

**USACE Preliminary Alternatives Conclusions White Paper**

**RE: NAO-2012-0080 / 13-V0408**

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The Norfolk District Regulatory Branch (Corps) is reviewing an application from Dominion Virginia Power (Dominion) who proposes to construct a new high voltage aerial electrical transmission line, known as the Surry-Skiffes Creek-Wheaton project. The proposed project consists of three components; (1) Surry – Skiffes Creek 500 kilovolt (kV) aerial transmission line, (2) Skiffes Creek 500 kV – 230 kV – 115 kV Switching Station, and (3) Skiffes Creek – Wheaton 230 kV aerial transmission line. In total, the proposed project will permanently impact 2,712 square feet (0.06 acres) of subaqueous river bottom and 281 square feet (0.01 acres) of non-tidal wetlands, and convert 0.56 acres of palustrine forested wetlands to scrub shrub non-tidal wetlands.

As proposed, the aerial transmission lines will cross portions of the James River, Woods Creek, and Skiffes Creek. In addition to structures being built within the James River, structural discharges are proposed in non-tidal wetlands. The proposed activities will require a Corps permit pursuant to Section 10 of the Rivers and Harbor Act and Section 404 of the Clean Water Act.

Additional information specific to the proposed project and alternatives can be found at <http://www.nao.usace.army.mil/Missions/Regulatory/SkiffesCreekPowerLine.aspx> . Our website also contains links to the applicant's and consulting party websites, where additional project information and perspectives on the project may be found.

To date, the Corps has received numerous comments, both supporting and in opposition to the proposed project. Opposition has largely been due to viewshed impacts that would result from the proposed 500kV aerial transmission line crossing the James River in proximity to nationally significant historic and cultural resources. Many commenters have suggested Dominion, explore alternatives to the proposed crossing that would avoid these viewshed impacts. Dominion has explored a wide range of alternatives including, but not limited to burial or relocation of the proposed line.

Dominion has provided a voluminous amount of information in support of its proposed project. At the request of the Corps and in response to comments received from the general public, Consulting Parties to the National Historic Preservation Act review, and independent electrical consultants, Dominion has provided further information addressing alternatives. To facilitate the Preliminary Alternatives Conclusions presented in this White Paper, the Corps has independently evaluated information supplied by Dominion, as well as information on alternatives supplied through public, agency, and consulting party comments, including the latest input and proposed alternatives provided by Princeton Energy Resources International, LLC (PERI) and TABORS CARAMANIS RUDKEVICH (TCR). The Corps has carefully evaluated each alternative presented, against the purpose & need and review criteria in light of all information supplied to date. The following is a general summary of our preliminary findings:

**Project Need:**

Dominion currently supplies power to the North Hampton Roads Load Area (NHRLA) via generation from the Yorktown Power Station (approximately 1,141 MW) and two transmission corridors that deliver power into the service area. The NHRLA consist of approximately 285,000 customers comprised of the Peninsula (*Counties of Charles City, James City and York and the Cities of Williamsburg, Yorktown, Newport News, Poquoson, and Hampton*), Middle Peninsula (*Counties of Essex, King William, King and Queen, Middlesex, Mathews, Gloucester, and City of West Point*), and

Northern Neck (*Counties of King George, Westmoreland, Northumberland, Richmond and Lancaster, and the City of Colonial Beach*). Yorktown Power Station is comprised of two coal fired Units (Yorktown 1 & 2) that produce approximately 323 MW combined and one oil fired Unit (Yorktown 3) that produces 818 MW.

With the current configuration Dominion would be unable to maintain compliance with the North American Electric Reliability Corporation (NERC) standards after 2021. NERC has confirmed that these standards are absolute requirements that have no waiver provision. NERC has the authority to impose fines of up to \$1 million per day, per violation. Based on updated load projections, the NHRLA must maintain 656 MW of generating capacity, with a minimum of 276 MW available after or under certain contingencies to remain NERC compliant. Dominion's 2013 power flow studies projected the demand for electricity in this area would grow 8% between the summer of 2015 and 2020. Updated 2016 projections find a 3% growth for this same period of time. Even if Yorktown Power Station continued in operation, this load growth will lead to an increased demand that would cause Dominion to be non-compliant.

In December 2011, the United States Environmental Protection Agency (EPA) passed its Mercury Air and Toxics Standards (MATS) Rule requiring power generation facilities to reduce their toxic air pollutant emissions prior to April 2015. Dominion's Yorktown Power Station, is subject to these required reductions. In order to achieve compliance with MATS, Dominion must either retrofit, repower, or decommission Yorktown. Dominion plans to comply with MATS by terminating further use of Yorktown Units 1 & 2, and limiting its use of Unit 3 to only 8% or less in a given year. Dominion has requested and received yearly extensions from both the Virginia Department of Environmental Quality and Environmental Protection Agency. Dominion's final extension, allowing Yorktown to operate only under emergency situations, was granted by EPA under an Administrative Order and expires April 15, 2017. We have confirmed with EPA that the Rule provides no additional time or waiver provisions beyond April 2017.

Power load analysis using current systems and user trends demonstrate an electrical need in the NHRLA immediately following the shutdown of the Yorktown Generators. Absent an improvement to the NHRLA electrical grid Dominion will be required to implement pre-contingency load shedding (i.e., rolling blackouts) to prevent the possibility of cascading outages impacting the reliability of the interconnected transmission system. The Regional Transmission Organization (PJM Interconnection), responsible for reliability of the electric transmission system in the Mid-Atlantic region, has independently evaluated NHRLA electrical supply and demand and concurs. Based on a 2017 Load Forecast Report, PJM reaffirms the project need and believes Dominion's preferred alternative remains the most effective and efficient solution to address the NERC reliability criteria violations that will exist in both the short and long term.

Project Purpose:

- (1) Basic:** To continue providing the North Hampton Roads Load Area (NHRLA) with reliable, cost effective, bulk electrical service consistent with mandatory North American Electric Reliability Corporation (NERC) Reliability Standards for transmission facilities and planning criteria.
- (2) Overall:** Provide sustainable electrical capacity into the NHRLA in a manner that addresses future load growth deficiencies, replaces aging infrastructure, complies with

Federal regulations, including MATS, and maintains compliance with NERC Reliability Standards.

### Alternatives Considerations:

Dominion has provided information on a wide range of alternatives to the proposed action. These include generation alternatives, upgrades to existing facilities, use of existing transmission lines, and the construction of new transmission at varying capacities. The general criteria in evaluating these alternatives are:

- Continue to provide the NHRLA with electrical service that meets current demand and reasonable projected future load growth
- Compliance with NERC Reliability Criteria Standards
- Compliance with MATS
- Cost
- Existing Technology/Engineering
- Siting/land use Restrictions

**Decommission (basically evaluated as a no build alternative):** Decommissioning alone would not satisfy project need. The loss of generation capacity from Yorktown Power Station creates immediate NERC reliability criteria violations. Some “build” alternative, such as those explored below, would be required both to become compliant with the NERC reliability criteria and to meet projected electrical demands. The updated load flow modeling evidence and confirmation by PJM establishes a need for new electric infrastructure to address approaching NERC reliability violations that have been projected.

**Demand-Side Management (DSM):** Rather than approaching power usage from the supply side, DSM resources include activities and programs undertaken to influence the amount and timing of electricity use, as well as market purchases from outside power generators to reduce overall demand. DSM resources are already included in the transmission planning process. Additional amounts cannot be assumed to be available to address NERC reliability violations due to transient and voluntary nature of these resources.

**Retrofitting (environmental controls):** Retrofitting Yorktown Power Station alone would not fully meet the project purpose and need and would not be practicable. The necessary air emission and environmental control devices needed to comply with environmental regulations alone would not increase the facilities generation capacity such that it addresses future load growth. Therefore, additional projects would be needed to ensure NERC compliance beyond 2021. Additionally, the Yorktown Units are nearly 60 years old and would require substantial structural and environmental upgrades to become compliant with MATS. Dominion estimates that these upgrades would cost over \$1 billion. Some have questioned the NHRLA’s dependency on all Units at Yorktown. However in order to meet the capacity levels necessary to satisfy NERC requirements, any retrofitting alternative must include continued operation of Units 1, 2, and 3 with unrestricted availability.

**Repowering (changing fuel source):** Dominion has explored running all units at the Yorktown Power Station on alternative fuels, such as natural gas and oil. These Units are currently designed to only generate their maximum electrical capacity when powered by their primary fuel source. Units 1 & 2 are currently powered by coal. Units 1 & 2 can utilize alternative fuels at startup and can utilize alternative fuels simultaneous with the primary fuel (co-fire) to boost output. However, Units 1 & 2 in their current configuration cannot approach maximum output on alternative fuels alone. Without

substantive upgrades, utilizing alternative fuels alone would substantially limit generation capacity. Dominion estimates the required upgrades to convert the Yorktown Units to burn alternative fuels would cost between \$391 - \$992 million. Presently, there exists no sufficient natural gas supply to support year-round operations at Yorktown. Additionally, since repowering would not substantially increase output capacity, additional projects would be needed before 2021 to avoid NERC non-compliance. Some have questioned the NHRLA's dependency on all Units at Yorktown. However in order to meet the capacity levels necessary to satisfy NERC requirements, any repowering alternative must include continued operation of Units 1, 2, and 3 with unrestricted availability.

**New Generation:** New generation options throughout the area such as combined-cycle, combustion turbine, and coal generation were considered. Also considered were small scale generation sources such as biomass, wind, and solar. A standalone generation solution was found to be \$633 million with an additional \$722 million required to provide sufficient infrastructure to meet NERC requirements. Bringing the total cost of a new generation solution to an estimated \$1.3 billion. New generation would also face siting, permitting, and construction timeline constraints.

**High Tension Low Sag Conductors (HTLS):** Use of HTLS conductors would require the majority of 230kV-115kV system in the NHRLA to be upgraded. Use of HTLS conductors on the Surry-Skiffes Creek-Wheaton 500 kV Overhead (Dominion's Preferred Alternative) pose no reduction in the number of towers needed to cross the James River.

**214/263 230 kV Line Rebuild (James River Bridge Crossing):** Line 214 and Line 263 are located adjacent to the James River Bridge. Dominion evaluated rebuilding these lines to a higher capacity. However, the load flow analysis showed that the rebuild of these lines, without additional facilities, would not resolve all NERC criteria violations. This alternative is also problematic in that outages of the existing Lines 214 and 263 would be required during the demolition and rebuild of this corridor. Without replacement generation already in place, outages of these lines would result in NERC violations.

**Chuckatuck – Newport News 230 kV Line (Whittier Hybrid):** The Chuckatuck – Newport News 230 kV Line, or the Whittier Hybrid, involves the building of a new 15.4 mile long transmission line along new or expanded right-of-way (ROW) between the Chuckatuck and Wheaton Substations. This alternative requires the construction of a new line through several miles of wetlands between Chuckatuck and the James River as well as the expansion of existing ROW in congested residential areas. This alternative also involved a new overhead crossing of the James River in the vicinity of the existing James River Crossing. In addition to logistical concerns, this proposed alternative does not resolve all of the NERC reliability criteria violations that will occur once Yorktown is decommissioned.

**Chickahominy – Lanexa 500 kV:** The existing Lanexa corridor extends from the Chickahominy Substation in Charles City County to the Lightfoot Substation in Lightfoot, Virginia. This alternative evaluated the potential to expand a 14.3 mile section of this existing corridor to construct a new overhead 500 kV line. The corridor is currently occupied by three 230 kV lines and one 115 kV line. While this alternative allowed for the construction of a 500 kV line, any event causing the loss of the entire ROW would result in cascading outages impacting the NHRLA, northern Virginia, the City of Richmond and parts of North Carolina therefore making this solution non-compliant with NERC.

**Surry – Wheaton 500 kV Line:** This alternative would entail a new 500 kV line, adjacent to the US Highway 17 James River Bridge from Surry to Wheaton. Physical, electrical, routing, siting, and environmental constraints exist. The existing corridor contains a 230 kV line. This corridor is not sufficient to accommodate a 500 kV line and would need to be expanded. This would require

acquisition of new ROW through residential areas, historic districts, and wetlands. This alternative would also require the construction of a new crossing of the James River and switching station. Therefore, the same obstacles outlined above in the Chuckatuck – Newport News 230 kV Line Whittier Hybrid alternative would apply to the River crossing. The likely location for the switching station would be either the Winchester or Whealton Substation. Either site would need to be expanded by at least 15 acres to accommodate the electrical equipment required to convert the 500 kV line to the 230 kV connection. Winchester and Whealton Substations, are located in developed areas and would require the demolition of homes and businesses to obtain the necessary expansion required.

**Save The James Alliance Alt Solution:** This alternative includes the closing of Yorktown Unit 1 and continued operation of Yorktown Unit 2, while building a submarine 230kV line across James River, and constructing future generation facilities. Continued operation of Yorktown Unit 2 in its present condition is not compliant with MATS. This hybrid alternative would require Dominion to run Yorktown Unit 2 in violation of MATS indefinitely or long enough to retrofit or repower one or both of the Yorktown Units or to develop new generation. This alternative presents the same obstacles of retrofitting, repowering, and new generation as discussed above.

**Chickahominy – Skiffes Creek 500 kV:** The Chickahominy – Skiffes Creek alternative utilizes a ROW currently owned by Dominion that extends approximately 37.9 miles from the Chickahominy Substation in Charles City County to the proposed Skiffes Creek Switching Station in James City County. Approximately 13 miles of this route is existing, cleared ROW while the remaining 24.9 miles is unimproved ROW that would require clearing for construction of the proposed line. The Chickahominy – Skiffes Creek 500 kV resolves all NERC criteria violations caused by the retirement of Yorktown Power Station.

**Surry-Skiffes Creek 500 kV Overhead (Dominion’s Proposed Project):** This alternative consists of three components; (1) Surry – Skiffes Creek 500 kilovolt (kV) aerial transmission line, (2) Skiffes Creek 500 kV – 230 kV – 115 kV Switching Station, and (3) Skiffes Creek – Whealton 230 kV aerial transmission line. This alternative fully resolves all NERC criteria violations that are presently projected for the NHRLA.

**Surry – Skiffes Creek 500 kV Underwater (High Voltage Direct Current):** An HVDC alternative would require the conversion of AC power to DC, the installation of an underwater HVDC crossing in the James River, and the conversion of DC power back to AC. The new infrastructure required would cost substantially more than the proposed project. Additionally, there are substantial siting constraints related to the required land-side converter stations.

**Surry – Skiffes Creek 500 kV Underwater (Alternating Current):** The placement of an underwater Alternating Current (AC) 500 kV line at 5000 MW capacity is on the cutting edge of technology. Existing underground and underwater projects were examined for comparison while evaluating the feasibility of this alternative. These comparisons supported information supplied by Dominion regarding the concerns with this alternative. Underwater lines in general present reliability and operational concerns, as locating and repairing damaged lines are significantly more difficult than locating and repairing overhead lines. Due to the limitations that exists with placing a 500kV (5000MW) transmission line under the River, Dominion also evaluated the alternative of relocating the proposed Skiffes Creek Switching Station from James City County, north of the River to Surry County on the south side. This configuration would require a total of eight transmission lines (five 230kV and three 115kV) crossing the James River, and would result in increased project costs and environmental impacts.

**NPCA/PERI Surry-Skiffes 345kV Underwater Alternative:** A 345kV line would not provide sufficient electrical supply to meet the capacity and energy requirements in the NHRLA. Additionally, Dominion's electrical transmission grid presently has no 345 kV transmission line infrastructure and integrating such a line presents substantial logistical and practicability challenges.

**NPCA/PERI Surry-Fort Eustis Underwater Double Circuit 230kV Alternative:** This alternative has the same short-comings as the double circuit 230kV crossing at the proposed project site. Without additional transmission facilities or generation factored into a double circuit 230kV solution, NERC compliance is unachievable. Assuming Dominion proceeded with a fully NERC compliant solution, this route change would increase the overall line length by 100% (12.8 miles versus 6.3 miles for an underground alternative at the project site). Additionally, the alternative would require acquisition of approximately 9 miles of new ROW including a section on Fort Eustis, a US Army installation.

**Hybrid Alternatives:** Several combinations of retrofitting, repowering, and retirement combined with transmission construction were also evaluated. These included several configurations of 230 kV lines, both overhead and submarine, combined with retention of generation at Yorktown. None of these combination alternatives satisfy the project purpose and need in a practicable way.

**NTHP/TCR Alternative A:** This alternative includes reconductoring and reconfiguring a number of existing transmission lines, in addition to enabling Yorktown Unit 3 to operate continuously as a synchronous condenser. Both Dominion and PJM have evaluated the proposed alternative and conclude it fails to adequately address the electrical needs of the NHRLA and therefore is not NERC compliant.

**NTHP/TCR Alternative B:** Similar to the proposed solution offered by NPCA & PERI, this alternative proposes the use of Yorktown Unit 3 only during summer peak loads. Both Dominion and PJM evaluated the proposed alternative and conclude it fails to adequately address the electrical needs of the NHRLA and therefore is not NERC compliant.

**NTHP/TCR Alternative C:** This alternative would keep Yorktown Unit 3 as a standby generation supply under summer peak conditions upon the occurrence of a critical single-element contingency. As part of this alternative, Yorktown Unit 3 would be converted to run as a continuous synchronous condenser, in addition to reconfiguring transmission delivery during summer peak conditions. Both Dominion and PJM evaluated the proposed alternative and conclude it fails to adequately address the electrical needs of the NHRLA and therefore is not NERC compliant.

**NTHP/TCR Alternative D:** This alternative would bypass critical ROW's by tapping into existing 230kV transmission lines, building new 230kV transmission lines, reconductoring existing transmission lines, enabling Yorktown Unit 3 to run as a continuous synchronous condenser, and reconfiguring transmission delivery during summer peak conditions. Both Dominion and PJM evaluated the proposed alternative and conclude it fails to adequately address the electrical needs of the NHRLA and therefore is not NERC compliant.

| <b>Alternatives</b>   | <b>Electrically Compliant w/NERC</b> |                                    |  |
|---|--------------------------------------|------------------------------------|--|
| NPCA/PERI Co-fire Alternative-- Continued Operations at Yorktown Power Station on co-fire Fuels with No Infrastructure Modifications              | N                                    |                                    |  |
| Decommission Yorktown Power Station with No Replacement Project   | N                                    |                                    |  |
| Demand-Side Management  | N                                    |                                    |  |
| Line 214/263 230kV Rebuild James River Bridge Crossing w/ no Add'l Facilities (standalone)  | N                                    |                                    |  |
| Chuckatuck-Newport News 230kV Line (Whittier Hybrid)  | N                                    |                                    |  |
| Chickahominy – Lanexa 500kV   | N                                    |                                    |  |
| Save The James Alliance Alt Solution -- Close Yorktown 1, Continue to Operate Yorktown 2 as is, and Build Underground 230kV line Build Generation | N                                    |                                    |  |
| Underwater 230kV Single Circuit (standalone)  | N                                    |                                    |  |
| Underwater 230kV Double Circuit (standalone)  | N                                    |                                    |  |
| Underwater Alternative 230kV (PAR)  | N                                    |                                    |  |
| NPCA/PERI Surry-Skiffes 345kV Underwater Alternative  | N                                    |                                    |  |
| NPCA/PERI Yorktown Unit 3 Alt--- Standby Unit Under Peak Loads  | N                                    |                                    |  |
| NTHP/TCR Alternatives (A, B, C, and D)  | N                                    |                                    |  |
|   |                                      |                                    |  |
| <b>Alternatives</b>   | <b>Electrically Compliant w/NERC</b> | <b>Estimated Construction Cost</b> | <b>Constraints</b>   |
| Continued Operations at Yorktown Power Station with No Modifications to its Current Infrastructure or fuel source(s)                              | Y (until 2021)                       | Fines/Penalties                    | - Violates Federal Law<br>- Doesn't comply with MATS<br>- Fails to provide future growth capacity  |
| Retrofit Yorktown Power Station (Units 1, 2, & 3) w/ Antipollution Control Equipment  | Y(until 2021)                        | \$859 Million – 1.87 Billion       | - Fails to provide future growth capacity<br>- Cost prohibitive<br>- > 4 Years to Construct  |
| Repower Yorktown Power Station (Units 1, 2, & 3) with Alternative Fuel Source (i.e. Natural Gas)  | Y (until 2021)                       | \$391 Million - \$992 Million      | - Inadequate supply of natural gas<br>- \$72 Million per year for Firm Transport of Natural Gas<br>- Fails to provide future growth capacity<br>- Cost prohibitive<br>- > 4 Years to Construct |
| New Generation (656 MW)   | Y (Until 2021)                       | 1.3 Billion                        | - Fuel Supply & Siting Issues<br>- Cost prohibitive<br>- > 4 Years to Construct  |
| High Tension Low Sag Conductors   | Y                                    | >\$400 Million                     | - Use on 230kV alternatives would require reconductoring virtually the entire 230kV-115kV system in the NHRLA.<br>- Use on 500kV S-S-W cost \$370,000 more in cost and                         |

|   |                |  |   |
|---|----------------|--|---|
|   |                |  | had no reduction in the number of towers needed to cross the James River.<br>- Cost Prohibitive   |
| Surry-Wheaton 500kV   | Y              | Unreported because it is not constructible | - Not constructible due to route alignment and the inability to obtain the necessary ROW to Wheaton Substation<br>- Blocks ability to construct future 500kV line from Surry and undermines operation capacity of Surry Nuclear Power Plant |
| Chickahominy-Skiffes 500kV  | Y (Until 2042) | \$213.2 Million                            | - 2.5 Years to Construct  |
| Surry-Skiffes 500kV Overhead (Dominion's Proposed Project)  | Y (Until 2042) | \$178.7 Million                            | - 1.5 – 2 Years to Construct  |
| Surry-Skiffes 500kV Underwater (HVDC)   | Y (Until 2042) | \$1 Billion                                | - Siting issues with required converter stations<br>- Cost Prohibitive<br>- 8 years to construct  |
| Surry-Skiffes 500kV Underwater (HVAC)   | Y              | Unreported                                 | - The placement of an underground Alternating Current (AC) 500 kV line of this capacity is on the cutting edge of technology.   |
| Underwater Single Circuit 230kV (w/add'l Transmission Facilities)   | Y (Until 2032) | \$488.6 Million                            | - Add'l Transmission Facilities are those required under the Double Circuit 230kV<br><br>(Note: Single Circuit 230kV requires a 2 <sup>nd</sup> line making this alternative a Double Circuit 230kV)  |
| Underwater Double Circuit 230kV (w/add'l Transmission Facilities)   | Y (Until 2032) | \$488.6 Million                            | - Cost Prohibitive<br>- 5 Years to Construct  |
| Line 214/263 230kV Rebuild James River Bridge Crossing (w/add'l Transmission Facilities)  | Y (Until 2038) | \$391.5 Million                            | - Cost Prohibitive<br>- 10 Years to Construct<br>- Cycled Power Outages required to rebuild lines 214 & 263   |
| NPCA/PERI Surry-Fort Eustis Alternative —Underwater Double Circuit 230kV (w/add'l Transmission Facilities)  | Y (Until 2032) | \$ 611.5 Million                           | - Cost Prohibitive<br>- 6 Years to Construct<br>- Siting and ROW issues across Ft Eustis Military Installation  |
| <b>HYBRID ALTERNATIVES</b>  |                |  |   |
| Line 214/263 230kV Rebuild James River Bridge Crossing Plus Retrofit Unit 3, Repower Unit 2 at Yorktown Power Station, and relocate a planned combine cycle Unit to the NHRLA | Y (Until 2021) | >\$1 Billion                               | - Cost Prohibitive<br>- 8 Years to Construct  |
| Underwater Single Circuit 230kV Plus Retrofit Unit 3, Repower Unit 2 at Yorktown Power Station, and relocate a planned combine cycle Unit to the NHRLA                        | Y (Until 2021) | \$1.2 Billion                              | - Cost Prohibitive<br>- 4 Years to Construct  |
| Underwater Double Circuit 230kV Plus Repower Unit 2 at Yorktown Power Station and relocate a planned combine cycle Unit to the NHRLA  | Y (Until 2021) | \$1.1 Billion                              | - Cost Prohibitive<br>- 5 Years to Construct  |

Available Alternatives:

Only two alternatives were electrically available at the time of Dominion’s application submittal in August 2013; (1) Surry - Skiffes 500kV Overhead (Dominion’s Preferred Alternative), and (2) Chickahominy – Skiffes Creek 500 kV alternative.

Table below provides a general impact comparison:

| Alternative  | Aquatic Resource  | Endangered Species  | Cultural Resource   |
|--|---|---|---|
| Surry-Skiffes 500kV Overhead (Dominion’s Proposed Project) | <ul style="list-style-type: none"> <li>• Conversion of 0.56 ac non-tidal wetlands</li> <li>• Direct loss of approx 3000 sq ft of tidal &amp; non-tidal resources.</li> </ul>  | <ul style="list-style-type: none"> <li>• Atlantic Sturgeon, Anadromous fish, Northern Long Eared Bat, Small Whorled Pogonia, Sensitive Joint Vetch, Bald Eagle, Hog Island Wildlife Manage Area</li> <li>• Not likely to adversely affect with incorporated protective measures.</li> </ul>   | <ul style="list-style-type: none"> <li>• Direct adverse effects to Lower JR Historic District, Capt John Smith Trail, and 44JC0662</li> <li>• Indirect adverse effects to Carters Grove, Jamestown Island, Colonial Parkway, Fort Crafford, Hog Island, and the Battle of Yorktown</li> <li>• Nationwide River Inventory</li> </ul>                                       |
| Chickahominy–Skiffes 500kV                                 | <ul style="list-style-type: none"> <li>• Approximately 62.00 ac of non-tidal wetland conversion for new ROW construction.</li> <li>• Direct losses of tidal &amp; non-tidal aquatic resources are estimated to be comparable to Dominion’s Proposed Project.</li> </ul> | <ul style="list-style-type: none"> <li>• Atlantic Sturgeon, Anadromous Fish, Northern Long Eared Bat, Small Whorled Pogonia, Sensitive Joint Vetch, Bald Eagle, Chickahominy Wildlife Management Area</li> <li>• Potential Impacts likely, but with protective measures affects should not be adverse and therefore comparable to Dominion’s Proposed Project.</li> </ul> | <ul style="list-style-type: none"> <li>• Comprehensive Historic Property Identification has not been completed for this corridor; however resources such as Capt John Smith Trail, Colonial National Historic Park would be present, as well as potential impacts to Tribal resources.</li> <li>• Adverse Effects Likely</li> <li>• Nationwide River Inventory</li> </ul> |

Updated Preliminary Findings:

The Corps has fully considered all information supplied to date. Additionally, Corps Electrical Engineers have independently evaluated the information for technical accuracy. In screening the various alternatives, the Corps focused on the ability to sustain sufficient power supply to meet current demand and predicted future growth, existing technology, implementation cost, and ability to maintain/achieve compliance with federal laws.

We have continued to review all input regarding alternatives. All alternatives, including Dominion’s proposed project, would, at this point require Dominion to operate Yorktown Power Station in violation of MATS in order to ensure uninterrupted and NERC compliant service to NHRLA. However, there is substantial difference among the alternatives in the length of time of non-compliance. Most of the alternatives reviewed would have a substantially greater cost than the applicant’s proposed project, even after accounting for the cost of measures the applicant has proposed as mitigation for its proposal. Additionally, many present technical and logistical challenges. We continue to find Dominion’s information in support of their proposed project compelling from a technical perspective and for the reasons elaborated upon in this White Paper.

Based on our thorough review of all information made available to date, it appears that only Dominion’s proposed project and the Chickahominy-Skiffes 500kV alternative, meet project purpose and need and are practicable. Other alternatives do not satisfy the project purpose and need and/or are not practicable due to cost, engineering constraints and/or logistics. Please note this is not a decision on whether Dominion’s preferred alternative is or is not permissible, nor does it exclude further consideration of alternatives should new information become available.