Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-183

ST. JOHNS DP-REC 115 KV

35.52 MW Capacity / 50 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.

The AG1-183 customer will be an interconnection to Rappahannock Electric Cooperative (REC) facilities. The Interconnection Customer (IC) will need to coordinate with REC for scope, cost and schedule for this physical interconnection. This PJM report identifies the effects on the transmission system. AG1-183 will interconnect within the Rappahannock Electric Cooperative (REC) system which interconnects with the Dominion transmission system at St. Johns DP 115 kV.

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 King and Queen County, Virginia. The installed facilities will have a total capability of 50 MW with 35.52 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 30, 2023. This study does not imply a TO commitment to this in-service date.

Final attachment facilities and local upgrades (if required) along with terms and conditions to interconnect AG1-183 will be specified in a separate two party Interconnection Agreement (IA) between REC and the Interconnection Customer as this project is considered FERC non-jurisdictional per the PJM Open Access Transmission Tariff (OATT).

From the transmission perspective, the impacts are were analyzed and detailed in the "Network Impacts" section below.

Queue Number	AG1-183
Project Name	ST. JOHNS DP-REC 115 KV
State	Virginia
County	King and Queen
Transmission Owner	Dominion
MFO	50
MWE	50
MWC	35.52
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

4.1 Primary Point of Interconnection

AG1-183 "St. Johns DP-REC 115 kV" will interconnect within the Rappahannock Electric Cooperative (REC) system which interconnects with the Dominion transmission system at St. Johns DP-REC 115 kV.

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

4.2 Secondary Point of Interconnection

There is no secondary point of interconnection specified for AG1-183.

AG1-183 will interconnect with the Dominion transmission system at the St. Johns DP 115 kV substation.

5 Cost Summary

The AG1-183 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$ 8,800,000 + Costs from REC to be provided in the Interconnection Agreement
Total System Network Upgrade Costs	$157,797,500[1]
Total Costs	**$166,597,500**

The costs assoicated with interconnecting AG1-183 to the Rappahannock Electric Cooperative (REC) system will be documented in the two-party Interconnection Agreement between the IC and Rappahannock Electric Cooperative (REC).

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

The required Attachment Facilities, Direct Connection and Non-Direct Connection work for the interconnection of AG1-183 to the Dominion Transmission System is detailed in the following sections. The associated one-line showing the generation project attachment facilities and primary direct and non-direct connection is shown in Attachment 1.

Note that the ITO findings were made from a conceptual review of this project. A more detailed review of the connection facilities and their cost will be identified in a future study phase. Further note that the cost estimate data contained in this document should be considered high level estimates since it was produced without a detailed engineering review. The applicant will be responsible for the actual cost of construction. ITO herein reserves the right to return to any issues in this document and, upon appropriate justification, request additional monies to complete any reinforcements to the transmission systems.

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

Description	Total Cost
Attachment Facilities (115 kV)	$500,000
230 kV Three Breaker Ring-Bus Substation	$6,500,000
Re-arrange line and tie-in new substation	$1,800,000
REC Interconnection Work	Interconnection Customer to contact REC
Total Physical Interconnection Costs	**$8,800,000 + Costs from REC to be determined**

AG1-183 "St. Johns DP-REC 115 kV" will interconnect within the Rappahannock Electric Cooperative (REC) system which interconnects with the Dominion transmission system at St. Johns DP-REC 115 kV.

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.

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.

The estimated schedule for the required Network Impact Reinforcements is identified in the "System Reinforcements" section of this report.

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[1].

8 Transmission Owner Analysis

Dominion assessed the impact of the proposed project 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 AG1-183 was evaluated as a 50.0 MW (Capacity 35.52 MW) injection at the St. Johns DP 115 kV substation in the Dominion area. Project AG1-183 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-183 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)

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 LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
168691613	314150	6STJOHN	230.0	DVP	939260	AE1-157 TAP	230.0	DVP	1	DVP_P1-2: LN 574	single	1123.30004883	99.24	100.5	DC	20.6

11.2 Multiple Facility Contingency

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

None.

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	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
168691674	314105	6AQUIA	230.0	DVP	314186	6FULLER ROAD	230.0	DVP	1	DVP_P1-2: LN 2089	single	678.679992676	107.72	108.84	DC	9.11
168691532	314134	6CRANES	230.0	DVP	314142	6STAFORD	230.0	DVP	1	DVP_P1-2: LN 2089	single	678.679992676	133.09	134.22	DC	9.11
168691605	314142	6STAFORD	230.0	DVP	314145	6AQUI_HARB_B	230.0	DVP	1	DVP_P1-2: LN 2089	single	678.679992676	117.92	119.04	DC	9.11
168691657	314144	6AQUI_HARB_A	230.0	DVP	314105	6AQUIA	230.0	DVP	1	DVP_P1-2: LN 2089	single	678.679992676	111.8	112.93	DC	9.11
168691611	314150	6STJOHN	230.0	DVP	939260	AE1-157 TAP	230.0	DVP	1	3142226HANOVER 230 939750 AE1-206 TAP 230 1	single	1123.30004883	118.32	121.46	DC	35.33
168691684	314186	6FULLER ROAD	230.0	DVP	314074	6POSSUM	230.0	DVP	1	DVP_P1-2: LN 2089	single	678.679992676	106.68	107.8	DC	9.11
168691601	314197	6LDYSMITH CT	230.0	DVP	314196	6LADYSMITH	230.0	DVP	1	3142226HANOVER 230 939750 AE1-206 TAP 230 1	single	1151.5	133.49	135.24	DC	26.24
168691603	314197	6LDYSMITH CT	230.0	DVP	314196	6LADYSMITH	230.0	DVP	1	3142126FOUR RIVERS 230 939750 AE1-206 TAP 230 1	single	1151.5	112.97	114.72	DC	26.24

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 LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
168691691	314212	6FOUR RIVERS	230.0	DVP	939750	AE1-206 TAP	230.0	DVP	1	3141976LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3000488 3	106.95	110.1	DC	35.33
168691514	314222	6HANOVER	230.0	DVP	314218	6ELMONT	230.0	DVP	1	3141976LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3000488 3	129.52	132.66	DC	35.33
168691515	314222	6HANOVER	230.0	DVP	314218	6ELMONT	230.0	DVP	1	3141506STJOHN 230 939260 AE1-157 TAP 230 1	single	1123.3000488 3	112.56	115.7	DC	35.33
169612303	939260	AE1-157 TAP	230.0	DVP	314197	6LDYSMITH CT	230.0	DVP	1	3142226HANOVER 230 939750 AE1-206 TAP 230 1	single	1123.3000488 3	135.27	138.42	DC	35.33
169612305	939260	AE1-157 TAP	230.0	DVP	314197	6LDYSMITH CT	230.0	DVP	1	3142126FOUR RIVERS 230 939750 AE1-206 TAP 230 1	single	1123.3000488 3	106.95	110.1	DC	35.33
168691499	939750	AE1-206 TAP	230.0	DVP	314222	6HANOVER	230.0	DVP	1	3141976LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3000488 3	135.27	138.42	DC	35.33
168691500	939750	AE1-206 TAP	230.0	DVP	314222	6HANOVER	230.0	DVP	1	3141506STJOHN 230 939260 AE1-157 TAP 230 1	single	1123.3000488 3	118.32	121.46	DC	35.33
168691502	939750	AE1-206 TAP	230.0	DVP	314222	6HANOVER	230.0	DVP	1	Base Case	single	1103.5600585 9	105.67	107.03	DC	14.98

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 LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
168691673	314105	6AQUIA	230.0	DVP	314186	6FULLER ROAD	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	120.17	120.7	DC	9.11
168691531	314134	6CRANES	230.0	DVP	314142	6STAFORD	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	145.47	146.0	DC	9.11
168691604	314142	6STAFORD	230.0	DVP	314145	6AQUI_HARB_B	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	130.36	130.89	DC	9.11
168691656	314144	6AQUI_HARB_A	230.0	DVP	314105	6AQUIA	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	124.25	124.78	DC	9.11
168691610	314150	6STJOHN	230.0	DVP	939260	AE1-157 TAP	230.0	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	operation	1123.30004883	133.89	137.04	DC	35.33
168691683	314186	6FULLER ROAD	230.0	DVP	314074	6POSSUM	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	119.12	119.65	DC	9.11
168691600	314197	6LDYSMITH CT	230.0	DVP	314196	6LADYSMITH	230.0	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	operation	1151.5	138.05	139.46	DC	26.24
168691690	314212	6FOUR RIVERS	230.0	DVP	939750	AE1-206 TAP	230.0	DVP	1	314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	operation	1123.30004883	122.02	125.16	DC	35.33
168691512	314222	6HANOVER	230.0	DVP	314218	6ELMONT	230.0	DVP	1	314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	operation	1123.30004883	154.67	157.82	DC	35.33
168691516	314222	6HANOVER	230.0	DVP	314218	6ELMONT	230.0	DVP	1	Base Case	operation	1123.30004883	108.14	109.41	DC	14.98
169612302	939260	AE1-157 TAP	230.0	DVP	314197	6LDYSMITH CT	230.0	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	operation	1123.30004883	160.43	163.58	DC	35.33

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 LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
168691497	939750	AE1-206 TAP	230.0	DVP	314222	6HANOVER	230.0	DVP	1	3141976LDYSMITH CT 230 939260 AE1-157 TAP 230 1	operation	1123.30004883	160.43	163.58	DC	35.33
168691501	939750	AE1-206 TAP	230.0	DVP	314222	6HANOVER	230.0	DVP	1	Base Case	operation	1103.56005859	115.93	117.23	DC	14.98
169911393	965440	AG1-412 TAP	230.0	DVP	313837	6SUMMIT	230.0	DVP	1	DVP_P1-2: LN 2089	operation	1123.30004883	103.59	104.61	DC	12.94

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
168691499,168691502,168691500	11	AE1-206 TAP 230.0 kV - 6HANOVER 230.0 kV Ckt 1	DVP n6158 (1401) : Rebuild 3.37 miles of 230 kV Line 2032 from AE1-206 Tap to Hanover with 2-768.2 ACSS 200C. Project Type : FAC Cost : $5,055,000 Time Estimate : 30-36 Months DVP dom-253 (1480) : Rebuild 3.37 miles of 230 kV Line 2032 from AE1-206 Tap to Hanover with 2-768.2 ACSS 250C. Replace Line Switch at Hanover 230 kV Project Type : FAC Cost : $5,305,000 Time Estimate : 30-36 Months DVP dom-399 (1626) : Wreck and Rebuild 3.37 miles of 230 kV Line2032 from AE1-206 Tap to Hanover as a double circuit (6 wire) with 2-636 ACSR on each circuit. Replace Line Switch at Hanover terminal. Project Type : FAC Cost : $8,675,000 Time Estimate : 30-36 Months	$19,035,000
168691532	3	6CRANES 230.0 kV - 6STAFORD 230.0 kV Ckt 1	DVP n6131 (1389) : Rebuild 7.62 miles of 230 kV Line 2104 from Cranes Corner to Stafford with 2-636 ACSR. Project Type : FAC Cost : $11,430,000 Time Estimate : 30-36 Months	$11,430,000
168691691	8	6FOUR RIVERS 230.0 kV - AE1-206 TAP 230.0 kV Ckt 1	DVP dom-210 (1437) : Rebuild 2.4 miles of 230 kV Line 2032 from Four Rivers to AE1-206 Tap with 2-768 ACSS (@250 C). Replace Breaker, Wave trap, Relay (Secondary CT) and Line Lead at Four River 230 kV. Replace Breaker at AE1-206 230 kV generation station. Project Type : FAC Cost : $6,320,000 Time Estimate : 36-40 Months	$6,320,000

ID	Idx	Facility	Upgrade Description	Cost
169612305,169612303	10	AE1-157 TAP 230.0 kV - 6LDYSMITH CT 230.0 kV Ckt 1	DVP n6156 (1399) : Rebuild 7.8 miles of 230 kV Line 256 from AE1-157 Tap to Ladysmith CT with 2-768.2 ACSS 200C. Project Type : FAC Cost : $19,500,000 Time Estimate : 30-36 Months DVP dom-252 (1479) : Wreck and rebuild 7.9 miles of existing single circuit line 256 between Ladysmith CT to AE1-157 Tap 230 kV. Add new circuit between Ladysmith CT to AE1-157 Tap 230 kV, constructed as a double circuit line. Utilize 2-636 ACSR for all new and modified circuits. Add two breakers at Ladysmith CT and a breaker at AE1-157 Station. Project Type : CON Cost : $23,350,000 Time Estimate : 36-40 Months	$42,850,000
168691605	4	6STAFORD 230.0 kV - 6AQUI_HARB_B 230.0 kV Ckt 1	DVP n6382 (1270) : Rebuild 0.32 miles of 230 kV Line2104 from Stafford to Aquia Harbor with 2-636 ACSR. Project Type : FAC Cost : $500,000 Time Estimate : 30-36 Months	$500,000
168691684	6	6FULLER ROAD 230.0 kV - 6POSSUM 230.0 kV Ckt 1	DVP dom-290 (1517) : Rebuild 3.41 mi miles of 230 kV Line 252 from Fuller Road to Possum Point with 2-636 ACSR (24/7) 150 C. Replace wave trap at Possum Point terminal. Project Type : FAC Cost : $8,725,000 Time Estimate : 30-36 Months	$8,725,000
168691514,168691515	9	6HANOVER 230.0 kV - 6ELMONT 230.0 kV Ckt 1	DVP n6159 (1402) : Rebuild 3.19 miles of 230 kV Line 2032 from Hanover to Elmont with 2-768.2 ACSS 200C. Project Type : FAC Cost : $4,785,000 Time Estimate : 30-36 Months DVP dom-250 (1477) : Rebuild 3.19 miles of 230 kV Line 2032 from Hanover to Elmont with 2-768.2 ACSS 250C. Replace Line Switch, Wave trap and Relay (Secondary CT) at Elmont 230 kV. Project Type : FAC Cost : $5,355,000 Time Estimate : 30-36 Months	$10,140,000

ID	Idx	Facility	Upgrade Description	Cost
168691601,168691603	7	6LDYSMITH CT 230.0 kV - 6LADYSMITH 230.0 kV Ckt 1	**DVP** **b3027.1 (1165) : PJM baseline upgrade b3027.1: Add a 2nd 500/230 kV 840 MVA transformer at Dominions Ladysmith Substation. The baseline project has an projected in-service date of 06/01/2021.** **Project Type : CON** **Cost : $0** **Time Estimate : N/A Months** **DVP** **b3027.2 (1166) : PJM Baseline Upgrade b3027.2. Re-conductor Line #2089 between Ladysmith and Ladysmith CT Substations to increase the line rating from 1047 MVA to 1225 MVA. The baseline project has a projected in-service date of 06/01/2021.** **Project Type : FAC** **Cost : $0** **Time Estimate : N/A Months** **DVP** **dom-249 (1476) : Install a second 230 kV circuit of 3.94 miles from Ladysmith to Ladysmith CT (Line 2089) with a 2000/2000/2300 MVA conductor. Add Breakers at both stations.** **Project Type : CON** **Cost : $8,310,000** **Time Estimate : 30-36 Months**	$8,310,000
168691674	2	6AQUIA 230.0 kV - 6FULLER ROAD 230.0 kV Ckt 1	**DVP** **dom-280 (1507) : Rebuild 4.7 miles of 230 kV Line 252 from Aquia to Fuller Road with 2-636 ACSR (24/7) 150 C. Replace Line lead at Aquia terminal.** **Project Type : FAC** **Cost : $11,750,000** **Time Estimate : 30-36 Months**	$11,750,000
168691657	5	6AQUI_HARB_A 230.0 kV - 6AQUIA 230.0 kV Ckt 1	**DVP** **dom-284 (1511) : Rebuild 3.745 miles of 230 kV Line 252 from Aquia to Aquia Harbor with 2-636 ACSR (24/7) 150 C. Replace Line lead at Aquia terminal and wave trap at Aquia Harbor terminal.** **Project Type : FAC** **Cost : $9,562,500** **Time Estimate : 30-36 Months**	$9,562,500

ID	Idx	Facility	Upgrade Description	Cost
168691613,168691611	1	6STJOHN 230.0 kV - AE1-157 TAP 230.0 kV Ckt 1	**DVP** **n6384 (1254) : Rebuild 4.45 miles of 230 kV Line 256 from St. John to AE1-157 Tap with 2-768.2 ACSS 200C.** **Project Type : FAC** **Cost : $11,125,000** **Time Estimate : 30-36 Months** **DVP** **dom-248 (1475) : Rebuild 4.45 miles of 230 kV Line 256 from St. John to AE1-157 Tap with 2-768.2 ACSS 250C. Replace Line Lead at St Johns 230 kV.** **Project Type : FAC** **Cost : $11,125,000** **Time Estimate : 30-36 Months** **DVP** **dom-285 (1512) : Rebuild 4.45 miles of 230 kV Line 256 from St. John to AE1-157 Tap with 2-768.2 ACSS 250C. Replace Line Switch and Line Lead at St. Johns terminal.** **Project Type : FAC** **Cost : $6,925,000** **Time Estimate : 30-36 Months**	$29,175,000
			TOTAL COST	**$157,797,500**

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
168691611	314150	6STJOHN	DVP	939260	AE1-157 TAP	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	single	1123.3	118.32	121.46	DC	35.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315043	1FOUR RIVERA	16.9462	80/20	16.9462
315044	1FOUR RIVERB	16.9462	80/20	16.9462
315045	1FOUR RIVERC	20.7121	80/20	20.7121
315046	1FOUR RIVERD	16.9462	80/20	16.9462
315047	1FOUR RIVERE	16.9462	80/20	16.9462
315048	1FOUR RIVERF	20.7121	80/20	20.7121
315051	1AA1-145 CT1	26.6746	80/20	26.6746
315052	1AA1-145 CT2	26.6746	80/20	26.6746
939755	AE1-206 C	170.0680	80/20	170.0680
942191	AE2-231 C O1	26.2561	80/20	26.2561
946001	AF1-265	149.1825	80/20	149.1825
957411	AF2-035 C	47.7384	80/20	47.7384
960091	AF2-300 C	11.9346	80/20	11.9346
963341	AG1-183 C	35.3264	80/20	35.3264
963381	AG1-187	14.4011	80/20	14.4011
963621	AG1-213 C	3.9782	80/20	3.9782
966711	AG1-541 C	31.8256	80/20	31.8256
966881	AG1-559 C	11.9346	80/20	11.9346
CALDERWOOD	CALDERWOOD	0.2709	Confirmed LTF	0.2709
NY	NY	0.3014	Confirmed LTF	0.3014
PRAIRIE	PRAIRIE	1.4077	Confirmed LTF	1.4077
CHEOAH	CHEOAH	0.2728	Confirmed LTF	0.2728
COTTONWOOD	COTTONWOOD	1.1445	Confirmed LTF	1.1445
HAMLET	HAMLET	0.3147	Confirmed LTF	0.3147
GIBSON	GIBSON	0.2976	Confirmed LTF	0.2976
BLUEG	BLUEG	0.9461	Confirmed LTF	0.9461
TRIMBLE	TRIMBLE	0.3033	Confirmed LTF	0.3033
CATAWBA	CATAWBA	0.1908	Confirmed LTF	0.1908

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
168691674	314105	6AQUIA	DVP	314186	6FULLER ROAD	DVP	1	DVP_P1-2: LN 2089	single	678.68	107.72	108.84	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.5419	80/20	0.5419
314134	6CRANES	0.1739	80/20	0.1739
314190	6WESTMOR	0.5171	80/20	0.5171
315033	1BIRCHWDA	100.9501	80/20	100.9501
315034	1NORNECKC1	0.7558	80/20	0.7558
315035	1NORNECKC2	0.7284	80/20	0.7284
315037	1LDYSMT1	9.1596	80/20	9.1596
315038	1LDYSMT2	9.1596	80/20	9.1596
315039	1LDYSMT3	8.8175	80/20	8.8175
315040	1LDYSMT4	8.8340	80/20	8.8340
315041	1LDYSMT5	8.8616	80/20	8.8616
315043	1FOUR RIVERA	2.4950	80/20	2.4950
315044	1FOUR RIVERB	2.4950	80/20	2.4950
315045	1FOUR RIVERC	3.0495	80/20	3.0495
315046	1FOUR RIVERD	2.4950	80/20	2.4950
315047	1FOUR RIVERE	2.4950	80/20	2.4950
315048	1FOUR RIVERF	3.0495	80/20	3.0495
315050	1FOURRIVERG	3.9569	80/20	3.9569
315051	1AA1-145 CT1	3.9274	80/20	3.9274
315052	1AA1-145 CT2	3.9274	80/20	3.9274
316077	AC2-138 C	0.1912	80/20	0.1912
316156	AD2-030 C	0.2139	80/20	0.2139
925863	AC1-065 C	3.4588	Adder	4.07
927044	AC1-191 C	4.3397	Adder	5.11
934141	AD1-041 C	3.0009	80/20	3.0009
934781	AD1-105 C	7.2320	80/20	7.2320
936581	AD2-073 C	2.9660	80/20	2.9660
936591	AD2-074 C	5.1755	80/20	5.1755
938961	AE1-124 C	0.6019	80/20	0.6019
939245	AE1-155 C	12.6418	80/20	12.6418
939261	AE1-157 C O1	22.6227	80/20	22.6227
939271	AE1-158 C O1	23.0879	80/20	23.0879
939611	AE1-191 C	6.0018	80/20	6.0018
939755	AE1-206 C	22.0351	80/20	22.0351
940231	AE2-005 C	0.6289	Adder	0.74
940551	AE2-041	3.2514	Adder	3.83
942191	AE2-231 C O1	6.7729	80/20	6.7729
943431	AF1-014 C	0.5958	Adder	0.7
943471	AF1-018	3.2514	Adder	3.83
943601	AF1-031 C	9.6612	80/20	9.6612
943741	AF1-042 C	2.7081	80/20	2.7081

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943991	AF1-067 C	4.7757	80/20	4.7757
944491	AF1-114 C	12.9805	80/20	12.9805
945831	AF1-248	0.0637	80/20	0.0637
946001	AF1-265	19.3290	80/20	19.3290
957191	AF2-013	37.1160	80/20	37.1160
957411	AF2-035 C	12.3144	80/20	12.3144
957551	AF2-049 C	10.0319	80/20	10.0319
957601	AF2-054 C	1.2358	80/20	1.2358
957971	AF2-091 C	4.4134	80/20	4.4134
958261	AF2-120 C	6.1782	80/20	6.1782
960091	AF2-300 C	3.0786	80/20	3.0786
961781	AG1-019	37.1160	80/20	37.1160
961951	AG1-038 C	2.9932	80/20	2.9932
962131	AG1-057	0.8616	Adder	1.91
962851	AG1-134 C	9.5514	80/20	9.5514
962861	AG1-135 C	5.8626	80/20	5.8626
962971	AG1-146 C	2.5699	80/20	2.5699
962981	AG1-147 C	5.9963	80/20	5.9963
963051	AG1-154 C	6.9948	80/20	6.9948
963341	AG1-183 C	9.1127	80/20	9.1127
963381	AG1-187	3.7148	80/20	3.7148
963611	AG1-210 C	0.7695	80/20	0.7695
963621	AG1-213 C	1.0262	80/20	1.0262
964021	AG1-256 C	1.6539	80/20	1.6539
964211	AG1-282 C	2.1487	80/20	2.1487
964591	AG1-322 O1	29.6912	80/20	29.6912
965231	AG1-388 C	2.1487	80/20	2.1487
965441	AG1-412 C	30.2480	80/20	30.2480
966661	AG1-536 C	5.3229	80/20	5.3229
966711	AG1-541 C	8.2096	80/20	8.2096
966871	AG1-558 C	0.5169	Adder	1.15
966881	AG1-559 C	3.0786	80/20	3.0786
WEC	WEC	0.1673	Confirmed LTF	0.1673
LGEE	LGEE	0.3619	Confirmed LTF	0.3619
CPLE	CPLE	1.7861	Confirmed LTF	1.7861
CBM-W2	CBM-W2	7.7862	Confirmed LTF	7.7862
NY	NY	0.7891	Confirmed LTF	0.7891
TVA	TVA	1.5036	Confirmed LTF	1.5036
SIGE	SIGE	0.2340	Confirmed LTF	0.2340
CBM-S2	CBM-S2	21.7674	Confirmed LTF	21.7674
CBM-S1	CBM-S1	0.3735	Confirmed LTF	0.3735
MEC	MEC	1.0313	Confirmed LTF	1.0313
LAGN	LAGN	1.8427	Confirmed LTF	1.8427
CBM-W1	CBM-W1	6.7436	Confirmed LTF	6.7436

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
168691532	314134	6CRANES	DVP	314142	6STAFORD	DVP	1	DVP_P1-2: LN 2089	single	678.68	133.09	134.22	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.5419	80/20	0.5419
314134	6CRANES	0.1739	80/20	0.1739
314190	6WESTMOR	0.5171	80/20	0.5171
315033	1BIRCHWDA	100.9501	80/20	100.9501
315034	1NORNECKC1	0.7558	80/20	0.7558
315035	1NORNECKC2	0.7284	80/20	0.7284
315037	1LDYSMT1	9.1596	80/20	9.1596
315038	1LDYSMT2	9.1596	80/20	9.1596
315039	1LDYSMT3	8.8175	80/20	8.8175
315040	1LDYSMT4	8.8340	80/20	8.8340
315041	1LDYSMT5	8.8616	80/20	8.8616
315043	1FOUR RIVERA	2.4950	80/20	2.4950
315044	1FOUR RIVERB	2.4950	80/20	2.4950
315045	1FOUR RIVERC	3.0495	80/20	3.0495
315046	1FOUR RIVERD	2.4950	80/20	2.4950
315047	1FOUR RIVERE	2.4950	80/20	2.4950
315048	1FOUR RIVERF	3.0495	80/20	3.0495
315050	1FOURRIVERG	3.9569	80/20	3.9569
315051	1AA1-145 CT1	3.9274	80/20	3.9274
315052	1AA1-145 CT2	3.9274	80/20	3.9274
316077	AC2-138 C	0.1912	80/20	0.1912
316156	AD2-030 C	0.2139	80/20	0.2139
925863	AC1-065 C	3.4588	Adder	4.07
927044	AC1-191 C	4.3397	Adder	5.11
934141	AD1-041 C	3.0009	80/20	3.0009
934781	AD1-105 C	7.2320	80/20	7.2320
936581	AD2-073 C	2.9660	80/20	2.9660
936591	AD2-074 C	5.1755	80/20	5.1755
938961	AE1-124 C	0.6019	80/20	0.6019
939245	AE1-155 C	12.6418	80/20	12.6418
939261	AE1-157 C O1	22.6227	80/20	22.6227
939271	AE1-158 C O1	23.0879	80/20	23.0879
939611	AE1-191 C	6.0018	80/20	6.0018
939755	AE1-206 C	22.0351	80/20	22.0351
940231	AE2-005 C	0.6289	Adder	0.74
940551	AE2-041	3.2514	Adder	3.83
942191	AE2-231 C O1	6.7729	80/20	6.7729
943431	AF1-014 C	0.5958	Adder	0.7
943471	AF1-018	3.2514	Adder	3.83
943601	AF1-031 C	9.6612	80/20	9.6612
943741	AF1-042 C	2.7081	80/20	2.7081

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943991	AF1-067 C	4.7757	80/20	4.7757
944491	AF1-114 C	12.9805	80/20	12.9805
945831	AF1-248	0.0637	80/20	0.0637
946001	AF1-265	19.3290	80/20	19.3290
957191	AF2-013	37.1160	80/20	37.1160
957411	AF2-035 C	12.3144	80/20	12.3144
957551	AF2-049 C	10.0319	80/20	10.0319
957601	AF2-054 C	1.2358	80/20	1.2358
957971	AF2-091 C	4.4134	80/20	4.4134
958261	AF2-120 C	6.1782	80/20	6.1782
960091	AF2-300 C	3.0786	80/20	3.0786
961781	AG1-019	37.1160	80/20	37.1160
961951	AG1-038 C	2.9932	80/20	2.9932
962131	AG1-057	0.8616	Adder	1.91
962851	AG1-134 C	9.5514	80/20	9.5514
962861	AG1-135 C	5.8626	80/20	5.8626
962971	AG1-146 C	2.5699	80/20	2.5699
962981	AG1-147 C	5.9963	80/20	5.9963
963051	AG1-154 C	6.9948	80/20	6.9948
963341	AG1-183 C	9.1127	80/20	9.1127
963381	AG1-187	3.7148	80/20	3.7148
963611	AG1-210 C	0.7695	80/20	0.7695
963621	AG1-213 C	1.0262	80/20	1.0262
964021	AG1-256 C	1.6539	80/20	1.6539
964211	AG1-282 C	2.1487	80/20	2.1487
964591	AG1-322 O1	29.6912	80/20	29.6912
965231	AG1-388 C	2.1487	80/20	2.1487
965441	AG1-412 C	30.2480	80/20	30.2480
966661	AG1-536 C	5.3229	80/20	5.3229
966711	AG1-541 C	8.2096	80/20	8.2096
966871	AG1-558 C	0.5169	Adder	1.15
966881	AG1-559 C	3.0786	80/20	3.0786
WEC	WEC	0.1673	Confirmed LTF	0.1673
LGEE	LGEE	0.3619	Confirmed LTF	0.3619
CPLE	CPLE	1.7861	Confirmed LTF	1.7861
CBM-W2	CBM-W2	7.7862	Confirmed LTF	7.7862
NY	NY	0.7891	Confirmed LTF	0.7891
TVA	TVA	1.5036	Confirmed LTF	1.5036
SIGE	SIGE	0.2340	Confirmed LTF	0.2340
CBM-S2	CBM-S2	21.7674	Confirmed LTF	21.7674
CBM-S1	CBM-S1	0.3735	Confirmed LTF	0.3735
MEC	MEC	1.0313	Confirmed LTF	1.0313
LAGN	LAGN	1.8427	Confirmed LTF	1.8427
CBM-W1	CBM-W1	6.7436	Confirmed LTF	6.7436

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
168691605	314142	6STAFORD	DVP	314145	6AQUI_HARB_B	DVP	1	DVP_P1-2: LN 2089	single	678.68	117.92	119.04	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.5419	80/20	0.5419
314134	6CRANES	0.1739	80/20	0.1739
314190	6WESTMOR	0.5171	80/20	0.5171
315033	1BIRCHWDA	100.9501	80/20	100.9501
315034	1NORNECKC1	0.7558	80/20	0.7558
315035	1NORNECKC2	0.7284	80/20	0.7284
315037	1LDYSMT1	9.1596	80/20	9.1596
315038	1LDYSMT2	9.1596	80/20	9.1596
315039	1LDYSMT3	8.8175	80/20	8.8175
315040	1LDYSMT4	8.8340	80/20	8.8340
315041	1LDYSMT5	8.8616	80/20	8.8616
315043	1FOUR RIVERA	2.4950	80/20	2.4950
315044	1FOUR RIVERB	2.4950	80/20	2.4950
315045	1FOUR RIVERC	3.0495	80/20	3.0495
315046	1FOUR RIVERD	2.4950	80/20	2.4950
315047	1FOUR RIVERE	2.4950	80/20	2.4950
315048	1FOUR RIVERF	3.0495	80/20	3.0495
315050	1FOURRIVERG	3.9569	80/20	3.9569
315051	1AA1-145 CT1	3.9274	80/20	3.9274
315052	1AA1-145 CT2	3.9274	80/20	3.9274
316077	AC2-138 C	0.1912	80/20	0.1912
316156	AD2-030 C	0.2139	80/20	0.2139
925863	AC1-065 C	3.4588	Adder	4.07
927044	AC1-191 C	4.3397	Adder	5.11
934141	AD1-041 C	3.0009	80/20	3.0009
934781	AD1-105 C	7.2320	80/20	7.2320
936581	AD2-073 C	2.9660	80/20	2.9660
936591	AD2-074 C	5.1755	80/20	5.1755
938961	AE1-124 C	0.6019	80/20	0.6019
939245	AE1-155 C	12.6418	80/20	12.6418
939261	AE1-157 C O1	22.6227	80/20	22.6227
939271	AE1-158 C O1	23.0879	80/20	23.0879
939611	AE1-191 C	6.0018	80/20	6.0018
939755	AE1-206 C	22.0351	80/20	22.0351
940231	AE2-005 C	0.6289	Adder	0.74
940551	AE2-041	3.2514	Adder	3.83
942191	AE2-231 C O1	6.7729	80/20	6.7729
943431	AF1-014 C	0.5958	Adder	0.7
943471	AF1-018	3.2514	Adder	3.83
943601	AF1-031 C	9.6612	80/20	9.6612
943741	AF1-042 C	2.7081	80/20	2.7081

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943991	AF1-067 C	4.7757	80/20	4.7757
944491	AF1-114 C	12.9805	80/20	12.9805
945831	AF1-248	0.0637	80/20	0.0637
946001	AF1-265	19.3290	80/20	19.3290
957191	AF2-013	37.1160	80/20	37.1160
957411	AF2-035 C	12.3144	80/20	12.3144
957551	AF2-049 C	10.0319	80/20	10.0319
957601	AF2-054 C	1.2358	80/20	1.2358
957971	AF2-091 C	4.4134	80/20	4.4134
958261	AF2-120 C	6.1782	80/20	6.1782
960091	AF2-300 C	3.0786	80/20	3.0786
961781	AG1-019	37.1160	80/20	37.1160
961951	AG1-038 C	2.9932	80/20	2.9932
962131	AG1-057	0.8616	Adder	1.91
962851	AG1-134 C	9.5514	80/20	9.5514
962861	AG1-135 C	5.8626	80/20	5.8626
962971	AG1-146 C	2.5699	80/20	2.5699
962981	AG1-147 C	5.9963	80/20	5.9963
963051	AG1-154 C	6.9948	80/20	6.9948
963341	AG1-183 C	9.1127	80/20	9.1127
963381	AG1-187	3.7148	80/20	3.7148
963611	AG1-210 C	0.7695	80/20	0.7695
963621	AG1-213 C	1.0262	80/20	1.0262
964021	AG1-256 C	1.6539	80/20	1.6539
964211	AG1-282 C	2.1487	80/20	2.1487
964591	AG1-322 O1	29.6912	80/20	29.6912
965231	AG1-388 C	2.1487	80/20	2.1487
965441	AG1-412 C	30.2480	80/20	30.2480
966661	AG1-536 C	5.3229	80/20	5.3229
966711	AG1-541 C	8.2096	80/20	8.2096
966871	AG1-558 C	0.5169	Adder	1.15
966881	AG1-559 C	3.0786	80/20	3.0786
WEC	WEC	0.1673	Confirmed LTF	0.1673
LGEE	LGEE	0.3619	Confirmed LTF	0.3619
CPLE	CPLE	1.7861	Confirmed LTF	1.7861
CBM-W2	CBM-W2	7.7862	Confirmed LTF	7.7862
NY	NY	0.7891	Confirmed LTF	0.7891
TVA	TVA	1.5036	Confirmed LTF	1.5036
SIGE	SIGE	0.2340	Confirmed LTF	0.2340
CBM-S2	CBM-S2	21.7674	Confirmed LTF	21.7674
CBM-S1	CBM-S1	0.3735	Confirmed LTF	0.3735
MEC	MEC	1.0313	Confirmed LTF	1.0313
LAGN	LAGN	1.8427	Confirmed LTF	1.8427
CBM-W1	CBM-W1	6.7436	Confirmed LTF	6.7436

11.6.5 Index 5

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
168691657	314144	6AQUI_HARB_A	DVP	314105	6AQUIA	DVP	1	DVP_P1-2: LN 2089	single	678.68	111.8	112.93	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.5419	80/20	0.5419
314134	6CRANES	0.1739	80/20	0.1739
314190	6WESTMOR	0.5171	80/20	0.5171
315033	1BIRCHWDA	100.9501	80/20	100.9501
315034	1NORNECKC1	0.7558	80/20	0.7558
315035	1NORNECKC2	0.7284	80/20	0.7284
315037	1LDYSMT1	9.1596	80/20	9.1596
315038	1LDYSMT2	9.1596	80/20	9.1596
315039	1LDYSMT3	8.8175	80/20	8.8175
315040	1LDYSMT4	8.8340	80/20	8.8340
315041	1LDYSMT5	8.8616	80/20	8.8616
315043	1FOUR RIVERA	2.4950	80/20	2.4950
315044	1FOUR RIVERB	2.4950	80/20	2.4950
315045	1FOUR RIVERC	3.0495	80/20	3.0495
315046	1FOUR RIVERD	2.4950	80/20	2.4950
315047	1FOUR RIVERE	2.4950	80/20	2.4950
315048	1FOUR RIVERF	3.0495	80/20	3.0495
315050	1FOURRIVERG	3.9569	80/20	3.9569
315051	1AA1-145 CT1	3.9274	80/20	3.9274
315052	1AA1-145 CT2	3.9274	80/20	3.9274
316077	AC2-138 C	0.1912	80/20	0.1912
316156	AD2-030 C	0.2139	80/20	0.2139
925863	AC1-065 C	3.4588	Adder	4.07
927044	AC1-191 C	4.3397	Adder	5.11
934141	AD1-041 C	3.0009	80/20	3.0009
934781	AD1-105 C	7.2320	80/20	7.2320
936581	AD2-073 C	2.9660	80/20	2.9660
936591	AD2-074 C	5.1755	80/20	5.1755
938961	AE1-124 C	0.6019	80/20	0.6019
939245	AE1-155 C	12.6418	80/20	12.6418
939261	AE1-157 C O1	22.6227	80/20	22.6227
939271	AE1-158 C O1	23.0879	80/20	23.0879
939611	AE1-191 C	6.0018	80/20	6.0018
939755	AE1-206 C	22.0351	80/20	22.0351
940231	AE2-005 C	0.6289	Adder	0.74
940551	AE2-041	3.2514	Adder	3.83
942191	AE2-231 C O1	6.7729	80/20	6.7729
943431	AF1-014 C	0.5958	Adder	0.7
943471	AF1-018	3.2514	Adder	3.83
943601	AF1-031 C	9.6612	80/20	9.6612
943741	AF1-042 C	2.7081	80/20	2.7081

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943991	AF1-067 C	4.7757	80/20	4.7757
944491	AF1-114 C	12.9805	80/20	12.9805
945831	AF1-248	0.0637	80/20	0.0637
946001	AF1-265	19.3290	80/20	19.3290
957191	AF2-013	37.1160	80/20	37.1160
957411	AF2-035 C	12.3144	80/20	12.3144
957551	AF2-049 C	10.0319	80/20	10.0319
957601	AF2-054 C	1.2358	80/20	1.2358
957971	AF2-091 C	4.4134	80/20	4.4134
958261	AF2-120 C	6.1782	80/20	6.1782
960091	AF2-300 C	3.0786	80/20	3.0786
961781	AG1-019	37.1160	80/20	37.1160
961951	AG1-038 C	2.9932	80/20	2.9932
962131	AG1-057	0.8616	Adder	1.91
962851	AG1-134 C	9.5514	80/20	9.5514
962861	AG1-135 C	5.8626	80/20	5.8626
962971	AG1-146 C	2.5699	80/20	2.5699
962981	AG1-147 C	5.9963	80/20	5.9963
963051	AG1-154 C	6.9948	80/20	6.9948
963341	AG1-183 C	9.1127	80/20	9.1127
963381	AG1-187	3.7148	80/20	3.7148
963611	AG1-210 C	0.7695	80/20	0.7695
963621	AG1-213 C	1.0262	80/20	1.0262
964021	AG1-256 C	1.6539	80/20	1.6539
964211	AG1-282 C	2.1487	80/20	2.1487
964591	AG1-322 O1	29.6912	80/20	29.6912
965231	AG1-388 C	2.1487	80/20	2.1487
965441	AG1-412 C	30.2480	80/20	30.2480
966661	AG1-536 C	5.3229	80/20	5.3229
966711	AG1-541 C	8.2096	80/20	8.2096
966871	AG1-558 C	0.5169	Adder	1.15
966881	AG1-559 C	3.0786	80/20	3.0786
WEC	WEC	0.1673	Confirmed LTF	0.1673
LGEE	LGEE	0.3619	Confirmed LTF	0.3619
CPLE	CPLE	1.7861	Confirmed LTF	1.7861
CBM-W2	CBM-W2	7.7862	Confirmed LTF	7.7862
NY	NY	0.7891	Confirmed LTF	0.7891
TVA	TVA	1.5036	Confirmed LTF	1.5036
SIGE	SIGE	0.2340	Confirmed LTF	0.2340
CBM-S2	CBM-S2	21.7674	Confirmed LTF	21.7674
CBM-S1	CBM-S1	0.3735	Confirmed LTF	0.3735
MEC	MEC	1.0313	Confirmed LTF	1.0313
LAGN	LAGN	1.8427	Confirmed LTF	1.8427
CBM-W1	CBM-W1	6.7436	Confirmed LTF	6.7436

11.6.6 Index 6

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
168691684	314186	6FULLER ROAD	DVP	314074	6POSSUM	DVP	1	DVP_P1-2: LN 2089	single	678.68	106.68	107.8	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.5419	80/20	0.5419
314134	6CRANES	0.1739	80/20	0.1739
314190	6WESTMOR	0.5171	80/20	0.5171
315033	1BIRCHWDA	100.9501	80/20	100.9501
315034	1NORNECKC1	0.7558	80/20	0.7558
315035	1NORNECKC2	0.7284	80/20	0.7284
315037	1LDYSMT1	9.1596	80/20	9.1596
315038	1LDYSMT2	9.1596	80/20	9.1596
315039	1LDYSMT3	8.8175	80/20	8.8175
315040	1LDYSMT4	8.8340	80/20	8.8340
315041	1LDYSMT5	8.8616	80/20	8.8616
315043	1FOUR RIVERA	2.4950	80/20	2.4950
315044	1FOUR RIVERB	2.4950	80/20	2.4950
315045	1FOUR RIVERC	3.0495	80/20	3.0495
315046	1FOUR RIVERD	2.4950	80/20	2.4950
315047	1FOUR RIVERE	2.4950	80/20	2.4950
315048	1FOUR RIVERF	3.0495	80/20	3.0495
315050	1FOURRIVERG	3.9569	80/20	3.9569
315051	1AA1-145 CT1	3.9274	80/20	3.9274
315052	1AA1-145 CT2	3.9274	80/20	3.9274
316077	AC2-138 C	0.1912	80/20	0.1912
316156	AD2-030 C	0.2139	80/20	0.2139
925863	AC1-065 C	3.4588	Adder	4.07
927044	AC1-191 C	4.3397	Adder	5.11
934141	AD1-041 C	3.0009	80/20	3.0009
934781	AD1-105 C	7.2320	80/20	7.2320
936581	AD2-073 C	2.9660	80/20	2.9660
936591	AD2-074 C	5.1755	80/20	5.1755
938961	AE1-124 C	0.6019	80/20	0.6019
939245	AE1-155 C	12.6418	80/20	12.6418
939261	AE1-157 C O1	22.6227	80/20	22.6227
939271	AE1-158 C O1	23.0879	80/20	23.0879
939611	AE1-191 C	6.0018	80/20	6.0018
939755	AE1-206 C	22.0351	80/20	22.0351
940231	AE2-005 C	0.6289	Adder	0.74
940551	AE2-041	3.2514	Adder	3.83
942191	AE2-231 C O1	6.7729	80/20	6.7729
943431	AF1-014 C	0.5958	Adder	0.7
943471	AF1-018	3.2514	Adder	3.83
943601	AF1-031 C	9.6612	80/20	9.6612
943741	AF1-042 C	2.7081	80/20	2.7081

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943991	AF1-067 C	4.7757	80/20	4.7757
944491	AF1-114 C	12.9805	80/20	12.9805
945831	AF1-248	0.0637	80/20	0.0637
946001	AF1-265	19.3290	80/20	19.3290
957191	AF2-013	37.1160	80/20	37.1160
957411	AF2-035 C	12.3144	80/20	12.3144
957551	AF2-049 C	10.0319	80/20	10.0319
957601	AF2-054 C	1.2358	80/20	1.2358
957971	AF2-091 C	4.4134	80/20	4.4134
958261	AF2-120 C	6.1782	80/20	6.1782
960091	AF2-300 C	3.0786	80/20	3.0786
961781	AG1-019	37.1160	80/20	37.1160
961951	AG1-038 C	2.9932	80/20	2.9932
962131	AG1-057	0.8616	Adder	1.91
962851	AG1-134 C	9.5514	80/20	9.5514
962861	AG1-135 C	5.8626	80/20	5.8626
962971	AG1-146 C	2.5699	80/20	2.5699
962981	AG1-147 C	5.9963	80/20	5.9963
963051	AG1-154 C	6.9948	80/20	6.9948
963341	AG1-183 C	9.1127	80/20	9.1127
963381	AG1-187	3.7148	80/20	3.7148
963611	AG1-210 C	0.7695	80/20	0.7695
963621	AG1-213 C	1.0262	80/20	1.0262
964021	AG1-256 C	1.6539	80/20	1.6539
964211	AG1-282 C	2.1487	80/20	2.1487
964591	AG1-322 O1	29.6912	80/20	29.6912
965231	AG1-388 C	2.1487	80/20	2.1487
965441	AG1-412 C	30.2480	80/20	30.2480
966661	AG1-536 C	5.3229	80/20	5.3229
966711	AG1-541 C	8.2096	80/20	8.2096
966871	AG1-558 C	0.5169	Adder	1.15
966881	AG1-559 C	3.0786	80/20	3.0786
WEC	WEC	0.1673	Confirmed LTF	0.1673
LGEE	LGEE	0.3619	Confirmed LTF	0.3619
CPLE	CPLE	1.7861	Confirmed LTF	1.7861
CBM-W2	CBM-W2	7.7862	Confirmed LTF	7.7862
NY	NY	0.7891	Confirmed LTF	0.7891
TVA	TVA	1.5036	Confirmed LTF	1.5036
SIGE	SIGE	0.2340	Confirmed LTF	0.2340
CBM-S2	CBM-S2	21.7674	Confirmed LTF	21.7674
CBM-S1	CBM-S1	0.3735	Confirmed LTF	0.3735
MEC	MEC	1.0313	Confirmed LTF	1.0313
LAGN	LAGN	1.8427	Confirmed LTF	1.8427
CBM-W1	CBM-W1	6.7436	Confirmed LTF	6.7436

11.6.7 Index 7

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
168691601	314197	6LDYSMITH CT	DVP	314196	6LADYSMITH	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	single	1151.5	133.49	135.24	DC	26.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314131	6ARNOLDS	0.4441	80/20	0.4441
314134	6CRANES	0.1111	80/20	0.1111
314190	6WESTMOR	0.3655	80/20	0.3655
315008	1POSSM6A	1.6185	80/20	1.6185
315009	1POSSM6B	1.6185	80/20	1.6185
315010	1POSSM6S	2.5233	80/20	2.5233
315033	1BIRCHWDA	84.0568	80/20	84.0568
315034	1NORNECKC1	0.4682	80/20	0.4682
315035	1NORNECKC2	0.4513	80/20	0.4513
315037	1LDYSMT1	19.3442	80/20	19.3442
315038	1LDYSMT2	19.3442	80/20	19.3442
315039	1LDYSMT3	18.6217	80/20	18.6217
315040	1LDYSMT4	18.6567	80/20	18.6567
315041	1LDYSMT5	18.7150	80/20	18.7150
315043	1FOUR RIVERA	12.5849	80/20	12.5849
315044	1FOUR RIVERB	12.5849	80/20	12.5849
315045	1FOUR RIVERC	15.3816	80/20	15.3816
315046	1FOUR RIVERD	12.5849	80/20	12.5849
315047	1FOUR RIVERE	12.5849	80/20	12.5849
315048	1FOUR RIVERF	15.3816	80/20	15.3816
315050	1FOURRIVERG	1.8758	80/20	1.8758
315051	1AA1-145 CT1	19.8096	80/20	19.8096
315052	1AA1-145 CT2	19.8096	80/20	19.8096
316077	AC2-138 C	0.1185	80/20	0.1185
934781	AD1-105 C	3.8175	80/20	3.8175
936581	AD2-073 C	1.9931	80/20	1.9931
936591	AD2-074 C	2.7840	80/20	2.7840
938961	AE1-124 C	0.4500	80/20	0.4500
939245	AE1-155 C	7.0802	80/20	7.0802
939261	AE1-157 C O1	57.4639	80/20	57.4639
939271	AE1-158 C O1	58.6456	80/20	58.6456
939755	AE1-206 C	126.2989	80/20	126.2989
942191	AE2-231 C O1	19.4993	80/20	19.4993
943601	AF1-031 C	5.0998	80/20	5.0998
943741	AF1-042 C	1.4567	80/20	1.4567
943991	AF1-067 C	2.5209	80/20	2.5209
944491	AF1-114 C	9.9498	80/20	9.9498
945831	AF1-248	0.0395	80/20	0.0395
946001	AF1-265	110.7885	80/20	110.7885

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957191	AF2-013	29.9640	80/20	29.9640
957411	AF2-035 C	35.4533	80/20	35.4533
957551	AF2-049 C	25.4820	80/20	25.4820
957971	AF2-091 C	3.3829	80/20	3.3829
958261	AF2-120 C	3.4559	80/20	3.4559
960091	AF2-300 C	8.8633	80/20	8.8633
961781	AG1-019	29.9640	80/20	29.9640
961951	AG1-038 C	1.6101	80/20	1.6101
962851	AG1-134 C	5.0418	80/20	5.0418
962861	AG1-135 C	3.2281	80/20	3.2281
962971	AG1-146 C	1.2528	80/20	1.2528
962981	AG1-147 C	2.9232	80/20	2.9232
963051	AG1-154 C	14.7724	80/20	14.7724
963341	AG1-183 C	26.2354	80/20	26.2354
963381	AG1-187	10.6951	80/20	10.6951
963611	AG1-210 C	0.4768	80/20	0.4768
963621	AG1-213 C	2.9544	80/20	2.9544
964021	AG1-256 C	1.0683	80/20	1.0683
964211	AG1-282 C	1.2662	80/20	1.2662
964591	AG1-322 O1	24.7226	80/20	24.7226
965231	AG1-388 C	1.2662	80/20	1.2662
965441	AG1-412 C	53.2864	80/20	53.2864
966661	AG1-536 C	2.9811	80/20	2.9811
966711	AG1-541 C	23.6355	80/20	23.6355
966881	AG1-559 C	8.8633	80/20	8.8633
CALDERWOOD	CALDERWOOD	0.6093	Confirmed LTF	0.6093
NY	NY	0.1853	Confirmed LTF	0.1853
PRAIRIE	PRAIRIE	2.8775	Confirmed LTF	2.8775
CHEOAH	CHEOAH	0.6151	Confirmed LTF	0.6151
COTTONWOOD	COTTONWOOD	2.4717	Confirmed LTF	2.4717
HAMLET	HAMLET	0.8079	Confirmed LTF	0.8079
GIBSON	GIBSON	0.5908	Confirmed LTF	0.5908
BLUEG	BLUEG	1.8784	Confirmed LTF	1.8784
TRIMBLE	TRIMBLE	0.6010	Confirmed LTF	0.6010
CATAWBA	CATAWBA	0.4704	Confirmed LTF	0.4704

11.6.8 Index 8

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
168691691	314212	6FOUR RIVERS	DVP	939750	AE1-206 TAP	DVP	1	314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3	106.95	110.1	DC	35.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315043	1FOUR RIVERA	16.9462	80/20	16.9462
315044	1FOUR RIVERB	16.9462	80/20	16.9462
315045	1FOUR RIVERC	20.7121	80/20	20.7121
315046	1FOUR RIVERD	16.9462	80/20	16.9462
315047	1FOUR RIVERE	16.9462	80/20	16.9462
315048	1FOUR RIVERF	20.7121	80/20	20.7121
315051	1AA1-145 CT1	26.6746	80/20	26.6746
315052	1AA1-145 CT2	26.6746	80/20	26.6746
939261	AE1-157 C O1	77.3760	80/20	77.3760
939271	AE1-158 C O1	78.9673	80/20	78.9673
942191	AE2-231 C O1	26.2561	80/20	26.2561
957411	AF2-035 C	47.7384	80/20	47.7384
957551	AF2-049 C	34.3120	80/20	34.3120
960091	AF2-300 C	11.9346	80/20	11.9346
963341	AG1-183 C	35.3264	80/20	35.3264
963381	AG1-187	14.4011	80/20	14.4011
963621	AG1-213 C	3.9782	80/20	3.9782
966711	AG1-541 C	31.8256	80/20	31.8256
966881	AG1-559 C	11.9346	80/20	11.9346
CALDERWOOD	CALDERWOOD	0.2709	Confirmed LTF	0.2709
NY	NY	0.3014	Confirmed LTF	0.3014
PRAIRIE	PRAIRIE	1.4077	Confirmed LTF	1.4077
CHEOAH	CHEOAH	0.2728	Confirmed LTF	0.2728
COTTONWOOD	COTTONWOOD	1.1445	Confirmed LTF	1.1445
HAMLET	HAMLET	0.3147	Confirmed LTF	0.3147
GIBSON	GIBSON	0.2976	Confirmed LTF	0.2976
BLUEG	BLUEG	0.9461	Confirmed LTF	0.9461
TRIMBLE	TRIMBLE	0.3033	Confirmed LTF	0.3033
CATAWBA	CATAWBA	0.1908	Confirmed LTF	0.1908

11.6.9 Index 9

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
168691514	314222	6HANOVER	DVP	314218	6ELMONT	DVP	1	314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3	129.52	132.66	DC	35.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315043	1FOUR RIVERA	16.9462	80/20	16.9462
315044	1FOUR RIVERB	16.9462	80/20	16.9462
315045	1FOUR RIVERC	20.7121	80/20	20.7121
315046	1FOUR RIVERD	16.9462	80/20	16.9462
315047	1FOUR RIVERE	16.9462	80/20	16.9462
315048	1FOUR RIVERF	20.7121	80/20	20.7121
315051	1AA1-145 CT1	26.6746	80/20	26.6746
315052	1AA1-145 CT2	26.6746	80/20	26.6746
939261	AE1-157 C O1	77.3760	80/20	77.3760
939271	AE1-158 C O1	78.9673	80/20	78.9673
939755	AE1-206 C	170.0680	80/20	170.0680
942191	AE2-231 C O1	26.2561	80/20	26.2561
946001	AF1-265	149.1825	80/20	149.1825
957411	AF2-035 C	47.7384	80/20	47.7384
957551	AF2-049 C	34.3120	80/20	34.3120
960091	AF2-300 C	11.9346	80/20	11.9346
963341	AG1-183 C	35.3264	80/20	35.3264
963381	AG1-187	14.4011	80/20	14.4011
963621	AG1-213 C	3.9782	80/20	3.9782
966711	AG1-541 C	31.8256	80/20	31.8256
966881	AG1-559 C	11.9346	80/20	11.9346
CALDERWOOD	CALDERWOOD	0.2709	Confirmed LTF	0.2709
NY	NY	0.3014	Confirmed LTF	0.3014
PRAIRIE	PRAIRIE	1.4077	Confirmed LTF	1.4077
CHEOAH	CHEOAH	0.2728	Confirmed LTF	0.2728
COTTONWOOD	COTTONWOOD	1.1445	Confirmed LTF	1.1445
HAMLET	HAMLET	0.3147	Confirmed LTF	0.3147
GIBSON	GIBSON	0.2976	Confirmed LTF	0.2976
BLUEG	BLUEG	0.9461	Confirmed LTF	0.9461
TRIMBLE	TRIMBLE	0.3033	Confirmed LTF	0.3033
CATAWBA	CATAWBA	0.1908	Confirmed LTF	0.1908

11.6.10 Index 10

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
169612303	939260	AE1-157 TAP	DVP	314197	6LDYSMITH CT	DVP	1	314222 6HANOVER 230 939750 AE1-206 TAP 230 1	single	1123.3	135.27	138.42	DC	35.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315043	1FOUR RIVERA	16.9462	80/20	16.9462
315044	1FOUR RIVERB	16.9462	80/20	16.9462
315045	1FOUR RIVERC	20.7121	80/20	20.7121
315046	1FOUR RIVERD	16.9462	80/20	16.9462
315047	1FOUR RIVERE	16.9462	80/20	16.9462
315048	1FOUR RIVERF	20.7121	80/20	20.7121
315051	1AA1-145 CT1	26.6746	80/20	26.6746
315052	1AA1-145 CT2	26.6746	80/20	26.6746
939261	AE1-157 C O1	77.3760	80/20	77.3760
939271	AE1-158 C O1	78.9673	80/20	78.9673
939755	AE1-206 C	170.0680	80/20	170.0680
942191	AE2-231 C O1	26.2561	80/20	26.2561
946001	AF1-265	149.1825	80/20	149.1825
957411	AF2-035 C	47.7384	80/20	47.7384
957551	AF2-049 C	34.3120	80/20	34.3120
960091	AF2-300 C	11.9346	80/20	11.9346
963341	AG1-183 C	35.3264	80/20	35.3264
963381	AG1-187	14.4011	80/20	14.4011
963621	AG1-213 C	3.9782	80/20	3.9782
966711	AG1-541 C	31.8256	80/20	31.8256
966881	AG1-559 C	11.9346	80/20	11.9346
CALDERWOOD	CALDERWOOD	0.2709	Confirmed LTF	0.2709
NY	NY	0.3014	Confirmed LTF	0.3014
PRAIRIE	PRAIRIE	1.4077	Confirmed LTF	1.4077
CHEOAH	CHEOAH	0.2728	Confirmed LTF	0.2728
COTTONWOOD	COTTONWOOD	1.1445	Confirmed LTF	1.1445
HAMLET	HAMLET	0.3147	Confirmed LTF	0.3147
GIBSON	GIBSON	0.2976	Confirmed LTF	0.2976
BLUEG	BLUEG	0.9461	Confirmed LTF	0.9461
TRIMBLE	TRIMBLE	0.3033	Confirmed LTF	0.3033
CATAWBA	CATAWBA	0.1908	Confirmed LTF	0.1908

11.6.11 Index 11

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
168691499	939750	AE1-206 TAP	DVP	314222	6HANOVER	DVP	1	314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	single	1123.3	135.27	138.42	DC	35.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315043	1FOUR RIVERA	16.9462	80/20	16.9462
315044	1FOUR RIVERB	16.9462	80/20	16.9462
315045	1FOUR RIVERC	20.7121	80/20	20.7121
315046	1FOUR RIVERD	16.9462	80/20	16.9462
315047	1FOUR RIVERE	16.9462	80/20	16.9462
315048	1FOUR RIVERF	20.7121	80/20	20.7121
315051	1AA1-145 CT1	26.6746	80/20	26.6746
315052	1AA1-145 CT2	26.6746	80/20	26.6746
939261	AE1-157 C O1	77.3760	80/20	77.3760
939271	AE1-158 C O1	78.9673	80/20	78.9673
939755	AE1-206 C	170.0680	80/20	170.0680
942191	AE2-231 C O1	26.2561	80/20	26.2561
946001	AF1-265	149.1825	80/20	149.1825
957411	AF2-035 C	47.7384	80/20	47.7384
957551	AF2-049 C	34.3120	80/20	34.3120
960091	AF2-300 C	11.9346	80/20	11.9346
963341	AG1-183 C	35.3264	80/20	35.3264
963381	AG1-187	14.4011	80/20	14.4011
963621	AG1-213 C	3.9782	80/20	3.9782
966711	AG1-541 C	31.8256	80/20	31.8256
966881	AG1-559 C	11.9346	80/20	11.9346
CALDERWOOD	CALDERWOOD	0.2709	Confirmed LTF	0.2709
NY	NY	0.3014	Confirmed LTF	0.3014
PRAIRIE	PRAIRIE	1.4077	Confirmed LTF	1.4077
CHEOAH	CHEOAH	0.2728	Confirmed LTF	0.2728
COTTONWOOD	COTTONWOOD	1.1445	Confirmed LTF	1.1445
HAMLET	HAMLET	0.3147	Confirmed LTF	0.3147
GIBSON	GIBSON	0.2976	Confirmed LTF	0.2976
BLUEG	BLUEG	0.9461	Confirmed LTF	0.9461
TRIMBLE	TRIMBLE	0.3033	Confirmed LTF	0.3033
CATAWBA	CATAWBA	0.1908	Confirmed LTF	0.1908

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
AA1-145	Four Rivers 230kV	In Service
AC1-065	Harmony Village-Shackleford 115kV	Engineering and Procurement
AC1-191	Elmont 115kV	Active
AC2-138	Northern Neck 34.5kV	Partially in Service - Under Construction
AD1-041	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AD1-105	Kings Dominion DP 115 kV	Active
AD2-030	Wan 34.5 kV	In Service
AD2-073	Sanders DP 230 kV	Active
AD2-074	Garner DP-Lancaster 115 kV	Active
AE1-124	Oak Grove 34.5 kV	Engineering and Procurement
AE1-155	Garner-Northern Neck 115 kV	Active
AE1-157	Ladysmith CT-St. Johns 230 kV	Active
AE1-158	Ladysmith CT-St. Johns 230 kV	Active
AE1-191	Harmony Village-Shackleford 115 kV	Active
AE1-206	Four Rivers-Hanover 230 kV	Active
AE2-005	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AE2-041	Harmony Village 230 kV	Active
AE2-231	St. Johns 115 kV	Active
AF1-014	Harmony Village-Shackleford 115 kV	Active
AF1-018	Harmony Village 230 kV	Active
AF1-031	Kings Dominion DP 115 kV	Active
AF1-042	Garner DP-Lancaster 115 kV	Active
AF1-067	Kings Dominion DP 115 kV	Active
AF1-114	Oak Grove-Dahlgren 230 kV	Active
AF1-248	Northern Neck 34.5 kV	Partially in Service - Under Construction
AF1-265	Four Rivers-Hanover 230 kV	Active
AF2-013	Arnold's Corner-Dahlgren 230 kV	Active
AF2-035	St. Johns 115 kV	Active
AF2-049	Ladysmith CT-St. Johns 230 kV	Active
AF2-054	Wan 34.5 kV	Active
AF2-091	Oak Grove-Dahlgren 230 kV	Active
AF2-120	Garner-Northern Neck 115 kV	Active
AF2-300	St. Johns 115 kV	Active
AG1-019	Arnold's Corner-Dahlgren 230 kV	Active
AG1-038	Garner DP-Lancaster 115 kV	Active
AG1-057	Harmony Village 230 kV	Active
AG1-134	Kings Dominion DP 115 kV	Active
AG1-135	Garner-Lancaster 115 kV	Active
AG1-146	Garner DP-Lancaster 115 kV	Active

Queue Number	Project Name	Status
AG1-147	Garner DP-Lancaster 115 kV	Active
AG1-154	Ladysmith CT 230 kV	Active
AG1-183	St. Johns DP-REC 115 kV	Active
AG1-187	St. Johns DP-REC 115 kV	Active
AG1-210	Northern Neck 34.5 kV	Active
AG1-213	St Johns 13.2 kV	Active
AG1-256	Northern Neck 230 kV	Active
AG1-282	Dunnsville 34.5 kV	Active
AG1-322	Birchwood 230 kV	Active
AG1-388	Dunnsville 34.5 kV	Active
AG1-412	Ladysmith CT-Mine Road 230 kV	Active
AG1-536	Garner-Northern Neck 115 kV	Active
AG1-541	St. Johns 115 kV	Active
AG1-558	Buckner 34.5 kV	Active
AG1-559	Caroline Pines 22 kV	Active

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-2: LN 574	CONTINGENCY 'DVP_P1-2: LN 574' OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LADYSMITH 500.00 END
Base Case	
314212 6FOUR RIVERS 230 939750 AE1-206 TAP 230 1	CONTINGENCY '314212 6FOUR RIVERS 230 939750 AE1-206 TAP 230 1' OPEN BRANCH FROM BUS 314212 TO BUS 939750 CKT 1 END
314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1	CONTINGENCY '314197 6LDYSMITH CT 230 939260 AE1-157 TAP 230 1' OPEN BRANCH FROM BUS 314197 TO BUS 939260 CKT 1 END
DVP_P1-2: LN 2089	CONTINGENCY 'DVP_P1-2: LN 2089' OPEN BRANCH FROM BUS 314196 TO BUS 314197 CKT 1 /* 6LADYSMITH 230.00 - 6LDYSMITH CT230.00 END
314222 6HANOVER 230 939750 AE1-206 TAP 230 1	CONTINGENCY '314222 6HANOVER 230 939750 AE1-206 TAP 230 1' OPEN BRANCH FROM BUS 314222 TO BUS 939750 CKT 1 END
314150 6STJOHN 230 939260 AE1-157 TAP 230 1	CONTINGENCY '314150 6STJOHN 230 939260 AE1-157 TAP 230 1' OPEN BRANCH FROM BUS 314150 TO BUS 939260 CKT 1 END

12 Short Circuit Analysis

The following Breakers are overdutied:

None.

12.1 System Reinforcements - Short Circuit

No short circuit impacts were identified for this project.

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).

14 Attachment 1: One Line Diagram