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December 18, 2014
File: 203446520

Attention: Mr. Randy Steffey
U.S. Army Corps of Engineers
Norfolk District Office
803 Front Street
Norfolk, VA 23501

Dear Mr. Steffey,

Reference: NAO-2012-0080 Surry – Skiffes Creek – Whealton Alternatives Analysis Summary

On behalf of Dominion Virginia Power (Dominion), Stantec Consulting Services, Inc. (Stantec) is pleased to provide this additional information in response to your email dated December 2, 2014, The following provides a comparison of environmental impacts for the proposed Surry – Skiffes Creek – Whealton 500kV/230kV line project as well as electrically viable alternatives presented in the Alternatives Analysis submitted on November 6, 2014. The intent of this submission is to assist the Corps with their alternatives analysis under the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The following is a summary of the approach, assumptions made and available data used to develop the environmental factors associated with the analyzed alternatives.

Practicability

Dominion conducted an extensive alternatives study which was presented in the submitted Alternatives Analysis. Environmental impacts were not evaluated for all of the alternatives discussed as many of the proposed options were determined to be not practicable. Under 40 CFR 230.10(a)(2), an alternative is considered practicable if:

> "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

Dominion first evaluated potential project alternatives to determine whether each could meet the overall project purpose and need. As stated in the Joint Permit Application (JPA) submitted in August 2013 and the Alternatives Analysis, the overall purpose of the project is:

> "to provide reliable, cost-effective bulk electric power delivery to the North Hampton Roads Load Area (NHRLA) to maintain compliance with North American Electric Reliability Corporation (NERC) reliability standards."

Alternatives were evaluated on whether they could electrically address the NERC reliability standards that must be met due to the retirement of Yorktown Units 1 and 2, regardless of whether the project could address the reliability needs within the required timeframe. The Alternatives Analysis provided detail on why the alternatives in Table 1 would not electrically

address the NERC reliability standards. As these options are not electrically viable, they are not considered further.

Table 1. Alternatives that do not electrically address NERC violations

Alternative	Section in Alternatives Analysis
No Action	3.0
Demand-Side Management	3.2.2
Line 214/263 230 kV Rebuild (James River Bridge Crossing)	3.2.3.1
Chuckatuck – Newport News 230 kV Line (Whittier Hybrid)	3.2.3.2
Chickahominy – Lanexa 500 kV	3.2.3.4
Underground 230 kV Hybrid Single Circuit	3.3.1
Underground 230 kV Hybrid Double Circuit	3.3.1
Alternative 230 kV Underground Crossing (PAR)	3.3.1.1

After eliminating alternatives that are not electrically viable, and therefore do not meet the overall purpose, Dominion evaluated the practicability of the remaining alternatives based upon cost, existing technology, and logistics. At the time of the initial analysis, all alternatives except for the proposed project and Chickahominy – Skiffes 500kV alternative were determined to be not practicable based upon cost and logistics[1]. Logistical constraints include engineering, available space, and the capability to meet the schedule dictated by the MATS rule and NERC reliability criteria. As such, detailed evaluations for environmental impacts were only assessed for these two options as they were, at the time, the only two practicable alternatives.

Environmental Impacts

At the request of the Corps, Stantec is providing qualitative information concerning environmental impacts for alternatives shown in Table 3-1 of the Alternatives Analysis, as well as impacts for the Surry – Skiffes Creek 500 kV underground (HVDC) and Surry – Whealton 500 kV alternatives. The practicability of each of these alternatives from an electrical and logistical standpoint was extensively discussed in the previously submitted Alternatives Analysis. The following information provides only an environmental assessment of these alternatives, and does not change the ultimate determination of practicability previously presented.

Dominion and Stantec conducted detailed field studies on both the Surry – Skiffes Creek 500 kV route and the Chickahominy – Skiffes Creek 500 kV route as part of the planning process. The information presented in the modified Table 3-1 (attached) reflects the results of these studies.

[1] Original analysis was completed in 2012 and early 2013 and presented during the State Corporation Commission (SCC) hearing. At this time, only the Surry – Skiffes Creek 500 kV alternative is potentially able to meet the required schedule and in-service date of April 2016.

Reference: NAO-2012-0080 Surry – Skiffes Creek – Whealton Alternatives Analysis Summary

However, detailed studies were not conducted for other alternatives as they are not practicable alternatives. Relative impacts for these alternatives were assessed utilizing available desktop resources, agency databases and aerial imagery. As such, the information presented is based on best professional judgment given the anticipated project engineering and construction methods. A modified Table 3-1 is attached that provides environmental impact comparison of the following resources:

- Tidal wetland impacts
- Palustrine forested (PFO) wetland conversion
- Subaqueous bottom impacts
- Direct oyster lease impacts
- Water quality impacts
- Nature of any proposed river crossing
- Federally protected species impacts
- Potential for visual effects to architectural resources
- Archaeological sites within ROW
- Underwater archaeological sites within ROW
- Homes within 500 feet of ROW

Note that all alternatives would require the Skiffes Creek – Whealton 230 kV rebuild; therefore, environmental impacts for this portion of the project are not included in Table 3-1. A discussion of the assumptions made for the evaluation of each alternative follow.

Surry – Skiffes 500 kV (Proposed Project)

Impacts associated with the proposed project are provided in the JPA and BASF modification. Fieldwork was conducted to identify the extent of jurisdictional wetlands and assess the presence/absence of federally protected species. Concurrence with federally protected species affect determinations has been obtained from the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Water quality impacts are expected to be minimal given the use of erosion and sediment controls.

Chickahominy-Skiffes Creek 500 kV (Section 3.2.3.5)

The environmental impacts of this route were evaluated in detail during the SCC approval process; therefore, fieldwork for wetlands and cultural resources was conducted. Environmental impacts for this alternative were provided in Table 4-1 of the JPA. Detailed habitat or presence/absence surveys were not conducted for the federally threatened small-whorled pogonia and sensitive joint-vetch; however, potential habitat for these species appears to occur in multiple areas along the route. No affect determination has been made for the Atlantic sturgeon. Bald eagles nest within the vicinity of this alternative; however, a determination of the

effect has not been made. Impacts to water quality are assumed to be the same as for the proposed alternative.

Underground 230 kV Single and Double Circuit plus Retrofit Generation (Sections 3.3.1 and 3.2.1)

As stated in the Alternatives Analysis, no 230kV solution could meet the project purpose and need. Each of the 230 kV options presented must therefore be evaluated in conjunction with additional generation retrofits. It is assumed that a 230 kV option would include a submarine crossing of the James River, and generally follow the Surry – Skiffes Creek 500 kV route on the overland portions of the project. Impacts to PFO wetlands from the overland portions of this line would be the same as the impacts provided in Table 4-1 of the JPA. Additional impacts may occur due to the need to construct a transition station to convert the overhead line to submarine on the Surry side and back to overhead on the James City County side. Section 3.3.1 of the Alternatives Analysis discusses ROW widths and possible construction methodology. This information was used to evaluate potential impacts to subaqueous bottom, oyster leases, and water quality.

NMFS has not evaluated the effect this alternative would have on Atlantic sturgeon; however, adverse effects may occur depending upon the timing and duration of any proposed dredging. Like the proposed project, these alternatives would be unlikely to disturb bald eagles.

There are eight underwater anomalies located within the proposed crossings for these alternatives. The effect to these underwater resources from directional drilling or the dredging of required splice pits was not evaluated, but it is possible that they may be impacted whereas the proposed alternative was able to avoid all located anomalies. Direct impacts to private oyster lease areas may occur.

No environmental impacts are expected to occur for the retrofitting of Yorktown Units 1 or 2.

Line 214/263 230 kV Rebuild (James River Bridge Crossing) plus Retrofit Generation (Sections 3.2.3.1 and 3.2.1)

As stated above, this 230 kV option is evaluated only in conjunction with additional generation upgrades. Some temporary impacts to tidal wetlands could occur during structure rebuilds on the Isle of Wight County side of the James River crossing. Since this alternative involves a rebuild, no additional PFO wetland conversion, subaqueous bottom encroachment, or direct impacts to oyster leases would be expected. As with the proposed project, minimal impacts to water quality would be expected.

NMFS did not make an Atlantic sturgeon affect determination; however, it is assumed that this alternative would have the same effect as the proposed project. It appears that adequate

buffer occurs between the existing line and known bald eagle nests and the alternative would not be expected to disturb bald eagles.

Archaeological resources were not evaluated; however, as this alternative is a rebuild of an existing line, it is not expected that the project would adversely affect any archaeological site potentially eligible for listing on the NRHP. Architectural resources may be affected if tower heights were required to increase. The number of homes within 500 feet of the ROW required for the Line 214/263 230 kV Rebuild alternative was not evaluated; however, since this alternative would use existing ROW, little effect is assumed to occur.

New Generation (Section 3.2.1)

Environmental impacts are difficult to evaluate without an identified site for a new generation facility and associated natural gas pipeline; however, several assumptions can be made. Tidal wetland impacts and encroachment over subaqueous bottom may occur due to the construction of the facility intake structure. Similarly, the pipeline ROW may cause impacts to tidal wetlands and would likely result in PFO wetland conversion. The facility itself would be unlikely to have direct encroachment on subaqueous bottom, but the pipeline ROW may require encroachments. Best management practices and erosion and sediment controls would minimize water quality impacts during construction. Any new facility would also be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act for the discharge of cooling and process water.

It is assumed that the location of a new generation facility could avoid impacts to threatened or endangered species through careful siting of the facility. However, any proposed intake would need to comply with the Section 316(b) rule for new cooling water intakes, and the effect to Atlantic sturgeon would need to be evaluated if the intake were proposed on the James River.

The facility itself, including the associated intake structure, would need to be evaluated for effect on any architectural resources eligible for listing on the NRHP. Archaeological surveys would need to occur for the facility and pipeline. Due to the limited footprint and near shore nature of the intake structure, minimal impacts to underwater cultural resources would be expected. It is unknown how many homes or businesses would be in the vicinity of any proposed new generation facility or the pipeline ROW; however, it is likely that some would be affected.

Surry – Whealton 500 kV (Section 3.2.3.3)

The Surry – Whealton 500 kV alternative would require new ROW and would cross approximately 5 acres of tidal wetlands at the Isle of Wight County side of the James River. Although potential structure locations were not determined for this alternative, it appears that at least one structure may need to be located with tidal wetlands and temporary and permanent impacts would

occur. Although the width and location of the required expanded ROW were not evaluated, there are extensive PFO wetlands on both sides of the existing 230 kV line and significant PFO wetland conversion would be expected. Based upon the number of existing structures in the James River and the structure footprints needed for the Surry – Skiffes 500 kV proposed project, it is estimated that approximately 0.5 acre of subaqueous bottom encroachment would occur. A total of 10 oyster leases would be crossed by this alternative, and new towers would need to be constructed within the oyster lease areas. Water quality impacts would be similar to that of the proposed project.

NMFS did not make a determination of the effect to Atlantic sturgeon; however, it is assumed that this alternative would have the same effect as the proposed project. It appears that adequate buffer occurs between the existing line that would have expanded ROW and known bald eagle nests; therefore, this alternative would not be expected to disturb bald eagles.

The placement of larger structures required for the 500 kV line could lead to visual impacts to architectural resources where there are not currently any from the 230 kV line. Structure placement on the overland portions could potentially avoid any adverse impacts to archaeological sites eligible for listing on the NRHP. Although the new 500 kV line would be located adjacent to an existing crossing at the James River, it is unknown whether underwater archaeological resources may be affected by this alternative. Condemnation of some homes and/or businesses would be likely for the expansion of ROW and upgrade of the Whealton or Winchester substations to a switching station.

<u>Surry – Skiffes Creek 500 kV Underground (HVDC) (Section 3.3.3)</u>

An exact route for the Surry – Skiffes Creek 500 kV Underground (HVDC) alternative was not identified; however, trenching impacts to tidal wetlands within Hog Island would likely occur if a northern route were required to avoid crossing the natural gas pipelines in the James River. Additionally, the large (10 – 20 acre) sites required on both sides of the river for stations to convert the voltage from alternating current to direct current could lead to significant direct impacts to tidal wetlands (Hog Island) or PFO wetlands, depending on the location of the sites. PFO wetland conversion impacts from the overland line segment between the James River and the Skiffes Creek switching station would be similar to either the proposed project or the 230 kV underground alternatives depending on the James River crossing route required. A ROW width was not determined. However, oyster leases are prevalent in the area and any proposed HVDC crossing would result in significant direct impact. The installation of the submarine cable required for the Surry – Skiffes 500 kV Underground (HVDC) alternative would result in temporary impacts to water quality during construction due to increased turbidity and potential release of contaminants bound to sediment in the river.

Reference: NAO-2012-0080 Surry – Skiffes Creek – Whealton Alternatives Analysis Summary

Survey information collected for the proposed project indicates that small-whorled pogonia would not be present for the HVDC alternative. NMFS has not evaluated the effect that trenching or jet-plowing over a 4 mile crossing would have on Atlantic sturgeon; however, potential adverse effects could occur depending upon the timing and duration of proposed dredging. Like the proposed project, this alternative would be unlikely to disturb bald eagles.

Although no structures would be located in the James River, large converter stations five to eight stories (up to nearly 100 feet tall) would need to be constructed on both sides of the river. The potential effect of these large structures on nearby architectural resources (Carters Grove, Hog Island) has not been evaluated. Underwater archaeological effects cannot be evaluated without a proposed route; however, the required trenching for this alternative would lead to adverse effects to any resources along the route. The Surry – Skiffes Creek 500 kV Underground (HVDC) alternative would have effects to homes similar to the proposed project.

Thank you for your prompt review of this material. If you have any questions or require additional information, please advise me at your earliest convenience.

Regards,

STANTEC CONSULTING SERVICES,INC.

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Attachment: Modified Table 3-1. Additional Analyses Summary Results

Cc: Courtney R. Fisher, Virginia Dominion Power
Ben Stagg, Virginia Marine Resources Commission
Larissa Ambrose, Department of Environmental Quality

Additional Analyses Summary Results

	A	B	C	D	E	F	G	H	I	J	K
			Alternative A[1] - 230kV		Alternative B[2] - 230kV		Alternative C[3] - 230kV				
	Proposed Project including 500 kV Updated Proposed Route	Overhead 500 kV Chickahominy Alternative	Transmission Only	Transmission Plus *Generation*[9]	Transmission Only	Transmission Plus *Generation*[9]	Transmission Only	Transmission Plus *Generation*[9]	Stand Alone *Generation* Option[4,9]	Surry-Whealton 500 kV	Surry - Skiffes Creek 500 kV Underground (HVDC)
Does project electrically address 2015 NERC Reliability Violations?	YES	YES	NO	YES[5]	NO	YES[5]	NO	YES[5]	YES[5]	YES[5]	YES[5]
COST	$155.4 M	$213.2 M	$273.8 M	$623.8 M	$440.4 M	$540.4 M	$144.8 M	$494.8 M	$633.0 M	Not Evaluated	>$1,000M
If "NO" in Line 1, what is the cost of additional transmission facilities to fully resolve 2015 NERC Reliability Violations?	Ø	Ø	$214.8 M	Ø	$48.2 M	Ø	$ 82.1 M	Ø	Ø	Ø	Ø
Total COST to fully resolve 2015 NERC Reliability Violations	$155.4 M	$213.2 M	$488.6 M	$623.8 M	$488.6 M	$540.4 M	$ 226.9 M	$494.8 M	$633.0 M	Not Evaluated	>$1,000 M
Can construction necessary to fully resolve 2015 NERC Reliability Violations be completed by June 1, 2015?[6]	YES	YES**	NO	NO	NO	NO	NO	NO	NO	Not Evaluated	Not Evaluated
Can construction necessary to fully resolve 2015 NERC Reliability Violations be completed by April 16, 2017?[7]	YES	YES**	NO	YES**	NO	NO	NO[8]	NO	YES**	Not Evaluated	Not Evaluated
Additional COST to fully resolve 2021 NERC Reliability Violations	$17.3 M	$17.3 M	$26.7 M	$577.0 M	$26.7 M	$577.0 M	$181.9 M	$577.0 M	$712.0 M	Not Evaluated	Not Evaluated
Total COST to fully resolve 2021 NERC Reliability Violations	**$172.7 M**	**$230.5 M**	**$515.3 M**	**$1,200.8 M**	**$515.3 M**	**$1,117.4 M**	**$ 408.8 M**	**$1071.8 M**	**$1,345.0 M**	**Not Evaluated**	**Not Evaluated**
Completion date for facilities to address 2015 NERC Reliability Violations**	2015	2015	2018	2017	2018	2018	N/A[8]	2021	2016	Not Evaluated	Not Evaluated
Environmental Impacts											
Tidal Wetlands	1.20 ac crossed 0 ac impact	8.64 ac crossed <0.1 ac impact	1.20 ac crossed 0 ac impact	1.20 ac crossed 0 ac impact	1.20 ac crossed 0 ac impact	1.20 ac crossed 0 ac impact	Temp impact	Temp impact	Potential impact	5 ac crossed <0.1 ac impact	Potential impact
PFO Wetland Conversion	0.41 ac	62.00 ac	0.73 ac	0.73 ac	0.73 ac	0.73 ac	Likely 0 ac	Likely 0 ac	Potential impact	Potential impact	Potential impact
River Crossing	New James River aerial	New Chickahominy River aerial	New James River underground	New James River underground	New James River underground	New James River underground	Existing James River aerial rebuild	Existing James River aerial rebuild	None likely	New James River aerial at existing aerial	New James River underground

Additional Analyses Summary Results

Subaqueous Bottom Encroachment	0.63 ac	<0.1 ac	Direct impacts required	Direct impacts required	Direct impacts required	Direct impacts required	Impacts unlikely	Impacts unlikely	Minimum impact	Minimal impacts similar to proposed	Significant impacts
Private Oyster Lease Impacts	<0.25 ac	0 ac	Direct impacts likely	Direct impacts likely	Direct impacts likely	Direct impacts likely	Impacts unlikely	Impacts unlikely	Minimum impact	10 leases present, similar impacts to proposed project	Significant impact
Water Quality Impacts	Minimal w/ E&S controls	Minimal w/ E&S controls	Turbidity, release of contaminants	Turbidity, release of contaminants	Turbidity, release of contaminants	Turbidity, release of contaminants	Minimal w/ E&S controls	Minimal w/ E&S controls	Minimal w/ E&S controls	Minimal w/ E&S controls	Turbidity, release of contaminants
Protected Species Impacts	Not likely to adversely affect	Potential impacts to SWP, SJV, bald eagle[10]	Potential impacts to Atlantic sturgeon	Potential impacts to Atlantic sturgeon	Potential impacts to Atlantic sturgeon	Potential impacts to Atlantic sturgeon	Not likely to adversely affect	Not likely to adversely affect	Unknown	Not likely to adversely affect	Potential impacts to Atlantic sturgeon
Potential for Visual Effects to Architectural Resources	Effects to resources on James River	Potential effects to resources along new ROW	Potential visual effects from onshore towers (0.8 mi from Carters Grove)	Potential visual effects from onshore towers (0.8 mi from Carters Grove)	Potential visual effects from onshore towers (0.8 mi from Carters Grove)	Potential visual effects from onshore towers (0.8 mi from Carters Grove)	Little change to existing visual effects	Little change to existing visual effects	Potential effects	Little change to existing visual effects	Large (5-8 story) converter stations on both sides of James River
Archaeological Sites w/in ROW	7	68	Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project	Unknown but existing ROW	Unknown but existing ROW	Unknown	Unknown	Unknown for converter station
Underwater Archaeological Sites w/in ROW	6 all avoided by towers	Unknown	Similar to proposed project but may be directly impacted	Similar to proposed project but may be directly impacted	Similar to proposed project but may be directly impacted	Similar to proposed project but may be directly impacted	Unknown but existing crossing	Unknown but existing crossing	Unlikely to affect	Unknown but existing crossing	Similar to proposed project but may be directly impacted
Homes w/in 500 FT of ROW	84	1,129	84	84	84	84	No new ROW required	No new ROW required	Unknown - New generation and pipeline would likely affect some homes	Many homes within ROW/switching station expansion	84

1. Alt. A: underground 230 kV hybrid single circuit (1000 MVA) on James River Crossing Variation 3 Hybrid Conceptual Route.
2. Alt. B: underground 230 kV hybrid double circuit (1000 MVA/circuit) on James River Crossing Variation 3 Hybrid Conceptual Route.
3. Alt. C: rebuild of the existing James River crossing of 230 kV Line #214 and 230 kV Line #263.
4. Amount of generation at Yorktown that is the "lowest" cost to solve the need. 620 MW in 2015 and 2021 (2 units minimum; lose 1 unit and maintain ≥ 295 MW).
5. Electrically resolves NERC Reliability Violations assuming generation at Yorktown is retained and/or added until violations are resolved.
6. Date by which the 2015 NERC Reliability Violations must be resolved.
7. If requested and granted, date by which fourth and fifth year MATS extensions end.
8. Alternative C is NOT constructible without generation already in place to address reliability issues that result from the wreck and rebuild of existing lines.
   - Generation required to be in place to support construction would cost between $383M - $652M.
   - To construct the facilities needed to address NERC Reliability Violations in 2015 would take 10 years. Additional construction time would be needed to address 2021 NERC Reliability Violations.
9. Retrofit and repower options require 3-years of capital expenditures for construction and implementation (excluding permitting), beginning July 1, 2013. Effect of multiple retrofit and repower options being executed at the same time has not been incorporated.
10. SWP = small whorled pogonia; SJV = sensitive joint vetch

** The information presented in the table above was prepared for consideration during the SCC hearings and does not reflect the one-year extension to the MATS rule recently granted by the DEQ. As of the preparation of this Alternatives Analysis, only the proposed Project, the Surry-Skiffes Creek-Whealton Line, can be constructed in time to meet the April 16, 2016 NERC compliance date.