaluation of Site/Design Parameters and Characteristics

Subject [16]	DCD Site Parameter Value [1][16]	Site Characteristic	Evaluation
Extreme Wind			
Seismic Category I and II Structures			
100-year Wind Speed (3-sec gust) [13]	67.1 m/s (150 mph)	**ESP and Unit 3** 42.9 m/s (96 mph), 3-second gust	The ESP site characteristic value for basic wind speed is defined as the 3-second gust wind speed at 10 m (33 ft) above the ground that has a 1 percent annual probability of being exceeded (100-year mean recurrence interval). The ESP site characteristic value for basic wind speed falls within (is lower than) the DCD site parameter value. SSAR Table 1.9-1, which refers to SSAR Section 2.3.1.3.1, provides the same value as FSER Supplement 1, Appendix A. The Unit 3 site characteristic value falls within (is the same as) the ESP site characteristic value.
Exposure Category	D		The DCD site parameter of extreme wind exposure category is determined using ASCE 7 (DCD Reference 2.0-2). Exposure category is determined by a number of variables including wind speed, building shape and location, and surface roughness. A DCD site parameter of Exposure Category D results in the most severe design wind pressures.
		ESP No value provided	
		Unit 3 Exposure Category D	The Unit 3 site characteristic is Exposure Category D as this value cannot be exceeded. The Unit 3 site characteristic falls within (is the same as) the DCD site parameter value for extreme wind exposure category, i.e., Exposure Category D.

2.2 Nearby Industrial, Transportation, and Military Facilities

NAPS COL 2.0-5-A

The information needed to address DCD COL Item 2.0-5-A is included in SSAR Sections 2.2.1 and 2.2.2, which are incorporated by reference with the following supplements. SSAR Section 3.5.1.6 is also incorporated by reference, with no supplements.

2.2.2.1 Industrial Facilities

The first paragraph of this SSAR section is supplemented as follows with information on nearby industrial facilities.

NAPS ESP COL 2.2-1

Since the SSAR was submitted, no hazardous industrial facilities have been added at the 2.51 km^2 (620 acres) industrial development near the Unit 3 EAB. The industrial site poses no hazard to Unit 3.

2.2.2.6.1 Airports

The first paragraph of this SSAR section is supplemented as follows with information to identify an additional airport in the vicinity of Unit 3.

A third airport within 16.1 km (10 mi) of the Unit 3 site opened in 2007. Table 2.2-201 provides operations-related information. The location is shown with other nearby airports in Figure 2.2-201. Because this is a small private airport, it is not expected to grow substantially in the foreseeable future.

After the fourth paragraph of this SSAR section, a new paragraph is added to describe the additional airport in the vicinity of Unit 3.

Seven Gables, a private landing strip with an unlighted 457 m (1500 ft) turf runway, is approximately 12.2 km (7.6 mi) north-northwest of the site. It is not licensed for commercial use and with only three small aircraft based on the field (one single-engine airplane, one helicopter, and one ultralight), the expected volume of traffic is very light. (Reference 2.2-201)

NAPS COL 2.0-30-A

2.5.5 Stability of Slopes

The information needed to address DCD COL Item 2.0-30-A is included in the following sections.

SSAR Section 2.5.5 is incorporated by reference with the following variances and/or supplements.

NAPS ESP VAR 2.5-1

SSAR Section 2.5.5 addressed the stability of slopes at the North Anna ESP site. However, the information presented in this FSAR section replaces the analyses presented in SSAR Section 2.5.5 because the slopes being considered have changed, and, for the seismic slope stability analysis, the peak ground acceleration being applied is different. The method of analysis remains essentially the same. In summary, the slopes considered herein are lower, less steep, and have a smaller applied seismic acceleration than the slopes analyzed in SSAR Section 2.5.5. As a result, the slopes addressed in this section have a higher computed factor of safety against failure, and are stable under both long-term static and short-term seismic conditions.

This section presents information on the stability of permanent slopes at the Unit 3 site. The information was developed from a review of reports prepared for the existing units and the originally planned Units 3 and 4, geotechnical literature, the ESP subsurface investigation, and the Unit 3 subsurface investigation. The review included the site-specific reports from the UFSAR (SSAR Reference 5), and reports prepared by Dames and Moore regarding the design and construction of the existing units (SSAR Reference 7) and the originally planned Units 3 and 4 (SSAR Reference 8).

a. **Description of Slopes**

The grading plan for Unit 3 is shown in Figure 2.5-255. The design plant grade for the power block area is at Elevation 88.4 m (290 ft) with elevations around the perimeter of this area ranging from about Elevation 88.1 m (289 ft) to 86.6 m (284 ft) to allow for adequate surface drainage. To the northeast of the power block area, going towards the existing Units 1 and 2, ground surface elevation reduces at a 2 percent slope down to the yard grade of Units 1 and 2 at Elevation 82.3 m (270 ft). (Coordinates and directions in this section are with reference to true north.) To attain these ground elevations, there is cut in the power block area, reaching as much as 12.2 m (40 ft) to the south of the reactor building. However, as existing grade falls off towards the northeast of the for saprolite are as follows: void ratio equals 0.7, total porosity equals 41 percent, effective porosity equals 33 percent, and seepage velocity equals 0.037 m/day (0.12 ft/day). The Unit 3 values result in a seepage velocity that does not fall within (is larger than) the SSAR value.

The variance in Unit 3 values for void ratio, porosity, and seepage velocity from the SSAR values results from the use of additional data collected from the Unit 3 subsurface investigation.

Justification

The variance in values for void ratio, porosity, and seepage velocity is acceptable because compliance with 10 CFR 20 is demonstrated in FSAR Section 2.4.13 which evaluates radionuclide concentrations as a result of a postulated accidental release of liquid effluents in the groundwater pathways.

Variance: NAPS ESP VAR 2.4-2 – NAPS Water Supply Well Information

Request

This is a request to use corrected information for Unit 3 regarding the NAPS water supply wells rather than the SSAR information. The information in FSAR Table 2.4-17R revises SSAR Table 2.4-17 to correct certain information that is now known to be different and to reflect updated information on water supply wells at the NAPS site.

This variance results from the need to provide corrected information for well No. 2 and the Security Training Building well which is based on a reconsideration of technical content of the references for SSAR Table 2.4-17.

Justification

This variance in the NAPS water supply well information is acceptable because the corrected and new information continues to support the conclusions in SSAR Section 2.4.12.1.3 that: “Any groundwater supply required by the new units would likely come from an increase in the storage capacity for the existing wells or from drilling additional wells. In either event, additional groundwater withdrawal by the new units is not expected to impact any offsite wells due to: 1) their distance from the site, 2) the direction of the hydraulic gradient toward Lake Anna and the lake’s recharge effect, and 3) the existence of hydrologic divides between the ESP site and the offsite wells.”

Variance: NAPS ESP VAR 2.5-1 – Stability of Slopes

Request

This is a request to use the information presented in FSAR Section 2.5.5 on slopes and the safety of the slopes rather than the information in SSAR Section 2.5.5. The slopes near Unit 3 are different from those anticipated in the SSAR, and, for the seismic slope stability analysis, the peak ground acceleration being applied is different. The method of analysis remains essentially the same.

This variance results from the need to provide Unit 3-specific information which is different from that presented in the SSAR.

Justification

This variance in Unit 3 slopes and slope analyses is acceptable because the slopes being considered in FSAR Section 2.5.5 are lower, less steep, and have a smaller applied seismic acceleration than the slopes analyzed in SSAR Section 2.5.5. As a result, the Unit 3 slopes have a higher computed factor of safety against failure, and are shown to be stable under both long-term static and short-term seismic conditions.

Variance: NAPS ESP VAR 12.2-1 – Gaseous Pathway Doses

Request

This is a request to use updated information for Unit 3 gaseous effluent doses rather than the SSAR information which referred to ESP-ER Section 5.4. Several of the gaseous pathway doses to the maximally exposed individual (MEI) in FSAR Table 12.2-18bR do not fall within (are greater than) the corresponding values in ESP-ER Table 5.4-9. The Unit 3 values which are higher are shown in bold font in FSAR Table 12.2-18bR.

This variance is due to a change in maximum long-term dispersion estimates from those used in the ESP Application as discussed above under NAPS ESP VAR 2.0-1.

Justification

This variance is acceptable because estimated annual doses from normal gaseous effluent releases remain within applicable limits. FSAR Table 12.2-18bR shows the annual gaseous pathway doses to the maximally exposed individual (MEI) for Unit 3 and compares each to the corresponding estimate from the ESP-ER Table 5.4-9. Not all doses increased for the three locations with higher long term dispersion estimates because the normal release source term is lower for Unit 3 than the composite source term used to bound the multiple reactor types considered in the ESP Application. The effect of these changes is slight increases in thirteen Unit 3 total body and thyroid doses when compared to the earlier estimates for the ESP. The Unit 3 values that exceed the corresponding ESP value are shown in bold font in FSAR Table 12.2-18bR.

Although some of the individual pathway doses increased compared to the ESP Application, all gaseous effluent doses are acceptable when compared with the applicable limits in FSAR Table 12.2-201. As shown, the Unit 3 annual total body dose meets the 10 CFR 50, Appendix I, limit. This table also shows that the Unit 3 total body dose estimate is lower than the corresponding ESP value.

The gaseous effluent pathway thyroid dose for the MEI is also compared with the applicable limit in FSAR Table 12.2-201. While it meets the 10 CFR 50, Appendix I, limit, this table shows that the

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4.2 Water-Related Impacts

The information for this section is provided in ESP-ER Section 4.2 and associated impacts are resolved as SMALL in FEIS Section 4.3. Supplemental information is provided in Section 4.2.1.1 below.

4.2.1 **Hydrologic Alterations**

4.2.1.1 **Surface Water**

The ESP-ER describes two small ephemeral streams that discharge in the vicinity of the cooling tower area and indicates that these streams would be impacted by construction activities. These streams are designated Stream A and Stream B on ESP-ER Figure 4.2-1. A third ephemeral stream (designated as Stream C) has been identified in the cooling tower area. All three streams are shown on ESP-ER Figure 2.4-5, ESP-ER Figure 2.4-6, and Figure 1.1-1. It has now been determined that Unit 3 construction activities would alter only Streams B and C and that Stream A would not be altered, as it is outside of the construction area. The drainage area of Stream A and Stream C are not substantially different, and the discharge point of both streams is Lake Anna. Once construction is complete, the area would continue to drain to the wetlands, through stream beds, to Lake Anna. Thus, while the particular streams identified as being altered by construction have changed, the impact remains SMALL because the area of concern is not substantially different than what was evaluated in the ESP-ER.

The ESP-ER indicated that no new transmission lines or alterations to existing rights-of-way were expected; however, the PJM System Impact Study (Reference) concludes that an additional transmission line would be required as a system reinforcement associated with the interconnection of Unit 3. The new transmission line would be installed in the NAPS-to-Ladysmith corridor on new transmission towers located in proximity to the existing towers. Construction activities for the new transmission line would be performed in accordance with existing corridor procedures.

Section 2.4 identifies wetlands crossed by the Ladysmith corridor. To the extent practical, the construction of new transmission towers would avoid alterations to wetlands and shorelines. In accordance with existing corridor procedures, impacts from construction of overhead transmission lines adjacent to streams would be minimized through various practices, including:

- Hand-clearing of trees and brush located within approximately 100 feet of a stream or ditch with running water
- Removing material approximately three inches in diameter and above from the buffer and leaving material less than three inches undisturbed
- Limiting the disturbance of soil within an approximate 100-foot buffer zone around streams and ditches

Chapter 8 Need for Power

This chapter demonstrates the need for the power to be generated by the proposed facility and related benefits. This demonstration is supported by an analysis, which is organized into five sections:

- A discussion of benefits in Section 8.0.1,
- A power system description in Section 8.1,
- An analysis of demand for capacity and energy in Section 8.2,
- An analysis of supply resources in Section 8.3, and
- An assessment of need in Section 8.4.

8.0.1 Benefits

This section describes the benefits associated with construction and operation of the proposed NAPS Unit 3. Non-monetary benefits of constructing and operating the proposed Unit 3 include benefits related to: net electrical generating benefits; fuel diversity, dampened price volatility, and enhanced reliability; emissions avoidance; waste reduction; and reduction in dependence on imported power. Monetary benefits of constructing and operating Unit 3 include benefits related to tax revenues and to the local and state economy.

8.0.1.1 Net Electrical Generating Benefits

As demonstrated in Section 8.4, the Dominion Zone,[1] the region of interest, has a specific need for new baseload capacity and this need is projected to increase. The baseload capacity supply portfolio in the Dominion Zone is currently out of balance with baseload requirements, because development of new baseload capacity has not kept pace with recent growth in baseload requirements. Instead, the growth in baseload energy consumption has been met predominantly by the recent development of gas-fired units, which are more suitable as cycling or mid-range resources.

As discussed in Section 8.3.1.1.2, over the past 10 years from 1997 to 2006, DVP's baseload requirement has grown by over 2000 MW, based on analysis of DVP weather-normalized annual energy sales. Over the same period, there has been virtually no development of additional

1. In May 2005, DVP joined PJM Interconnection LLC (PJM) and transferred control of the transmission facilities that it owns and operates in its control area to PJM. With its integration into PJM, DVP separated its electric generation and traditional customer delivery businesses (referred to now as "load serving entity" or "LSE") into two distinct operations within PJM's system. When DVP joined PJM, it resulted in the creation of the PJM South Region, which is also known as the Dominion Zone, the region of interest (ROI) for the purposes of this COL Application. The Dominion Zone is currently coterminous with the power system control area of DVP and includes the electric distribution service territories (service territory) of DVP, ODEC, North Carolina Electric Cooperatives (NCEMCS) and other municipals. DVP operates as an LSE in the Dominion Zone.

Table 3.0-2 Evaluation of ESP Design Parameters

	ESP Design Parameters [From FEIS Table I-2]		Unit 3 Design Characteristic Value	
Item	**ESP Value**	**Description and References**		**Evaluation**
Source Term (continued)				
Atmospheric (Design Basis Accidents)	ESP-ER Table 7.1-16	AP1000 Steam Generator Tube Rupture, Accident Initiated Iodine Spike	Not Applicable	This design parameter is not applicable because it is related to a non-ESBWR plant.
	ESP-ER Table 7.1-18	ABWR Main Steam Line Break	Not Applicable	This design parameter is not applicable because it is related to a non-ESBWR plant.
	ESP-ER Table 7.1-20a	ESBWR Main Steam Line Break	MBq values presented in DCD Table 15.4-12	The Unit 3 design characteristic source term values for an MSLB are provided in DCD Table 15.4-12. The Unit 3 design characteristic values do not fall within (are not equal to or less than) the ESP design parameter values identified in ESP-ER Table 7.1-20a which is referenced in FEIS Table I-2. Although the source terms listed in ESP-ER Table 7.1-20a have decreased, additional radionuclides have been identified. A comparison of each ESP and Unit 3 source term value is provided in Table 3.0-4 of this ER. See Section 7.1 for the analysis of radiological consequences of accidental releases. As described in Section 7.1, the resultant MSLB doses remain below those presented in ESP-ER Table 7.1-20b and 7.1-20c.
	ESP-ER Table 7.1-11	AP1000 Loss-of-Coolant Accident	Not Applicable	This design parameter is not applicable because it is related to a non-ESBWR plant.
	ESP-ER Table 7.1-11	ABWR Loss-of-Coolant Accident	Not Applicable	This design parameter is not applicable because it is related to a non-ESBWR plant.