Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-038

GARNER DP-LANCASTER 115 KV

18.9 MW Capacity / 45 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.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

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 an uprate to a planned/existing Solar generating facility located in Lancaster, Virginia. This project is an increase to the Interconnection Customer's AD2-074/AF1-042 project, which will share the same point of interconnection. The AG1-038 queue position is a 45 MW uprate (18.9 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 176 MW with 68.68 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this uprate project is December 31, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-038
Project Name	GARNER DP-LANCASTER 115 KV
State	Virginia
County	Lancaster
Transmission Owner	Dominion
MFO	176
MWE	45
MWC	18.9
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

AG1-038 "Garner DP-Lancaster 115 kV" will interconnect with the Dominion transmission system as an uprate to AD2-074 & AF1-042, sharing the POI and Attachment Facilities.

The IC is responsible for securing right-of-way, permits, and constructing the proposed attachment line from the generating facility site to the Point of Interconnection. The IC may not install any facilities on Dominion's right-of-way without first obtaining the necessary approval from Dominion Energy.

Costs provided are contingent on the AD2-074 & AF1-042 project being built. Should the AD2-074 & AF1-042 project withdraw from the Interconnection Queue, the AG1-038 project will assume the Attachment, Direct Connection, and Non-Direct Connection costs identified in the AD2-074 & AF1-042 study report for connection to the Dominion system.

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 AG1-038.

5 Cost Summary

The AG1-038 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$0
Total System Network Upgrade Costs	$840,000[1]
Total Costs	$840,000

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

[1] This project currently causes and/or contributes to overloads of the Transmission System (see Summer Peak Load Flow Analysis section below) and therefore has potential to have cost allocation for the system reinforcements listed in the report. This will be re-evaluated in the System Impact phase. The results may vary with queue customers withdrawing from the queue and other generators deactivating over time. If a customer is the first to cause the need for a project (causes loading to exceed 100% of rating), then the customer is responsible. If a customer contributes to a facility that is already overloaded by a prior queue, then they may receive cost allocation.

6 Transmission Owner Scope of Work

The required Attachment Facilities, Direct Connection and Non-Direct Connection work for the interconnection of AG1-038 to the Dominion Transmission System is detailed in the following sections. The associated one-line showing the generation project attachment facilities and primary direct and non-direct connection is shown in Attachment 1.

Note that the ITO findings were made from a conceptual review of this project. A more detailed review of the connection facilities and their cost will be identified in a future study phase. Further note that 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.

The total physical interconnection costs is given in the table below:

Description	Total Cost
Total Physical Interconnection Costs	$0

AG1-038 "Garner DP-Lancaster 115 kV" will interconnect with the Dominion transmission system as an uprate to AD2-074 & AF1-042, sharing the POI and Attachment Facilities.

As AG1-038 is sharing the POI and Attachment Facilities with AD2-074 & AF1-042, there are no associated interconnection costs for this project. Should the AD2-074 & AF1-042 project withdraw from the Interconnection Queue,the AG1-038 project will assume the Attachment, Direct Connection, and Non-Direct Connection costs identified in the AD2-074 & AF1-042 study report for connection to the Dominion system.

It is estimated to take 18-30 months to complete this work upon execution of an Interconnection Construction Service Agreement (ICSA). These preliminary cost estimates are based on typical engineering costs. A more detailed engineering cost estimates are normally done when the IC provides an exact site plan location for the generation substation during the Facility Study phase.

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 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.

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

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)
- Irradiance (Watts/meter^2)
- 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 AG1-038 was evaluated as a 45.0 MW (Capacity 18.9 MW) injection as an uprate to AD2-074 & AF1-042 which is tapping the Garner DP to Lancaster 115 kV line in the Dominion area. Project AG1-038 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-038 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
166879402	945360	AF1-201 TAP	115.0	DVP	314177	3HAYES89	115.0	DVP	1	DVP_P7-1: LN 85-2016-B	tower	208.0	122.82	129.46	DC	13.81

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
168612077	314105	6AQUIA	230.0	DVP	314186	6FULLER ROAD	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	115.56	115.97	DC	7.13
168612022	314132	6BIRCHWD	230.0	DVP	314163	6FINES	230.0	DVP	1	DVP_P1-2: LN 2090-B	operation	548.020019531	116.51	118.29	DC	9.8
168612024	314132	6BIRCHWD	230.0	DVP	314163	6FINES	230.0	DVP	1	Base Case	operation	548.020019531	101.26	103.17	DC	10.51
168611935	314134	6CRANES	230.0	DVP	314142	6STAFORD	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	140.86	141.28	DC	7.13
168612008	314142	6STAFORD	230.0	DVP	314145	6AQUI_HARB_B	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	125.76	126.17	DC	7.13

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
168612060	314144	6AQUI_HARB_A	230.0	DVP	314105	6AQUIA	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	119.64	120.06	DC	7.13
168612043	314163	6FINES	230.0	DVP	314137	6FREDBRG	230.0	DVP	1	DVP_P1-2: LN 2090-B	operation	548.020019531	112.73	114.52	DC	9.8
168611889	314173	3GARNER	115.0	DVP	939240	AE1-155 TAP	115.0	DVP	1	DVP_P1-2: LN 65-A	operation	203.979995728	82.16	104.23	DC	45.0
168612037	314174	3HARMONY	115.0	DVP	314176	6HARMONY	230.0	DVP	1	DVP_P1-2: LN 89-B	operation	224.377990723	102.87	108.32	DC	12.23
168611845	314181	3NORNECK	115.0	DVP	314182	6NORNECK	230.0	DVP	2	DVP_P1-3: 6NORNECK-TX#4	operation	177.377990723	111.9	124.95	DC	23.15
168611885	314181	3NORNECK	115.0	DVP	314182	6NORNECK	230.0	DVP	1	DVP_P1-3: 6NORNECK-TX#6	operation	179.916000366	106.51	118.93	DC	22.36
168612087	314186	6FULLER ROAD	230.0	DVP	314074	6POSSUM	230.0	DVP	1	DVP_P1-2: LN 2089	operation	678.679992676	114.51	114.93	DC	7.13
169531522	939240	AE1-155 TAP	115.0	DVP	314181	3NORNECK	115.0	DVP	1	DVP_P1-2: LN 65-A	operation	203.979995728	144.43	166.49	DC	45.0
169531524	939240	AE1-155 TAP	115.0	DVP	314181	3NORNECK	115.0	DVP	1	Base Case	operation	203.979995728	101.2	113.53	DC	25.15
169531661	945360	AF1-201 TAP	115.0	DVP	314177	3HAYES89	115.0	DVP	1	DVP_P1-2: LN 2016	operation	169.199996948	124.56	129.99	DC	9.18
169531663	945360	AF1-201 TAP	115.0	DVP	314177	3HAYES89	115.0	DVP	1	Base Case	operation	169.199996948	103.58	107.07	DC	5.9

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166879402	1	AF1-201 TAP 115.0 kV - 3HAYES89 115.0 kV Ckt 1	DVP dom-145 (1323) : Reconductor 1.4 miles of 115 kV Line 89 from Hayes to AF1-201 Tap with 636 ACSR Project Type : FAC Cost : $840,000 Time Estimate : 30-36 Months	$840,000
			TOTAL COST	$840,000[1]

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
166879402	945360	AF1-201 TAP	DVP	314177	3HAYES89	DVP	1	DVP_P7-1: LN 85-2016-B	tower	208.0	122.82	129.46	DC	13.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
315034	1NORNECKC1	0.5545	50/50	0.5545
315035	1NORNECKC2	0.5345	50/50	0.5345
316077	AC2-138 C	0.1403	50/50	0.1403
316078	AC2-138 E	0.7905	50/50	0.7905
316156	AD2-030 C	1.1864	50/50	1.1864
316157	AD2-030 E	3.8461	50/50	3.8461
934141	AD1-041 C	17.2215	50/50	17.2215
934142	AD1-041 E	11.4810	50/50	11.4810
936591	AD2-074 C	10.0259	50/50	10.0259
936592	AD2-074 E	16.3580	50/50	16.3580
939245	AE1-155 C	20.3672	50/50	20.3672
939246	AE1-155 E	13.6675	50/50	13.6675
939611	AE1-191 C	34.4430	50/50	34.4430
939612	AE1-191 E	22.9620	50/50	22.9620
943741	AF1-042 C	5.2461	50/50	5.2461
943742	AF1-042 E	8.5594	50/50	8.5594
945361	AF1-201 C O1	76.5126	50/50	76.5126
945362	AF1-201 E O1	51.0084	50/50	51.0084
945831	AF1-248	0.0468	50/50	0.0468
957601	AF2-054 C	6.8542	50/50	6.8542
957602	AF2-054 E	4.5694	50/50	4.5694
957831	AF2-077 C	9.4201	50/50	9.4201
957832	AF2-077 E	6.2801	50/50	6.2801
958261	AF2-120 C	10.0157	50/50	10.0157
958262	AF2-120 E	6.6772	50/50	6.6772
961951	AG1-038 C	5.7983	50/50	5.7983
961952	AG1-038 E	8.0072	50/50	8.0072
962531	AG1-102 C	4.8357	50/50	4.8357
962532	AG1-102 E	10.0795	50/50	10.0795
962533	AG1-102 BAT	0.0785	50/50	0.0785
962861	AG1-135 C	10.2596	50/50	10.2596
962862	AG1-135 E	6.8398	50/50	6.8398
962971	AG1-146 C	6.8897	50/50	6.8897
962972	AG1-146 E	4.5931	50/50	4.5931
962981	AG1-147 C	16.0759	50/50	16.0759
962982	AG1-147 E	10.7173	50/50	10.7173
963611	AG1-210 C	0.5646	50/50	0.5646
963612	AG1-210 E	0.8470	50/50	0.8470
966661	AG1-536 C	8.5757	50/50	8.5757
966662	AG1-536 E	11.5236	50/50	11.5236
G-007A	G-007A	0.1894	Confirmed LTF	0.1894

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
VFT	VFT	0.5096	Confirmed LTF	0.5096
CALDERWOOD	CALDERWOOD	0.0552	Confirmed LTF	0.0552
PRAIRIE	PRAIRIE	0.1731	Confirmed LTF	0.1731
CHEOAH	CHEOAH	0.0566	Confirmed LTF	0.0566
CBM-N	CBM-N	0.0936	Confirmed LTF	0.0936
COTTONWOOD	COTTONWOOD	0.1974	Confirmed LTF	0.1974
HAMLET	HAMLET	0.1247	Confirmed LTF	0.1247
GIBSON	GIBSON	0.0289	Confirmed LTF	0.0289
BLUEG	BLUEG	0.0885	Confirmed LTF	0.0885
TRIMBLE	TRIMBLE	0.0278	Confirmed LTF	0.0278
CATAWBA	CATAWBA	0.0613	Confirmed LTF	0.0613

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
AC2-138	Northern Neck 34.5kV	Partially in Service - Under Construction
AD1-041	Harmony Village-Shackleford 115 kV	Engineering and Procurement
AD2-030	Wan 34.5 kV	In Service
AD2-074	Garner DP-Lancaster 115 kV	Active
AE1-155	Garner-Northern Neck 115 kV	Active
AE1-191	Harmony Village-Shackleford 115 kV	Active
AF1-042	Garner DP-Lancaster 115 kV	Active
AF1-201	Hayes-White Marsh 115 kV	Active
AF1-248	Northern Neck 34.5 kV	Partially in Service - Under Construction
AF2-054	Wan 34.5 kV	Active
AF2-077	White Marsh 34.5 kV	Active
AF2-120	Garner-Northern Neck 115 kV	Active
AG1-038	Garner DP-Lancaster 115 kV	Active
AG1-102	White Marsh 34.5 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
AG1-536	Garner-Northern Neck 115 kV	Active

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P7-1: LN 85-2016-B	CONTINGENCY 'DVP_P7-1: LN 85-2016-B' /* . OPEN BRANCH FROM BUS 934140 TO BUS 314184 CKT 1 /* AD1-041 TAP 115.00 - 3SHACKLE 115.00 OPEN BRANCH FROM BUS 314184 TO BUS 314188 CKT 1 /* 3SHACKLE 115.00 - 3WEST PT 115.00 OPEN BRANCH FROM BUS 314188 TO BUS 314387 CKT 1 /* 3WEST PT 115.00 - 3LANEXA 115.00 OPEN BUS 314184 /* ISLAND: 3SHACKLE 115.00 OPEN BUS 925860 /* ISLAND: AC1-065 MAIN115.00 OPEN BUS 925862 /* ISLAND: AC1-065 COL 34.500 OPEN BUS 925863 /* ISLAND: AC1-065 C 0.3900 OPEN BUS 925864 /* ISLAND: AC1-065 TRE 13.800 OPEN BUS 925865 /* ISLAND: AC1-065 E 0.3900 OPEN BUS 314188 /* ISLAND: 3WEST PT 115.00 OPEN BRANCH FROM BUS 314174 TO BUS 314176 CKT 1 /* 3HARMONY 115.00 - 6HARMONY 230.00 OPEN BRANCH FROM BUS 314176 TO BUS 314189 CKT 1 /* 6HARMONY 230.00 - 6PAPERMILL 230.00 OPEN BRANCH FROM BUS 314189 TO BUS 314375 CKT 1 /* 6PAPERMILL 230.00 - 6CORRCTN 230.00 OPEN BRANCH FROM BUS 314375 TO BUS 314388 CKT 1 /* 6CORRCTN 230.00 - 6LANEXA 230.00 OPEN BUS 313846 /* ISLAND: 6HARMONY_1 230.00 OPEN BUS 314176 /* ISLAND: 6HARMONY 230.00 OPEN BUS 934391 /* ISLAND: AD1-063 C 230.00 OPEN BUS 934392 /* ISLAND: AD1-063 E 230.00 OPEN BUS 314189 /* ISLAND: 6PAPERMILL 230.00 OPEN BUS 314375 /* ISLAND: 6CORRCTN 230.00 OPEN BUS 923842 /* ISLAND: AB2-024 E 230.00 END
DVP_P1-2: LN 65-A	CONTINGENCY 'DVP_P1-2: LN 65-A' OPEN BRANCH FROM BUS 313813 TO BUS 314178 CKT 1 /* 3OCRAN 115.00 - 3LANCAST 115.00 OPEN BRANCH FROM BUS 313813 TO BUS 314191 CKT 1 /* 3OCRAN 115.00 - 3WHIT STONE 115.00 OPEN BRANCH FROM BUS 313870 TO BUS 314191 CKT 1 /* 3RAPPAHNCK 115.00 - 3WHIT STONE 115.00 OPEN BRANCH FROM BUS 962970 TO BUS 314178 CKT 1 /* AG1-146 TAP 115.00 - 3LANCAST 115.00 OPEN BUS 314178 /* ISLAND: 3LANCAST 115.00 OPEN BRANCH FROM BUS 314178 TO BUS 314400 CKT 1 /* 3LANCAST 115.00 - 3LANCA_1 115.00 OPEN BUS 314400 /* ISLAND: 3LANCA_1 115.00 OPEN BUS 313813 /* ISLAND: 3OCRAN 115.00 OPEN BUS 314191 /* ISLAND: 3WHIT STONE 115.00 END

Contingency Name	Contingency Definition
DVP_P1-2: LN 2016	CONTINGENCY 'DVP_P1-2: LN 2016' OPEN BRANCH FROM BUS 314174 TO BUS 314176 CKT 1 /* 3HARMONY 115.00 - 6HARMONY 230.00 OPEN BRANCH FROM BUS 314176 TO BUS 314189 CKT 1 /* 6HARMONY 230.00 - 6PAPERMILL 230.00 OPEN BRANCH FROM BUS 314189 TO BUS 314375 CKT 1 /* 6PAPERMILL 230.00 - 6CORRCTN 230.00 OPEN BRANCH FROM BUS 314375 TO BUS 314388 CKT 1 /* 6CORRCTN 230.00 - 6LANEXA 230.00 OPEN BUS 313846 /* ISLAND: 6HARMONY_1 230.00 OPEN BUS 314176 /* ISLAND: 6HARMONY 230.00 OPEN BUS 934391 /* ISLAND: AD1-063 C 230.00 OPEN BUS 934392 /* ISLAND: AD1-063 E 230.00 OPEN BUS 314189 /* ISLAND: 6PAPERMILL 230.00 OPEN BUS 314375 /* ISLAND: 6CORRCTN 230.00 OPEN BUS 923842 /* ISLAND: AB2-024 E 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_P1-3: 6NORNECK-TX#6	CONTINGENCY 'DVP_P1-3: 6NORNECK-TX#6' OPEN BRANCH FROM BUS 314181 TO BUS 314182 CKT 2 /* 3NORNECK 115.00 - 6NORNECK 230.00 END
DVP_P1-3: 6NORNECK-TX#4	CONTINGENCY 'DVP_P1-3: 6NORNECK-TX#4' OPEN BRANCH FROM BUS 314181 TO BUS 314182 CKT 1 /* 3NORNECK 115.00 - 6NORNECK 230.00 END
Base Case	
DVP_P1-2: LN 2089	CONTINGENCY 'DVP_P1-2: LN 2089' OPEN BRANCH FROM BUS 314196 TO BUS 314197 CKT 1 /* 6LADYSMITH 230.00 - 6LDYSMITH CT230.00 END
DVP_P1-2: LN 89-B	CONTINGENCY 'DVP_P1-2: LN 89-B' OPEN BRANCH FROM BUS 945360 TO BUS 314177 CKT 1 /* AF1-201 TAP 115.00 - 3HAYES89 115.00 END

12 Short Circuit Analysis

The following Breakers are overdutied:

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