



Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-531

POOLESVILLE-WINCHESTER 230 KV

36 MW Capacity / 60 MW Energy

January 2021

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1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Dominion.

2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Isle of Wight County, Virginia. The installed facilities will have a total capability of 60 MW with 36 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 12, 2023. This study does not imply a TO commitment to this in-service date.

| | |
|----------------------------|-------------------------------|
| Queue Number | AG1-531 |
| Project Name | POOLESVILLE-WINCHESTER 230 KV |
| State | Virginia |
| County | Isle of Wight |
| Transmission Owner | Dominion |
| MFO | 60 |
| MWE | 60 |
| MWC | 36 |
| Fuel | Solar |
| Basecase Study Year | 2024 |

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-531 will interconnect with the Dominion transmission system. The POI will be a newly constructed 230 kV three breaker ring bus located on the line between the Poolesville substation and Winchester substation.

The IC is responsible for securing right-of-way, permits, and constructing the proposed attachment line from the generating facility site to the Point of Interconnection. The IC may not install any facilities on Dominion's right-of-way without first obtaining the necessary approval from Dominion Energy.

Attachment 1 shows a one-line diagram of the proposed interconnection facilities.

5 Cost Summary

The AG1-531 project will be responsible for the following costs:

| Description | Total Cost |
|---|----------------------------|
| Total Physical Interconnection Costs | \$ 10,400,000 |
| Total System Network Upgrade Costs | \$ 86,290,000 ¹ |
| Total Costs | \$ 96,690,000 |

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

¹ This project currently causes and/or contributes to overloads of the Transmission System (see Summer Peak Load Flow Analysis section below) and therefore has potential to have cost allocation for the system reinforcements listed in the report. This will be re-evaluated in the System Impact phase. The results may vary with queue customers withdrawing from the queue and other generators deactivating over time. If a customer is the first to cause the need for a project (causes loading to exceed 100% of rating), then the customer is responsible. If a customer contributes to a facility that is already overloaded by a prior queue, then they may receive cost allocation.

6 Transmission Owner Scope of Work

AG1-531 will interconnect with the Dominion transmission system. The primary POI will be a newly constructed 230 kV three breaker ring bus located on the line between the Poolesville substation and Winchester substation.

It is estimated to take 18-30 months to complete this work upon execution of an Interconnection Construction Service Agreement (ICSA). These preliminary cost estimates are based on typical engineering costs. A more detailed engineering cost estimates are normally done when the IC provides an exact site plan location for the generation substation during the Facility Study phase.

Remote Terminal Work: During the Facilities Study, ITO's System Protection Engineering Department will review transmission line protection as well as anti-islanding required to accommodate the new generation and interconnection substation. System Protection Engineering will determine the minimal acceptable protection requirements to reliably interconnect the proposed generating facility with the transmission system. The review is based on maintaining system reliability by reviewing ITO's protection requirements with the known transmission system configuration which includes generating facilities in the area. This review may determine that transmission line protection and communication upgrades are required at remote substations.

The total physical interconnection costs is given in the table below:

| Description | Total Cost |
|--|---------------|
| Attachment Facilities | \$ 2,100,000 |
| 230 kV Three Breaker Ring-Bus Substation | \$ 6,500,000 |
| Re-arrange line and tie-in new substation | \$ 1,800,000 |
| Total Physical Interconnection Costs | \$ 10,400,000 |

7 Schedule

The estimated schedule for the Attachment Facilities, Direct Connection and Non-Direct Connection work is identified in the “Transmission Owner Scope of Work” section of this report.

This schedule will be more clearly identified in future study phases.

If the customer is ultimately responsible for network upgrades, then the schedule for those upgrades will be refined in future study phases. The customer would need to wait for those upgrades to be completed prior to commercial operation unless determined deliverable by an interim deliverability study. The elapsed time to complete any network upgrades is provided in the System Reinforcements table of this report.

8 Transmission Owner Analysis

Dominion assessed the impact of the proposed AG1-531 for compliance with NERC Reliability Criteria on the Dominion Transmission System. The system was assessed using the summer 2024 AG1 case provided to Dominion by PJM.

When performing a generation analysis, Dominion’s main analysis includes load flow study results following a single contingency event for both normal and stressed system conditions. Dominion Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of Dominion’s Planning Criteria and interconnection requirements can be found in the Company’s Facility Connection Requirements which are publicly available at: <http://www.dominionenergy.com>.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically, in Planning Studies, NERC Planning Event 3 and 6 Contingency Conditions (Loss of generator, transmission circuit, transformer, shunt device, or Single Pole of a DC line followed by the loss of a generator, transmission circuit, transformer, shunt device or single pole of a DC line) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For Dominion Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating.

8.1 Power Flow Analysis

PJM performed a power flow analysis of the transmission system using a 2024 summer peak load flow model and the results were verified by Dominion. Additionally, Dominion performed an analysis of its transmission system and no further deficiencies were identified.

9 Interconnection Customer Requirements

9.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in Dominion’s “Dominion Energy Electric Transmission Generator Interconnection Requirements” documented in Dominion’s Facility Interconnection Requirements “Exhibit C” located at:

<https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>. Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

9.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with Dominion’s “Dominion’s Facility Interconnection Requirements” document located at: <https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated protection device (circuit breaker, circuit switcher, fuse) to protect the IC’s GSU transformer(s).
2. The purchase and installation of the minimum required Dominion generation interconnection relaying and control facilities as described in the System Protection section noted above. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.
3. The purchase and installation of supervisory control and data acquisition (“SCADA”) equipment to provide information in a compatible format to the Dominion Transmission System Control Center.
4. Compliance with the Dominion and PJM generator power factor and voltage control requirements.

The GSU(s) associated with the IC queue request shall meet the grounding requirements as noted in Dominion’s “Dominion’s Facility Interconnection Requirements” document located at: <https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>.

The IC will also be required to meet all PJM, SERC, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and SERC audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the Dominion system.

9.3 Power Factor Requirements

The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the Dominion transmission system.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter²) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

10.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/>

11 Summer Peak - Load Flow Analysis

The Queue Project AG1-531 was evaluated as a 60.0 MW (Capacity 36.0 MW) injection tapping the Poolesville to Winchester 230 kV line in the Dominion area. Project AG1-531 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-531 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

| ID | FROM BUS# | FROM BUS | kV | FROM BUS AREA | TO BUS# | TO BUS | kV | TO BUS AREA | CK T ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADIN G % | POST PROJECT LOADIN G % | AC D C | MW IMPACT |
|-----------|-----------|-------------|-------|---------------|---------|-----------|-------|-------------|---------|-------------------------|-------|------------|------------------------|-------------------------|--------|-----------|
| 163408943 | 966610 | AG1-531 TAP | 230.0 | DVP | 314421 | 6WINCHS T | 230.0 | DVP | 1 | DVP_P7-1: LN 240-2197-A | tower | 671.0 | 96.99 | 101.83 | DC | 32.42 |
| 163408944 | 966610 | AG1-531 TAP | 230.0 | DVP | 314421 | 6WINCHS T | 230.0 | DVP | 1 | DVP_P7-1: LN 240-2197-B | tower | 671.0 | 96.99 | 101.83 | DC | 32.42 |

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

| ID | FROM BUS# | FROM BUS | kV | FROM BUS AREA | TO BUS# | TO BUS | kV | TO BUS AREA | CK T ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADIN G % | POST PROJECT LOADIN G % | AC D C | MW IMPACT |
|-----------|-----------|----------|-------|---------------|---------|----------|-------|-------------|---------|----------------------|--------|---------------|------------------------|-------------------------|--------|-----------|
| 163408350 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | DVP_P2-2: BASIN B7 | bus | 549.0 | 183.0 | 183.46 | DC | 5.69 |
| 163408627 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | DVP_P7-1: LN 223-226 | tower | 549.0 | 174.18 | 174.73 | DC | 6.93 |
| 163408628 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | DVP_P7-1: LN 223-290 | tower | 549.0 | 173.02 | 173.6 | DC | 7.18 |
| 168880889 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | DVP_P1-2: LN 211 | single | 449.320007324 | 184.64 | 185.79 | DC | 5.3 |
| 168880922 | 314303 | 6HOPEWLL | 230.0 | DVP | 314287 | 6CHESTFB | 230.0 | DVP | 1 | DVP_P1-2: LN 228 | single | 449.320007324 | 175.98 | 177.27 | DC | 5.87 |
| 163408930 | 314538 | 6SURREY | 230.0 | DVP | 314522 | 6CHCKTUK | 230.0 | DVP | 1 | DVP_P7-1: LN 223-226 | tower | 830.0 | 102.48 | 103.72 | DC | 10.52 |

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

| ID | FROM BUS# | FROM BUS | kV | FROM BUS AREA | TO BUS# | TO BUS | kV | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADIN G % | POST PROJECT LOADIN G % | AC/D C | MW IMPACT |
|-----------|-----------|--------------|-------|---------------|---------|--------------|-------|-------------|--------|---------------------|-----------|---------------|------------------------|-------------------------|--------|-----------|
| 168574903 | 313896 | 6COLONIAL TR | 230.0 | DVP | 314303 | 6HOPEWLL | 230.0 | DVP | 1 | DVP_P 1-2: LN 240-A | operation | 678.679992676 | 143.73 | 145.05 | DC | 8.92 |
| 168880833 | 314209 | 6SKIFF CREEK | 230.0 | DVP | 314386 | 6KINGS M | 230.0 | DVP | 1 | DVP_P 1-2: LN 567 | operation | 441.799987793 | 264.04 | 265.58 | DC | 6.74 |
| 168880841 | 314296 | 6PENNINGAN | 230.0 | DVP | 314415 | 6WALR209 | 230.0 | DVP | 1 | DVP_P 1-2: LN 567 | operation | 441.799987793 | 252.14 | 253.68 | DC | 6.74 |
| 168880887 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | DVP_P 1-2: LN 211 | operation | 449.320007324 | 207.56 | 208.43 | DC | 8.83 |
| 168880890 | 314303 | 6HOPEWLL | 230.0 | DVP | 314286 | 6CHESTFA | 230.0 | DVP | 1 | Base Case | operation | 449.320007324 | 173.24 | 173.74 | DC | 5.11 |
| 168880921 | 314303 | 6HOPEWLL | 230.0 | DVP | 314287 | 6CHESTFB | 230.0 | DVP | 1 | DVP_P 1-2: LN 228 | operation | 449.320007324 | 195.38 | 196.33 | DC | 9.78 |
| 168880924 | 314303 | 6HOPEWLL | 230.0 | DVP | 314287 | 6CHESTFB | 230.0 | DVP | 1 | Base Case | operation | 449.320007324 | 138.99 | 139.65 | DC | 6.79 |
| 168881355 | 314307 | 6HULL282 | 230.0 | DVP | 314322 | 6MDLTHAN | 230.0 | DVP | 1 | DVP_P 1-2: LN 563 | operation | 678.679992676 | 99.83 | 100.06 | DC | 3.44 |
| 168880837 | 314386 | 6KINGS M | 230.0 | DVP | 314296 | 6PENNINGAN | 230.0 | DVP | 1 | DVP_P 1-2: LN 567 | operation | 441.799987793 | 256.1 | 257.64 | DC | 6.74 |
| 168881065 | 314391 | 6LIGH209 | 230.0 | DVP | 314388 | 6LANEXA | 230.0 | DVP | 1 | DVP_P 1-2: LN 567 | operation | 663.640014648 | 149.38 | 150.41 | DC | 6.74 |
| 168880851 | 314415 | 6WALR209 | 230.0 | DVP | 314391 | 6LIGH209 | 230.0 | DVP | 1 | DVP_P 1-2: LN 567 | operation | 441.799987793 | 236.0 | 237.54 | DC | 6.74 |
| 169067328 | 314538 | 6SURRY | 230.0 | DVP | 313896 | 6COLONIAL TR | 230.0 | DVP | 1 | DVP_P 1-2: LN 240-A | operation | 678.679992676 | 111.01 | 112.34 | DC | 8.96 |
| 169804632 | 935160 | AD1-151 TAP | 230.0 | DVP | 314303 | 6HOPEWLL | 230.0 | DVP | 2 | DVP_P 1-2: LN 2197 | operation | 678.679992676 | 116.7 | 118.02 | DC | 8.94 |
| 169804699 | 942550 | AE2-270 TAP | 230.0 | DVP | 935160 | AD1-151 TAP | 230.0 | DVP | 2 | DVP_P 1-2: LN 2197 | operation | 678.679992676 | 105.07 | 106.4 | DC | 8.94 |
| 169804730 | 961610 | AG1-000B TAP | 230.0 | DVP | 942550 | AE2-270 TAP | 230.0 | DVP | 2 | DVP_P 1-2: LN 212 | operation | 678.679992676 | 100.08 | 101.41 | DC | 8.96 |

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

| ID | Idx | Facility | Upgrade Description | Cost |
|---|-----|---|---|---------------------|
| 163408628,163408350,163408627,168880889 | 2 | 6HOPEWLL 230.0 kV - 6CHESTF A 230.0 kV Ckt 1 | <u>DVP</u> b2922 (808) : PJM Baseline Upgrade b2922. Rebuild 8 of 11 miles of 230kV Lines #211 and #228 to current standard with a summer emergency rating of 1046 MVA for rebuilt section. Proposed conductor is 2-636 ACSR. The baseline project has an projected in-service date of 12/01/2020. Project Type : FAC Cost : \$0 Time Estimate : N/A Months | \$7,500,000 |
| 168880922 | 3 | 6HOPEWLL 230.0 kV - 6CHESTF B 230.0 kV Ckt 1 | n6155 (1047) : Rebuild 3 miles of 230 kV Line 211 from Hopewell to Chesterfield with 2-636 ACSR. Project Type : FAC Cost : \$7,500,000 Time Estimate : 30-36 Months | |
| 163408944,163408943 | 1 | AG1-531 TAP 230.0 kV - 6WINCHST 230.0 kV Ckt 1 | <u>DVP</u> dom-420 (1296) : Rebuild 17.5 miles of 230 kV Line 214 from AG1-531 Tap to Winchester with 2-636 ACSR 150 C Project Type : FAC Cost : \$43,750,000 Time Estimate : 36-40 Months | \$43,750,000 |
| 163408930 | 4 | 6SURRY 230.0 kV - 6CHCKTUK 230.0 kV Ckt 1 | <u>DVP</u> dom-217 (1093) : Rebuild 23.36 miles of 230 kV Line 290 from Surry to Chuckatuck with 2-636 ACSR. Project Type : FAC Cost : \$35,040,000 Time Estimate : 36-40 Months | \$35,040,000 |
| | | | TOTAL COST | \$86,290,000 |

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.6.1 Index 1

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC DC | MW IMPACT |
|-----------|-----------|-------------|---------------|---------|----------|-------------|--------|-------------------------|-------|------------|-----------------------|------------------------|-------|-----------|
| 163408944 | 966610 | AG1-531 TAP | DVP | 314421 | 6WINCHST | DVP | 1 | DVP_P7-1: LN 240-2197-B | tower | 671.0 | 96.99 | 101.83 | DC | 32.42 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|-------------------------------------|--------------------|-------|----------------|
| 314525 | 6KINGFORK | 1.1535 | Adder | 1.36 |
| 315116 | 1SURRY 1 | 30.4521 | 50/50 | 30.4521 |
| 315117 | 1GRAVELC | 1.0672 | 50/50 | 1.0672 |
| 315119 | 1GRAVEL3 | 3.0935 | 50/50 | 3.0935 |
| 315120 | 1GRAVEL4 | 3.1332 | 50/50 | 3.1332 |
| 315121 | 1GRAVEL5 | 3.0935 | 50/50 | 3.0935 |
| 315122 | 1GRAVEL6 | 3.1296 | 50/50 | 3.1296 |
| 316033 | AB2-134 C | 2.5888 | 50/50 | 2.5888 |
| 316151 | AD2-215 E (Withdrawn : 01/14/2021) | 0.2469 | Adder | 0.29 |
| 316258 | AE1-162 C | 0.3120 | 50/50 | 0.3120 |
| 916192 | Z1-068 E | 0.4737 | Adder | 0.56 |
| 924814 | AB2-134 E | 16.1342 | 50/50 | 16.1342 |
| 925522 | AC1-027 E | 0.2931 | Adder | 0.34 |
| 926662 | AC1-147 E | 0.3870 | Adder | 0.46 |
| 927225 | AC1-216 C | 1.9761 | 50/50 | 1.9761 |
| 927226 | AC1-216 E | 9.8496 | 50/50 | 9.8496 |
| 932044 | AC2-012 C | 2.9806 | Adder | 3.51 |
| 932046 | AC2-012 E | 4.8632 | Adder | 5.72 |
| 934014 | AD1-025 C | 21.5275 | 50/50 | 21.5275 |
| 934015 | AD1-025 E | 12.7520 | 50/50 | 12.7520 |
| 935112 | AD1-144 E | 0.2516 | Adder | 0.3 |
| 936041 | AD2-007 C | 1.0284 | 50/50 | 1.0284 |
| 936042 | AD2-007 E | 0.7084 | 50/50 | 0.7084 |
| 936051 | AD2-008 C | 3.7479 | 50/50 | 3.7479 |
| 936052 | AD2-008 E | 8.1585 | 50/50 | 8.1585 |
| 939312 | AE1-162 E | 1.3186 | 50/50 | 1.3186 |
| 939431 | AE1-175 C | -0.5665 | Adder | -0.67 |
| 940251 | AE2-007 O1 (Withdrawn : 12/11/2020) | 48.3524 | Adder | 56.89 |
| 940891 | AE2-078 C | 4.2006 | 50/50 | 4.2006 |
| 940892 | AE2-078 E | 2.1640 | 50/50 | 2.1640 |
| 940901 | AE2-079 C | 4.2006 | 50/50 | 4.2006 |
| 940902 | AE2-079 E | 2.1640 | 50/50 | 2.1640 |
| 941281 | AE2-122 C O1 | 7.0909 | Adder | 8.34 |
| 941282 | AE2-122 E O1 | 28.6135 | Adder | 33.66 |
| 941291 | AE2-123 C O1 | 7.2873 | Adder | 8.57 |
| 941292 | AE2-123 E O1 | 28.4172 | Adder | 33.43 |
| 941301 | AE2-124 C O1 | 6.5132 | Adder | 7.66 |
| 941302 | AE2-124 E O1 | 28.5792 | Adder | 33.62 |
| 941591 | AE2-156 O1 | 5.1493 | Adder | 6.06 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|---------------------------------------|--------------------|-----------------------|----------------|
| 942551 | AE2-270 | 34.2795 | 50/50 | 34.2795 |
| 943621 | AF1-033 C | 4.2006 | 50/50 | 4.2006 |
| 943622 | AF1-033 E | 2.1640 | 50/50 | 2.1640 |
| 945363 | AF1-201 BAT | 1.4408 | Merchant Transmission | 1.4408 |
| 957631 | AF2-057 | 1.0458 | Adder | 1.23 |
| 957711 | AF2-065 C | 17.4825 | 50/50 | 17.4825 |
| 957712 | AF2-065 E | 16.7970 | 50/50 | 16.7970 |
| 961611 | AG1-000B C | 20.3392 | 50/50 | 20.3392 |
| 961711 | AG1-011 | 36.5648 | 50/50 | 36.5648 |
| 962321 | AG1-081 C (Withdrawn : 01/15/2021) | 3.8188 | 50/50 | 3.8188 |
| 962322 | AG1-081 E (Withdrawn : 01/15/2021) | 2.5458 | 50/50 | 2.5458 |
| 965001 | AG1-364 C O1 | 1.0945 | Adder | 2.43 |
| 965002 | AG1-364 E O1 | 1.6418 | Adder | 3.64 |
| 966611 | AG1-531 C | 19.4540 | 50/50 | 19.4540 |
| 966612 | AG1-531 E | 12.9694 | 50/50 | 12.9694 |
| WEC | WEC | 0.0019 | Confirmed LTF | 0.0019 |
| LGEE | LGEE | 0.0063 | Confirmed LTF | 0.0063 |
| CPLE | CPLE | 0.4354 | Confirmed LTF | 0.4354 |
| CBM-W2 | CBM-W2 | 0.8064 | Confirmed LTF | 0.8064 |
| NY | NY | 0.1438 | Confirmed LTF | 0.1438 |
| TVA | TVA | 0.1946 | Confirmed LTF | 0.1946 |
| O-066 | O-066 | 1.8777 | Confirmed LTF | 1.8777 |
| SIGE | SIGE | 0.0315 | Confirmed LTF | 0.0315 |
| CBM-S2 | CBM-S2 | 4.6249 | Confirmed LTF | 4.6249 |
| CBM-S1 | CBM-S1 | 0.0441 | Confirmed LTF | 0.0441 |
| G-007 | G-007 | 0.2940 | Confirmed LTF | 0.2940 |
| MEC | MEC | 0.0556 | Confirmed LTF | 0.0556 |
| LAGN | LAGN | 0.2415 | Confirmed LTF | 0.2415 |

11.6.2 Index 2

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC DC | MW IMPACT |
|-----------|-----------|----------|---------------|---------|-----------|-------------|--------|------------------|--------|------------|-----------------------|------------------------|-------|-----------|
| 168880889 | 314303 | 6HOPEWLL | DVP | 314286 | 6CHESTF A | DVP | 1 | DVP_P1-2: LN 211 | single | 449.32 | 184.64 | 185.79 | DC | 5.3 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|--------------------------------------|--------------------|-------|----------------|
| 314507 | 3THOMPSN | 0.1591 | 80/20 | 0.1591 |
| 315074 | 1HOPCGN1 (Deactivation : 25/06/2019) | 0.0548 | 80/20 | 0.0548 |
| 315075 | 1HOPCGN2 (Deactivation : 25/06/2019) | 0.0548 | 80/20 | 0.0548 |
| 315076 | 1HOPPOLC | 4.5911 | 80/20 | 4.5911 |
| 315077 | 1HOPHCF1 | 7.1762 | 80/20 | 7.1762 |
| 315078 | 1HOPHCF2 | 7.1762 | 80/20 | 7.1762 |
| 315079 | 1HOPHCF3 | 7.1762 | 80/20 | 7.1762 |
| 315080 | 1HOPHCF4 | 10.8940 | 80/20 | 10.8940 |
| 315098 | 1CHESPKA | 0.2101 | 80/20 | 0.2101 |
| 315099 | 1CHESPKB (Deactivation : 31/05/2019) | 1.4565 | 80/20 | 1.4565 |
| 315116 | 1SURRY 1 | 30.7852 | 80/20 | 30.7852 |
| 315117 | 1GRAVELC | 1.0789 | 80/20 | 1.0789 |
| 315119 | 1GRAVEL3 | 3.1274 | 80/20 | 3.1274 |
| 315120 | 1GRAVEL4 | 3.1675 | 80/20 | 3.1675 |
| 315121 | 1GRAVEL5 | 3.1274 | 80/20 | 3.1274 |
| 315122 | 1GRAVEL6 | 3.1638 | 80/20 | 3.1638 |
| 315260 | 1GOSPORTA | 0.1677 | 80/20 | 0.1677 |
| 315261 | 1GOSPORTB | 0.2141 | 80/20 | 0.2141 |
| 315262 | 1GOSPORTC | 0.1817 | 80/20 | 0.1817 |
| 316033 | AB2-134 C | 4.2297 | 80/20 | 4.2297 |
| 316083 | AB2-161 C (Suspended) | 2.2498 | 80/20 | 2.2498 |
| 316132 | AB2-190 C | 45.8382 | 80/20 | 45.8382 |
| 316150 | AD2-215 C (Withdrawn : 01/14/2021) | 0.1507 | 80/20 | 0.1507 |
| 316258 | AE1-162 C | 0.3350 | 80/20 | 0.3350 |
| 926661 | AC1-147 C | 0.1777 | 80/20 | 0.1777 |
| 927225 | AC1-216 C | 3.2286 | 80/20 | 3.2286 |
| 932044 | AC2-012 C | 5.0941 | 80/20 | 5.0941 |
| 932581 | AC2-078 C O1 | 2.7271 | 80/20 | 2.7271 |
| 932591 | AC2-079 C O1 | 3.2610 | 80/20 | 3.2610 |
| 934014 | AD1-025 C | 35.1733 | 80/20 | 35.1733 |
| 934575 | AD1-082 C | 5.1272 | 80/20 | 5.1272 |
| 935111 | AD1-144 C | 0.1492 | 80/20 | 0.1492 |
| 935164 | AD1-151 C | 36.8343 | 80/20 | 36.8343 |
| 936041 | AD2-007 C | 1.6803 | 80/20 | 1.6803 |
| 936051 | AD2-008 C | 6.1236 | 80/20 | 6.1236 |
| 936661 | AD2-085 C | 1.7907 | 80/20 | 1.7907 |
| 938634 | AE1-085 C | 6.0320 | 80/20 | 6.0320 |
| 939195 | AE1-149 C | 7.5468 | 80/20 | 7.5468 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|-------------------------------------|--------------------|---------------|----------------|
| 940061 | AE2-000BC O1 | 6.9828 | 80/20 | 6.9828 |
| 940251 | AE2-007 O1 (Withdrawn : 12/11/2020) | 84.1425 | 80/20 | 84.1425 |
| 940651 | AE2-052 | 2.5156 | 80/20 | 2.5156 |
| 940891 | AE2-078 C | 2.7313 | 80/20 | 2.7313 |
| 940901 | AE2-079 C | 2.7313 | 80/20 | 2.7313 |
| 941591 | AE2-156 O1 | 8.8500 | 80/20 | 8.8500 |
| 942151 | AE2-227 C | -1.4898 | Adder | -1.75 |
| 942341 | AE2-247 C | 0.7776 | 80/20 | 0.7776 |
| 942551 | AE2-270 | 58.4190 | 80/20 | 58.4190 |
| 943461 | AF1-017 C | 0.7035 | 80/20 | 0.7035 |
| 943621 | AF1-033 C | 2.7313 | 80/20 | 2.7313 |
| 957631 | AF2-057 | 1.7874 | 80/20 | 1.7874 |
| 957711 | AF2-065 C | 29.7937 | 80/20 | 29.7937 |
| 959641 | AF2-255 C | -0.3725 | Adder | -0.44 |
| 961611 | AG1-000B C | 23.3678 | 80/20 | 23.3678 |
| 961711 | AG1-011 | 59.7424 | 80/20 | 59.7424 |
| 962321 | AG1-081 C (Withdrawn : 01/15/2021) | 2.4830 | 80/20 | 2.4830 |
| 963221 | AG1-171 C | 4.9112 | 80/20 | 4.9112 |
| 963231 | AG1-172 C | 4.9112 | 80/20 | 4.9112 |
| 963241 | AG1-173 C | 4.9112 | 80/20 | 4.9112 |
| 963251 | AG1-174 C | 4.9112 | 80/20 | 4.9112 |
| 963261 | AG1-175 C | 4.9112 | 80/20 | 4.9112 |
| 965001 | AG1-364 C O1 | 3.5460 | 80/20 | 3.5460 |
| 966611 | AG1-531 C | 5.3003 | 80/20 | 5.3003 |
| 966731 | AG1-544 C | 4.7110 | 80/20 | 4.7110 |
| 966741 | AG1-545 C | 1.5644 | 80/20 | 1.5644 |
| WEC | WEC | 0.0287 | Confirmed LTF | 0.0287 |
| LGEE | LGEE | 0.0641 | Confirmed LTF | 0.0641 |
| CPL | CPL | 1.2674 | Confirmed LTF | 1.2674 |
| CBM-W2 | CBM-W2 | 2.9658 | Confirmed LTF | 2.9658 |
| NY | NY | 0.3639 | Confirmed LTF | 0.3639 |
| TVA | TVA | 0.6608 | Confirmed LTF | 0.6608 |
| SIGE | SIGE | 0.0885 | Confirmed LTF | 0.0885 |
| CBM-S2 | CBM-S2 | 13.8852 | Confirmed LTF | 13.8852 |
| CBM-S1 | CBM-S1 | 0.1539 | Confirmed LTF | 0.1539 |
| MEC | MEC | 0.2765 | Confirmed LTF | 0.2765 |
| LAGN | LAGN | 0.8207 | Confirmed LTF | 0.8207 |
| CBM-W1 | CBM-W1 | 0.9113 | Confirmed LTF | 0.9113 |

11.6.3 Index 3

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC DC | MW IMPACT |
|-----------|-----------|----------|---------------|---------|-----------|-------------|--------|------------------|--------|------------|-----------------------|------------------------|-------|-----------|
| 168880922 | 314303 | 6HOPEWLL | DVP | 314287 | 6CHESTF B | DVP | 1 | DVP_P1-2: LN 228 | single | 449.32 | 175.98 | 177.27 | DC | 5.87 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|--------------------------------------|--------------------|-------|----------------|
| 314421 | 6WINCHST | 0.0650 | 80/20 | 0.0650 |
| 314507 | 3THOMPSN | 0.1637 | 80/20 | 0.1637 |
| 315074 | 1HOPCGN1 (Deactivation : 25/06/2019) | 0.0566 | 80/20 | 0.0566 |
| 315075 | 1HOPCGN2 (Deactivation : 25/06/2019) | 0.0566 | 80/20 | 0.0566 |
| 315076 | 1HOPPOLC | 4.7446 | 80/20 | 4.7446 |
| 315077 | 1HOPHCF1 | 7.4163 | 80/20 | 7.4163 |
| 315078 | 1HOPHCF2 | 7.4163 | 80/20 | 7.4163 |
| 315079 | 1HOPHCF3 | 7.4163 | 80/20 | 7.4163 |
| 315080 | 1HOPHCF4 | 11.2584 | 80/20 | 11.2584 |
| 315098 | 1CHESPKA | 0.2164 | 80/20 | 0.2164 |
| 315099 | 1CHESPKB (Deactivation : 31/05/2019) | 1.5000 | 80/20 | 1.5000 |
| 315110 | 1ELIZAR3 | 1.5591 | 80/20 | 1.5591 |
| 315116 | 1SURRY 1 | 32.2643 | 80/20 | 32.2643 |
| 315117 | 1GRAVELC | 1.1307 | 80/20 | 1.1307 |
| 315119 | 1GRAVEL3 | 3.2776 | 80/20 | 3.2776 |
| 315120 | 1GRAVEL4 | 3.3196 | 80/20 | 3.3196 |
| 315121 | 1GRAVEL5 | 3.2776 | 80/20 | 3.2776 |
| 315122 | 1GRAVEL6 | 3.3158 | 80/20 | 3.3158 |
| 315260 | 1GOSPORTA | 0.1726 | 80/20 | 0.1726 |
| 315261 | 1GOSPORTB | 0.2205 | 80/20 | 0.2205 |
| 315262 | 1GOSPORTC | 0.1871 | 80/20 | 0.1871 |
| 316033 | AB2-134 C | 4.3923 | 80/20 | 4.3923 |
| 316132 | AB2-190 C | 47.5362 | 80/20 | 47.5362 |
| 316150 | AD2-215 C (Withdrawn : 01/14/2021) | 0.1554 | 80/20 | 0.1554 |
| 316258 | AE1-162 C | 0.3500 | 80/20 | 0.3500 |
| 926661 | AC1-147 C | 0.1830 | 80/20 | 0.1830 |
| 927225 | AC1-216 C | 3.3527 | 80/20 | 3.3527 |
| 932044 | AC2-012 C | 5.2463 | 80/20 | 5.2463 |
| 934014 | AD1-025 C | 36.5251 | 80/20 | 36.5251 |
| 935111 | AD1-144 C | 0.1538 | 80/20 | 0.1538 |
| 935164 | AD1-151 C | 38.1987 | 80/20 | 38.1987 |
| 936041 | AD2-007 C | 1.7448 | 80/20 | 1.7448 |
| 936051 | AD2-008 C | 6.3589 | 80/20 | 6.3589 |
| 940251 | AE2-007 O1 (Withdrawn : 12/11/2020) | 86.6486 | 80/20 | 86.6486 |
| 940891 | AE2-078 C | 2.8954 | 80/20 | 2.8954 |
| 940901 | AE2-079 C | 2.8954 | 80/20 | 2.8954 |
| 941591 | AE2-156 O1 | 9.1170 | 80/20 | 9.1170 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---------|---------------------------------------|--------------------|---------------|----------------|
| 942161 | AE2-228 C | -1.5594 | Adder | -1.83 |
| 942551 | AE2-270 | 60.6255 | 80/20 | 60.6255 |
| 943621 | AF1-033 C | 2.8954 | 80/20 | 2.8954 |
| 946261 | AF1-291 C | -1.5553 | Adder | -1.83 |
| 957631 | AF2-057 | 1.8408 | 80/20 | 1.8408 |
| 957711 | AF2-065 C | 30.9190 | 80/20 | 30.9190 |
| 959651 | AF2-256 C | -0.3898 | Adder | -0.46 |
| 961611 | AG1-000B C | 24.4189 | 80/20 | 24.4189 |
| 961711 | AG1-011 | 62.0384 | 80/20 | 62.0384 |
| 962321 | AG1-081 C (Withdrawn : 01/15/2021) | 2.6322 | 80/20 | 2.6322 |
| 963221 | AG1-171 C | 5.0932 | 80/20 | 5.0932 |
| 963231 | AG1-172 C | 5.0932 | 80/20 | 5.0932 |
| 963241 | AG1-173 C | 5.0932 | 80/20 | 5.0932 |
| 963251 | AG1-174 C | 5.0932 | 80/20 | 5.0932 |
| 963261 | AG1-175 C | 5.0932 | 80/20 | 5.0932 |
| 965001 | AG1-364 C O1 | 3.6524 | 80/20 | 3.6524 |
| 966611 | AG1-531 C | 5.8658 | 80/20 | 5.8658 |
| CPLE | CPLE | 0.6668 | Confirmed LTF | 0.6668 |
| CBM-W2 | CBM-W2 | 0.2061 | Confirmed LTF | 0.2061 |
| NY | NY | 0.3230 | Confirmed LTF | 0.3230 |
| PRAIRIE | PRAIRIE | 0.1007 | Confirmed LTF | 0.1007 |
| TVA | TVA | 0.1540 | Confirmed LTF | 0.1540 |
| SIGE | SIGE | 0.0541 | Confirmed LTF | 0.0541 |
| CBM-S2 | CBM-S2 | 6.7234 | Confirmed LTF | 6.7234 |
| CBM-S1 | CBM-S1 | 0.0258 | Confirmed LTF | 0.0258 |
| GIBSON | GIBSON | 0.0628 | Confirmed LTF | 0.0628 |
| BLUEG | BLUEG | 0.2187 | Confirmed LTF | 0.2187 |
| TRIMBLE | TRIMBLE | 0.0723 | Confirmed LTF | 0.0723 |
| LAGN | LAGN | 0.1890 | Confirmed LTF | 0.1890 |

11.6.4 Index 4

| ID | FROM BUS# | FROM BUS | FROM BUS AREA | TO BUS# | TO BUS | TO BUS AREA | CKT ID | CONT NAME | Type | Rating MVA | PRE PROJECT LOADING % | POST PROJECT LOADING % | AC DC | MW IMPACT |
|-----------|-----------|----------|---------------|---------|----------|-------------|--------|----------------------|-------|------------|-----------------------|------------------------|-------|-----------|
| 163408930 | 314538 | 6SURRY | DVP | 314522 | 6CHCKTUK | DVP | 1 | DVP_P7-1: LN 223-226 | tower | 830.0 | 102.48 | 103.72 | DC | 10.52 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|--------|--------------------------------------|--------------------|-------|----------------|
| 314539 | 3UNCAMP | -1.9260 | Adder | -2.27 |
| 314541 | 3WATKINS | -0.2063 | Adder | -0.24 |
| 315073 | 1STONECA | 3.4977 | Adder | 4.11 |
| 315074 | 1HOPCGN1 (Deactivation : 25/06/2019) | 0.0091 | Adder | 0.01 |
| 315075 | 1HOPCGN2 (Deactivation : 25/06/2019) | 0.0091 | Adder | 0.01 |
| 315078 | 1HOPHCF2 | 1.4032 | 50/50 | 1.4032 |
| 315079 | 1HOPHCF3 | 1.4032 | 50/50 | 1.4032 |
| 315080 | 1HOPHCF4 | 2.1302 | 50/50 | 2.1302 |
| 315116 | 1SURRY 1 | 44.0038 | 50/50 | 44.0038 |
| 315117 | 1GRAVELC | 1.5422 | 50/50 | 1.5422 |
| 315119 | 1GRAVEL3 | 4.4702 | 50/50 | 4.4702 |
| 315120 | 1GRAVEL4 | 4.5275 | 50/50 | 4.5275 |
| 315121 | 1GRAVEL5 | 4.4702 | 50/50 | 4.4702 |
| 315122 | 1GRAVEL6 | 4.5223 | 50/50 | 4.5223 |
| 315293 | 1DOMTR9 | -1.8894 | Adder | -2.22 |
| 315294 | 1DOMTR10 | -2.3154 | Adder | -2.72 |
| 316033 | AB2-134 C | 2.6060 | 50/50 | 2.6060 |
| 316132 | AB2-190 C | 22.9376 | 50/50 | 22.9376 |
| 924814 | AB2-134 E | 16.2415 | 50/50 | 16.2415 |
| 925332 | AB2-190 E | 9.8304 | 50/50 | 9.8304 |
| 927225 | AC1-216 C | 1.9892 | 50/50 | 1.9892 |
| 927226 | AC1-216 E | 9.9152 | 50/50 | 9.9152 |
| 934014 | AD1-025 C | 21.6707 | 50/50 | 21.6707 |
| 934015 | AD1-025 E | 12.8368 | 50/50 | 12.8368 |
| 934061 | AD1-033 C | -2.0663 | Adder | -2.43 |
| 935164 | AD1-151 C | 18.4320 | 50/50 | 18.4320 |
| 935165 | AD1-151 E | 12.2880 | 50/50 | 12.2880 |
| 936041 | AD2-007 C | 1.0352 | 50/50 | 1.0352 |
| 936042 | AD2-007 E | 0.7132 | 50/50 | 0.7132 |
| 936051 | AD2-008 C | 3.7728 | 50/50 | 3.7728 |
| 936052 | AD2-008 E | 8.2128 | 50/50 | 8.2128 |
| 940891 | AE2-078 C | 3.7708 | 50/50 | 3.7708 |
| 940892 | AE2-078 E | 1.9426 | 50/50 | 1.9426 |
| 940901 | AE2-079 C | 3.7708 | 50/50 | 3.7708 |
| 940902 | AE2-079 E | 1.9426 | 50/50 | 1.9426 |
| 942131 | AE2-225 C | -0.9854 | Adder | -1.16 |
| 942171 | AE2-229 C | -0.7391 | Adder | -0.87 |
| 942551 | AE2-270 | 32.8110 | 50/50 | 32.8110 |
| 943611 | AF1-032 C | -0.8048 | Adder | -0.95 |
| 943621 | AF1-033 C | 3.7708 | 50/50 | 3.7708 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|------------|---------------------------------------|--------------------|-----------------------|----------------|
| 943622 | AF1-033 E | 1.9426 | 50/50 | 1.9426 |
| 957491 | AF2-043 C | -0.9854 | Adder | -1.16 |
| 957632 | AF2-057 BAT | 1.1110 | Merchant Transmission | 1.1110 |
| 957711 | AF2-065 C | 16.7336 | 50/50 | 16.7336 |
| 957712 | AF2-065 E | 16.0774 | 50/50 | 16.0774 |
| 961091 | AF2-400 C | -0.1432 | Adder | -0.17 |
| 961611 | AG1-000B C | 27.4156 | 50/50 | 27.4156 |
| 961711 | AG1-011 | 36.8080 | 50/50 | 36.8080 |
| 961853 | AG1-028 BAT | 4.7840 | Merchant Transmission | 4.7840 |
| 962321 | AG1-081 C (Withdrawn : 01/15/2021) | 3.4280 | 50/50 | 3.4280 |
| 962322 | AG1-081 E (Withdrawn : 01/15/2021) | 2.2854 | 50/50 | 2.2854 |
| 963221 | AG1-171 C | 2.4576 | 50/50 | 2.4576 |
| 963222 | AG1-171 E | 1.6384 | 50/50 | 1.6384 |
| 963231 | AG1-172 C | 2.4576 | 50/50 | 2.4576 |
| 963232 | AG1-172 E | 1.6384 | 50/50 | 1.6384 |
| 963241 | AG1-173 C | 2.4576 | 50/50 | 2.4576 |
| 963242 | AG1-173 E | 1.6384 | 50/50 | 1.6384 |
| 963251 | AG1-174 C | 2.4576 | 50/50 | 2.4576 |
| 963252 | AG1-174 E | 1.6384 | 50/50 | 1.6384 |
| 963261 | AG1-175 C | 2.4576 | 50/50 | 2.4576 |
| 963262 | AG1-175 E | 1.6384 | 50/50 | 1.6384 |
| 964493 | AG1-312 BAT | 1.9989 | Merchant Transmission | 1.9989 |
| 964952 | AG1-359 BAT | 4.5943 | Merchant Transmission | 4.5943 |
| 965003 | AG1-364 BAT | 2.9219 | Merchant Transmission | 2.9219 |
| 965183 | AG1-383 BAT | 0.2665 | Merchant Transmission | 0.2665 |
| 965742 | AG1-442 BAT | 1.0423 | Merchant Transmission | 1.0423 |
| 965752 | AG1-443 BAT | 1.0423 | Merchant Transmission | 1.0423 |
| 966492 | AG1-518 BAT | 2.5602 | Merchant Transmission | 2.5602 |
| 966611 | AG1-531 C | 6.3108 | 50/50 | 6.3108 |
| 966612 | AG1-531 E | 4.2072 | 50/50 | 4.2072 |
| 966932 | AG1-431A BAT | 6.6430 | Merchant Transmission | 6.6430 |
| G-007A | G-007A | 0.0048 | Confirmed LTF | 0.0048 |
| VFT | VFT | 0.0064 | Confirmed LTF | 0.0064 |
| CALDERWOOD | CALDERWOOD | 0.4046 | Confirmed LTF | 0.4046 |
| NY | NY | 0.0177 | Confirmed LTF | 0.0177 |
| PRAIRIE | PRAIRIE | 1.5033 | Confirmed LTF | 1.5033 |
| CHEOAH | CHEOAH | 0.4134 | Confirmed LTF | 0.4134 |
| COTTONWOOD | COTTONWOOD | 1.5309 | Confirmed LTF | 1.5309 |
| HAMLET | HAMLET | 0.8224 | Confirmed LTF | 0.8224 |
| GIBSON | GIBSON | 0.2763 | Confirmed LTF | 0.2763 |
| BLUEG | BLUEG | 0.8593 | Confirmed LTF | 0.8593 |
| TRIMBLE | TRIMBLE | 0.2732 | Confirmed LTF | 0.2732 |
| CATAWBA | CATAWBA | 0.4109 | Confirmed LTF | 0.4109 |

11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

| Queue Number | Project Name | Status |
|--------------|-------------------------------|---|
| AB2-134 | Hopewell-Surry 230kV | In Service |
| AB2-161 | Waverly #2 DP 115kV | Suspended |
| AB2-190 | Hopewell-Surry 230kV | Engineering and Procurement |
| AC1-027 | Pendleton 34.5kV | In Service |
| AC1-147 | Grassfield 34.5kV | Engineering and Procurement |
| AC1-216 | Hopewell-Surry 230kV | Partially in Service - Under Construction |
| AC2-012 | Grassfield-Great Bridge 115kV | Active |
| AC2-078 | Disputanta-Waverly 115kV | Engineering and Procurement |
| AC2-079 | Ivor-Oak Ridge 115kV | Engineering and Procurement |
| AD1-025 | Hopewell-Surry 230 kV | Active |
| AD1-033 | Fentress-Landstown 230 kV | Engineering and Procurement |
| AD1-082 | Bakers Pond-Ivor 115kV | Engineering and Procurement |
| AD1-144 | Kings Fork 34.5 kV | Partially in Service - Under Construction |
| AD1-151 | Hopewell-Surry 230 kV | Active |
| AD2-007 | Hopewell-Surry 230 kV | Active |
| AD2-008 | Hopewell-Surry 230 kV | Active |
| AD2-085 | Myrtle-Windsor DP 115kV | Active |
| AD2-215 | Kings Fork 34.5 kV | Withdrawn |
| AE1-085 | Bakers Pond-Bell Ave 115 kV | Active |
| AE1-149 | Disputanta-Poe 115 kV | Active |
| AE1-162 | Smithfield 34.5 kV | Engineering and Procurement |
| AE1-175 | Light Foot 34.5 kV | Engineering and Procurement |
| AE2-000B | N/A | N/A |
| AE2-007 | Chesapeake 230 kV | Withdrawn |
| AE2-052 | Disputanta-Poe 115 kV | Active |
| AE2-078 | Poolesville 34.5 kV | Engineering and Procurement |
| AE2-079 | Poolesville 34.5 kV | Engineering and Procurement |
| AE2-122 | Birdneck-Landstown 230 kV | Active |
| AE2-123 | Birdneck-Landstown 230 kV | Active |
| AE2-124 | Landstown 230 kV | Active |
| AE2-156 | Yadkin 115 kV | Active |
| AE2-225 | Suffolk 34 kV | Engineering and Procurement |
| AE2-227 | Iron Bridge 34 kV | Engineering and Procurement |
| AE2-228 | Tyler 34 kV | Engineering and Procurement |
| AE2-229 | Suffolk 34 kV | Engineering and Procurement |
| AE2-247 | Myrtle-Windsor 115 kV | Active |
| AE2-270 | Hopewell-Surry 230 kV | Active |
| AF1-017 | Myrtle-Windsor 115 kV | Active |
| AF1-032 | Suffolk 34.5 kV | Engineering and Procurement |

| Queue Number | Project Name | Status |
|--------------|---------------------------------|-----------------------------|
| AF1-033 | Poolesville 34 kV | Engineering and Procurement |
| AF1-201 | Hayes-White Marsh 115 kV | Active |
| AF1-291 | Tyler 34.5 kV | Engineering and Procurement |
| AF2-043 | Suffolk 34.5 kV | Engineering and Procurement |
| AF2-057 | Grassfield 34.5 kV | Active |
| AF2-065 | Surry-Hopewell 230 kV | Active |
| AF2-255 | Iron Bridge 34.5 kV | Engineering and Procurement |
| AF2-256 | Tyler 34.5 kV | Engineering and Procurement |
| AF2-400 | Franklin 13.2 kV | Engineering and Procurement |
| AG1-000B | N/A | N/A |
| AG1-011 | Colonial Trial 230 kV | Active |
| AG1-028 | Suffolk-Holland 115 kV | Active |
| AG1-081 | Poolesville 34.5 kV | Withdrawn |
| AG1-171 | Hopewell-Surry 230kV | Active |
| AG1-172 | Hopewell-Surry 230 kV | Active |
| AG1-173 | Hopewell-Surry 230 kV | Active |
| AG1-174 | Hopewell-Surry 230 kV | Active |
| AG1-175 | Hopewell-Surry 230 kV | Active |
| AG1-312 | Earleys-Cashie 230 kV | Active |
| AG1-359 | Fentress 230 kV | Active |
| AG1-364 | Deep Creek 115 kV | Active |
| AG1-383 | Hickory 34.5 kV | Active |
| AG1-431A | Mackeys 230 kV | Active |
| AG1-442 | Cashie-Earleys 230 kV | Active |
| AG1-443 | Cashie-Earleys 230 kV | Active |
| AG1-518 | Suffolk 230 kV | Active |
| AG1-531 | Poolesville-Winchester 230 kV | Active |
| AG1-544 | Bakers Pond DP 115 kV | Active |
| AG1-545 | W. Quaker Rd-Disputanta 34.5 kV | Active |
| Z1-068 | Birdneck 34.5kV | In Service |

11.8 Contingency Descriptions

| Contingency Name | Contingency Definition |
|--------------------------------|---|
| DVP_P1-2: LN 211 | CONTINGENCY 'DVP_P1-2: LN 211' OPEN BRANCH FROM BUS 314287 TO BUS 314303 CKT 1 /* 6CHESTF B 230.00 - 6HOPEWLL 230.00 END |
| DVP_P1-2: LN 212 | CONTINGENCY 'DVP_P1-2: LN 212' OPEN BRANCH FROM BUS 313896 TO BUS 314538 CKT 1 /* 6COLONIAL TR230.00 - 6SURRY 230.00 END |
| DVP_P1-2: LN 240-A | CONTINGENCY 'DVP_P1-2: LN 240-A' OPEN BRANCH FROM BUS 314303 TO BUS 935160 CKT 2 /* 6HOPEWLL 230.00 - AD1-151 TAP 230.00 OPEN BUS 316132 /* ISLAND: AB2-190 C 230.00 OPEN BUS 925332 /* ISLAND: AB2-190 E 230.00 OPEN BUS 935160 /* ISLAND: AD1-151 TAP 230.00 OPEN BUS 935161 /* ISLAND: AD1-151 MAIN230.00 OPEN BUS 935162 /* ISLAND: AD1-151 COL 34.500 OPEN BUS 935163 /* ISLAND: AD1-151 GSU 34.500 OPEN BUS 935164 /* ISLAND: AD1-151 C 0.6000 OPEN BUS 935165 /* ISLAND: AD1-151 E 0.6000 END |
| DVP_P7-1: LN 240-2197-A | CONTINGENCY 'DVP_P7-1: LN 240-2197-A' /* . OPEN BRANCH FROM BUS 314303 TO BUS 935160 CKT 2 /* 6HOPEWLL 230.00 - AD1-151 TAP 230.00 OPEN BUS 316132 /* ISLAND: AB2-190 C 230.00 OPEN BUS 925332 /* ISLAND: AB2-190 E 230.00 OPEN BUS 935160 /* ISLAND: AD1-151 TAP 230.00 OPEN BUS 935161 /* ISLAND: AD1-151 MAIN230.00 OPEN BUS 935162 /* ISLAND: AD1-151 COL 34.500 OPEN BUS 935163 /* ISLAND: AD1-151 GSU 34.500 OPEN BUS 935164 /* ISLAND: AD1-151 C 0.6000 OPEN BUS 935165 /* ISLAND: AD1-151 E 0.6000 OPEN BRANCH FROM BUS 313896 TO BUS 314303 CKT 1 /* 6COLONIAL TR230.00 - 6HOPEWLL 230.00 END |
| DVP_P7-1: LN 240-2197-B | CONTINGENCY 'DVP_P7-1: LN 240-2197-B' /* . OPEN BRANCH FROM BUS 935160 TO BUS 942550 CKT 2 /* AD1-151 TAP 230.00 - AE2-270 TAP 230.00 OPEN BRANCH FROM BUS 313896 TO BUS 314303 CKT 1 /* 6COLONIAL TR230.00 - 6HOPEWLL 230.00 END |

| Contingency Name | Contingency Definition |
|----------------------|---|
| DVP_P1-2: LN 228 | CONTINGENCY 'DVP_P1-2: LN 228' OPEN BRANCH FROM BUS 314286 TO BUS 314303 CKT 1 /* 6CHESTF A 230.00 - 6HOPEWLL 230.00 END |
| DVP_P1-2: LN 567 | CONTINGENCY 'DVP_P1-2: LN 567' OPEN BRANCH FROM BUS 314903 TO BUS 314924 CKT 1 /* 8CHCKAHM 500.00 - 8SURRY 500.00 END |
| DVP_P7-1: LN 223-226 | CONTINGENCY 'DVP_P7-1: LN 223-226' /* . OPEN BRANCH FROM BUS 314475 TO BUS 314514 CKT 1 /* 6HARBORV 230.00 - 6YADKIN 230.00 OPEN BRANCH FROM BUS 314475 TO BUS 314533 CKT 1 /* 6HARBORV 230.00 - 6SMITFLD 230.00 OPEN BRANCH FROM BUS 314533 TO BUS 314538 CKT 1 /* 6SMITFLD 230.00 - 6SURRY 230.00 OPEN BUS 314475 /* ISLAND: 6HARBORV 230.00 OPEN BUS 314533 /* ISLAND: 6SMITFLD 230.00 OPEN BUS 316258 /* ISLAND: AE1-162 C 230.00 OPEN BUS 939312 /* ISLAND: AE1-162 E 230.00 OPEN BRANCH FROM BUS 314453 TO BUS 314484 CKT 1 /* 6CHRLND 230.00 - 6HARBORV226 230.00 OPEN BRANCH FROM BUS 314484 TO BUS 314523 CKT 1 /* 6HARBORV226 230.00 - 6CRITTDN 230.00 OPEN BRANCH FROM BUS 314523 TO BUS 314538 CKT 1 /* 6CRITTDN 230.00 - 6SURRY 230.00 OPEN BUS 314484 /* ISLAND: 6HARBORV226 230.00 OPEN BUS 314523 /* ISLAND: 6CRITTDN 230.00 END |
| DVP_P1-2: LN 2197 | CONTINGENCY 'DVP_P1-2: LN 2197' OPEN BRANCH FROM BUS 313896 TO BUS 314303 CKT 1 /* 6COLONIAL TR230.00 - 6HOPEWLL 230.00 END |
| Base Case | |

| Contingency Name | Contingency Definition |
|-----------------------------|---|
| DVP_P7-1: LN 223-290 | CONTINGENCY 'DVP_P7-1: LN 223-290' /* . OPEN BRANCH FROM BUS 314475 TO BUS 314514 CKT 1 /* 6HARBORV 230.00 - 6YADKIN 230.00 OPEN BRANCH FROM BUS 314475 TO BUS 314533 CKT 1 /* 6HARBORV 230.00 - 6SMITFLD 230.00 OPEN BRANCH FROM BUS 314533 TO BUS 314538 CKT 1 /* 6SMITFLD 230.00 - 6SURREY 230.00 OPEN BUS 314475 /* ISLAND: 6HARBORV 230.00 OPEN BUS 314533 /* ISLAND: 6SMITFLD 230.00 OPEN BUS 316258 /* ISLAND: AE1-162 C 230.00 OPEN BUS 939312 /* ISLAND: AE1-162 E 230.00 OPEN BRANCH FROM BUS 314522 TO BUS 314538 CKT 1 /* 6CHCKTUK 230.00 - 6SURREY 230.00 END |
| DVP_P2-2: BASIN B7 | CONTINGENCY 'DVP_P2-2: BASIN B7' /* BASIN 230 KV OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 - 6CHESTF B 230.00 OPEN BRANCH FROM BUS 314276 TO BUS 314339 CKT 1 /* 6BASIN 230.00 - 6SPRUNCE 230.00 OPEN BRANCH FROM BUS 314274 TO BUS 314276 CKT 2 /* 3BASIN 115.00 - 6BASIN 230.00 END |
| DVP_P1-2: LN 563 | CONTINGENCY 'DVP_P1-2: LN 563' OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 END |

12 Short Circuit Analysis

The following Breakers are overdutied:

None

12.1 System Reinforcements - Short Circuit

None

13 Affected Systems

13.1 TVA

TVA Impacts to be determined during later study phases (as applicable).

13.2 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).