Generation Interconnection

Feasibility Study Report

for

Queue Project AF2-057

GRASSFIELD 34.5 KV

20 MW Capacity / 20 MW Energy

July 2020

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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 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 Storage generating facility located in Mecklenburg County, Virginia. The installed facilities will have a total capability of 20 MW with 20 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is April 01, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-057
Project Name	GRASSFIELD 34.5 KV
State	Virginia
County	Mecklenburg
Transmission Owner	Dominion
MFO	20
MWE	20
MWC	20
Fuel	Storage
Basecase Study Year	2023

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

AF2-057 will interconnect with the Dominion distribution system. The Point of Interconnection (POI) is a direct connection to an existing Grassfield 34.5 kV substation in the Dominion area. This is the primary Point of Interconnection (POI) chosen by the IC with the ITO's transmission system. The IC is responsible for securing right-of-way, permits and constructing the proposed attachment line from the solar facility site to the proposed new substation. Attachment 1 shows a one-line diagram of the proposed interconnection facilities. The IC may not install any facilities on Dominion's right-of-way without first obtaining the necessary approval from Dominion Energy.

No secondary POI was selected for the AF2-057 project.

5 Cost Summary

The costs associated with interconnecting the AF2-057 project to the Dominion distribution system will be documented in the two-party Interconnection Agreement between the IC and ITO.

The AF2-057 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$ To be provided in the two-party IA with ITO
Total System Network Upgrade Costs	$ 4,175,000
Total Costs	**$ 4,175,000**

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. 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.

6 Transmission Owner Scope of Work

Dominion assessed the impact of the proposed Queue Project AF2-057 was evaluated as a 20 MW Capacity (20.0 MW Energy) injection at the Grassfield 34.5 kV substation in the Dominion Distribution System, for compliance with NERC Reliability Criteria on Dominion Transmission System. The system was assessed using the summer 2023 AF2 case provided to Dominion by PJM. When performing a generation analysis, Dominion's main analysis will be load flow study results under single contingency (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.

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

7 Schedule

The schedule for the required Network Impact Reinforcements will be more clearly identified in future study phases. The estimate elapsed time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Transmission Owner Analysis

8.1 Power Flow Analysis

PJM performed a power flow analysis of the transmission system using a 2023 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 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 Interconnected Transmission Owner Requirements

See Section 3.4.6 "Metering and telecommunications" of Dominion's "Dominion's Facility Interconnection Requirements" document located at: https://www.dominionenergy.com/company/moving-energy/electric-transmission-access.

11 Summer Peak - Load Flow Analysis

The Queue Project AF2-057 was evaluated as a 20.0 MW (Capacity 20.0 MW) injection at the Grassfield 115 kV substation in the Dominion area. Project AF2-057 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-057 was studied with a commercial probability of 53%. Potential network impacts were as follows:

11.1 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
97897965	314209	6SKIFF CREEK	230.0	DVP	314386	6KINGSM	230.0	DVP	1	DVP_P1-2: LN 2146	single	441.8	99.86	100.14	DC	1.23

11.2 Multiple Facility Contingency

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

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
96834578	314927	8YADKIN	500.0	DVP	314928	8SUFFOLK	500.0	DVP	1	DVP_P7-1: LN 579-2110	tower	3637.0	99.87	100.04	DC	13.78

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)

None

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.

None

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
97897965	1	6SKIFF CREEK 230.0 kV - 6KINGS M 230.0 kV Ckt 1	DVP dom-066 (1132) : Rebuild 1.55 miles of 230 kV Line 2154 from Skiffes Creek to Kings Mill with 2-636 ACSR. Project Type : FAC Cost : $3,875,000 Time Estimate : 30-36 Months	$3,875,000
96834578	2	8YADKIN 500.0 kV - 8SUFFOLK 500.0 kV Ckt 1	DVP dom-182 (1233) : Replace Wave Trap at Suffolk Project Type : FAC Cost : $300,000 Time Estimate : 9 Months	$300,000
			TOTAL COST	$4,175,000

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
97897965	314209	6SKIFF CREEK	DVP	314386	6KINGSM	DVP	1	DVP_P1-2: LN 2146	single	441.8	99.86	100.14	DC	1.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314295	6BIRDNECK	0.0159	80/20	0.0159
314421	6WINCHST	0.1213	80/20	0.1213
314491	3PENDLTN	0.1184	80/20	0.1184
314507	3THOMPSN	0.1192	80/20	0.1192
315092	1YORKTN3	22.6723	80/20	22.6723
315098	1CHESPKA	0.1576	80/20	0.1576
315099	**1CHESPKB (Deactivation : 31/05/2019)**	**1.0213**	**80/20**	**1.0213**
315108	1ELIZAR1	1.1579	80/20	1.1579
315109	1ELIZAR2	1.1378	80/20	1.1378
315110	1ELIZAR3	1.1727	80/20	1.1727
315233	1SURRY 2	10.8789	80/20	10.8789
315260	1GOSPORTA	0.1258	80/20	0.1258
315261	1GOSPORTB	0.1607	80/20	0.1607
315262	1GOSPORTC	0.1364	80/20	0.1364
315603	6AA1-139SOLA	0.8740	80/20	0.8740
315611	6Z1-036WIND	1.8242	Adder	2.15
923831	AB2-022 C	0.6514	Adder	0.77
925861	AC1-065 C	-2.3884	Adder	-2.81
926661	AC1-147 C	0.7724	80/20	0.7724
926751	AC1-161 C O1	10.9128	80/20	10.9128
926781	AC1-164 C	-17.9797	Adder	-21.15
932041	AC2-012 C	3.4941	80/20	3.4941
932501	AC2-070 C	-0.4886	Adder	-0.57
932831	AC2-110 C	-0.9554	Adder	-1.12
933261	AC2-137 C	-0.7516	Adder	-0.88
933271	AC2-138 C	-0.5616	Adder	-0.66
933291	AC2-141 C	10.9128	80/20	10.9128
933731	AC2-196 C	0.6118	80/20	0.6118
934061	AD1-033 C	2.5704	80/20	2.5704
934191	AD1-046 C	-2.8104	Adder	-3.31
935111	AD1-144 C	0.6827	80/20	0.6827
936151	AD2-021	-0.0857	Adder	-0.1
936301	AD2-039 C	-0.9554	Adder	-1.12
936341	AD2-044 C	-0.1755	Adder	-0.21
937221	AD2-160 C O1	1.9867	80/20	1.9867
937251	**AD2-164 (Withdrawn : 06/30/2020)**	**3.9658**	**80/20**	**3.9658**
937541	AD2-215 C	0.6897	80/20	0.6897
938031	AE1-004 C	-0.9554	Adder	-1.12
938531	AE1-072 C O1	5.9219	80/20	5.9219
938961	AE1-124 C	-1.2175	Adder	-1.43

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939311	AE1-162 C	0.7208	80/20	0.7208
940251	AE2-007 O1	59.3623	80/20	59.3623
940891	AE2-078 C	0.9756	80/20	0.9756
940901	AE2-079 C	0.9756	80/20	0.9756
941101	AE2-104 C O1	0.8993	Adder	1.06
941281	AE2-122 C O1	9.7390	80/20	9.7390
941291	AE2-123 C O1	10.0087	80/20	10.0087
941301	AE2-124 C O1	9.1001	80/20	9.1001
941501	AE2-147 C	4.4385	Adder	5.22
941591	AE2-156 O1	6.1330	80/20	6.1330
942131	AE2-225 C	0.7457	80/20	0.7457
942171	AE2-229 C	0.7457	80/20	0.7457
942401	AE2-253 C	2.0897	80/20	2.0897
942851	AE2-304 C	0.1727	Adder	0.2
943611	AF1-032 C	0.6090	80/20	0.6090
943621	AF1-033 C	0.9756	80/20	0.9756
944501	AF1-115 C O1	2.9712	80/20	2.9712
944581	AF1-123 C O1	16.4860	80/20	16.4860
944591	AF1-124 C O1	16.4860	80/20	16.4860
944601	AF1-125 C O1	16.4860	80/20	16.4860
944871	AF1-152 C	1.4795	Adder	1.74
945361	AF1-201 C O1	6.8751	80/20	6.8751
957491	AF2-043 C	0.7457	80/20	0.7457
957631	AF2-057	1.2260	80/20	1.2260
957791	**AF2-073 C (Withdrawn : 07/02/2020)**	**1.3961**	**Adder**	**3.1**
957801	**AF2-074 C (Withdrawn : 07/02/2020)**	**0.6205**	**Adder**	**1.38**
957821	AF2-076 C O1	1.8261	80/20	1.8261
957871	AF2-081 C O1	3.3779	80/20	3.3779
958161	AF2-110 C	0.1965	Adder	0.44
960101	AF2-301 C	1.4897	80/20	1.4897
WEC	WEC	0.0907	Confirmed LTF	0.0907
LGEE	LGEE	0.1740	Confirmed LTF	0.1740
CPLE	CPLE	1.3032	Confirmed LTF	1.3032
CBM-W2	CBM-W2	4.2260	Confirmed LTF	4.2260
NY	NY	0.2632	Confirmed LTF	0.2632
CBM-W1	CBM-W1	3.2901	Confirmed LTF	3.2901
TVA	TVA	0.9296	Confirmed LTF	0.9296
CBM-S2	CBM-S2	8.6006	Confirmed LTF	8.6006
CBM-S1	CBM-S1	5.0864	Confirmed LTF	5.0864
MADISON	MADISON	0.3105	Confirmed LTF	0.3105
MEC	MEC	0.5911	Confirmed LTF	0.5911

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
96834578	314927	8YADKIN	DVP	314928	8SUFFOLK	DVP	1	DVP_P7-1: LN 579-2110	tower	3637.0	99.87	100.04	DC	13.78

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
314295	6BIRDNECK	0.1793	50/50	0.1793
314491	3PENDLTN	1.3352	50/50	1.3352
315098	1CHESPKA	1.7702	50/50	1.7702
315099	**1CHESPKB (Deactivation : 31/05/2019)**	**11.4753**	**50/50**	**11.4753**
315108	1ELIZAR1	13.2311	50/50	13.2311
315109	1ELIZAR2	13.0013	50/50	13.0013
315110	1ELIZAR3	13.4004	50/50	13.4004
315611	6Z1-036WIND	7.9603	Adder	9.37
901082	W1-029 E	36.7225	Adder	43.2
913392	Y1-086 E	4.6482	Adder	5.47
916042	**Z1-036 E (Suspended)**	**53.3341**	**Adder**	**62.75**
916192	Z1-068 E	7.2747	50/50	7.2747
917122	Z2-027 E	1.9451	Adder	2.29
919152	AA1-139 E	18.1749	Adder	21.38
920692	AA2-178 E	3.5159	Adder	4.14
923831	AB2-022 C	4.8732	Adder	5.73
923832	AB2-022 E	2.6240	Adder	3.09
924812	AB2-134 E OP	10.5654	Adder	12.43
925331	AB2-190 C	15.9289	Adder	18.74
925332	AB2-190 E	6.8267	Adder	8.03
925522	AC1-027 E	4.4232	50/50	4.4232
926661	AC1-147 C	7.3767	Adder	8.68
926662	AC1-147 E	4.3324	Adder	5.1
927222	AC1-216 E O1	6.4500	Adder	7.59
932041	AC2-012 C	39.2599	50/50	39.2599
932042	AC2-012 E	64.0556	50/50	64.0556
933731	AC2-196 C	6.9089	50/50	6.9089
933732	AC2-196 E	4.6013	50/50	4.6013
934011	AD1-025 C	14.0971	Adder	16.58
934012	AD1-025 E	8.3505	Adder	9.82
934061	AD1-033 C	29.0325	50/50	29.0325
934062	AD1-033 E	19.3550	50/50	19.3550
935161	AD1-151 C O1	12.8000	Adder	15.06
935162	AD1-151 E O1	8.5333	Adder	10.04
936041	AD2-007 C	0.6734	Adder	0.79
936042	AD2-007 E	0.4639	Adder	0.55
936051	AD2-008 C	2.4543	Adder	2.89
936052	AD2-008 E	5.3425	Adder	6.29
937221	AD2-160 C O1	17.3363	Adder	20.4
937222	AD2-160 E O1	9.0910	Adder	10.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938531	AE1-072 C O1	47.3359	Adder	55.69
938532	AE1-072 E O1	24.6761	Adder	29.03
939311	AE1-162 C	4.3056	Adder	5.07
939312	AE1-162 E	2.8704	Adder	3.38
940251	AE2-007 O1	676.9039	50/50	676.9039
940491	AE2-034 C	6.1529	Adder	7.24
940492	AE2-034 E	2.6370	Adder	3.1
940891	AE2-078 C	2.5143	Adder	2.96
940892	AE2-078 E	1.2952	Adder	1.52
940901	AE2-079 C	2.5143	Adder	2.96
940902	AE2-079 E	1.2952	Adder	1.52
941281	AE2-122 C O1	110.1002	50/50	110.1002
941282	AE2-122 E O1	444.2811	50/50	444.2811
941291	AE2-123 C O1	113.1489	50/50	113.1489
941292	AE2-123 E O1	441.2323	50/50	441.2323
941301	AE2-124 C O1	102.9075	50/50	102.9075
941302	AE2-124 E O1	451.5457	50/50	451.5457
941501	AE2-147 C	18.2598	Adder	21.48
941502	AE2-147 E	12.1732	Adder	14.32
941591	AE2-156 O1	69.3970	50/50	69.3970
942401	AE2-253 C	18.2349	Adder	21.45
942402	AE2-253 E	8.1925	Adder	9.64
942551	AE2-270	22.5497	Adder	26.53
942851	AE2-304 C	0.7916	Adder	0.93
942852	AE2-304 E	0.3078	Adder	0.36
943621	AF1-033 C	2.5143	Adder	2.96
943622	AF1-033 E	1.2952	Adder	1.52
944501	AF1-115 C O1	7.6572	Adder	9.01
944502	AF1-115 E O1	3.7714	Adder	4.44
944581	AF1-123 C O1	205.5069	50/50	205.5069
944582	AF1-123 E O1	470.5531	50/50	470.5531
944591	AF1-124 C O1	205.5069	50/50	205.5069
944592	AF1-124 E O1	470.5531	50/50	470.5531
944601	AF1-125 C O1	205.5069	50/50	205.5069
944602	AF1-125 E O1	470.5531	50/50	470.5531
944871	AF1-152 C	6.0866	Adder	7.16
944872	AF1-152 E	4.0577	Adder	4.77
945711	AF1-236 C O1	67.3596	Adder	79.25
945712	AF1-236 E O1	109.9024	Adder	129.3
957531	AF2-047 C	7.7488	Adder	17.2
957532	AF2-047 E	3.8977	Adder	8.65
957631	AF2-057	6.2058	Adder	13.78
957711	AF2-065 C	6.0952	Adder	13.53
957712	AF2-065 E	5.8561	Adder	13.0
957871	AF2-081 C O1	14.9842	Adder	33.26
957872	AF2-081 E O1	6.4218	Adder	14.25
960101	AF2-301 C	1.1729	Adder	2.6
960102	AF2-301 E	0.7819	Adder	1.74
960132	AF2-304 E O1	4.8190	Adder	10.7
NEWTON	NEWTON	0.4395	Confirmed LTF	0.4395
FARMERCITY	FARMERCITY	0.0230	Confirmed LTF	0.0230
CALDERWOOD	CALDERWOOD	0.2112	Confirmed LTF	0.2112

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
NY	NY	0.2151	Confirmed LTF	0.2151
PRAIRIE	PRAIRIE	1.0616	Confirmed LTF	1.0616
O-066	O-066	2.5670	Confirmed LTF	2.5670
CHEOAH	CHEOAH	0.2132	Confirmed LTF	0.2132
EDWARDS	EDWARDS	0.1428	Confirmed LTF	0.1428
TILTON	TILTON	0.2570	Confirmed LTF	0.2570
G-007	G-007	0.3973	Confirmed LTF	0.3973
GIBSON	GIBSON	0.2233	Confirmed LTF	0.2233
BLUEG	BLUEG	0.7083	Confirmed LTF	0.7083
TRIMBLE	TRIMBLE	0.2271	Confirmed LTF	0.2271
CATAWBA	CATAWBA	0.1582	Confirmed LTF	0.1582

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
AA1-139	Hickory-Shawboro 230kV	In Service
AA2-178	Mackeys 230kV	Under Construction
AB2-022	Elizabeth City 34.5kV	Engineering and Procurement
AB2-134	Hopewell-Surry 230kV	In Service
AB2-190	Hopewell-Surry 230kV	Engineering and Procurement
AC1-027	Pendleton 34.5kV	In Service
AC1-065	Harmony Village-Shackleford 115kV	Engineering and Procurement
AC1-147	Grassfield 34.5kV	Engineering and Procurement
AC1-161	Septa 500kV	Active
AC1-164	Chickahominy 230kV	Engineering and Procurement
AC1-216	Hopewell-Surry 230kV	Under Construction
AC2-012	Grassfield-Great Bridge 115kV	Active
AC2-070	Old Church 34.5kV	Engineering and Procurement
AC2-110	Harmony Village-Shackleford 115kV	Engineering and Procurement
AC2-137	Elko 34.5kV	Under Construction
AC2-138	Northern Neck 34.5kV	Under Construction
AC2-141	Septa 500kV	Active
AC2-196	Fentress 34.5kV	Engineering and Procurement
AD1-025	Hopewell-Surry 230 kV	Active
AD1-033	Fentress-Landstown 230 kV	Active
AD1-046	Oak Grove 34.5 kV III	Engineering and Procurement
AD1-144	Kings Fork 34.5 kV	Engineering and Procurement
AD1-151	Hopewell-Surry 230 kV	Active
AD2-007	Hopewell-Surry 230 kV	Active
AD2-008	Hopewell-Surry 230 kV	Active
AD2-021	Elko 34.5 kV	Under Construction
AD2-039	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AD2-044	Northern Neck 34.5 kV	Under Construction
AD2-160	Hickory-Moyock 230kV	Active
AD2-164	Peninsula 34.5kV	Withdrawn
AD2-215	Kings Fork 34.5 kV	Engineering and Procurement
AE1-004	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AE1-072	Shawboro-Sligo 230 kV	Active
AE1-124	Oak Grove 34.5 kV	Engineering and Procurement
AE1-162	Smithfield 34.5 kV	Engineering and Procurement
AE2-007	Chesapeake 230 kV	Active
AE2-034	Mackeys 230 kV	Active
AE2-078	Poolesville 34.5 kV	Engineering and Procurement
AE2-079	Poolesville 34.5 kV	Engineering and Procurement

Queue Number	Project Name	Status
AE2-104	Suffolk 115 kV	Active
AE2-122	Birdneck-Landstown 230 kV	Active
AE2-123	Birdneck-Landstown 230 kV	Active
AE2-124	Landstown 230 kV	Active
AE2-147	Swamp 230 kV	Active
AE2-156	Yadkin 115 kV	Active
AE2-225	Suffolk 34 kV	Engineering and Procurement
AE2-229	Suffolk 34 kV	Engineering and Procurement
AE2-253	Hickory-Moyock 230 kV	Active
AE2-270	Hopewell-Surry 230 kV	Active
AE2-304	South Hertford 34 kV	Engineering and Procurement
AF1-032	Suffolk 34.5 kV	Engineering and Procurement
AF1-033	Poolesville 34 kV	Engineering and Procurement
AF1-115	Poolesville 230 kV	Active
AF1-123	Fentress 500 kV	Active
AF1-124	Fentress 500 kV	Active
AF1-125	Fentress 500 kV	Active
AF1-152	Swamp 230 kV	Active
AF1-201	Hayes-Whitemarsh 115 kV	Active
AF1-236	Mackeys 230 kV	Active
AF2-043	Suffolk 34.5 kV	Active
AF2-047	Creswell-Riders Creek 115 kV	Active
AF2-057	Grassfield 34.5 kV	Active
AF2-065	Surry-Hopewell 230 kV	Active
AF2-073	Nucor Steel-Suffolk 230 kV	Withdrawn
AF2-074	Nucor Steel-Suffolk 230 kV	Withdrawn
AF2-076	Suffolk-Nucor Steel 230 kV	Active
AF2-081	Moyock 230 kV	Active
AF2-110	Suffolk 115 kV	Active
AF2-301	Poolesville-Winchester 230 kV	Active
AF2-304	Surry-Hopewell 230 kV	Active
W1-029	Winfall 230kV	In Service
Y1-086	Morgans Corner	In Service
Z1-036	WinFall-Chowan 230kV	Suspended
Z1-068	Birdneck 34.5kV	Under Construction
Z2-027	Pasquotank 34.5kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-2: LN 2146	CONTINGENCY 'DVP_P1-2: LN 2146' OPEN BRANCH FROM BUS 314209 TO BUS 314413 CKT 1 /* 6SKIFF CREEK230.00 - 6WALR285 230.00 END
DVP_P7-1: LN 579-2110	CONTINGENCY 'DVP_P7-1: LN 579-2110' /* . OPEN BRANCH FROM BUS 314923 TO BUS 314927 CKT 1 /* 8SEPTA 500.00 - 8YADKIN 500.00 OPEN BRANCH FROM BUS 314480 TO BUS 314508 CKT 1 /* 6HUNTSMN 230.00 - 6THRASHER 230.00 OPEN BRANCH FROM BUS 314480 TO BUS 314537 CKT 1 /* 6HUNTSMN 230.00 - 6SUFFOLK 230.00 OPEN BUS 314480 /* ISLAND: 6HUNTSMN 230.00 END

12 Short Circuit Analysis

Short circuit analysis will be provided in the System Impact Study report.

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).

Attachment 1: One Line Diagram