Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-036

TUNIS 34.5 KV

8.1 MW Capacity / 13.5 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 Bertie County, North Carolina. The installed facilities will have a total capability of 13.5 MW with 8.1 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2021. This study does not imply a TO commitment to this in-service date.

Queue Number	**AG1-036**
Project Name	TUNIS 34.5 KV
State	North Carolina
County	Bertie
Transmission Owner	Dominion
MFO	13.5
MWE	13.5
MWC	8.1
Fuel	Solar/Storage
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

AG1-036 will interconnect with the Dominion transmission system at the Tunis 115 kV substation.

5 Cost Summary

The AG1-036 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$ To be provided in the two-party IA with ITO
Total System Network Upgrade Costs	$ 63,916,000[1]
Total Costs	$ 63,916,000

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

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 Transmission Owner Analysis

Dominion assessed the impact of the proposed AG1-036 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.

7.1 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.

8 Interconnection Customer Requirements

8.1 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.

8.2 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.

8.3 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.

9 Revenue Metering and SCADA Requirements

9.1 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.

9.2 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)

9.3 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/

10 Summer Peak - Load Flow Analysis

The Queue Project AG1-036 was evaluated as a 13.5 MW (Capacity 8.1 MW) injection at the Tunis 115 kV substation in the Dominion area. Project AG1-036 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-036 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

10.1 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
168610813	314534	3S HAMPT	115.0	DVP	314541	3WATKINS	115.0	DVP	1	DVP_P1-2: LN 136	single	269.779998779	99.17	100.5	DC	3.6
168909644	314551	3AHOSKIE	115.0	DVP	314568	3EARLEYS	115.0	DVP	1	Base Case	single	141.0	99.78	103.56	DC	5.32
163461449	314574	6EVERETS	230.0	DVP	304451	6GREENVILE T	230.0	CPLE	1	DVP_P1-2: LN 229	single	478.0	99.81	100.02	DC	0.99

10.2 Multiple Facility Contingency

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

None

10.3 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
168610694	314524	3FRNKLN	115.0	DVP	314539	3UNCAMP	115.0	DVP	1	DVP_P1-2: LN 136	single	224.660003662	113.58	115.19	DC	3.6
168909641	314551	3AHOSKIE	115.0	DVP	314568	3EARLEYS	115.0	DVP	1	DVP_P1-2: LN 108-A	single	141.0	165.69	171.44	DC	8.1
168909643	314551	3AHOSKIE	115.0	DVP	314568	3EARLEYS	115.0	DVP	1	DVP_P1-2: LN 140	single	141.0	124.92	129.05	DC	5.82
168909729	314568	3EARLEYS	115.0	DVP	314569	6EARLEYS	230.0	DVP	2	DVP_P1-3: 6EARLEYS-TX#3	single	175.779998779	112.29	114.31	DC	3.56
168909719	314580	3MAPLETN	115.0	DVP	314589	3MURPHYS	115.0	DVP	1	DVP_P1-2: LN 136	single	142.880004883	134.94	140.61	DC	8.1
168909658	314589	3MURPHYS	115.0	DVP	964800	AG1-343 TAP	115.0	DVP	1	DVP_P1-2: LN 136	single	116.559997559	203.87	210.81	DC	8.1
168909661	314589	3MURPHYS	115.0	DVP	964800	AG1-343 TAP	115.0	DVP	1	Base Case	single	116.559997559	100.59	102.97	DC	2.78
168909664	314617	3TUNIS	115.0	DVP	314551	3AHOSKIE	115.0	DVP	1	DVP_P1-2: LN 108-A	single	142.880004883	166.31	171.98	DC	8.1
168909666	314617	3TUNIS	115.0	DVP	314551	3AHOSKIE	115.0	DVP	1	DVP_P1-2: LN 108-B	single	142.880004883	139.7	145.37	DC	8.1
168909667	314617	3TUNIS	115.0	DVP	314551	3AHOSKIE	115.0	DVP	1	Base Case	single	142.880004883	103.03	106.75	DC	5.32
169530379	938770	AE1-103 TAP	115.0	DVP	314527	3HOLLAND	115.0	DVP	1	DVP_P1-2: LN 136	single	224.660003662	107.91	109.51	DC	3.6

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
168909702	957520	AF2-046 TAP	115.0	DVP	314580	3MAPLETN	115.0	DVP	1	DVP_P1-2: LN 136	single	142.880004883	139.7	145.37	DC	8.1
169838908	961850	AG1-027 TAP	115.0	DVP	314536	3SUFFOLK	115.0	DVP	1	DVP_P1-2: LN 136	single	269.779998779	113.63	114.97	DC	3.6
168909611	964800	AG1-343 TAP	115.0	DVP	314558	3BOYKINS	115.0	DVP	1	DVP_P1-2: LN 136	single	116.559997559	203.87	210.81	DC	8.1
168909614	964800	AG1-343 TAP	115.0	DVP	314558	3BOYKINS	115.0	DVP	1	Base Case	single	116.559997559	100.5	102.89	DC	2.78

10.4 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
168310189	313720	3NEWSOMS	115.0	DVP	314526	3HANDSOM	115.0	DVP	1	DVP_P1-2: LN 136	operation	280.119995117	111.84	113.98	DC	6.01
168309975	313723	3PECAN	115.0	DVP	314559	3CAROLNA	115.0	DVP	1	DVP_P1-2: LN 68-A	operation	224.660003662	155.59	157.27	DC	3.79
168310033	313737	3COPELDDP	115.0	DVP	961850	AG1-027 TAP	115.0	DVP	1	DVP_P1-2: LN 1010	operation	269.779998779	139.69	141.03	DC	3.6
168610691	314524	3FRNKLN	115.0	DVP	314539	3UNCAMP	115.0	DVP	1	DVP_P1-2: LN 136	operation	224.660003662	164.68	167.35	DC	6.01
168610693	314524	3FRNKLN	115.0	DVP	314539	3UNCAMP	115.0	DVP	1	Base Case	operation	224.660003662	133.71	134.73	DC	2.3
168610951	314526	3HANDSOM	115.0	DVP	314534	3S HAMPT	115.0	DVP	1	DVP_P1-2: LN 136	operation	280.119995117	110.91	113.05	DC	6.01
168610737	314527	3HOLLAND	115.0	DVP	313737	3COPELDDP	115.0	DVP	1	DVP_P1-2: LN 1010	operation	269.779998779	143.18	144.51	DC	3.6
168610810	314534	3S HAMPT	115.0	DVP	314541	3WATKINS	115.0	DVP	1	DVP_P1-2: LN 136	operation	269.779998779	131.62	133.85	DC	6.01
168909760	314539	3UNCAMP	115.0	DVP	938770	AE1-103 TAP	115.0	DVP	1	DVP_P1-2: LN 1010	operation	224.660003662	158.56	160.17	DC	3.6
168909762	314539	3UNCAMP	115.0	DVP	938770	AE1-103 TAP	115.0	DVP	1	Base Case	operation	224.660003662	132.48	133.51	DC	2.3
168610915	314541	3WATKINS	115.0	DVP	314524	3FRNKLN	115.0	DVP	1	DVP_P1-2: LN 136	operation	269.779998779	116.75	118.97	DC	6.01

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
168909639	314551	3AHOSKIE	115.0	DVP	314568	3EARLEYS	115.0	DVP	1	DVP_P1-2: LN 108-A	operation	141.0	241.64	251.21	DC	13.5
168909642	314551	3AHOSKIE	115.0	DVP	314568	3EARLEYS	115.0	DVP	1	Base Case	operation	141.0	157.64	163.93	DC	8.86
168909818	314558	3BOYKINS	115.0	DVP	314587	3MARGTSV	115.0	DVP	1	DVP_P1-2: LN 68-B	operation	280.119995117	131.88	133.24	DC	3.8
168909727	314568	3EARLEYS	115.0	DVP	314569	6EARLEYS	230.0	DVP	2	DVP_P1-3: 6EARLEYS-TX#3	operation	175.779998779	160.43	163.81	DC	5.93
168909771	314568	3EARLEYS	115.0	DVP	314569	6EARLEYS	230.0	DVP	1	DVP_P1-3: 6EARLEYS-TX#4	operation	202.475997925	139.4	142.33	DC	5.94
168909717	314580	3MAPLETN	115.0	DVP	314589	3MURPHYS	115.0	DVP	1	DVP_P1-2: LN 136	operation	142.880004883	205.07	214.52	DC	13.5
168909820	314587	3MARGTSV	115.0	DVP	314604	3SEABORD	115.0	DVP	1	DVP_P1-2: LN 68-B	operation	280.119995117	131.63	132.99	DC	3.8
168909656	314589	3MURPHYS	115.0	DVP	964800	AG1-343 TAP	115.0	DVP	1	DVP_P1-2: LN 136	operation	116.559997559	291.36	302.94	DC	13.5
168909660	314589	3MURPHYS	115.0	DVP	964800	AG1-343 TAP	115.0	DVP	1	Base Case	operation	116.559997559	144.52	148.5	DC	4.64
168310064	314604	3SEABORD	115.0	DVP	313723	3PECAN	115.0	DVP	1	DVP_P1-2: LN 68-B	operation	280.119995117	129.99	131.34	DC	3.8
168909662	314617	3TUNIS	115.0	DVP	314551	3AHOSKIE	115.0	DVP	1	DVP_P1-2: LN 108-A	operation	142.880004883	237.69	247.14	DC	13.5
168909665	314617	3TUNIS	115.0	DVP	314551	3AHOSKIE	115.0	DVP	1	Base Case	operation	142.880004883	159.93	166.13	DC	8.86
169530376	938770	AE1-103 TAP	115.0	DVP	314527	3HOLLAND	115.0	DVP	1	DVP_P1-2: LN 1010	operation	224.660003662	176.12	177.72	DC	3.6
169530378	938770	AE1-103 TAP	115.0	DVP	314527	3HOLLAND	115.0	DVP	1	Base Case	operation	224.660003662	141.31	142.34	DC	2.3
168909700	957520	AF2-046 TAP	115.0	DVP	314580	3MAPLETN	115.0	DVP	1	DVP_P1-2: LN 136	operation	142.880004883	209.83	219.27	DC	13.5
169838905	961850	AG1-027 TAP	115.0	DVP	314536	3SUFFOLK	115.0	DVP	1	DVP_P1-2: LN 1010	operation	269.779998779	184.84	186.17	DC	3.6
168909609	964800	AG1-343 TAP	115.0	DVP	314558	3BOYKINS	115.0	DVP	1	DVP_P1-2: LN 136	operation	116.559997559	291.36	302.94	DC	13.5
168909613	964800	AG1-343 TAP	115.0	DVP	314558	3BOYKINS	115.0	DVP	1	Base Case	operation	116.559997559	144.43	148.41	DC	4.64

10.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
168909729	5	3EARLEYS 115.0 kV - 6EARLEYS 230.0 kV Ckt 2	DVP dom-016 (1190) : Add additional 230/115 kV transformer at Earleys substation. Project Type : CON Cost : $6,000,000 Time Estimate : 16-18 Months	$6,000,000
168909644,168909641,168909643	2	3AHOSKIE 115.0 kV - 3EARLEYS 115.0 kV Ckt 1	DVP dom-313 (1539) : Reconductor 6.81 miles of 115 kV Line 136 from Earleys to Ahoskie with 768.2 ACSS 250 C. Replace Wave Trap, Relay (CT and Secondary CT) at Earleys terminal. Replace Line Switch and Line Lead at Ahoskie terminal. Project Type : FAC Cost : $4,676,000 Time Estimate : 30-36 Months	$4,676,000
168909614,168909611	12	AG1-343 TAP 115.0 kV - 3BOYKINS 115.0 kV Ckt 1	DVP dom-418 (1644) : Reconductor 2.15 miles of 115 kV Line 108 from Boykins to AG1-343 with 768.2 ACSS 250 C. Replace Wave Trap and Breaker Switch at Boykins terminal. Project Type : FAC Cost : $1,640,000 Time Estimate : 30-36 Months	$1,640,000
168909719	6	3MAPLETN 115.0 kV - 3MURPHYS 115.0 kV Ckt 1	DVP dom-318 (1544) : Reconductor 2.21 miles of 115 kV Line 108 from Murphys to Mapleton with 768.2 ACSS 250 C. Project Type : FAC Cost : $1,326,000 Time Estimate : 30-36 Months	$1,326,000
168610813	1	3S HAMPT 115.0 kV - 3WATKINS 115.0 kV Ckt 1	DVP dom-310 (1536) : Reconductor 0.76 miles of 115 kV Line 93 from South Hampton to Watkins with 768.2 ACSS 250 C. Replace Line Switch at Watkins terminal Project Type : FAC Cost : $656,000 Time Estimate : 30-36 Months	$656,000
168909666,168909667,168909664	8	3TUNIS 115.0 kV - 3AHOSKIE 115.0 kV Ckt 1	DVP dom-327 (1553) : Reconductor 7.98 miles of 115 kV Line 136 from Tunis to Ahoskie with 768.2 ACSS 250 C. Replace Line Switch and Line Lead at Ahoskie terminal. Replace Relay (Secondary CT), Relay Trip and Line Switch at Tunis terminal. Project Type : FAC Cost : $5,308,000 Time Estimate : 30-36 Months	$5,308,000

ID	Idx	Facility	Upgrade Description	Cost
169838908	11	AG1-027 TAP 115.0 kV - 3SUFFOLK 115.0 kV Ckt 1	DVP dom-411 (1637) : Reconductor 6.45 miles of 115 kV Line 68 from AG1-027 Tap to Suffolk with 786.2 ACSS 250 C. Replace Wave Trap at Suffolk terminal. Project Type : FAC Cost : $4,020,000 Time Estimate : 36-40 Months	$4,020,000
168610694	4	3FRNKLN 115.0 kV - 3UNCAMP 115.0 kV Ckt 1	DVP dom-308 (1534) : Reconductor 2.89 miles of 115 kV Line 93 from Franklin to Union Camp with 768.2 ACSS 250 C. Replace Line Switch, Breaker Switch at Franklin terminal. Project Type : FAC Cost : $2,134,000 Time Estimate : 30-36 Months	$2,134,000
163461449	3	6EVERETS 230.0 kV - 6GREENVILE T 230.0 kV Ckt 1	DVP dom-173 (1351) : Rebuild 20.32 miles of 230 kV Line 218 from Everetts to Greenville with 2-636 ACSR Project Type : FAC Cost : $30,480,000 Time Estimate : 30-36 Months CPLE The external (i.e. Non-PJM) Transmission Owner, CPLE, will not evaluate this violation until the impact study phase.	$30,480,000
169530379	9	AE1-103 TAP 115.0 kV - 3HOLLAND 115.0 kV Ckt 1	DVP dom-396 (1622) : Reconductor 0.1 mi of 115 kV Line 68 from AE1-103 Tap to Holland with 768.2 ACSS 250 C. Replace Line Switch at Holland terminal Project Type : FAC Cost : $260,000 Time Estimate : 30-36 Months	$260,000
168909658,168909661	7	3MURPHYS 115.0 kV - AG1-343 TAP 115.0 kV Ckt 1	DVP dom-319 (1545) : Reconductor 10.36 miles of 115 kV Line 108 from Murphys to AG1-343 with 768.2 ACSS 250 C. Project Type : FAC Cost : $6,216,000 Time Estimate : 36-40 Months	$6,216,000
168909702	10	AF2-046 TAP 115.0 kV - 3MAPLETN 115.0 kV Ckt 1	DVP dom-406 (1632) : Reconductor 2 miles of 115 kV Line 108 from AF2-046 Tap to Mapleton with 636 ACSR 150 C. Project Type : FAC Cost : $1,200,000 Time Estimate : 30-36 Months	$1,200,000
			TOTAL COST	$63,916,000

10.6 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".

10.6.1 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
168610813	314534	3S HAMPT	DVP	314541	3WATKINS	DVP	1	DVP_P1-2: LN 136	single	269.78	99.17	100.5	DC	3.6

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.7476	80/20	2.7476
314572	3EMPORIA	0.1276	80/20	0.1276
314589	3MURPHYS	0.2267	80/20	0.2267
315115	1S HAMPT1	5.0559	80/20	5.0559
315126	1ROARAP2	0.7800	80/20	0.7800
315128	1ROARAP4	0.7443	80/20	0.7443
315606	3AA2-053SOLA	0.7396	80/20	0.7396
315607	3AA1-063SOLA	1.8868	80/20	1.8868
315608	3AA2-088SOLA	2.8057	80/20	2.8057
316087	AB2-174 C	0.4095	80/20	0.4095
316129	AC1-054 C	2.9570	80/20	2.9570
923991	AB2-040 C O1	2.9924	80/20	2.9924
927145	AC1-208 C	3.1135	80/20	3.1135
957521	AF2-046 C	44.3940	80/20	44.3940
961091	AF2-400 C	-0.8220	Adder	-0.97
961681	AG1-008 C	44.4830	80/20	44.4830
961931	AG1-036 C	3.6031	80/20	3.6031
964501	AG1-313 C O1	1.9613	80/20	1.9613
964801	AG1-343 C	15.5691	80/20	15.5691
965291	AG1-394 C	5.3380	80/20	5.3380
965721	AG1-440 C	2.2671	80/20	2.2671
965731	AG1-441 C	2.2671	80/20	2.2671
965771	AG1-445	1.3099	80/20	1.3099
965781	AG1-446	1.3099	80/20	1.3099
966751	AG1-546 C	6.8149	80/20	6.8149
966811	AG1-552 C	1.2385	80/20	1.2385
WEC	WEC	0.0397	Confirmed LTF	0.0397
LGEE	LGEE	0.0823	Confirmed LTF	0.0823
CPLE	CPLE	0.4941	Confirmed LTF	0.4941
CBM-W2	CBM-W2	1.7920	Confirmed LTF	1.7920
NY	NY	0.0702	Confirmed LTF	0.0702
TVA	TVA	0.3416	Confirmed LTF	0.3416
SIGE	SIGE	0.0298	Confirmed LTF	0.0298
CBM-S2	CBM-S2	5.4497	Confirmed LTF	5.4497
CBM-S1	CBM-S1	0.0851	Confirmed LTF	0.0851
MEC	MEC	0.2415	Confirmed LTF	0.2415
LAGN	LAGN	0.4253	Confirmed LTF	0.4253
CBM-W1	CBM-W1	1.6403	Confirmed LTF	1.6403

10.6.2 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
168909641	314551	3AHOSKIE	DVP	314568	3EARLEYS	DVP	1	DVP_P1-2: LN 108-A	single	141.0	165.69	171.44	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314589	3MURPHYS	0.5096	80/20	0.5096
316140	**AB2-099 C (Suspended)**	**3.4999**	**80/20**	**3.4999**
943171	AE2-346 C	8.3998	80/20	8.3998
957521	AF2-046 C	99.7980	80/20	99.7980
961681	AG1-008 C	99.9980	80/20	99.9980
961931	AG1-036 C	8.0998	80/20	8.0998
961941	AG1-037 C	2.9999	80/20	2.9999
962331	AG1-082 C	11.9998	80/20	11.9998
962341	AG1-083 C	11.9998	80/20	11.9998
964801	AG1-343 C	34.9993	80/20	34.9993
CALDERWOOD	CALDERWOOD	0.0010	Confirmed LTF	0.0010
NY	NY	0.0011	Confirmed LTF	0.0011
PRAIRIE	PRAIRIE	0.0052	Confirmed LTF	0.0052
CHEOAH	CHEOAH	0.0010	Confirmed LTF	0.0010
COTTONWOOD	COTTONWOOD	0.0042	Confirmed LTF	0.0042
HAMLET	HAMLET	0.0012	Confirmed LTF	0.0012
GIBSON	GIBSON	0.0011	Confirmed LTF	0.0011
BLUEG	BLUEG	0.0035	Confirmed LTF	0.0035
TRIMBLE	TRIMBLE	0.0011	Confirmed LTF	0.0011
CATAWBA	CATAWBA	0.0007	Confirmed LTF	0.0007

10.6.3 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
163461449	314574	6EVERETS	DVP	304451	6GREENVILE T	CPLE	1	DVP_P1-2: LN 229	single	478.0	99.81	100.02	DC	0.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313526	AB2-022 C	0.1498	80/20	0.1498
314582	3KELFORD	0.2431	80/20	0.2431
314589	3MURPHYS	0.0506	80/20	0.0506
314638	6ELIZ CT	0.0876	80/20	0.0876
314639	6TANGLEW	0.1740	80/20	0.1740
314643	3O INLET	0.1460	80/20	0.1460
315115	1S HAMPT1	0.5904	80/20	0.5904
315126	1ROARAP2	0.4351	80/20	0.4351
315128	1ROARAP4	0.4152	80/20	0.4152
315139	1GASTONA	0.9477	80/20	0.9477
315141	1GASTONB	0.9477	80/20	0.9477
315292	1DOMTR78	1.8587	80/20	1.8587
315293	1DOMTR9	9.6133	80/20	9.6133
315294	1DOMTR10	11.7810	80/20	11.7810
315601	1CONETOE2SOL	3.5058	80/20	3.5058
315602	1HOLLOMANSOL	1.5556	80/20	1.5556
315603	6AA1-139SOLA	0.7167	80/20	0.7167
315605	6W1-029WIND	0.5270	80/20	0.5270
315606	3AA2-053SOLA	0.6183	80/20	0.6183
315607	3AA1-063SOLA	0.5115	80/20	0.5115
315608	3AA2-088SOLA	0.4574	80/20	0.4574
315611	6Z1-036WIND	0.6808	80/20	0.6808
315614	AA2-178 C	1.3739	80/20	1.3739
316103	AB2-015 C	3.4420	80/20	3.4420
316140	**AB2-099 C (Suspended)**	**0.4760**	**80/20**	**0.4760**
316150	**AD2-215 C (Withdrawn : 01/14/2021)**	**0.0810**	**80/20**	**0.0810**
925121	AB2-169 C	1.8350	80/20	1.8350
926070	AC1-086 C	6.7553	80/20	6.7553
926201	AC1-098 C	1.9695	80/20	1.9695
926211	AC1-099 C	0.6600	80/20	0.6600
927024	AC1-189 C	22.3885	80/20	22.3885
932631	AC2-084 C	2.8076	80/20	2.8076
933991	AD1-023 C	14.1872	80/20	14.1872
934521	AD1-076 C	58.3995	80/20	58.3995
935111	AD1-144 C	0.0802	80/20	0.0802
936401	AD2-051 C O1	9.4540	80/20	9.4540
936661	AD2-085 C	0.9704	80/20	0.9704
937221	AD2-160 C O1	1.8017	80/20	1.8017
938221	AE1-035 C	0.3890	80/20	0.3890
938535	AE1-072 C	6.0024	80/20	6.0024
938771	AE1-103 C	1.3698	80/20	1.3698

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940491	AE2-034 C	6.5314	80/20	6.5314
941101	AE2-104 C O1	1.0591	80/20	1.0591
941501	AE2-147 C	7.7085	80/20	7.7085
941541	**AE2-151 C (Withdrawn : 01/08/2021)**	**0.1519**	**80/20**	**0.1519**
942131	AE2-225 C	0.6872	80/20	0.6872
942171	AE2-229 C	0.5154	80/20	0.5154
942401	AE2-253 C	1.8951	80/20	1.8951
943171	AE2-346 C	1.1425	80/20	1.1425
943611	AF1-032 C	0.5612	80/20	0.5612
944871	AF1-152 C	2.5695	80/20	2.5695
945711	AF1-236 C O1	71.5035	80/20	71.5035
957491	AF2-043 C	0.6872	80/20	0.6872
957521	AF2-046 C	10.5968	80/20	10.5968
957531	AF2-047 C	15.5199	80/20	15.5199
957821	AF2-076 C	2.0622	80/20	2.0622
957861	AF2-080 C	20.3341	80/20	20.3341
957871	AF2-081 C	3.2323	80/20	3.2323
958161	AF2-110 C	0.4366	80/20	0.4366
959511	AF2-242 C	15.3045	80/20	15.3045
961091	AF2-400 C	0.1859	80/20	0.1859
961671	AG1-007 C	3.2282	80/20	3.2282
961681	AG1-008 C	10.6180	80/20	10.6180
961851	AG1-027 C	5.7574	80/20	5.7574
961931	AG1-036 C	0.9884	80/20	0.9884
961941	AG1-037 C	0.4080	80/20	0.4080
962331	AG1-082 C	1.6321	80/20	1.6321
962341	AG1-083 C	1.6321	80/20	1.6321
962351	AG1-084 C	1.5548	80/20	1.5548
962361	AG1-085 C	1.5548	80/20	1.5548
962571	AG1-106 C	1.8786	80/20	1.8786
963821	AG1-235 C O1	6.9228	80/20	6.9228
964491	AG1-312 C O1	20.5834	80/20	20.5834
964501	AG1-313 C O1	2.4964	80/20	2.4964
964801	AG1-343 C	2.8371	80/20	2.8371
965181	AG1-383 C	0.7791	80/20	0.7791
965291	AG1-394 C	0.9274	80/20	0.9274
965631	AG1-431	41.3968	80/20	41.3968
965691	AG1-437 C O1	10.9782	80/20	10.9782
965701	AG1-438 C O1	10.9782	80/20	10.9782
965711	AG1-439 C O1	62.8890	80/20	62.8890
965741	AG1-442 O1	6.4040	80/20	6.4040
965751	AG1-443 O1	6.4040	80/20	6.4040
965761	AG1-444 O1	33.5408	80/20	33.5408
966491	AG1-518 O1	2.8635	80/20	2.8635
966801	AG1-551 C	5.2843	80/20	5.2843
966811	AG1-552 C	0.6909	80/20	0.6909
966931	AG1-431A	31.1020	80/20	31.1020
G-007A	G-007A	1.0093	Confirmed LTF	1.0093
VFT	VFT	2.6897	Confirmed LTF	2.6897
CALDERWOOD	CALDERWOOD	1.1426	Confirmed LTF	1.1426
PRAIRIE	PRAIRIE	3.8745	Confirmed LTF	3.8745
AC1-131	AC1-131	4.5817	LTF	4.5817

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CHEOAH	CHEOAH	1.1717	Confirmed LTF	1.1717
CBM-N	CBM-N	0.4908	Confirmed LTF	0.4908
COTTONWOOD	COTTONWOOD	4.2672	Confirmed LTF	4.2672
HAMLET	HAMLET	2.6704	Confirmed LTF	2.6704
GIBSON	GIBSON	0.6694	Confirmed LTF	0.6694
BLUEG	BLUEG	2.0520	Confirmed LTF	2.0520
TRIMBLE	TRIMBLE	0.6505	Confirmed LTF	0.6505
CATAWBA	CATAWBA	1.2299	Confirmed LTF	1.2299

10.6.4 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
168610694	314524	3FRNKLN	DVP	314539	3UNCAMP	DVP	1	DVP_P1-2: LN 136	single	224.66	113.58	115.19	DC	3.6

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.7476	80/20	2.7476
314572	3EMPORIA	0.1276	80/20	0.1276
314589	3MURPHYS	0.2267	80/20	0.2267
315115	1S HAMPT1	5.0559	80/20	5.0559
315126	1ROARAP2	0.7800	80/20	0.7800
315128	1ROARAP4	0.7443	80/20	0.7443
315606	3AA2-053SOLA	0.7396	80/20	0.7396
315607	3AA1-063SOLA	1.8868	80/20	1.8868
315608	3AA2-088SOLA	2.8057	80/20	2.8057
316087	AB2-174 C	0.4095	80/20	0.4095
316103	AB2-015 C	32.0905	80/20	32.0905
316129	AC1-054 C	2.9570	80/20	2.9570
923991	AB2-040 C O1	2.9924	80/20	2.9924
927145	AC1-208 C	3.1135	80/20	3.1135
957521	AF2-046 C	44.3940	80/20	44.3940
961091	AF2-400 C	1.7329	80/20	1.7329
961681	AG1-008 C	44.4830	80/20	44.4830
961931	AG1-036 C	3.6031	80/20	3.6031
964501	AG1-313 C O1	1.9613	80/20	1.9613
964801	AG1-343 C	15.5691	80/20	15.5691
965291	AG1-394 C	5.3380	80/20	5.3380
965721	AG1-440 C	2.2671	80/20	2.2671
965731	AG1-441 C	2.2671	80/20	2.2671
965771	AG1-445	1.3099	80/20	1.3099
965781	AG1-446	1.3099	80/20	1.3099
966751	AG1-546 C	6.8149	80/20	6.8149
966811	AG1-552 C	1.2385	80/20	1.2385
WEC	WEC	0.0397	Confirmed LTF	0.0397
LGEE	LGEE	0.0823	Confirmed LTF	0.0823
CPLE	CPLE	0.4941	Confirmed LTF	0.4941
CBM-W2	CBM-W2	1.7920	Confirmed LTF	1.7920
NY	NY	0.0702	Confirmed LTF	0.0702
TVA	TVA	0.3416	Confirmed LTF	0.3416
SIGE	SIGE	0.0298	Confirmed LTF	0.0298
CBM-S2	CBM-S2	5.4497	Confirmed LTF	5.4497
CBM-S1	CBM-S1	0.0851	Confirmed LTF	0.0851
MEC	MEC	0.2415	Confirmed LTF	0.2415
LAGN	LAGN	0.4253	Confirmed LTF	0.4253
CBM-W1	CBM-W1	1.6403	Confirmed LTF	1.6403

10.6.5 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
168909729	314568	3EARLEYS	DVP	314569	6EARLEYS	DVP	2	DVP_P1-3: 6EARLEYS-TX#3	single	175.78	112.29	114.31	DC	3.56

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.8357	80/20	2.8357
313719	3CHESTNUT	0.7616	80/20	0.7616
314582	3KELFORD	0.9905	80/20	0.9905
314589	3MURPHYS	0.1590	80/20	0.1590
314623	3WITAKRS	0.0972	80/20	0.0972
315115	1S HAMPT1	1.0912	80/20	1.0912
315126	1ROARAP2	0.8570	80/20	0.8570
315128	1ROARAP4	0.8178	80/20	0.8178
315606	3AA2-053SOLA	1.6715	80/20	1.6715
315607	3AA1-063SOLA	1.1232	80/20	1.1232
315608	3AA2-088SOLA	1.0808	80/20	1.0808
316087	AB2-174 C	0.4137	80/20	0.4137
316103	AB2-015 C	5.8060	80/20	5.8060
316129	AC1-054 C	3.1960	80/20	3.1960
316140	**AB2-099 C (Suspended)**	**1.8114**	**80/20**	**1.8114**
920591	AA2-165 C	0.1022	80/20	0.1022
923991	AB2-040 C O1	3.0884	80/20	3.0884
926201	AC1-098 C	9.2342	80/20	9.2342
926211	AC1-099 C	3.0944	80/20	3.0944
927145	AC1-208 C	8.4058	80/20	8.4058
932631	AC2-084 C	13.1636	80/20	13.1636
938771	AE1-103 C	1.7850	80/20	1.7850
941541	**AE2-151 C (Withdrawn : 01/08/2021)**	**0.6001**	**80/20**	**0.6001**
943171	AE2-346 C	4.3473	80/20	4.3473
957521	AF2-046 C	34.9879	80/20	34.9879
961091	AF2-400 C	0.3135	80/20	0.3135
961681	AG1-008 C	35.0580	80/20	35.0580
961931	AG1-036 C	3.5583	80/20	3.5583
961941	AG1-037 C	1.5526	80/20	1.5526
962331	AG1-082 C	6.2105	80/20	6.2105
962341	AG1-083 C	6.2105	80/20	6.2105
962351	AG1-084 C	6.1440	80/20	6.1440
962361	AG1-085 C	6.1440	80/20	6.1440
964501	AG1-313 C O1	8.0106	80/20	8.0106
964801	AG1-343 C	7.3500	80/20	7.3500
965291	AG1-394 C	2.2658	80/20	2.2658
965721	AG1-440 C	2.4102	80/20	2.4102
965731	AG1-441 C	2.4102	80/20	2.4102
965771	AG1-445	1.3926	80/20	1.3926
965781	AG1-446	1.3926	80/20	1.3926

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
966751	AG1-546 C	7.3830	80/20	7.3830
966811	AG1-552 C	1.3607	80/20	1.3607
WEC	WEC	0.0110	Confirmed LTF	0.0110
LGEE	LGEE	0.0239	Confirmed LTF	0.0239
CPLE	CPLE	0.0969	Confirmed LTF	0.0969
CBM-W2	CBM-W2	0.4928	Confirmed LTF	0.4928
NY	NY	0.0343	Confirmed LTF	0.0343
TVA	TVA	0.0952	Confirmed LTF	0.0952
SIGE	SIGE	0.0114	Confirmed LTF	0.0114
CBM-S2	CBM-S2	1.3676	Confirmed LTF	1.3676
CBM-S1	CBM-S1	0.0239	Confirmed LTF	0.0239
MEC	MEC	0.0667	Confirmed LTF	0.0667
LAGN	LAGN	0.1155	Confirmed LTF	0.1155
CBM-W1	CBM-W1	0.4486	Confirmed LTF	0.4486

10.6.6 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
168909719	314580	3MAPLETN	DVP	314589	3MURPHYS	DVP	1	DVP_P1-2: LN 136	single	142.88	134.94	140.61	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957521	AF2-046 C	99.8000	80/20	99.8000
961681	AG1-008 C	100.0000	80/20	100.0000
961931	AG1-036 C	8.1000	80/20	8.1000

10.6.7 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
168909658	314589	3MURPHYS	DVP	964800	AG1-343 TAP	DVP	1	DVP_P1-2: LN 136	single	116.56	203.87	210.81	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314589	3MURPHYS	0.5096	80/20	0.5096
957521	AF2-046 C	99.7980	80/20	99.7980
961681	AG1-008 C	99.9980	80/20	99.9980
961931	AG1-036 C	8.0998	80/20	8.0998
CALDERWOOD	CALDERWOOD	0.0010	Confirmed LTF	0.0010
NY	NY	0.0011	Confirmed LTF	0.0011
PRAIRIE	PRAIRIE	0.0052	Confirmed LTF	0.0052
CHEOAH	CHEOAH	0.0010	Confirmed LTF	0.0010
COTTONWOOD	COTTONWOOD	0.0042	Confirmed LTF	0.0042
HAMLET	HAMLET	0.0012	Confirmed LTF	0.0012
GIBSON	GIBSON	0.0011	Confirmed LTF	0.0011
BLUEG	BLUEG	0.0035	Confirmed LTF	0.0035
TRIMBLE	TRIMBLE	0.0011	Confirmed LTF	0.0011
CATAWBA	CATAWBA	0.0007	Confirmed LTF	0.0007

10.6.8 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
168909664	314617	3TUNIS	DVP	314551	3AHOSKIE	DVP	1	DVP_P1-2: LN 108-A	single	142.88	166.31	171.98	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314589	3MURPHYS	0.5096	80/20	0.5096
957521	AF2-046 C	99.7980	80/20	99.7980
961681	AG1-008 C	99.9980	80/20	99.9980
961931	AG1-036 C	8.0998	80/20	8.0998
964801	AG1-343 C	34.9993	80/20	34.9993
CALDERWOOD	CALDERWOOD	0.0010	Confirmed LTF	0.0010
NY	NY	0.0011	Confirmed LTF	0.0011
PRAIRIE	PRAIRIE	0.0052	Confirmed LTF	0.0052
CHEOAH	CHEOAH	0.0010	Confirmed LTF	0.0010
COTTONWOOD	COTTONWOOD	0.0042	Confirmed LTF	0.0042
HAMLET	HAMLET	0.0012	Confirmed LTF	0.0012
GIBSON	GIBSON	0.0011	Confirmed LTF	0.0011
BLUEG	BLUEG	0.0035	Confirmed LTF	0.0035
TRIMBLE	TRIMBLE	0.0011	Confirmed LTF	0.0011
CATAWBA	CATAWBA	0.0007	Confirmed LTF	0.0007

10.6.9 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
169530379	938770	AE1-103 TAP	DVP	314527	3HOLLAND	DVP	1	DVP_P1-2: LN 136	single	224.66	107.91	109.51	DC	3.6

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.7476	80/20	2.7476
314572	3EMPORIA	0.1276	80/20	0.1276
314589	3MURPHYS	0.2267	80/20	0.2267
315115	1S HAMPT1	5.0559	80/20	5.0559
315126	1ROARAP2	0.7800	80/20	0.7800
315128	1ROARAP4	0.7443	80/20	0.7443
315606	3AA2-053SOLA	0.7396	80/20	0.7396
315607	3AA1-063SOLA	1.8868	80/20	1.8868
315608	3AA2-088SOLA	2.8057	80/20	2.8057
316087	AB2-174 C	0.4095	80/20	0.4095
316103	AB2-015 C	32.0905	80/20	32.0905
316129	AC1-054 C	2.9570	80/20	2.9570
923991	AB2-040 C O1	2.9924	80/20	2.9924
927145	AC1-208 C	3.1135	80/20	3.1135
938771	AE1-103 C	15.2487	80/20	15.2487
957521	AF2-046 C	44.3940	80/20	44.3940
961091	AF2-400 C	1.7329	80/20	1.7329
961681	AG1-008 C	44.4830	80/20	44.4830
961931	AG1-036 C	3.6031	80/20	3.6031
964501	AG1-313 C O1	1.9613	80/20	1.9613
964801	AG1-343 C	15.5691	80/20	15.5691
965291	AG1-394 C	5.3380	80/20	5.3380
965721	AG1-440 C	2.2671	80/20	2.2671
965731	AG1-441 C	2.2671	80/20	2.2671
965771	AG1-445	1.3099	80/20	1.3099
965781	AG1-446	1.3099	80/20	1.3099
966751	AG1-546 C	6.8149	80/20	6.8149
966811	AG1-552 C	1.2385	80/20	1.2385
WEC	WEC	0.0397	Confirmed LTF	0.0397
LGEE	LGEE	0.0823	Confirmed LTF	0.0823
CPLE	CPLE	0.4941	Confirmed LTF	0.4941
CBM-W2	CBM-W2	1.7920	Confirmed LTF	1.7920
NY	NY	0.0702	Confirmed LTF	0.0702
TVA	TVA	0.3416	Confirmed LTF	0.3416
SIGE	SIGE	0.0298	Confirmed LTF	0.0298
CBM-S2	CBM-S2	5.4497	Confirmed LTF	5.4497
CBM-S1	CBM-S1	0.0851	Confirmed LTF	0.0851
MEC	MEC	0.2415	Confirmed LTF	0.2415
LAGN	LAGN	0.4253	Confirmed LTF	0.4253
CBM-W1	CBM-W1	1.6403	Confirmed LTF	1.6403

10.6.10 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
168909702	957520	AF2-046 TAP	DVP	314580	3MAPLETN	DVP	1	DVP_P1-2: LN 136	single	142.88	139.7	145.37	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957521	AF2-046 C	99.8000	80/20	99.8000
961681	AG1-008 C	100.0000	80/20	100.0000
961931	AG1-036 C	8.1000	80/20	8.1000

10.6.11 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
169838908	961850	AG1-027 TAP	DVP	314536	3SUFFOLK	DVP	1	DVP_P1-2: LN 136	single	269.78	113.63	114.97	DC	3.6

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.7476	80/20	2.7476
314572	3EMPORIA	0.1276	80/20	0.1276
314589	3MURPHYS	0.2267	80/20	0.2267
315115	1S HAMPT1	5.0559	80/20	5.0559
315126	1ROARAP2	0.7800	80/20	0.7800
315128	1ROARAP4	0.7443	80/20	0.7443
315606	3AA2-053SOLA	0.7396	80/20	0.7396
315607	3AA1-063SOLA	1.8868	80/20	1.8868
315608	3AA2-088SOLA	2.8057	80/20	2.8057
316087	AB2-174 C	0.4095	80/20	0.4095
316103	AB2-015 C	32.0905	80/20	32.0905
316129	AC1-054 C	2.9570	80/20	2.9570
923991	AB2-040 C O1	2.9924	80/20	2.9924
927145	AC1-208 C	3.1135	80/20	3.1135
938771	AE1-103 C	15.2487	80/20	15.2487
957521	AF2-046 C	44.3940	80/20	44.3940
961091	AF2-400 C	1.7329	80/20	1.7329
961681	AG1-008 C	44.4830	80/20	44.4830
961851	AG1-027 C	82.8345	80/20	82.8345
961931	AG1-036 C	3.6031	80/20	3.6031
964501	AG1-313 C O1	1.9613	80/20	1.9613
964801	AG1-343 C	15.5691	80/20	15.5691
965291	AG1-394 C	5.3380	80/20	5.3380
965721	AG1-440 C	2.2671	80/20	2.2671
965731	AG1-441 C	2.2671	80/20	2.2671
965771	AG1-445	1.3099	80/20	1.3099
965781	AG1-446	1.3099	80/20	1.3099
966751	AG1-546 C	6.8149	80/20	6.8149
966811	AG1-552 C	1.2385	80/20	1.2385
WEC	WEC	0.0397	Confirmed LTF	0.0397
LGEE	LGEE	0.0823	Confirmed LTF	0.0823
CPLE	CPLE	0.4941	Confirmed LTF	0.4941
CBM-W2	CBM-W2	1.7920	Confirmed LTF	1.7920
NY	NY	0.0702	Confirmed LTF	0.0702
TVA	TVA	0.3416	Confirmed LTF	0.3416
SIGE	SIGE	0.0298	Confirmed LTF	0.0298
CBM-S2	CBM-S2	5.4497	Confirmed LTF	5.4497
CBM-S1	CBM-S1	0.0851	Confirmed LTF	0.0851
MEC	MEC	0.2415	Confirmed LTF	0.2415
LAGN	LAGN	0.4253	Confirmed LTF	0.4253
CBM-W1	CBM-W1	1.6403	Confirmed LTF	1.6403

10.6.12 Index 12

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
168909611	964800	AG1-343 TAP	DVP	314558	3BOYKINS	DVP	1	DVP_P1-2: LN 136	single	116.56	203.87	210.81	DC	8.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314589	3MURPHYS	0.5096	80/20	0.5096
957521	AF2-046 C	99.7980	80/20	99.7980
961681	AG1-008 C	99.9980	80/20	99.9980
961931	AG1-036 C	8.0998	80/20	8.0998
964801	AG1-343 C	34.9993	80/20	34.9993
CALDERWOOD	CALDERWOOD	0.0010	Confirmed LTF	0.0010
NY	NY	0.0011	Confirmed LTF	0.0011
PRAIRIE	PRAIRIE	0.0052	Confirmed LTF	0.0052
CHEOAH	CHEOAH	0.0010	Confirmed LTF	0.0010
COTTONWOOD	COTTONWOOD	0.0042	Confirmed LTF	0.0042
HAMLET	HAMLET	0.0012	Confirmed LTF	0.0012
GIBSON	GIBSON	0.0011	Confirmed LTF	0.0011
BLUEG	BLUEG	0.0035	Confirmed LTF	0.0035
TRIMBLE	TRIMBLE	0.0011	Confirmed LTF	0.0011
CATAWBA	CATAWBA	0.0007	Confirmed LTF	0.0007

10.7 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
AA1-063	Huntsville (Cabin Creek) 69kV	Withdrawn
AA1-139	Hickory-Shawboro 230kV	In Service
AA2-053	Carolina-Jackson 115kV	In Service
AA2-088	Boykins-Handsome 115kV	In Service
AA2-165	Hornertown-Whitakers 115kV	In Service
AA2-178	Mackeys 230kV	Partially in Service - Under Construction
AB1-173	Brink-Trego 115kV	Engineering and Procurement
AB2-015	Franklin 115kV	Engineering and Procurement
AB2-022	Elizabeth City 34.5kV	Engineering and Procurement
AB2-040	Brink 115kV	Engineering and Procurement
AB2-099	Ahoskie 34.5kV	Suspended
AB2-169	Pantago-Five Points 115kV	Partially in Service - Under Construction
AB2-174	Emporia-Trego 115kV	In Service
AC1-054	Kerr Dam–Eatons Ferry 115 kV	Engineering and Procurement
AC1-086	Thelma 230kV	Active
AC1-098	Dawson-South Justice 115kV	Engineering and Procurement
AC1-099	Dawson-South Justice 115kV	Engineering and Procurement
AC1-131	PJM-CPLE	Confirmed
AC1-189	Chinquapin-Everetts 230kV	Active
AC1-208	Cox-Whitakers 115kV	Engineering and Procurement
AC2-084	Dawson-South Justice 115kV	Active
AD1-023	Cashie-Trowbridge 230 kV	Active
AD1-076	Trowbridge 230 kV	Active
AD1-144	Kings Fork 34.5 kV	Partially in Service - Under Construction
AD2-051	Earleys – Northampton 230kV	Active
AD2-085	Myrtle-Windsor DP 115kV	Active
AD2-160	Hickory-Moyock 230kV	Active
AD2-215	Kings Fork 34.5 kV	Withdrawn
AE1-035	Earleys 230 kV	Partially in Service - Under Construction
AE1-072	Shawboro-Sligo 230 kV	Active
AE1-103	Holland-Union Camp 115 kV	Active
AE2-034	Mackeys 230 kV	Active
AE2-104	Suffolk 115 kV	Active
AE2-147	Swamp 230 kV	Active
AE2-151	Earleys 34.5kV	Withdrawn
AE2-225	Suffolk 34 kV	Engineering and Procurement
AE2-229	Suffolk 34 kV	Engineering and Procurement
AE2-253	Hickory-Moyock 230 kV	Active
AE2-346	Ahoskie 34.5 kV	Active

Queue Number	Project Name	Status
AF1-032	Suffolk 34.5 kV	Engineering and Procurement
AF1-152	Swamp 230 kV	Active
AF1-236	Mackeys 230 kV	Active
AF2-043	Suffolk 34.5 kV	Engineering and Procurement
AF2-046	Tunis-Mapleton 115 kV	Active
AF2-047	Creswell-Riders Creek 115 kV	Active
AF2-076	Suffolk-Nucor Steel 230 kV	Active
AF2-080	Chinquapin-Everetts 230 kV	Active
AF2-081	Moyock 230 kV	Active
AF2-110	Suffolk 115 kV	Active
AF2-242	Wharton 115 kV	Active
AF2-400	Franklin 13.2 kV	Engineering and Procurement
AG1-007	Tar River 12.5 kV	Active
AG1-008	Tunis-Mapleton 115 kV	Active
AG1-027	Suffolk-Holland 115 kV	Active
AG1-036	Tunis 34.5 kV	Active
AG1-037	Earlys 34.5 kV	Active
AG1-082	Ahoskie 34.5 kV	Active
AG1-083	Ahoskie 34.5 kV	Active
AG1-084	Earlys 34.5 kV	Active
AG1-085	Earlys 34.5	Active
AG1-106	Thelma 230 kV	Active
AG1-235	Fentress-Sligo 230 kV	Active
AG1-312	Earleys-Cashie 230 kV	Active
AG1-313	Jackson DP-Occoneechee 115 kV	Active
AG1-343	Boykins-Murphy 115 kV	Active
AG1-383	Hickory 34.5 kV	Active
AG1-394	Boykins 34.5 kV	Active
AG1-431	Mackeys 230 kV	Active
AG1-431A	Mackeys 230 kV	Active
AG1-437	Cashie-Earleys 230 kV	Active
AG1-438	Cashie-Earleys 230 kV	Active
AG1-439	Chinquapin 230 kV	Active
AG1-440	Palmer Springs 115 kV	Active
AG1-441	Palmer Springs 115 kV	Active
AG1-442	Cashie-Earleys 230 kV	Active
AG1-443	Cashie-Earleys 230 kV	Active
AG1-444	Chinquapin 230 kV	Active
AG1-445	Palmer Spring 115 kV	Active
AG1-446	Palmer Springs 115 kV	Active
AG1-518	Suffolk 230 kV	Active
AG1-546	Ebony-Elams Road 115 kV	Active
AG1-551	Parmele 12.5 kV	Active
AG1-552	Carolina 13.2 kV	Active
W1-029	Winfall 230kV	In Service
Z1-036	WinFall-Chowan 230kV	Suspended

10.8 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-2: LN 229	CONTINGENCY 'DVP_P1-2: LN 229' OPEN BRANCH FROM BUS 314564 TO BUS 314610 CKT 1 /* 6EDGECOM 230.00 - 6TOTDP4 230.00 OPEN BRANCH FROM BUS 314564 TO BUS 315131 CKT 1 /* 6EDGECOM 230.00 - 1EDGECMA 13.800 OPEN BRANCH FROM BUS 314564 TO BUS 315132 CKT 1 /* 6EDGECOM 230.00 - 1EDGECMB 13.800 OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 1 /* 3TARBORO 115.00 - 6TARBORO 230.00 OPEN BRANCH FROM BUS 314609 TO BUS 314610 CKT 1 /* 6TARBORO 230.00 - 6TOTDP4 230.00 OPEN BUS 314610 /* ISLAND: 6TOTDP4 230.00 OPEN BUS 315131 /* ISLAND: 1EDGECMA 13.800 OPEN BUS 315132 /* ISLAND: 1EDGECMB 13.800 END
DVP_P1-3: 6EARLEYS-TX#3	CONTINGENCY 'DVP_P1-3: 6EARLEYS-TX#3' OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 1 /* 3EARLEYS 115.00 - 6EARLEYS 230.00 END
DVP_P1-2: LN 108-A	CONTINGENCY 'DVP_P1-2: LN 108-A' OPEN BRANCH FROM BUS 314558 TO BUS 964800 CKT 1 /* 3BOYKINS 115.00 - AG1-343 TAP 115.00 END
DVP_P1-2: LN 108-B	CONTINGENCY 'DVP_P1-2: LN 108-B' OPEN BRANCH FROM BUS 964800 TO BUS 314589 CKT 1 /* 3BOYKINS 115.00 - 3MURPHYS 115.00 OPEN BRANCH FROM BUS 314580 TO BUS 314589 CKT 1 /* 3MAPLETN 115.00 - 3MURPHYS 115.00 OPEN BRANCH FROM BUS 314580 TO BUS 957520 CKT 1 /* 3MAPLETN 115.00 - AF2-046 TAP 115.00 OPEN BUS 314580 /* ISLAND: 3MAPLETN 115.00 OPEN BUS 314589 /* ISLAND: 3MURPHYS 115.00 OPEN BUS 900672 /* ISLAND: V4-068 E 115.00 END
DVP_P1-2: LN 1010	CONTINGENCY 'DVP_P1-2: LN 1010' OPEN BRANCH FROM BUS 313723 TO BUS 314559 CKT 1 /* 3PECAN 115.00 - 3CAROLNA 115.00 OPEN BRANCH FROM BUS 314559 TO BUS 314835 CKT 1 /* 3CAROLNA 115.00 - 3CAROL_1 115.00 OPEN BUS 314835 /* ISLAND: 3CAROL_1 115.00 END

Contingency Name	Contingency Definition
DVP_P1-2: LN 140	CONTINGENCY 'DVP_P1-2: LN 140' OPEN BRANCH FROM BUS 313720 TO BUS 314526 CKT 1 /* 3NEWSOMS 115.00 - 3HANDSOM 115.00 OPEN BRANCH FROM BUS 314526 TO BUS 314534 CKT 1 /* 3HANDSOM 115.00 - 3SHAMPT 115.00 OPEN BUS 314526 /* ISLAND: 3HANDSOM 115.00 END
DVP_P1-2: LN 68-B	CONTINGENCY 'DVP_P1-2: LN 68-B' OPEN BRANCH FROM BUS 961850 TO BUS 314536 CKT 1 /* 3COPELD DP 115.00 - 3SUFFOLK 115.00 END
DVP_P1-2: LN 68-A	CONTINGENCY 'DVP_P1-2: LN 68-A' OPEN BRANCH FROM BUS 313737 TO BUS 314527 CKT 1 /* 3COPELD DP 115.00 - 3HOLLAND 115.00 OPEN BRANCH FROM BUS 313737 TO BUS 961850 CKT 1 /* 3COPELD DP 115.00 - 3SUFFOLK 115.00 OPEN BRANCH FROM BUS 314527 TO BUS 938770 CKT 1 /* 3HOLLAND 115.00 - AE1-103 TAP 115.00 OPEN BUS 313737 /* ISLAND: 3COPELD DP 115.00 OPEN BUS 314527 /* ISLAND: 3HOLLAND 115.00 END
DVP_P1-2: LN 136	CONTINGENCY 'DVP_P1-2: LN 136' OPEN BRANCH FROM BUS 314551 TO BUS 314568 CKT 1 /* 3AHOSKIE 115.00 - 3EARLEYS 115.00 OPEN BRANCH FROM BUS 314551 TO BUS 314617 CKT 1 /* 3AHOSKIE 115.00 - 3TUNIS 115.00 OPEN BUS 314551 /* ISLAND: 3AHOSKIE 115.00 OPEN BUS 316140 /* ISLAND: AB2-099 C 115.00 OPEN BUS 316141 /* ISLAND: AB2-099 E 115.00 END
Base Case	
DVP_P1-3: 6EARLEYS-TX#4	CONTINGENCY 'DVP_P1-3: 6EARLEYS-TX#4' OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 2 /* 3EARLEYS 115.00 - 6EARLEYS 230.00 END

11 Short Circuit Analysis

The following Breakers are overdutied:

None

11.1 System Reinforcements - Short Circuit

None

12 Affected Systems

12.1 TVA

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

12.2 Duke Energy Progress

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