Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-007

TAR RIVER 12.5 KV

7.7 MW Capacity / 12 MW Energy

January 2021

Table of Contents

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 Edgecombe County, North Carolina. The installed facilities will have a total capability of 12 MW with 7.7 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 15, 2021. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-007
Project Name	TAR RIVER 12.5 KV
State	North Carolina
County	Edgecombe
Transmission Owner	Dominion
MFO	12
MWE	12
MWC	7.7
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

AG1-007 will interconnect with the Dominion transmission system at the Tar River 115 kV substation.

5 Cost Summary

The AG1-007 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$ 3,293,884
Total System Network Upgrade Costs	$570,000,000[1]
Total Costs	$573,293,884

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

Utility Provided Attachment Facilities -193,884.00

The Interconnection Facilities required to be provided by the Utility will include:

New Attachment Facilities for 12 MWac of Generation

- Installation of five (5) new poles and guying needed
- Installation of approximately 300 feet of three (3) phase overhead 477 Al. Primary / 246.9 Al. Neutral conductor
- Installation of G & W Viper Recloser with a SEL651R-2 Recloser Control
- Power Quality Monitor (SEL-735 or equivalent device) at the Point of Common Coupling with all required metering/relay functionality
- Transformer and secondary voltage conductors to provide source voltage for the Utility owned Recloser, PQ Monitor, Metering Equipment, and Transfer Trip Equipment (if required)
- All metering needed for interconnection of generation and auxiliary load
  One Disconnect Switch at the Point-of-Interconnection

The estimated cost of the installation of the new attachment facilities to provide the interconnection is **$181,200 +7%tax = 193,884.00**

In addition to the onetime cost equal to the estimated cost of the new attachment facilities there will also be an ongoing monthly charge for the operation and maintenance cost of the attachment facilities equal to 0.44% of the estimated cost of the new attachment facilities (i.e. $181,200 x 0.0044 = $706.68 per month).

The Utility will bill the Interconnect Customer the actual amount for all construction work after the work has been completed and subtract any upfront payments from the total.

Utility Provided Distribution Upgrades – $3,100,00.00

IC proposes to build a 12 MW solar facility. Based on the location the solar site would interconnect to Dominion Energy's Tar River Substation with a new 12.5kV circuit. The site is located approximately 3.4 miles in circuit length away from the Tar River Substation. This facility would be the second DER connected to the transformer; existing NC13039 – 5 MW site – is already energized on Cir 715. The conductor between the substation and the interconnect site will consist of 477Al and UG 1000MCM. Due to the size of generation on the circuit, transfer trip will need to be installed between the interconnect recloser and the breaker.

There is inadequate transformer capacity for this 12 MW facility – a downsize to 9.4MW will be required. 13.4MVA ONAN + 1MW Light Load = 14.4MW DG capacity for the Tar River Substation Tx #3.

- Build new circuit Get-A-Way out of the Tar River Substation
- Overbuild existing Cir 715 with 477 Al from the station to the POI – Approximately 3.4 miles.
- Reconductor Cir 715 from pole O2220QO7100 to pole O2222GD7600 from 1/0 Al to 477Al – approximately 2.0 miles.
- Install 1000 MCM Al. Cable for the Airport Runway area – O2220RN1000 to O2220QO7100 – approximately 575 feet
- Move all taps on circuit 715 between Tar River Substation and POI at O2222GD7600 to new overbuild circuit
- Move fused taps at O2221LI3800 and O2221KJ7400 to A phase during transfer to New Circuit
- Install new load-break tie switch on the double-build near the station.
- Install new load-break tie switch on the double-build north of the airport runway underground cable.
- Line transposition will be required. .

Utility Provided Substation Upgrades - $Not Available at this time

Interconnection Customer Requirements (to include but not limited to)

- Installation of all conductors between the generating facility and POI
- Installation of pad mounted transformers
- Installation of a three-phase interruption device
- Installation of all generator breakers and associated equipment
- Communication lines for all metering
- Communication circuit(s) for Transfer Trip Scheme between the DG site and Substation, and between the DG site and inline recloser(s)
- Isolating devices that can be locked and tagged to isolate the IC facility from the ITO
- Obtain any required right-of-way between the ITO's existing facilities and the Point of Interconnection
- Obtain any required right-of-way for the construction of UTILITY facilities necessary for the interconnection of this generator.
- Provide and maintain a telephone line (POTS) to the UTILITY metering equipment.
- Metering to report real-time to PJM is required when the generation capacity is 10 MW or more total on the circuit.
- All ICs must provide generator status and instantaneous MW output to PJM per Manual 14D of the PJM OATT via communication links when the aggregate generation capacity reaches 10MW or more on a circuit. This communication medium is installed, owned, and maintained by the IC. Contact PJM for additional details concerning the requirement [PJM System Planning Division @ (610) 666-8980]

Preliminary Distribution Upgrades only plus attachments equal estimated $3,293,884.00

Estimated time for engineering, material acquisition, and construction: TBD months from the execution of the SGIA and payment of estimated charges.

Additional studies (System Impact and Facilities) may identify additional Distribution and Transmission system protection requirements that would be provided as Upgrades at the IC's expense. **These studies will also further refine the costs and construction time estimates.**

7 Schedule

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

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

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

8 Transmission Owner Analysis

Dominion assessed the impact of the proposed AG1-007 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 AG1-007 was evaluated as a 12.0 MW (Capacity 7.7 MW) injection at the Tar River 115 kV substation in the Dominion area. Project AG1-007 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-007 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

11.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
163437700	314554	3BTLEBRO	115.0	DVP	304223	3ROCKYMT115T	115.0	CPLE	1	DVP_P7-1: LN 2058-2181	tower	164.0	282.4	283.59	DC	1.94

11.4 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
168901451	314564	6EDGECOM	230.0	DVP	313845	6HATHAWAY	230.0	DVP	1	DVP_P1-2: LN 218	operation	441.799987793	110.39	112.2	DC	7.97

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
163437700	1	3BTLEBRO 115.0 kV - 3ROCKYMT115T 115.0 kV Ckt 1	**DVP** **dom-007 (1179) : Build new 500 kV line between Everetts and Suffolk.** **Project Type : CON** **Cost : $570,000,000** **Time Estimate : 48-60 Months** **DEP** **The external (i.e. Non-PJM) Transmission Owner, DEP, will not evaluate this violation until the impact study phase.** **Scope: Reconductor the circuit to 1590 ACSR will bring the rating to 185/205/214 MVA. Upgrading the terminal equipment at Rocky Mount will bring the rating to 301/301/301 MVA (Limited by 1590 ACSR conductor).** **Project Type: FAC** **Cost: TBD** **Time Estimate: 36 Months** **Note 1: Mitigations have been identified to achieve a DEP end rating of 301/301/301 MVA. However, no queue customer has yet officially agreed to construct the upgrade. Therefore, no construction plans have been put in place to date.** **Note 2: PJM is coordinating with Duke Energy Progress (DEP) and Dominion Energy (DVP) to evaluate remedies to alleviate the higher loading seen in the AG1 study on the Battleboro to Rocky Mountain 115 kV line. Reinforcements for the PJM queue project driving the need for this upgrade have been scoped while the best solution for the loading seen in AG1 is still being evaluated by both DEP and DVP.**	$570,000,000
			TOTAL COST	**$570,000,000**

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
163437700	314554	3BTLEBRO	DVP	304223	3ROCKYMT115T	CPLE	1	DVP_P7-1: LN 2058-2181	tower	164.0	282.4	283.59	DC	1.94

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
313506	AB1-173 C OP	3.1181	Adder	3.67
313719	3CHESTNUT	2.4261	50/50	2.4261
314541	3WATKINS	0.2172	Adder	0.26
314572	3EMPORIA	0.1704	Adder	0.2
314582	3KELFORD	0.3112	50/50	0.3112
314623	3WITAKRS	0.5240	50/50	0.5240
315126	1ROARAP2	0.8712	50/50	0.8712
315128	1ROARAP4	0.8314	50/50	0.8314
315131	**1EDGECMA (Deactivation : 22/04/2019)**	**12.5808**	**50/50**	**12.5808**
315132	**1EDGECMB (Deactivation : 22/04/2019)**	**12.5808**	**50/50**	**12.5808**
315136	1ROSEMG1	1.5086	50/50	1.5086
315137	1ROSEMS1	0.9355	50/50	0.9355
315138	1ROSEMG2	0.7070	50/50	0.7070
315139	1GASTONA	1.9383	50/50	1.9383
315141	1GASTONB	1.9383	50/50	1.9383
315293	1DOMTR9	2.0513	Adder	2.41
315294	1DOMTR10	2.5139	Adder	2.96
315601	1CONETOE2SOL	1.1895	50/50	1.1895
315606	3AA2-053SOLA	0.9246	50/50	0.9246
316020	AB2-059 C OP	4.4268	50/50	4.4268
316088	AB2-174 E	2.8075	Adder	3.3
316097	AB2-100 E1	1.0834	Adder	1.27
316099	AB2-100 E2	1.0834	Adder	1.27
316103	AB2-015 C	2.5912	Adder	3.05
316104	AB2-015 E	2.1248	Adder	2.5
316129	AC1-054 C	2.5555	Adder	3.01
316140	**AB2-099 C (Suspended)**	**0.2729**	**Adder**	**0.32**
316141	**AB2-099 E (Suspended)**	**0.1170**	**Adder**	**0.14**
900672	V4-068 E	0.1280	Adder	0.15
917332	Z2-043 E	0.9284	50/50	0.9284
917342	Z2-044 E	1.4235	50/50	1.4235
917512	Z2-088 E OP1	7.0561	50/50	7.0561
918492	AA1-063AE OP	2.0088	Adder	2.36
918512	AA1-065 E OP	1.4796	Adder	1.74
918532	AA1-067 E	0.2544	Adder	0.3
919692	AA2-053 E OP	2.4062	50/50	2.4062
919702	AA2-057 E OP	7.2586	50/50	7.2586
920042	AA2-088 E OP	4.1496	Adder	4.88
920591	AA2-165 C	0.3257	50/50	0.3257

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
920592	AA2-165 E	0.9976	50/50	0.9976
922922	AB1-081 C OP	3.7561	50/50	3.7561
922923	AB1-081 E OP	10.2031	50/50	10.2031
923262	**AB1-132 C OP (Suspended)**	**9.3820**	**50/50**	**9.3820**
923263	**AB1-132 E OP (Suspended)**	**4.0208**	**50/50**	**4.0208**
923573	AB1-173 E OP	0.4862	Adder	0.57
923991	AB2-040 C O1	3.3959	Adder	4.0
923992	AB2-040 E O1	2.7785	Adder	3.27
924152	AB2-059 E OP	14.4544	50/50	14.4544
925122	AB2-169 E	1.8344	Adder	2.16
925591	AC1-034 C	18.1743	50/50	18.1743
925592	AC1-034 E	13.7104	50/50	13.7104
925785	AC1-054 E	1.1772	Adder	1.38
926070	AC1-086 C	13.8161	50/50	13.8161
926071	AC1-086 E	6.2881	50/50	6.2881
926201	AC1-098 C	8.8191	50/50	8.8191
926202	AC1-098 E	5.2539	50/50	5.2539
926211	AC1-099 C	2.9553	50/50	2.9553
926212	AC1-099 E	1.7357	50/50	1.7357
927024	AC1-189 C	6.2804	50/50	6.2804
927025	AC1-189 E	3.1284	50/50	3.1284
927145	AC1-208 C	14.0422	50/50	14.0422
927146	AC1-208 E	6.2100	50/50	6.2100
932631	AC2-084 C	12.5719	50/50	12.5719
932632	AC2-084 E	6.1921	50/50	6.1921
933991	AD1-023 C	4.0327	Adder	4.74
933992	AD1-023 E	2.1954	Adder	2.58
934331	AD1-057 C O1	10.5448	50/50	10.5448
934332	AD1-057 E O1	5.6251	50/50	5.6251
936401	AD2-051 C O1	3.2781	Adder	3.86
936402	AD2-051 E O1	1.4076	Adder	1.66
938222	AE1-035 E	0.4069	Adder	0.48
940571	AE2-044 C	11.9036	50/50	11.9036
940572	AE2-044 E	5.1016	50/50	5.1016
941542	**AE2-151 E (Withdrawn : 01/08/2021)**	**0.2794**	**Adder**	**0.33**
942471	AE2-260 C O1	5.1280	Adder	6.03
942472	AE2-260 E O1	7.2735	Adder	8.56
943171	AE2-346 C	0.6550	Adder	0.77
943172	AE2-346 E	0.2807	Adder	0.33
944141	AF1-082	7.6523	50/50	7.6523
946281	AF1-292 C	0.5743	Adder	0.68
946282	AF1-292 E	0.3872	Adder	0.46
957521	AF2-046 C	7.3234	Adder	8.62
957522	AF2-046 E	3.6837	Adder	4.33
957861	AF2-080 C	5.7041	50/50	5.7041
957862	AF2-080 E	2.5286	50/50	2.5286
959511	AF2-242 C	2.4228	Adder	2.85
959512	AF2-242 E	1.8844	Adder	2.22
960081	AF2-299 C	0.9680	Adder	1.14
960082	AF2-299 E	0.6453	Adder	0.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
961091	AF2-400 C	0.1399	Adder	0.16
961092	AF2-400 E	0.2296	Adder	0.27
961671	AG1-007 C	1.2437	50/50	1.2437
961672	AG1-007 E	0.6945	50/50	0.6945
961681	AG1-008 C	3.8892	Adder	8.63
961682	AG1-008 E	1.9446	Adder	4.32
961931	AG1-036 C	0.3255	Adder	0.72
961932	AG1-036 E	0.2170	Adder	0.48
961941	AG1-037 C	0.1240	Adder	0.28
961942	AG1-037 E	0.0826	Adder	0.18
962331	AG1-082 C	0.4959	Adder	1.1
962332	AG1-082 E	0.3306	Adder	0.73
962341	AG1-083 C	0.4959	Adder	1.1
962342	AG1-083 E	0.3306	Adder	0.73
962351	AG1-084 C	0.4442	Adder	0.99
962352	AG1-084 E	0.2961	Adder	0.66
962361	AG1-085 C	0.4442	Adder	0.99
962362	AG1-085 E	0.2961	Adder	0.66
962571	AG1-106 C	3.8421	50/50	3.8421
962572	AG1-106 E	1.7424	50/50	1.7424
964491	AG1-312 C O1	3.5814	Adder	7.95
964492	AG1-312 E O1	0.8953	Adder	1.99
964501	AG1-313 C O1	2.8627	50/50	2.8627
964502	AG1-313 E O1	1.9084	50/50	1.9084
964801	AG1-343 C	1.2896	Adder	2.86
964802	AG1-343 E	1.0133	Adder	2.25
965291	AG1-394 C	0.4384	Adder	0.97
965292	AG1-394 E	0.2923	Adder	0.65
965691	AG1-437 C O1	1.7375	Adder	3.86
965692	AG1-437 E O1	1.1583	Adder	2.57
965701	AG1-438 C O1	1.7375	Adder	3.86
965702	AG1-438 E O1	1.1583	Adder	2.57
965711	AG1-439 C O1	21.3390	50/50	21.3390
965712	AG1-439 E O1	14.2260	50/50	14.2260
965741	AG1-442 O1	1.0135	Adder	2.25
965751	AG1-443 O1	1.0135	Adder	2.25
965761	AG1-444 O1	11.3808	50/50	11.3808
966621	AG1-532 C	0.2770	Adder	0.61
966622	AG1-532 E	0.1847	Adder	0.41
966751	AG1-546 C	3.1668	Adder	7.03
966752	AG1-546 E	1.6992	Adder	3.77
966801	AG1-551 C	0.4089	Adder	0.91
966802	AG1-551 E	0.1753	Adder	0.39
966811	AG1-552 C	1.3832	50/50	1.3832
966812	AG1-552 E	0.5928	50/50	0.5928
G-007A	G-007A	0.4867	Confirmed LTF	0.4867
VFT	VFT	1.2964	Confirmed LTF	1.2964
CALDERWOOD	CALDERWOOD	0.7087	Confirmed LTF	0.7087
PRAIRIE	PRAIRIE	2.4719	Confirmed LTF	2.4719
CHEOAH	CHEOAH	0.7262	Confirmed LTF	0.7262
CBM-N	CBM-N	0.2340	Confirmed LTF	0.2340
COTTONWOOD	COTTONWOOD	2.6313	Confirmed LTF	2.6313

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
HAMLET	HAMLET	1.5263	Confirmed LTF	1.5263
GIBSON	GIBSON	0.4390	Confirmed LTF	0.4390
BLUEG	BLUEG	1.3558	Confirmed LTF	1.3558
TRIMBLE	TRIMBLE	0.4307	Confirmed LTF	0.4307
CATAWBA	CATAWBA	0.7581	Confirmed LTF	0.7581

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
AA1-063A	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
AA2-088	Boykins-Handsome 115kV	In Service
AA2-165	Hornertown-Whitakers 115kV	In Service
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
AB2-040	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
AC1-189	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
AD2-051	Earleys – Northampton 230kV	Active
AE1-035	Earleys 230 kV	Partially in Service - Under Construction
AE2-044	Anaconda-Dunbar 115 kV	Active
AE2-151	Earleys 34.5kV	Withdrawn
AE2-260	Clubhouse 230 kV	Active
AE2-346	Ahoskie 34.5 kV	Active
AF1-082	Heartsease-Mayo Dunbar DP	Active
AF1-292	Fields 34.5kV	Active
AF2-046	Tunis-Mapleton 115 kV	Active
AF2-080	Chinquapin-Everetts 230 kV	Active
AF2-242	Wharton 115 kV	Active
AF2-299	Fields 34.5 kV	Active

Queue Number	Project Name	Status
AF2-400	Franklin 13.2 kV	Engineering and Procurement
AG1-007	Tar River 12.5 kV	Active
AG1-008	Tunis-Mapleton 115 kV	Active
AG1-036	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
AG1-312	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
AG1-437	Cashie-Earleys 230 kV	Active
AG1-438	Cashie-Earleys 230 kV	Active
AG1-439	Chinquapin 230 kV	Active
AG1-442	Cashie-Earleys 230 kV	Active
AG1-443	Cashie-Earleys 230 kV	Active
AG1-444	Chinquapin 230 kV	Active
AG1-532	Fields 34.5 kV	Active
AG1-546	Ebony-Elams Road 115 kV	Active
AG1-551	Parmele 12.5 kV	Active
AG1-552	Carolina 13.2 kV	Active
V4-068	Murphy's 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 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_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).