



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-551
PARMELE 12.5 KV
14 MW Capacity / 20 MW Energy**

January 2021

Table of Contents

1	Introduction.....	4
2	Preface.....	4
3	General.....	5
4	Point of Interconnection.....	6
5	Cost Summary.....	6
6	Transmission Owner Scope of Work.....	7
7	Schedule.....	7
8	Transmission Owner Analysis.....	7
8.1	Power Flow Analysis.....	8
9	Interconnection Customer Requirements.....	8
9.1	System Protection.....	8
9.2	Compliance Issues and Interconnection Customer Requirements.....	8
9.3	Power Factor Requirements.....	9
10	Revenue Metering and SCADA Requirements.....	9
10.1	PJM Requirements.....	9
10.2	Meteorological Data Reporting Requirements.....	9
10.3	Interconnected Transmission Owner Requirements.....	9
11	Summer Peak - Load Flow Analysis.....	10
11.1	Generation Deliverability.....	10
11.2	Multiple Facility Contingency.....	10
11.3	Contribution to Previously Identified Overloads.....	10
11.4	Potential Congestion due to Local Energy Deliverability.....	11
11.5	System Reinforcements - Summer Peak Load Flow - Primary POI.....	12
11.6	Flow Gate Details.....	13
11.6.1	Index 1.....	14
11.6.2	Index 2.....	16
11.6.3	Index 3.....	17
11.6.4	Index 4.....	20
11.6.5	Index 5.....	22
11.6.6	Index 6.....	23
11.7	Queue Dependencies.....	27

11.8	Contingency Descriptions.....	30
12	Short Circuit Analysis.....	32
12.1	System Reinforcements - Short Circuit.....	32
13	Affected Systems.....	33
13.1	TVA.....	33
13.2	Duke Energy Progress.....	33
14	Attachment 1: One Line Diagram.....	34

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 Martin County, North Carolina. The installed facilities will have a total capability of 20 MW with 14 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is October 15, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-551
Project Name	PARMELE 12.5 KV
State	North Carolina
County	Martin
Transmission Owner	Dominion
MFO	20
MWE	20
MWC	14
Fuel	Solar
Basecase Study Year	2024

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

4 Point of Interconnection

AG1-551 will interconnect with the Dominion transmission system at the Paramele 115 kV substation.

5 Cost Summary

The AG1-551 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ To be determined in a future study phase
Total System Network Upgrade Costs	\$67,235,000 ¹
Total Costs	\$67,235,000 + physical attachment costs from Dominion

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

Dominion to provide Transmission Owner Scope of Work in a future study phase. This will include Attachment Facilities, Direct, and Non-Direct Connection work, costs, and schedule for the interconnection.

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 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.

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 AG1-551 was evaluated as a 20.0 MW (Capacity 14.0 MW) injection at the Paramele 115 kV substation in the Dominion area. Project AG1-551 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-551 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
168585298	313851	6ECITYDP2	230.0	DVP	314638	6ELIZCT	230.0	DVP	1	DVP_P1-2: LN 2144	single	984.179992676	99.8	100.01	DC	2.08
169073484	314573	3EVERETS	115.0	DVP	314574	6EVERETS	230.0	DVP	1	DVP_P1-2: LN 2034-A	single	274.855987549	98.08	100.03	DC	5.37
169073501	314616	6TRWBRD G	230.0	DVP	314594	6PLYMOT H	230.0	DVP	1	DVP_P1-2: LN 246-A	single	789.599975586	99.66	100.08	DC	3.29
169292715	314639	6TANGLE W	230.0	DVP	313851	6ECITYDP2	230.0	DVP	1	DVP_P1-2: LN 2144	single	984.179992676	99.81	100.02	DC	2.08

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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
169073405	314573	3EVERETS	115.0	DVP	314574	6EVERETS	230.0	DVP	2	DVP_P1-2: LN 2034-A	single	241.391983032	119.8	122.13	DC	5.63
169073406	314573	3EVERETS	115.0	DVP	314574	6EVERETS	230.0	DVP	2	DVP_P1-2: LN 2034-B	single	241.391983032	112.1	114.43	DC	5.63
163942784	314574	6EVERETS	230.0	DVP	304451	6GREENVI LET	230.0	CPLE	1	DVP_P4-2: 2020T2144	breaker	478.0	229.32	230.65	DC	6.37
163942959	314574	6EVERETS	230.0	DVP	304451	6GREENVI LET	230.0	CPLE	1	DVP_P1-2: LN 2167	single	478.0	161.48	162.59	DC	5.28
163942962	314574	6EVERETS	230.0	DVP	304451	6GREENVI LET	230.0	CPLE	1	DVP_P1-2: LN 2177	single	478.0	155.72	156.82	DC	5.28

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
163943649	314574	6EVERETS	230.0	DVP	304451	6GREENVILLE	230.0	CPL	1	DVP_P7-1: LN 2058-2181	tower	478.0	235.25	236.6	DC	6.45

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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
168585256	313701	6CHINQUAPIN	230.0	DVP	314609	6TARBORO	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	183.55	184.98	DC	6.3
169073413	314564	6EDGECOM	230.0	DVP	313845	6HATHAWAY	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	184.14	185.56	DC	6.3
169073403	314573	3EVERETS	115.0	DVP	314574	6EVERETS	230.0	DVP	2	DVP_P1-2: LN 2034-A	operation	241.391983032	185.11	188.44	DC	8.04
169073482	314573	3EVERETS	115.0	DVP	314574	6EVERETS	230.0	DVP	1	DVP_P1-2: LN 2034-A	operation	274.855987549	147.99	150.78	DC	7.67
163942953	314574	6EVERETS	230.0	DVP	304451	6GREENVILLE	230.0	CPL	1	DVP_P1-2: LN 2092	operation	478.0	227.14	228.47	DC	6.37
163942958	314574	6EVERETS	230.0	DVP	304451	6GREENVILLE	230.0	CPL	1	Base Case	operation	478.0	167.51	168.71	DC	5.75
169073558	314574	6EVERETS	230.0	DVP	927020	AC1-189 TAP	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	110.88	112.31	DC	6.31
169073447	314609	6TARBORO	230.0	DVP	314610	6TOTDP4	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	170.12	171.55	DC	6.3
169073451	314610	6TOTDP4	230.0	DVP	314564	6EDGECOM	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	167.65	169.08	DC	6.3
169073534	314613	3TRWBRDG	115.0	DVP	314616	6TRWBRDG	230.0	DVP	1	DVP_P1-2: LN 2034-E	operation	194.861999512	120.72	122.65	DC	3.75
169073578	314614	3TRWBRDG	115.0	DVP	314616	6TRWBRDG	230.0	DVP	1	DVP_P1-2: LN 167	operation	182.36000061	99.18	101.25	DC	3.77
168585473	927020	AC1-189 TAP	230.0	DVP	313701	6CHINQUAPIN	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	128.53	129.95	DC	6.31

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
169073405,169073406	5	3EVERETS 115.0 kV - 6EVERETS 230.0 kV Ckt 2	dom-316 (1192) : Add additional 230/115 kV transformer at Everetts substation. Project Type : CON Cost : \$7,000,000 Time Estimate : 16-18 Months	\$7,000,000
169073484	2	3EVERETS 115.0 kV - 6EVERETS 230.0 kV Ckt 1		
169292715	4	6TANGLEW 230.0 kV - 6ECITYDP2 230.0 kV Ckt 1	dom-200 (1076) : Wreck and rebuild 5.6 miles of existing single circuit line 2020 between Elizabeth City to Pasquotank 230 kV. Add new circuit between Elizabeth City to Pasquotank 230 kV, constructed as a double circuit line. Utilize 2-636 ACSR for all new and modified circuits. Add a three breaker station at Pasquotank and Elizabeth City DP 230 kV. Project Type : CON Cost : \$27,000,000 Time Estimate : 36-40 Months	\$27,000,000
168585298	1	6ECITYDP2 230.0 kV - 6ELIZ CT 230.0 kV Ckt 1		
169073501	3	6TRWBRDG 230.0 kV - 6PLYMOTH 230.0 kV Ckt 1	dom-321 (1197) : Rebuild 1.67 miles of 230 kV Line 2126 from Plymouth to Trowbridge with 2-636 ACSR 150 C. Replace Line Switch at Plymoth terminal. Project Type : FAC Cost : \$2,755,000 Time Estimate : 30-36 Months	\$2,755,000
163942962,163942784,163943649,163942959	6	6EVERETS 230.0 kV - 6GREENVILE T 230.0 kV Ckt 1	dom-173 (1001) : 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	\$30,480,000
			TOTAL COST	\$67,235,000

11.6 Flow Gate Details

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

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
168585298	313851	6ECITYDP2	DVP	314638	6ELIZ CT	DVP	1	DVP_P1-2: LN 2144	single	984.18	99.8	100.01	DC	2.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313719	3CHESTNUT	0.4452	80/20	0.4452
314582	3KELFORD	0.2021	80/20	0.2021
314589	3MURPHYS	0.0336	80/20	0.0336
314623	3WITAKRS	0.0808	80/20	0.0808
314639	6TANGLEW	1.6096	80/20	1.6096
315126	1ROARAP2	0.4481	80/20	0.4481
315128	1ROARAP4	0.4276	80/20	0.4276
315131	1EDGEEMA (Deactivation : 22/04/2019)	3.5171	80/20	3.5171
315132	1EDGEEMB (Deactivation : 22/04/2019)	3.5171	80/20	3.5171
315136	1ROSEMG1	0.7472	80/20	0.7472
315137	1ROSEMS1	0.4634	80/20	0.4634
315138	1ROSEMG2	0.3502	80/20	0.3502
315139	1GASTONA	1.0779	80/20	1.0779
315141	1GASTONB	1.0779	80/20	1.0779
315292	1DOMTR78	2.1737	80/20	2.1737
315293	1DOMTR9	11.2428	80/20	11.2428
315294	1DOMTR10	13.7780	80/20	13.7780
315601	1CONETOE2SOL	0.7159	80/20	0.7159
315602	1HOLLOMANSOL	1.0507	80/20	1.0507
315606	3AA2-053SOLA	0.5641	80/20	0.5641
315607	3AA1-063SOLA	0.4265	80/20	0.4265
315611	6Z1-036WIND	3.5746	80/20	3.5746
315614	AA2-178 C	3.7047	80/20	3.7047
316020	AB2-059 C OP	0.6141	80/20	0.6141
316140	AB2-099 C (Suspended)	0.3350	80/20	0.3350
920591	AA2-165 C	0.0598	80/20	0.0598
922922	AB1-081 C OP	0.5211	80/20	0.5211
925121	AB2-169 C	1.3503	80/20	1.3503
925591	AC1-034 C	2.5214	80/20	2.5214
926070	AC1-086 C	7.6830	80/20	7.6830
926201	AC1-098 C	2.7937	80/20	2.7937
926211	AC1-099 C	0.9362	80/20	0.9362
927024	AC1-189 C	5.0127	80/20	5.0127
927145	AC1-208 C	3.6065	80/20	3.6065
932631	AC2-084 C	3.9825	80/20	3.9825
933991	AD1-023 C	21.0909	80/20	21.0909
934331	AD1-057 C O1	3.7301	80/20	3.7301
934521	AD1-076 C	103.7561	80/20	103.7561
936401	AD2-051 C O1	6.4211	80/20	6.4211
938221	AE1-035 C	0.2627	80/20	0.2627

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940491	AE2-034 C	17.6114	80/20	17.6114
940571	AE2-044 C	1.6514	80/20	1.6514
941541	AE2-151 C (Withdrawn : 01/08/2021)	0.1082	80/20	0.1082
943171	AE2-346 C	0.8040	80/20	0.8040
944141	AF1-082	1.0616	80/20	1.0616
945711	AF1-236 C O1	192.8033	80/20	192.8033
957521	AF2-046 C	7.1317	80/20	7.1317
957531	AF2-047 C	41.8481	80/20	41.8481
957861	AF2-080 C	4.5527	80/20	4.5527
959511	AF2-242 C	8.1864	80/20	8.1864
961671	AG1-007 C	0.6096	80/20	0.6096
961681	AG1-008 C	7.1460	80/20	7.1460
961931	AG1-036 C	0.6832	80/20	0.6832
961941	AG1-037 C	0.2872	80/20	0.2872
962331	AG1-082 C	1.1486	80/20	1.1486
962341	AG1-083 C	1.1486	80/20	1.1486
962351	AG1-084 C	1.1082	80/20	1.1082
962361	AG1-085 C	1.1082	80/20	1.1082
962571	AG1-106 C	2.1366	80/20	2.1366
964491	AG1-312 C O1	16.1392	80/20	16.1392
964501	AG1-313 C O1	2.0761	80/20	2.0761
964801	AG1-343 C	1.7860	80/20	1.7860
965631	AG1-431	111.6230	80/20	111.6230
965691	AG1-437 C O1	13.8060	80/20	13.8060
965701	AG1-438 C O1	13.8060	80/20	13.8060
965711	AG1-439 C O1	12.8430	80/20	12.8430
965741	AG1-442 O1	8.0535	80/20	8.0535
965751	AG1-443 O1	8.0535	80/20	8.0535
965761	AG1-444 O1	6.8496	80/20	6.8496
966801	AG1-551 C	2.0783	80/20	2.0783
966811	AG1-552 C	0.7115	80/20	0.7115
966931	AG1-431A	83.8640	80/20	83.8640
WEC	WEC	0.1288	Confirmed LTF	0.1288
LGEE	LGEE	0.2626	Confirmed LTF	0.2626
CPLE	CPLE	1.5008	Confirmed LTF	1.5008
CBM-W2	CBM-W2	5.5373	Confirmed LTF	5.5373
NY	NY	0.1277	Confirmed LTF	0.1277
TVA	TVA	1.0360	Confirmed LTF	1.0360
SIGE	SIGE	0.0757	Confirmed LTF	0.0757
CBM-S2	CBM-S2	16.1507	Confirmed LTF	16.1507
CBM-S1	CBM-S1	0.2592	Confirmed LTF	0.2592
MEC	MEC	0.7643	Confirmed LTF	0.7643
LAGN	LAGN	1.2932	Confirmed LTF	1.2932
CBM-W1	CBM-W1	5.4257	Confirmed LTF	5.4257

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
169073484	314573	3EVERETS	DVP	314574	6EVERETS	DVP	1	DVP_P1-2: LN 2034-A	single	274.86	98.08	100.03	DC	5.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315292	1DOMTR78	1.7361	80/20	1.7361
315293	1DOMTR9	8.9793	80/20	8.9793
315294	1DOMTR10	11.0040	80/20	11.0040
315611	6Z1-036WIND	0.4810	80/20	0.4810
315614	AA2-178 C	1.1358	80/20	1.1358
925121	AB2-169 C	1.7980	80/20	1.7980
933991	AD1-023 C	12.3085	80/20	12.3085
934521	AD1-076 C	50.8021	80/20	50.8021
940491	AE2-034 C	5.3995	80/20	5.3995
945711	AF1-236 C O1	59.1119	80/20	59.1119
957531	AF2-047 C	12.8303	80/20	12.8303
959511	AF2-242 C	15.3211	80/20	15.3211
964491	AG1-312 C O1	17.7419	80/20	17.7419
965631	AG1-431	34.2227	80/20	34.2227
965691	AG1-437 C O1	9.5046	80/20	9.5046
965701	AG1-438 C O1	9.5046	80/20	9.5046
965741	AG1-442 O1	5.5443	80/20	5.5443
965751	AG1-443 O1	5.5443	80/20	5.5443
966801	AG1-551 C	5.3690	80/20	5.3690
966931	AG1-431A	25.7120	80/20	25.7120
G-007A	G-007A	0.1894	Confirmed LTF	0.1894
VFT	VFT	0.5031	Confirmed LTF	0.5031
CALDERWOOD	CALDERWOOD	0.2003	Confirmed LTF	0.2003
PRAIRIE	PRAIRIE	0.6845	Confirmed LTF	0.6845
CHEOAH	CHEOAH	0.2052	Confirmed LTF	0.2052
CBM-N	CBM-N	0.0912	Confirmed LTF	0.0912
COTTONWOOD	COTTONWOOD	0.7434	Confirmed LTF	0.7434
HAMLET	HAMLET	0.4493	Confirmed LTF	0.4493
GIBSON	GIBSON	0.1196	Confirmed LTF	0.1196
BLUEG	BLUEG	0.3680	Confirmed LTF	0.3680
TRIMBLE	TRIMBLE	0.1169	Confirmed LTF	0.1169
CATAWBA	CATAWBA	0.2149	Confirmed LTF	0.2149

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
169073501	314616	6TRWBRDG	DVP	314594	6PLYMOTH	DVP	1	DVP_P1-2: LN 246-A	single	789.6	99.66	100.08	DC	3.29

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	3.4752	80/20	3.4752
313719	3CHESTNUT	0.8151	80/20	0.8151
314572	3EMPORIA	0.1885	80/20	0.1885
314582	3KELFORD	0.3847	80/20	0.3847
314589	3MURPHYS	0.0606	80/20	0.0606
314623	3WITAKRS	0.1468	80/20	0.1468
314704	3LAWRENC	0.1075	80/20	0.1075
315126	1ROARAP2	0.8327	80/20	0.8327
315128	1ROARAP4	0.7946	80/20	0.7946
315131	1EDGEEMA (Deactivation : 22/04/2019)	6.2849	80/20	6.2849
315132	1EDGEEMB (Deactivation : 22/04/2019)	6.2849	80/20	6.2849
315136	1ROSEMG1	1.3976	80/20	1.3976
315137	1ROSEMS1	0.8667	80/20	0.8667
315138	1ROSEMG2	0.6550	80/20	0.6550
315139	1GASTONA	2.0277	80/20	2.0277
315141	1GASTONB	2.0277	80/20	2.0277
315158	1KERR 1	0.1284	80/20	0.1284
315159	1KERR 2	0.3595	80/20	0.3595
315160	1KERR 3	0.3595	80/20	0.3595
315161	1KERR 4	0.3595	80/20	0.3595
315162	1KERR 5	0.3595	80/20	0.3595
315163	1KERR 6	0.3595	80/20	0.3595
315164	1KERR 7	0.3595	80/20	0.3595
315292	1DOMTR78	3.0489	80/20	3.0489
315293	1DOMTR9	15.7692	80/20	15.7692
315294	1DOMTR10	19.3250	80/20	19.3250
315601	1CONETOE2SOL	1.2470	80/20	1.2470
315602	1HOLLOMANSOL	2.0352	80/20	2.0352
315606	3AA2-053SOLA	1.0580	80/20	1.0580
315607	3AA1-063SOLA	0.7676	80/20	0.7676
315608	3AA2-088SOLA	0.4520	80/20	0.4520
316020	AB2-059 C OP	1.1041	80/20	1.1041
316087	AB2-174 C	0.5444	80/20	0.5444
316096	AB2-100 C1	0.3709	80/20	0.3709
316098	AB2-100 C2	0.3709	80/20	0.3709
316129	AC1-054 C	3.4136	80/20	3.4136
316140	AB2-099 C (Suspended)	0.6361	80/20	0.6361
920591	AA2-165 C	0.1094	80/20	0.1094
922922	AB1-081 C OP	0.9368	80/20	0.9368
923991	AB2-040 C O1	3.7849	80/20	3.7849

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
925121	AB2-169 C	1.9670	80/20	1.9670
925591	AC1-034 C	4.5328	80/20	4.5328
926070	AC1-086 C	14.4531	80/20	14.4531
926201	AC1-098 C	5.2234	80/20	5.2234
926211	AC1-099 C	1.7504	80/20	1.7504
927024	AC1-189 C	8.6823	80/20	8.6823
927145	AC1-208 C	6.6740	80/20	6.6740
932631	AC2-084 C	7.4461	80/20	7.4461
933991	AD1-023 C	30.3473	80/20	30.3473
934331	AD1-057 C O1	6.8270	80/20	6.8270
934521	AD1-076 C	142.2721	80/20	142.2721
936361	AD2-046 C O1	2.8414	80/20	2.8414
936401	AD2-051 C O1	12.4324	80/20	12.4324
938221	AE1-035 C	0.5089	80/20	0.5089
939181	AE1-148 C	2.7729	80/20	2.7729
940571	AE2-044 C	2.9688	80/20	2.9688
940661	AE2-053 O1	1.0270	80/20	1.0270
941541	AE2-151 C (Withdrawn : 01/08/2021)	0.2076	80/20	0.2076
942471	AE2-260 C O1	5.3217	80/20	5.3217
943171	AE2-346 C	1.5265	80/20	1.5265
943911	AF1-059	5.3370	80/20	5.3370
944141	AF1-082	1.9085	80/20	1.9085
946281	AF1-292 C	0.6336	80/20	0.6336
957521	AF2-046 C	13.0429	80/20	13.0429
957821	AF2-076 C	7.2189	80/20	7.2189
957861	AF2-080 C	7.8856	80/20	7.8856
959511	AF2-242 C	12.3745	80/20	12.3745
960081	AF2-299 C	1.0679	80/20	1.0679
961671	AG1-007 C	1.0673	80/20	1.0673
961681	AG1-008 C	13.0690	80/20	13.0690
961931	AG1-036 C	1.2783	80/20	1.2783
961941	AG1-037 C	0.5452	80/20	0.5452
962331	AG1-082 C	2.1808	80/20	2.1808
962341	AG1-083 C	2.1808	80/20	2.1808
962351	AG1-084 C	2.1252	80/20	2.1252
962361	AG1-085 C	2.1252	80/20	2.1252
962571	AG1-106 C	4.0193	80/20	4.0193
963301	AG1-179 C	1.9954	80/20	1.9954
963311	AG1-180	0.9722	80/20	0.9722
964491	AG1-312 C O1	29.2197	80/20	29.2197
964501	AG1-313 C O1	3.9236	80/20	3.9236
964801	AG1-343 C	3.0699	80/20	3.0699
965291	AG1-394 C	0.9749	80/20	0.9749
965451	AG1-413 C O1	2.2435	80/20	2.2435
965601	AG1-428 C O1	1.6658	80/20	1.6658
965691	AG1-437 C O1	20.9082	80/20	20.9082
965701	AG1-438 C O1	20.9082	80/20	20.9082
965711	AG1-439 C O1	22.3695	80/20	22.3695
965721	AG1-440 C	2.8112	80/20	2.8112
965731	AG1-441 C	2.8112	80/20	2.8112
965741	AG1-442 O1	12.1965	80/20	12.1965
965751	AG1-443 O1	12.1965	80/20	12.1965

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965761	AG1-444 O1	11.9304	80/20	11.9304
965771	AG1-445	1.6242	80/20	1.6242
965781	AG1-446	1.6242	80/20	1.6242
966621	AG1-532 C	0.5766	80/20	0.5766
966751	AG1-546 C	7.7793	80/20	7.7793
966801	AG1-551 C	3.2918	80/20	3.2918
966811	AG1-552 C	1.3221	80/20	1.3221
WEC	WEC	0.2470	Confirmed LTF	0.2470
LGEE	LGEE	0.5026	Confirmed LTF	0.5026
CPL	CPL	2.6795	Confirmed LTF	2.6795
CBM-W2	CBM-W2	10.3309	Confirmed LTF	10.3309
NY	NY	0.1913	Confirmed LTF	0.1913
TVA	TVA	1.9138	Confirmed LTF	1.9138
SIGE	SIGE	0.1337	Confirmed LTF	0.1337
CBM-S2	CBM-S2	29.0650	Confirmed LTF	29.0650
CBM-S1	CBM-S1	0.4803	Confirmed LTF	0.4803
MEC	MEC	1.4476	Confirmed LTF	1.4476
LAGN	LAGN	2.3888	Confirmed LTF	2.3888
AA2-074	AA2-074	1.7703	LTF	1.7703
CBM-W1	CBM-W1	10.4589	Confirmed LTF	10.4589

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
169292715	314639	6TANGLEW	DVP	313851	6CITYDP2	DVP	1	DVP_P1-2: LN 2144	single	984.18	99.81	100.02	DC	2.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313719	3CHESTNUT	0.4452	80/20	0.4452
314582	3KELFORD	0.2021	80/20	0.2021
314589	3MURPHYS	0.0336	80/20	0.0336
314623	3WITAKRS	0.0808	80/20	0.0808
314639	6TANGLEW	1.6096	80/20	1.6096
315126	1ROARAP2	0.4481	80/20	0.4481
315128	1ROARAP4	0.4276	80/20	0.4276
315131	1EDGEEMA (Deactivation : 22/04/2019)	3.5171	80/20	3.5171
315132	1EDGEEMB (Deactivation : 22/04/2019)	3.5171	80/20	3.5171
315136	1ROSEMG1	0.7472	80/20	0.7472
315137	1ROSEMS1	0.4634	80/20	0.4634
315138	1ROSEMG2	0.3502	80/20	0.3502
315139	1GASTONA	1.0779	80/20	1.0779
315141	1GASTONB	1.0779	80/20	1.0779
315292	1DOMTR78	2.1737	80/20	2.1737
315293	1DOMTR9	11.2428	80/20	11.2428
315294	1DOMTR10	13.7780	80/20	13.7780
315601	1CONETOE2SOL	0.7159	80/20	0.7159
315602	1HOLLOMANSOL	1.0507	80/20	1.0507
315606	3AA2-053SOLA	0.5641	80/20	0.5641
315607	3AA1-063SOLA	0.4265	80/20	0.4265
315611	6Z1-036WIND	3.5746	80/20	3.5746
315614	AA2-178 C	3.7047	80/20	3.7047
316020	AB2-059 C OP	0.6141	80/20	0.6141
316140	AB2-099 C (Suspended)	0.3350	80/20	0.3350
920591	AA2-165 C	0.0598	80/20	0.0598
922922	AB1-081 C OP	0.5211	80/20	0.5211
925121	AB2-169 C	1.3503	80/20	1.3503
925591	AC1-034 C	2.5214	80/20	2.5214
926070	AC1-086 C	7.6830	80/20	7.6830
926201	AC1-098 C	2.7937	80/20	2.7937
926211	AC1-099 C	0.9362	80/20	0.9362
927024	AC1-189 C	5.0127	80/20	5.0127
927145	AC1-208 C	3.6065	80/20	3.6065
932631	AC2-084 C	3.9825	80/20	3.9825
933991	AD1-023 C	21.0909	80/20	21.0909
934331	AD1-057 C O1	3.7301	80/20	3.7301
934521	AD1-076 C	103.7561	80/20	103.7561
936401	AD2-051 C O1	6.4211	80/20	6.4211
938221	AE1-035 C	0.2627	80/20	0.2627

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940491	AE2-034 C	17.6114	80/20	17.6114
940571	AE2-044 C	1.6514	80/20	1.6514
941541	AE2-151 C (Withdrawn : 01/08/2021)	0.1082	80/20	0.1082
943171	AE2-346 C	0.8040	80/20	0.8040
944141	AF1-082	1.0616	80/20	1.0616
945711	AF1-236 C O1	192.8033	80/20	192.8033
957521	AF2-046 C	7.1317	80/20	7.1317
957531	AF2-047 C	41.8481	80/20	41.8481
957861	AF2-080 C	4.5527	80/20	4.5527
959511	AF2-242 C	8.1864	80/20	8.1864
961671	AG1-007 C	0.6096	80/20	0.6096
961681	AG1-008 C	7.1460	80/20	7.1460
961931	AG1-036 C	0.6832	80/20	0.6832
961941	AG1-037 C	0.2872	80/20	0.2872
962331	AG1-082 C	1.1486	80/20	1.1486
962341	AG1-083 C	1.1486	80/20	1.1486
962351	AG1-084 C	1.1082	80/20	1.1082
962361	AG1-085 C	1.1082	80/20	1.1082
962571	AG1-106 C	2.1366	80/20	2.1366
964491	AG1-312 C O1	16.1392	80/20	16.1392
964501	AG1-313 C O1	2.0761	80/20	2.0761
964801	AG1-343 C	1.7860	80/20	1.7860
965631	AG1-431	111.6230	80/20	111.6230
965691	AG1-437 C O1	13.8060	80/20	13.8060
965701	AG1-438 C O1	13.8060	80/20	13.8060
965711	AG1-439 C O1	12.8430	80/20	12.8430
965741	AG1-442 O1	8.0535	80/20	8.0535
965751	AG1-443 O1	8.0535	80/20	8.0535
965761	AG1-444 O1	6.8496	80/20	6.8496
966801	AG1-551 C	2.0783	80/20	2.0783
966811	AG1-552 C	0.7115	80/20	0.7115
966931	AG1-431A	83.8640	80/20	83.8640
WEC	WEC	0.1288	Confirmed LTF	0.1288
LGEE	LGEE	0.2626	Confirmed LTF	0.2626
CPLE	CPLE	1.5008	Confirmed LTF	1.5008
CBM-W2	CBM-W2	5.5373	Confirmed LTF	5.5373
NY	NY	0.1277	Confirmed LTF	0.1277
TVA	TVA	1.0360	Confirmed LTF	1.0360
SIGE	SIGE	0.0757	Confirmed LTF	0.0757
CBM-S2	CBM-S2	16.1507	Confirmed LTF	16.1507
CBM-S1	CBM-S1	0.2592	Confirmed LTF	0.2592
MEC	MEC	0.7643	Confirmed LTF	0.7643
LAGN	LAGN	1.2932	Confirmed LTF	1.2932
CBM-W1	CBM-W1	5.4257	Confirmed LTF	5.4257

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
169073405	314573	3EVERETS	DVP	314574	6EVERETS	DVP	2	DVP_P1-2: LN 2034-A	single	241.39	119.8	122.13	DC	5.63

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315292	1DOMTR78	1.8204	80/20	1.8204
315293	1DOMTR9	9.4154	80/20	9.4154
315294	1DOMTR10	11.5385	80/20	11.5385
315605	6W1-029WIND	0.3180	80/20	0.3180
315611	6Z1-036WIND	0.5044	80/20	0.5044
315614	AA2-178 C	1.1910	80/20	1.1910
925121	AB2-169 C	1.8853	80/20	1.8853
933991	AD1-023 C	12.9060	80/20	12.9060
934521	AD1-076 C	53.2715	80/20	53.2715
940491	AE2-034 C	5.6616	80/20	5.6616
941501	AE2-147 C	4.6512	80/20	4.6512
944871	AF1-152 C	1.5504	80/20	1.5504
945711	AF1-236 C O1	61.9810	80/20	61.9810
957531	AF2-047 C	13.4530	80/20	13.4530
959511	AF2-242 C	16.0650	80/20	16.0650
964491	AG1-312 C O1	18.6032	80/20	18.6032
965631	AG1-431	35.8838	80/20	35.8838
965691	AG1-437 C O1	9.9660	80/20	9.9660
965701	AG1-438 C O1	9.9660	80/20	9.9660
965741	AG1-442 O1	5.8135	80/20	5.8135
965751	AG1-443 O1	5.8135	80/20	5.8135
966801	AG1-551 C	5.6297	80/20	5.6297
966931	AG1-431A	26.9600	80/20	26.9600
G-007A	G-007A	0.1966	Confirmed LTF	0.1966
VFT	VFT	0.5289	Confirmed LTF	0.5289
CALDERWOOD	CALDERWOOD	0.2097	Confirmed LTF	0.2097
PRAIRIE	PRAIRIE	0.7181	Confirmed LTF	0.7181
CHEOAH	CHEOAH	0.2152	Confirmed LTF	0.2152
CBM-N	CBM-N	0.0960	Confirmed LTF	0.0960
COTTONWOOD	COTTONWOOD	0.7812	Confirmed LTF	0.7812
HAMLET	HAMLET	0.4712	Confirmed LTF	0.4712
GIBSON	GIBSON	0.1250	Confirmed LTF	0.1250
BLUEG	BLUEG	0.3854	Confirmed LTF	0.3854
TRIMBLE	TRIMBLE	0.1224	Confirmed LTF	0.1224
CATAWBA	CATAWBA	0.2254	Confirmed LTF	0.2254

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
163943649	314574	6EVERETS	DVP	304451	6GREENVILLE	CPL	1	DVP_P7-1: LN 2058-2181	tower	478.0	235.25	236.6	DC	6.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	2.9855	Adder	3.51
314539	3UNCAMP	2.4187	Adder	2.85
314541	3WATKINS	0.2950	Adder	0.35
314572	3EMPORIA	0.1716	Adder	0.2
314582	3KELFORD	0.2963	50/50	0.2963
314589	3MURPHYS	0.0602	50/50	0.0602
314594	6PLYMOTH	0.0896	50/50	0.0896
314632	6AYDLETOLD	0.6586	Adder	0.77
315131	1EDGEEMA (Deactivation : 22/04/2019)	9.5990	50/50	9.5990
315132	1EDGEEMB (Deactivation : 22/04/2019)	9.5990	50/50	9.5990
315136	1ROSEMG1	1.5370	50/50	1.5370
315137	1ROSEMS1	0.9531	50/50	0.9531
315138	1ROSEMG2	0.7203	50/50	0.7203
315139	1GASTONA	2.1216	50/50	2.1216
315141	1GASTONB	2.1216	50/50	2.1216
315292	1DOMTR78	1.6763	50/50	1.6763
315293	1DOMTR9	8.6700	50/50	8.6700
315294	1DOMTR10	10.6250	50/50	10.6250
315601	1CONETOE2SOL	2.1704	50/50	2.1704
315602	1HOLLOMANSOL	1.5332	50/50	1.5332
315606	3AA2-053SOLA	0.9398	50/50	0.9398
315611	6Z1-036WIND	0.6573	50/50	0.6573
315614	AA2-178 C	1.2997	50/50	1.2997
316088	AB2-174 E	2.7352	Adder	3.22
316097	AB2-100 E1	1.2133	Adder	1.43
316099	AB2-100 E2	1.2133	Adder	1.43
316103	AB2-015 C	3.5908	Adder	4.22
316104	AB2-015 E	2.9445	Adder	3.46
316140	AB2-099 C (Suspended)	0.5180	50/50	0.5180
316141	AB2-099 E (Suspended)	0.2220	50/50	0.2220
900672	V4-068 E	0.2092	50/50	0.2092
901082	W1-029 E	18.7397	Adder	22.05
913392	Y1-086 E	0.7676	Adder	0.9
916042	Z1-036 E (Suspended)	27.9147	50/50	27.9147
917122	Z2-027 E	0.3981	Adder	0.47
917332	Z2-043 E	0.8838	50/50	0.8838
917342	Z2-044 E	0.2085	Adder	0.25
917512	Z2-088 E OP1	12.8742	50/50	12.8742
918492	AA1-063AE OP	2.0182	Adder	2.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
918512	AA1-065 E OP	4.3514	50/50	4.3514
918532	AA1-067 E	1.5974	50/50	1.5974
919692	AA2-053 E OP	2.4457	50/50	2.4457
919702	AA2-057 E OP	1.3810	Adder	1.62
920042	AA2-088 E OP	5.1904	Adder	6.11
920592	AA2-165 E	0.1898	Adder	0.22
920692	AA2-178 E	3.5306	50/50	3.5306
922923	AB1-081 E OP	1.4211	Adder	1.67
923262	AB1-132 C OP (Suspended)	10.2690	50/50	10.2690
923263	AB1-132 E OP (Suspended)	4.4010	50/50	4.4010
923573	AB1-173 E OP	0.4656	Adder	0.55
923832	AB2-022 E	0.4333	Adder	0.51
923991	AB2-040 C O1	3.2516	Adder	3.83
923992	AB2-040 E O1	2.6604	Adder	3.13
924152	AB2-059 E OP	2.0132	Adder	2.37
925121	AB2-169 C	1.6064	50/50	1.6064
925122	AB2-169 E	9.1375	50/50	9.1375
925591	AC1-034 C	2.5313	Adder	2.98
925592	AC1-034 E	1.9096	Adder	2.25
926070	AC1-086 C	15.1223	50/50	15.1223
926071	AC1-086 E	6.8827	50/50	6.8827
926201	AC1-098 C	3.8972	50/50	3.8972
926202	AC1-098 E	2.3218	50/50	2.3218
926211	AC1-099 C	1.3060	50/50	1.3060
926212	AC1-099 E	0.7670	50/50	0.7670
927024	AC1-189 C	15.5186	50/50	15.5186
927025	AC1-189 E	7.7302	50/50	7.7302
927145	AC1-208 C	4.2602	Adder	5.01
927146	AC1-208 E	1.8840	Adder	2.22
932631	AC2-084 C	5.5556	50/50	5.5556
932632	AC2-084 E	2.7364	50/50	2.7364
933991	AD1-023 C	13.4949	50/50	13.4949
933992	AD1-023 E	7.3467	50/50	7.3467
934331	AD1-057 C O1	8.8818	50/50	8.8818
934332	AD1-057 E O1	4.7379	50/50	4.7379
934521	AD1-076 C	54.8301	50/50	54.8301
934522	AD1-076 E	27.9194	50/50	27.9194
936401	AD2-051 C O1	9.4142	50/50	9.4142
936402	AD2-051 E O1	4.0424	50/50	4.0424
938221	AE1-035 C	0.3834	50/50	0.3834
938222	AE1-035 E	1.1966	50/50	1.1966
938535	AE1-072 C	5.1769	Adder	6.09
938536	AE1-072 E	2.6669	Adder	3.14
938771	AE1-103 C	1.3869	Adder	1.63
938772	AE1-103 E	1.9153	Adder	2.25
940491	AE2-034 C	6.1786	50/50	6.1786
940492	AE2-034 E	2.6480	50/50	2.6480
940571	AE2-044 C	1.6579	Adder	1.95
940572	AE2-044 E	0.7105	Adder	0.84
941501	AE2-147 C	6.4620	Adder	7.6
941502	AE2-147 E	4.3080	Adder	5.07

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
941541	AE2-151 C (Withdrawn : 01/08/2021)	0.1618	50/50	0.1618
941542	AE2-151 E (Withdrawn : 01/08/2021)	0.5523	50/50	0.5523
942471	AE2-260 C O1	5.7670	Adder	6.78
942472	AE2-260 E O1	8.1798	Adder	9.62
943171	AE2-346 C	1.2432	50/50	1.2432
943172	AE2-346 E	0.5328	50/50	0.5328
944141	AF1-082	1.0658	Adder	1.25
944871	AF1-152 C	2.1540	Adder	2.53
944872	AF1-152 E	1.4360	Adder	1.69
945711	AF1-236 C O1	67.6412	50/50	67.6412
945712	AF1-236 E O1	41.7792	50/50	41.7792
946281	AF1-292 C	0.5921	Adder	0.7
946282	AF1-292 E	0.3992	Adder	0.47
957521	AF2-046 C	12.3552	50/50	12.3552
957522	AF2-046 E	6.2148	50/50	6.2148
957531	AF2-047 C	14.6816	50/50	14.6816
957532	AF2-047 E	7.3849	50/50	7.3849
957821	AF2-076 C	1.7985	Adder	2.12
957822	AF2-076 E	1.1990	Adder	1.41
957861	AF2-080 C	14.0946	50/50	14.0946
957862	AF2-080 E	6.2481	50/50	6.2481
959511	AF2-242 C	13.2102	50/50	13.2102
959512	AF2-242 E	10.2746	50/50	10.2746
960081	AF2-299 C	0.9979	Adder	1.17
960082	AF2-299 E	0.6653	Adder	0.78
961091	AF2-400 C	0.1939	Adder	0.23
961092	AF2-400 E	0.3181	Adder	0.37
961671	AG1-007 C	1.8117	50/50	1.8117
961672	AG1-007 E	1.0117	50/50	1.0117
961681	AG1-008 C	12.3800	50/50	12.3800
961682	AG1-008 E	6.1900	50/50	6.1900
961851	AG1-027 C	2.9209	Adder	6.48
961852	AG1-027 E	1.6147	Adder	3.58
961931	AG1-036 C	1.1069	50/50	1.1069
961932	AG1-036 E	0.7380	50/50	0.7380
961941	AG1-037 C	0.4440	50/50	0.4440
961942	AG1-037 E	0.2960	50/50	0.2960
962331	AG1-082 C	1.7760	50/50	1.7760
962332	AG1-082 E	1.1840	50/50	1.1840
962341	AG1-083 C	1.7760	50/50	1.7760
962342	AG1-083 E	1.1840	50/50	1.1840
962351	AG1-084 C	1.6569	50/50	1.6569
962352	AG1-084 E	1.1046	50/50	1.1046
962361	AG1-085 C	1.6569	50/50	1.6569
962362	AG1-085 E	1.1046	50/50	1.1046
962571	AG1-106 C	4.2054	50/50	4.2054
962572	AG1-106 E	1.9071	50/50	1.9071
964491	AG1-312 C O1	20.1914	50/50	20.1914
964492	AG1-312 E O1	5.0478	50/50	5.0478
964501	AG1-313 C O1	3.3352	50/50	3.3352
964502	AG1-313 E O1	2.2235	50/50	2.2235

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
964801	AG1-343 C	3.6197	50/50	3.6197
964802	AG1-343 E	2.8440	50/50	2.8440
965291	AG1-394 C	1.2042	50/50	1.2042
965292	AG1-394 E	0.8028	50/50	0.8028
965631	AG1-431	39.1607	50/50	39.1607
965691	AG1-437 C O1	10.5492	50/50	10.5492
965692	AG1-437 E O1	7.0328	50/50	7.0328
965701	AG1-438 C O1	10.5492	50/50	10.5492
965702	AG1-438 E O1	7.0328	50/50	7.0328
965711	AG1-439 C O1	38.9340	50/50	38.9340
965712	AG1-439 E O1	25.9560	50/50	25.9560
965741	AG1-442 O1	6.1537	50/50	6.1537
965751	AG1-443 O1	6.1537	50/50	6.1537
965761	AG1-444 O1	20.7648	50/50	20.7648
966621	AG1-532 C	0.2856	Adder	0.63
966622	AG1-532 E	0.1904	Adder	0.42
966751	AG1-546 C	2.7754	Adder	6.16
966752	AG1-546 E	1.4892	Adder	3.31
966801	AG1-551 C	4.5154	50/50	4.5154
966802	AG1-551 E	1.9352	50/50	1.9352
966811	AG1-552 C	0.5563	Adder	1.23
966812	AG1-552 E	0.2384	Adder	0.53
966931	AG1-431A	29.4220	50/50	29.4220
G-007A	G-007A	1.1364	Confirmed LTF	1.1364
VFT	VFT	3.0250	Confirmed LTF	3.0250
CALDERWOOD	CALDERWOOD	1.3349	Confirmed LTF	1.3349
PRAIRIE	PRAIRIE	4.5383	Confirmed LTF	4.5383
AC1-131	AC1-131	5.3107	LTF	5.3107
CHEOAH	CHEOAH	1.3689	Confirmed LTF	1.3689
CBM-N	CBM-N	0.5508	Confirmed LTF	0.5508
COTTONWOOD	COTTONWOOD	4.9854	Confirmed LTF	4.9854
HAMLET	HAMLET	3.1098	Confirmed LTF	3.1098
GIBSON	GIBSON	0.7851	Confirmed LTF	0.7851
BLUEG	BLUEG	2.4096	Confirmed LTF	2.4096
TRIMBLE	TRIMBLE	0.7641	Confirmed LTF	0.7641
CATAWBA	CATAWBA	1.4357	Confirmed LTF	1.4357

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
AA1-063	Huntsville (Cabin Creek) 69kV	Withdrawn
AA1-063A	Carolina–Seaboard 115kV	In Service
AA1-065	Earleys 230kV	In Service
AA1-067	Everetts 34.5kV	In Service
AA2-053	Carolina-Jackson 115kV	In Service
AA2-057	Hornertown-Whitakers 115kV	In Service
AA2-074	CPL- PJM	Confirmed
AA2-088	Boykins- Handsome 115kV	In Service
AA2-165	Hornertown-Whitakers 115kV	In Service
AA2-178	Mackeys 230kV	Partially in Service - Under Construction
AB1-081	Anaconda-Mayo Dunbar 115kV	In Service
AB1-132	Thelma 230kV	Suspended
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
AB2-059	Benson-Dunbar 115kV	Partially in Service - Under Construction
AB2-099	Ahoskie 34.5kV	Suspended
AB2-100	Clubhouse-Lakeview 230kV	Under Construction
AB2-169	Pantago-Five Points 115kV	Partially in Service - Under Construction
AB2-174	Emporia-Trego 115kV	In Service
AC1-034	Heartsease DP - Mayo Dunbar 115kV	Engineering and Procurement
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-CPL	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
AD1-057	Hornertown-Hathaway 230 kV	Active
AD1-076	Trowbridge 230 kV	Active
AD2-046	Boydton DP-Kerr Dam 115 kV	Active
AD2-051	Earleys – Northampton 230kV	Active
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
AE1-148	Kerr Dam-Ridge Rd 115 kV	Active

Queue Number	Project Name	Status
AE2-034	Mackeys 230 kV	Active
AE2-044	Anaconda-Dunbar 115 kV	Active
AE2-053	Kerr Dam-Ridge Road 115 kV	Active
AE2-147	Swamp 230 kV	Active
AE2-151	Earleys 34.5kV	Withdrawn
AE2-260	Clubhouse 230 kV	Active
AE2-346	Ahoskie 34.5 kV	Active
AF1-059	Brodnax-South Hill 115 kV	Active
AF1-082	Heartsease-Mayo Dunbar DP	Active
AF1-152	Swamp 230 kV	Active
AF1-236	Mackeys 230 kV	Active
AF1-292	Fields 34.5kV	Active
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
AF2-242	Wharton 115 kV	Active
AF2-299	Fields 34.5 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	Ahoskie 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
AG1-179	Brunswick 69 kV	Active
AG1-180	Brunswick 69 kV	Active
AG1-312	Earleys-Cashie 230 kV	Active
AG1-313	Jackson DP-Occoneechee 115 kV	Active
AG1-343	Boykins-Murphy 115 kV	Active
AG1-394	Boykins 34.5 kV	Active
AG1-413	South Hill-Brodnax 115 kV	Active
AG1-428	Danieltown 69 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
AG1-532	Fields 34.5 kV	Active
AG1-546	Ebony-Elams Road 115 kV	Active
AG1-551	Parmele 12.5 kV	Active

Queue Number	Project Name	Status
AG1-552	Carolina 13.2 kV	Active
V4-068	Murphy's 34.5kV	In Service
W1-029	Winfall 230kV	In Service
Y1-086	Morgans Corner	In Service
Z1-036	WinFall-Chowan 230kV	Suspended
Z2-027	Pasquotank 34.5kV	In Service
Z2-043	Kelford 34.5kV	In Service
Z2-044	Whitakers 34.5kV	In Service
Z2-088	Tarboro-Everetts 230kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-2: LN 246-A	CONTINGENCY 'DVP_P1-2: LN 246-A' OPEN BRANCH FROM BUS 314537 TO BUS 957820 CKT 1 /* 6SUFFOLK 230.00 - AF2-076 230.00 END
DVP_P1-2: LN 2177	CONTINGENCY 'DVP_P1-2: LN 2177' OPEN BRANCH FROM BUS 313701 TO BUS 314609 CKT 1 /* 6CHINQUAPIN 230.00 - 6TARBORO 230.00 OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 2 /* 3TARBORO 115.00 - 6TARBORO 230.00 END
DVP_P1-2: LN 2167	CONTINGENCY 'DVP_P1-2: LN 2167' OPEN BRANCH FROM BUS 313845 TO BUS 314564 CKT 1 /* 6HATHAWAY 230.00 - 6EDGECOM 230.00 END
DVP_P1-2: LN 218	CONTINGENCY 'DVP_P1-2: LN 218' OPEN BRANCH FROM BUS 304451 TO BUS 314574 CKT 1 /* 6GREENVILE T230.00 - 6EVERETS 230.00 END
DVP_P4-2: 2020T2144	CONTINGENCY 'DVP_P4-2: 2020T2144' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND: 6ECITYDP2 230.00 OPEN BUS 314639 /* ISLAND: 6TANGLEW 230.00 OPEN BUS 917122 /* ISLAND: Z2-027 E 230.00 OPEN BRANCH FROM BUS 313713 TO BUS 314651 CKT 1 /* 6SWAMP 230.00 - 6WINFALL 230.00 END
DVP_P1-2: LN 2092	CONTINGENCY 'DVP_P1-2: LN 2092' OPEN BRANCH FROM BUS 313714 TO BUS 314662 CKT 1 /* 6PERQUIMANS 230.00 - 6S HERTFORD 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND: 6S HERTFORD 230.00 END

Contingency Name	Contingency Definition
DVP_P1-2: LN 2034-A	CONTINGENCY 'DVP_P1-2: LN 2034-A' OPEN BRANCH FROM BUS 314569 TO BUS 964490 CKT 1 /* 6EARLEYS 230.00 - AG1-312 TAP 230.00 END
DVP_P1-2: LN 2034-B	CONTINGENCY 'DVP_P1-2: LN 2034-B' OPEN BRANCH FROM BUS 965690 TO BUS 964490 CKT 1 /* AG1-437 TAP 230.00 - AG1-312 TAP 230.00 END
DVP_P1-2: LN 2034-E	CONTINGENCY 'DVP_P1-2: LN 2034-E' OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* 3TRWBRDG2 115.00 - 6TRWBRDG 230.00 OPEN BRANCH FROM BUS 933990 TO BUS 314616 CKT 1 /* AD1-023 TAP 230.00 - 6TRWBRDG 230.00 END
Base Case	
DVP_P1-2: LN 2144	CONTINGENCY 'DVP_P1-2: LN 2144' OPEN BRANCH FROM BUS 313713 TO BUS 314651 CKT 1 /* 6SWAMP 230.00 - 6WINFALL 230.00 END
DVP_P1-2: LN 167	CONTINGENCY 'DVP_P1-2: LN 167' OPEN BRANCH FROM BUS 314613 TO BUS 314616 CKT 1 /* 3TRWBRDG 115.00 - 6TRWBRDG 230.00 OPEN BRANCH FROM BUS 314613 TO BUS 314621 CKT 1 /* 3TRWBRDG 115.00 - 3WEYRHAEUSER115.00 OPEN BRANCH FROM BUS 314621 TO BUS 314783 CKT 2 /* 3WEYRHAEUSER115.00 - 1WEYRHBI 13.800 END
DVP_P7-1: LN 2058-2181	CONTINGENCY 'DVP_P7-1: LN 2058-2181' /* . OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 OPEN BRANCH FROM BUS 313844 TO BUS 313845 CKT 2 /* 3HATHAWAY 115.00 - 6HATHAWAY 230.00 OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END

12 Short Circuit Analysis

The following Breakers are overdutied:

None.

12.1 System Reinforcements - Short Circuit

None.

13 Affected Systems

13.1 TVA

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

13.2 Duke Energy Progress

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

14 Attachment 1: One Line Diagram