



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-388
DUNNSVILLE 34.5 KV
12 MW Capacity / 20 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 Essex County, Virginia. The installed facilities will have a total capability of 20 MW with 12 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 01, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-388
Project Name	DUNNSVILLE 34.5 KV
State	Virginia
County	Essex
Transmission Owner	Dominion
MFO	20
MWE	20
MWC	12
Fuel	Solar
Basecase Study Year	2024

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

4 Point of Interconnection

4.1 Primary Point of Interconnection

AG1-388 “Dunnsville 34.5 kV” will interconnect within the Old Dominion Electric Cooperative (ODEC) system which interconnects with the Dominion transmission system at the Dunnsville 230 kV substation.

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

4.2 Secondary Point of Interconnection

There is no secondary point of interconnection specified for AG1-388.

5 Cost Summary

The costs associated with interconnecting AG1-388 to the Old Dominion Electric Cooperative (ODEC) system will be documented in the two-party Interconnection Agreement between the IC and Old Dominion Electric Cooperative (ODEC).

The AG1-388 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ To be provided in IA
Total System Network Upgrade Costs	\$2,986,200 ¹
Total Costs	\$ To be provided in IA

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 Schedule

These schedules will be more clearly identified in future study phases.

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

8 Transmission Owner Analysis

Dominion assessed the impact of the proposed 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 AG1-388 was evaluated as a 20.0 MW (Capacity 12.0 MW) injection at the Dunnsville 230 kV substation in the Dominion area. Project AG1-388 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-388 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
16696996 6	31388 6	3GREYSP T	115. 0	DVP	31417 4	3HARMONY	115. 0	DVP	1	DVP_P7 -1: LN 2083- 2145-A	towe r	169.0	152.77	154.06	DC	2.17
16696996 7	31388 6	3GREYSP T	115. 0	DVP	31417 4	3HARMONY	115. 0	DVP	1	DVP_P7 -1: LN 2076- 2145-B	towe r	169.0	152.77	154.06	DC	2.17
16696996 4	31419 1	3WHIT STONE	115. 0	DVP	31387 0	3RAPPANH K	115. 0	DVP	1	DVP_P7 -1: LN 2076- 2145-B	towe r	169.0	152.83	154.12	DC	2.17
16696996 5	31419 1	3WHIT STONE	115. 0	DVP	31387 0	3RAPPANH K	115. 0	DVP	1	DVP_P7 -1: LN 2083- 2145-A	towe r	169.0	152.83	154.12	DC	2.17

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 PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
1684973 48	31388 6	3GREYSP T	115. 0	DVP	31417 4	3HARMONY	115. 0	DVP	1	Base Case	operatio n	138.1799926 76	141.22	141.67	DC	1.4

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
168802104	314132	6BIRCHWD	230.0	DVP	314163	6FINES	230.0	DVP	1	Base Case	operatio n	548.020019531	122.49	123.5	DC	5.52
168802125	314163	6FINES	230.0	DVP	314137	6FREDBRG	230.0	DVP	1	Base Case	operatio n	548.020019531	118.71	119.72	DC	5.52
168802287	314175	6COMORN	230.0	DVP	314132	6BIRCHWD	230.0	DVP	1	DVP_P1-2: LN2090-B	operatio n	548.020019531	99.44	100.38	DC	5.12
168497345	314191	3WHITSTONE	115.0	DVP	313870	3RAPPAHNCK	115.0	DVP	1	Base Case	operatio n	138.179992676	141.29	141.74	DC	1.4
169724541	962860	AG1-135TAP	115.0	DVP	936590	AD2-074TAP	115.0	DVP	1	DVP_P1-2: LN2083	operatio n	203.979995728	105.37	106.44	DC	2.17

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166969965,166 969964	2	3WHIT STONE 115.0 kV - 3RAPPHNCK 115.0 kV Ckt 1	<u>DVP</u> dom-291 (1849) : Reconductor 0.877 miles of 115 kV Line 65 from Whitestone to Rappahannock with 636 ACSR 150 C Project Type : FAC Cost : \$526,200 Time Estimate : 30-36 Months	\$526,200
166969967,166 969966	1	3GREYSPT 115.0 kV - 3HARMONY 115.0 kV Ckt 1	<u>DVP</u> dom-204 (1762) : Reconductor 4.1 miles of 115 kV Line 65 from Grey Spt to Harmony with 636 ACSR. Project Type : FAC Cost : \$2,460,000 Time Estimate : 30-36 Months	\$2,460,000
			TOTAL COST	\$2,986,200

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
166969967	313886	3GREYSPT	DVP	314174	3HARMONY	DVP	1	DVP_P7-1: LN 2076-2145-B	tower	169.0	152.77	154.06	DC	2.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314190	6WESTMOR	0.2918	50/50	0.2918
315034	1NORNECKC1	0.9396	50/50	0.9396
315035	1NORNECKC2	0.9057	50/50	0.9057
316077	AC2-138 C	0.2377	50/50	0.2377
316078	AC2-138 E	1.3395	50/50	1.3395
925863	AC1-065 C	-3.2442	Adder	-3.82
926472	AC1-118 E	0.9530	50/50	0.9530
934141	AD1-041 C	-2.9557	Adder	-3.48
936581	AD2-073 C	1.8667	50/50	1.8667
936582	AD2-073 E	0.9249	50/50	0.9249
936591	AD2-074 C	15.4805	50/50	15.4805
936592	AD2-074 E	25.2577	50/50	25.2577
938961	AE1-124 C	0.2941	50/50	0.2941
938962	AE1-124 E	0.9389	50/50	0.9389
939245	AE1-155 C	31.8265	50/50	31.8265
939246	AE1-155 E	21.3573	50/50	21.3573
940231	AE2-005 C	-0.5899	Adder	-0.69
940552	AE2-041 BAT	2.3932	Merchant Transmission	2.3932
943472	AF1-018 BAT	2.3932	Merchant Transmission	2.3932
943741	AF1-042 C	8.1003	50/50	8.1003
943742	AF1-042 E	13.2162	50/50	13.2162
944491	AF1-114 C	5.8859	50/50	5.8859
944492	AF1-114 E	8.1281	50/50	8.1281
945831	AF1-248	0.0793	50/50	0.0793
957191	AF2-013	14.0140	50/50	14.0140
957971	AF2-091 C	2.0012	50/50	2.0012
957972	AF2-091 E	2.7636	50/50	2.7636
958261	AF2-120 C	15.6441	50/50	15.6441
958262	AF2-120 E	10.4294	50/50	10.4294
961781	AG1-019	14.0140	50/50	14.0140
961951	AG1-038 C	8.9529	50/50	8.9529
961952	AG1-038 E	12.3636	50/50	12.3636
962132	AG1-057 BAT	0.6342	Merchant Transmission	0.6342
962861	AG1-135 C	15.9422	50/50	15.9422
962862	AG1-135 E	10.6282	50/50	10.6282
962971	AG1-146 C	10.4629	50/50	10.4629
962972	AG1-146 E	6.9752	50/50	6.9752
962981	AG1-147 C	24.4133	50/50	24.4133
962982	AG1-147 E	16.2756	50/50	16.2756
963611	AG1-210 C	0.9568	50/50	0.9568
963612	AG1-210 E	1.4351	50/50	1.4351

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
964021	AG1-256 C	1.1211	50/50	1.1211
964022	AG1-256 E	1.6817	50/50	1.6817
964211	AG1-282 C	1.3040	50/50	1.3040
964212	AG1-282 E	0.8694	50/50	0.8694
965231	AG1-388 C	1.3040	50/50	1.3040
965232	AG1-388 E	0.8694	50/50	0.8694
966661	AG1-536 C	13.4006	50/50	13.4006
966662	AG1-536 E	18.0071	50/50	18.0071
G-007A	G-007A	0.0096	Confirmed LTF	0.0096
VFT	VFT	0.0258	Confirmed LTF	0.0258
CALDERWOOD	CALDERWOOD	0.0094	Confirmed LTF	0.0094
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
CHEOAH	CHEOAH	0.0095	Confirmed LTF	0.0095
CBM-N	CBM-N	0.0048	Confirmed LTF	0.0048
COTTONWOOD	COTTONWOOD	0.0336	Confirmed LTF	0.0336
HAMLET	HAMLET	0.0202	Confirmed LTF	0.0202
GIBSON	GIBSON	0.0055	Confirmed LTF	0.0055
BLUEG	BLUEG	0.0174	Confirmed LTF	0.0174
TRIMBLE	TRIMBLE	0.0056	Confirmed LTF	0.0056
CATAWBA	CATAWBA	0.0101	Confirmed LTF	0.0101

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
166969965	314191	3WHIT STONE	DVP	313870	3RAPPANHCK	DVP	1	DVP_P7-1: LN 2083-2145-A	tower	169.0	152.83	154.12	DC	2.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314190	6WESTMOR	0.2918	50/50	0.2918
315034	1NORNECKC1	0.9396	50/50	0.9396
315035	1NORNECKC2	0.9057	50/50	0.9057
316077	AC2-138 C	0.2377	50/50	0.2377
316078	AC2-138 E	1.3395	50/50	1.3395
925863	AC1-065 C	-3.2442	Adder	-3.82
926472	AC1-118 E	0.9530	50/50	0.9530
934141	AD1-041 C	-2.9557	Adder	-3.48
936581	AD2-073 C	1.8667	50/50	1.8667
936582	AD2-073 E	0.9249	50/50	0.9249
936591	AD2-074 C	15.4805	50/50	15.4805
936592	AD2-074 E	25.2577	50/50	25.2577
938961	AE1-124 C	0.2941	50/50	0.2941
938962	AE1-124 E	0.9389	50/50	0.9389
939245	AE1-155 C	31.8265	50/50	31.8265
939246	AE1-155 E	21.3573	50/50	21.3573
940231	AE2-005 C	-0.5899	Adder	-0.69
940552	AE2-041 BAT	2.3932	Merchant Transmission	2.3932
943472	AF1-018 BAT	2.3932	Merchant Transmission	2.3932
943741	AF1-042 C	8.1003	50/50	8.1003
943742	AF1-042 E	13.2162	50/50	13.2162
944491	AF1-114 C	5.8859	50/50	5.8859
944492	AF1-114 E	8.1281	50/50	8.1281
945831	AF1-248	0.0793	50/50	0.0793
957191	AF2-013	14.0140	50/50	14.0140
957971	AF2-091 C	2.0012	50/50	2.0012
957972	AF2-091 E	2.7636	50/50	2.7636
958261	AF2-120 C	15.6441	50/50	15.6441
958262	AF2-120 E	10.4294	50/50	10.4294
961781	AG1-019	14.0140	50/50	14.0140
961951	AG1-038 C	8.9529	50/50	8.9529
961952	AG1-038 E	12.3636	50/50	12.3636
962132	AG1-057 BAT	0.6342	Merchant Transmission	0.6342
962861	AG1-135 C	15.9422	50/50	15.9422
962862	AG1-135 E	10.6282	50/50	10.6282
962971	AG1-146 C	10.4629	50/50	10.4629
962972	AG1-146 E	6.9752	50/50	6.9752
962981	AG1-147 C	24.4133	50/50	24.4133
962982	AG1-147 E	16.2756	50/50	16.2756
963611	AG1-210 C	0.9568	50/50	0.9568
963612	AG1-210 E	1.4351	50/50	1.4351

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
964021	AG1-256 C	1.1211	50/50	1.1211
964022	AG1-256 E	1.6817	50/50	1.6817
964211	AG1-282 C	1.3040	50/50	1.3040
964212	AG1-282 E	0.8694	50/50	0.8694
965231	AG1-388 C	1.3040	50/50	1.3040
965232	AG1-388 E	0.8694	50/50	0.8694
966661	AG1-536 C	13.4006	50/50	13.4006
966662	AG1-536 E	18.0071	50/50	18.0071
G-007A	G-007A	0.0096	Confirmed LTF	0.0096
VFT	VFT	0.0258	Confirmed LTF	0.0258
CALDERWOOD	CALDERWOOD	0.0094	Confirmed LTF	0.0094
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
CHEOAH	CHEOAH	0.0095	Confirmed LTF	0.0095
CBM-N	CBM-N	0.0048	Confirmed LTF	0.0048
COTTONWOOD	COTTONWOOD	0.0336	Confirmed LTF	0.0336
HAMLET	HAMLET	0.0202	Confirmed LTF	0.0202
GIBSON	GIBSON	0.0055	Confirmed LTF	0.0055
BLUEG	BLUEG	0.0174	Confirmed LTF	0.0174
TRIMBLE	TRIMBLE	0.0056	Confirmed LTF	0.0056
CATAWBA	CATAWBA	0.0101	Confirmed LTF	0.0101

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
AC1-065	Harmony Village-Shackleford 115kV	Engineering and Procurement
AC1-118	Westmoreland 34.5kV	In Service
AC2-138	Northern Neck 34.5kV	Partially in Service - Under Construction
AD1-041	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AD2-073	Sanders DP 230 kV	Active
AD2-074	Garner DP-Lancaster 115 kV	Active
AE1-124	Oak Grove 34.5 kV	Engineering and Procurement
AE1-155	Garner-Northern Neck 115 kV	Active
AE2-005	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AE2-041	Harmony Village 230 kV	Active
AF1-018	Harmony Village 230 kV	Active
AF1-042	Garner DP-Lancaster 115 kV	Active
AF1-114	Oak Grove-Dahlgren 230 kV	Active
AF1-248	Northern Neck 34.5 kV	Partially in Service - Under Construction
AF2-013	Arnold's Corner-Dahlgren 230 kV	Active
AF2-091	Oak Grove-Dahlgren 230 kV	Active
AF2-120	Garner-Northern Neck 115 kV	Active
AG1-019	Arnold's Corner-Dahlgren 230 kV	Active
AG1-038	Garner DP-Lancaster 115 kV	Active
AG1-057	Harmony Village 230 kV	Active
AG1-135	Garner-Lancaster 115 kV	Active
AG1-146	Garner DP-Lancaster 115 kV	Active
AG1-147	Garner DP-Lancaster 115 kV	Active
AG1-210	Northern Neck 34.5 kV	Active
AG1-256	Northern Neck 230 kV	Active
AG1-282	Dunnsville 34.5 kV	Active
AG1-388	Dunnsville 34.5 kV	Active
AG1-536	Garner-Northern Neck 115 kV	Active

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
Base Case	
DVP_P7-1: LN 2076-2145-B	CONTINGENCY 'DVP_P7-1: LN 2076-2145-B' /* . OPEN BRANCH FROM BUS 957190 TO BUS 314131 CKT 1 /* AF2-013 TAP 230.00 - 6ARNOLDS 230.00 OPEN BRANCH FROM BUS 314131 TO BUS 314175 CKT 1 /* 6ARNOLDS 230.00 - 6COMORN 230.00 OPEN BRANCH FROM BUS 314132 TO BUS 314175 CKT 1 /* 6BIRCHWD 230.00 - 6COMORN 230.00 OPEN BUS 314131 /* ISLAND: 6ARNOLDS 230.00 OPEN BUS 314175 /* ISLAND: 6COMORN 230.00 END
DVP_P1-2: LN 2083	CONTINGENCY 'DVP_P1-2: LN 2083' OPEN BRANCH FROM BUS 314132 TO BUS 314163 CKT 1 /* 6BIRCHWD 230.00 - 6FINES 230.00 OPEN BRANCH FROM BUS 314137 TO BUS 314163 CKT 1 /* 6FREDBRG 230.00 - 6FINES 230.00 OPEN BUS 314163 /* ISLAND: 6FINES 230.00 END
DVP_P1-2: LN 2090-B	CONTINGENCY 'DVP_P1-2: LN 2090-B' OPEN BRANCH FROM BUS 965440 TO BUS 314197 CKT 1 /* AG1-412 TAP 230.00 - 6LDYSMITH CT230.00 END
DVP_P7-1: LN 2083-2145-A	CONTINGENCY 'DVP_P7-1: LN 2083-2145-A' /* . OPEN BRANCH FROM BUS 314132 TO BUS 314163 CKT 1 /* 6BIRCHWD 230.00 - 6FINES 230.00 OPEN BRANCH FROM BUS 314137 TO BUS 314163 CKT 1 /* 6FREDBRG 230.00 - 6FINES 230.00 OPEN BUS 314163 /* ISLAND: 6FINES 230.00 OPEN BRANCH FROM BUS 957190 TO BUS 314131 CKT 1 /* AF2-013 TAP 230.00 - 6ARNOLDS 230.00 OPEN BRANCH FROM BUS 314131 TO BUS 314175 CKT 1 /* 6ARNOLDS 230.00 - 6COMORN 230.00 OPEN BRANCH FROM BUS 314132 TO BUS 314175 CKT 1 /* 6BIRCHWD 230.00 - 6COMORN 230.00 OPEN BUS 314131 /* ISLAND: 6ARNOLDS 230.00 OPEN BUS 314175 /* ISLAND: 6COMORN 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