Generation Interconnection

Feasibility Study Report

for

Queue Project AE2-182

BRIERY-CLOVER 230 KV

13.6 MW Capacity / 20 MW Energy

July, 2019

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1 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.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

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.

2 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Mecklenburg County, Virginia. This queue request is for an additional 20 MW with 13.5 MW of this output being recognized by PJM as Capacity. The total installed facilities will have a capability of 130.5 MW with 88.8 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is March 1, 2021. This study does not imply a TO commitment to this in-service date.

This project is an increase to the Interconnection Customer's AD1-088 project which will share the same point of interconnection.

Queue Number	**AE2-182**
Project Name	BRIERY-CLOVER 230 KV
Interconnection Customer	
State	Virginia
County	Mecklenburg
Transmission Owner	Dominion
MFO	130.5
MWE	20
MWC	13.6
Fuel	Solar
Basecase Study Year	2022

2.1 Point of Interconnection

AE2-182 will interconnect with the Dominion transmission system as an uprate to AD1-088 which will interconnect to the Briery to Clover 230 kV line through a new interconnection switchyard.

2.2 Cost Summary

The AE2-182 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ N/A
Direct Connection Network Upgrade	$ N/A
Non Direct Connection Network Upgrades	$ N/A
Total Costs	$ 0

In addition, the AE2-182 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	$ 42,405,000

Cost allocations for these upgrades will be provided in the System Impact Study Report.

3 Transmission Owner Scope of Work

Dominion assessed the impact of the proposed Queue Project AE2-182 was evaluated as a 13.6 MW Capacity (20.0 MW Energy) injection at the AD1-088 230 kV substation in the Dominion Transmission System, for compliance with NERC Reliability Criteria on Dominion Transmission System. The system was assessed using the summer 2022 AE2 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 Category C Contingency Conditions (Bus Fault, Tower Line, N-1-1, and Stuck Breaker scenarios) 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.

The required Attachment Facilities, Direct Connection and Non-Direct Connection work for the interconnection of the AE2-182 generation project to the Dominion Transmission System is detailed in the following sections. The associated one-line with the generation project attachment facilities and primary direct and non-direct connection are 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 phases. 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.

4 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

None

5 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

None

6 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

None

7 System Reinforcements Cost Estimate

Upgrade Description	Cost
Rebuild 12.76 miles of 230 kV Line 298 from Buckingham to Farmville with 2-636 ACSR.	$19,140,000
Rebuild 15.51 miles of 230 kV Line 298 from Buckingham to Bremo with 2-636 ACSR.	$23,265,000
TOTAL COST	$42,405,000

8 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.

9 Transmission Owner Analysis

9.1 Power Flow Analysis

PJM performed a power flow analysis of the transmission system using a 2022 summer peak load flow model and the results were verified by Dominion. Additionally, Dominion performed an analysis of its transmission system. At the Primary POI, the AE2-182 project contributes to overloads on the Dominion transmission system as shown in the "Network Impact – Option 1" section of the report. The estimated cost of system reinforcements necessary to mitigate these overloads is also provided.

9.2 Short Circuit Analysis

PJM performed a short circuit analysis and the results were verified by Dominion. The connection of AE2-182 project to the system does not result in any newly overdutied circuit breakers on the Dominion transmission system and does not have a significant fault current contribution to existing overdutied circuit breakers

9.3 Stability Analysis

PJM will complete a dynamic stability analysis, if necessary, as part of the System Impact Study. The results of this analysis will be reviewed by Dominion. Should stability concerns be identified in PJM's study, Dominion will develop appropriate system reinforcement(s) and included the estimated cost of any reinforcement(s) in Dominion's System Impact Study report.

10 Interconnection Customer Requirements

10.1 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.

10.2 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.

10.3 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.

11 Revenue Metering and SCADA Requirements

11.1 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.

11.2 Dominion 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.

12 Network Impacts

The Queue Project AE2-182 was evaluated as a 20.0 MW (Capacity 13.6 MW) uprate to the AD1-088 which is a tap of the Briery to Clover 230 kV line in the Dominion area. Project AE2-182 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-182 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

13 Generation Deliverability

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

None

14 Multiple Facility Contingency

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

None

15 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	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
1938861	314677	6BUCKING	DVP	314747	6BREMO	DVP	1	DVP_P4-2: 556T591	breaker	699.0	106.39	107.52	DC	7.95
1938862	314677	6BUCKING	DVP	314747	6BREMO	DVP	1	DVP_P4-2: 511T556	breaker	699.0	106.39	107.52	DC	7.95
1938863	314677	6BUCKING	DVP	314747	6BREMO	DVP	1	DVP_P4-2: 511T591	breaker	699.0	106.32	107.45	DC	7.95
1938881	314692	6FARMVIL	DVP	314677	6BUCKING	DVP	1	DVP_P4-2: 556T591	breaker	684.0	104.49	105.65	DC	7.96
1938882	314692	6FARMVIL	DVP	314677	6BUCKING	DVP	1	DVP_P4-2: 511T556	breaker	684.0	104.49	105.65	DC	7.96
1938883	314692	6FARMVIL	DVP	314677	6BUCKING	DVP	1	DVP_P4-2: 511T591	breaker	684.0	104.42	105.58	DC	7.96

16 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	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
7968382	313802	6PRINCE EDW	DVP	314692	6FARMVIL	DVP	1	DVP_P1-2: LN 556	operation	571.52	88.06	89.66	DC	9.13
7968365	314268	6BRIERY	DVP	313802	6PRINCE EDW	DVP	1	DVP_P1-2: LN 556	operation	571.52	89.13	90.73	DC	9.13
1939712	314677	6BUCKING	DVP	314747	6BREMO	DVP	1	DVP_P1-2: LN 556	operation	571.52	127.5	128.88	DC	7.95
1939739	314692	6FARMVIL	DVP	314677	6BUCKING	DVP	1	DVP_P1-2: LN 556	operation	559.3	125.12	126.53	DC	7.95
1939671	314697	6SEDGE HILL	DVP	927250	AC1-221 TAP	DVP	1	DVP_P1-2: LN 556	operation	674.92	130.91	132.16	DC	8.46
1939634	927250	AC1-221 TAP	DVP	304070	6PERSON230 T	CPLE	1	DVP_P1-2: LN 556	operation	718.0	137.13	138.3	DC	8.46
7968364	943050	AE2-328 TAP	DVP	314268	6BRIERY	DVP	1	DVP_P1-2: LN 556	operation	571.52	89.81	91.41	DC	9.13

17 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
1938882,1938883,1938881	2	6FARMVIL 230.0 kV - 6BUCKING 230.0 kV Ckt 1	dom-035 (102) : Rebuild 12.76 miles of 230 kV Line 298 from Buckingham to Farmville with 2-636 ACSR. Project Type : FAC Cost : $19,140,000 Time Estimate : 30-36 Months	$19,140,000
1938861,1938862,1938863	1	6BUCKING 230.0 kV - 6BREMO 230.0 kV Ckt 1	dom-034 (100) : Rebuild 15.51 miles of 230 kV Line 298 from Buckingham to Bremo with 2-636 ACSR. Project Type : FAC Cost : $23,265,000 Time Estimate : 30-36 Months	$23,265,000
			TOTAL COST	$42,405,000

18 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

18.1 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
1938863	314677	6BUCKING	DVP	314747	6BREMO	DVP	1	DVP_P4-2: 511T591	breaker	699.0	106.32	107.45	DC	7.95

Bus #	Bus	MW Impact
314429	3JTRSVLE	0.69
315150	1BUGGS 1	13.27
315151	1BUGGS 2	13.27
315153	1CLOVER1	15.93
315154	1CLOVER2	15.72
315159	1KERR 2	1.04
315266	1PLYWOOD A	1.07
924021	AB2-043 C O1	0.53
924022	AB2-043 E O1	7.09
924031	AB2-045 C	1.15
924032	AB2-045 E	4.39
924161	AB2-060 C O1	1.55
924162	AB2-060 E O1	6.0
924301	AB2-077 C O1	0.33
924302	AB2-077 E O1	1.8
924311	AB2-078 C O1	0.33
924312	AB2-078 E O1	1.8
924321	AB2-079 C O1	0.33
924322	AB2-079 E O1	1.8
924401	AB2-089 C	1.92
924402	AB2-089 E	0.99
925611	AC1-036 C	0.22
925612	AC1-036 E	1.66
925781	AC1-054 C O1	6.07
925782	AC1-054 E O1	2.8
925831	AC1-062	0.09
925991	AC1-075 C	4.97
925992	AC1-075 E	2.82
926021	AC1-080 C	1.66
926022	AC1-080 E	0.93
926271	AC1-105 C O1	6.78
926272	AC1-105 E O1	3.38
927251	AC1-221 C	1.67
927252	AC1-221 E	1.67
927261	AC1-222 C	4.08
927262	AC1-222 E	3.88
932511	AC2-071 C	1.13
932512	AC2-071 E	4.67
932761	AC2-100 C	3.84
932762	AC2-100 E	1.88
934231	AD1-050 C	4.23

Bus #	Bus	MW Impact
934232	AD1-050 E	2.31
934311	AD1-055 C	2.83
934312	AD1-055 E	0.73
934341	AD1-058 C	4.18
934342	AD1-058 E	1.06
934611	AD1-087 C O1	12.07
934612	AD1-087 E O1	5.67
934621	AD1-088 C	29.91
934622	AD1-088 E	14.04
934991	AD1-131 C	1.37
934992	AD1-131 E	0.91
935171	AD1-152 C O1	12.0
935172	AD1-152 E O1	8.0
935221	AD1-157 C	0.47
935222	AD1-157 E	2.59
935231	AD1-160 C	2.85
935232	AD1-160 E	3.93
936261	AD2-033 C	23.77
936262	AD2-033 E	15.84
936331	AD2-043 C	5.29
936332	AD2-043 E	6.26
936361	AD2-046 C O1	9.36
936362	AD2-046 E O1	4.31
936481	AD2-063 C O1	23.83
936482	AD2-063 E O1	15.89
937481	AD2-202 C O1	3.32
937482	AD2-202 E O1	1.67
938371	AE1-056 C	16.75
938372	AE1-056 E	9.15
939181	AE1-148 C O1	9.41
939182	AE1-148 E O1	6.27
939371	AE1-168 C	33.76
939372	AE1-168 E	22.5
940241	AE2-006	0.94
940661	AE2-053	3.5
941791	AE2-182 C	5.41
941792	AE2-182 E	2.55
942451	AE2-258	3.22
942461	AE2-259 C O1	30.47
942462	AE2-259 E O1	20.32
942711	AE2-287 C O1	10.05
942712	AE2-287 E O1	6.7
942751	AE2-291 C O1	6.67
942752	AE2-291 E O1	4.45
942761	AE2-292 C O1	8.31
942762	AE2-292 E O1	5.54
943051	AE2-328 C	34.03
943052	AE2-328 E	15.94
AA2-074	AA2-074	2.39
CARR	CARR	0.25
CBM-S1	CBM-S1	5.4
CBM-S2	CBM-S2	6.67

Bus #	Bus	MW Impact
CBM-W1	CBM-W1	5.02
CBM-W2	CBM-W2	34.78
CIN	CIN	2.29
CPLE	CPLE	3.51
G-007	G-007	0.84
IPL	IPL	1.43
LGEE	LGEE	0.66
MEC	MEC	5.23
MECS	MECS	1.96
O-066	O-066	5.34
RENSSELAER	RENSSELAER	0.2
WEC	WEC	0.61

18.2 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
1938883	314692	6FARMVIL	DVP	314677	6BUCKING	DVP	1	DVP_P4-2: 511T591	breaker	684.0	104.42	105.58	DC	7.96

Bus #	Bus	MW Impact
314429	3JTRSVLE	0.69
315150	1BUGGS 1	13.28
315151	1BUGGS 2	13.28
315153	1CLOVER1	15.94
315154	1CLOVER2	15.73
315159	1KERR 2	1.04
315266	1PLYWOOD A	1.07
924021	AB2-043 C O1	0.53
924022	AB2-043 E O1	7.09
924161	AB2-060 C O1	1.55
924162	AB2-060 E O1	6.0
924301	AB2-077 C O1	0.33
924302	AB2-077 E O1	1.8
924311	AB2-078 C O1	0.33
924312	AB2-078 E O1	1.8
924321	AB2-079 C O1	0.33
924322	AB2-079 E O1	1.8
924401	AB2-089 C	1.92
924402	AB2-089 E	0.99
925611	AC1-036 C	0.22
925612	AC1-036 E	1.66
925781	AC1-054 C O1	6.08
925782	AC1-054 E O1	2.8
925831	AC1-062	0.09
925991	AC1-075 C	4.97
925992	AC1-075 E	2.82
926021	AC1-080 C	1.66
926022	AC1-080 E	0.94
926271	AC1-105 C O1	6.79
926272	AC1-105 E O1	3.38
927251	AC1-221 C	1.67
927252	AC1-221 E	1.67
927261	AC1-222 C	4.08
927262	AC1-222 E	3.89
932761	AC2-100 C	3.85
932762	AC2-100 E	1.88
934231	AD1-050 C	4.23
934232	AD1-050 E	2.31
934311	AD1-055 C	2.83
934312	AD1-055 E	0.73
934341	AD1-058 C	4.19

Bus #	Bus	MW Impact
934342	AD1-058 E	1.06
934611	AD1-087 C O1	12.08
934612	AD1-087 E O1	5.68
934621	AD1-088 C	29.92
934622	AD1-088 E	14.04
934991	AD1-131 C	1.37
934992	AD1-131 E	0.92
935171	AD1-152 C O1	12.0
935172	AD1-152 E O1	8.0
935221	AD1-157 C	0.47
935222	AD1-157 E	2.59
935231	AD1-160 C	2.85
935232	AD1-160 E	3.93
936261	AD2-033 C	23.78
936262	AD2-033 E	15.85
936331	AD2-043 C	5.29
936332	AD2-043 E	6.26
936361	AD2-046 C O1	9.37
936362	AD2-046 E O1	4.31
936481	AD2-063 C O1	23.85
936482	AD2-063 E O1	15.9
937481	AD2-202 C O1	3.33
937482	AD2-202 E O1	1.68
938371	AE1-056 C	16.75
938372	AE1-056 E	9.15
939181	AE1-148 C O1	9.42
939182	AE1-148 E O1	6.28
939371	AE1-168 C	33.77
939372	AE1-168 E	22.51
940241	AE2-006	0.94
940661	AE2-053	3.51
941791	AE2-182 C	5.41
941792	AE2-182 E	2.55
942451	AE2-258	3.23
942461	AE2-259 C O1	30.48
942462	AE2-259 E O1	20.32
942711	AE2-287 C O1	10.07
942712	AE2-287 E O1	6.71
942751	AE2-291 C O1	6.68
942752	AE2-291 E O1	4.46
942761	AE2-292 C O1	8.32
942762	AE2-292 E O1	5.55
943051	AE2-328 C	34.04
943052	AE2-328 E	15.94
AA2-074	AA2-074	2.39
CARR	CARR	0.25
CBM-S1	CBM-S1	5.45
CBM-S2	CBM-S2	6.69
CBM-W1	CBM-W1	5.11
CBM-W2	CBM-W2	35.13
CIN	CIN	2.33
CPLE	CPLE	3.52

Bus #	Bus	MW Impact
G-007	G-007	0.82
IPL	IPL	1.45
LGEE	LGEE	0.67
MEC	MEC	5.3
MECS	MECS	2.02
O-066	O-066	5.24
RENSSELAER	RENSSELAER	0.2
WEC	WEC	0.62

Affected Systems

19 Affected Systems

19.1 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

19.2 MISO

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

19.3 TVA

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

19.4 Duke Energy Progress

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

19.5 NYISO

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

Contingency Name	Contingency Definition
DVP_P4-2: 511T556	CONTINGENCY 'DVP_P4-2: 511T556' /* RAWLINGS 500 KV OPEN BRANCH FROM BUS 942930 TO BUS 314936 CKT 1 /* AE2-313 TAP 500.00 - 8RAWLINGS 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 1 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 2 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 3 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314906 TO BUS 314936 CKT 1 /* 8CLOVER 500.00 - 8RAWLINGS 500.00 OPEN BUS 314906 /* ISLAND: 8CLOVER 500.00 OPEN BUS 314915 /* ISLAND: 8CLOVER_STC 500.00 END
DVP_P4-2: 556T591	CONTINGENCY 'DVP_P4-2: 556T591' /* RAWLINGS 500 KV OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 1 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 2 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 3 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314906 TO BUS 314936 CKT 1 /* 8CLOVER 500.00 - 8RAWLINGS 500.00 OPEN BUS 314906 /* ISLAND: 8CLOVER 500.00 OPEN BUS 314915 /* ISLAND: 8CLOVER_STC 500.00 OPEN BRANCH FROM BUS 314935 TO BUS 314936 CKT 1 /* 8HERITAGE 500.00 - 8RAWLINGS 500.00 END
DVP_P1-2: LN 556	CONTINGENCY 'DVP_P1-2: LN 556' OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 1 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 2 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314686 TO BUS 314906 CKT 3 /* 6CLOVER 230.00 - 8CLOVER 500.00 OPEN BRANCH FROM BUS 314906 TO BUS 314936 CKT 1 /* 8CLOVER 500.00 - 8RAWLINGS 500.00 OPEN BUS 314906 /* ISLAND: 8CLOVER 500.00 OPEN BUS 314915 /* ISLAND: 8CLOVER_STC 500.00 END
DVP_P4-2: 511T591	CONTINGENCY 'DVP_P4-2: 511T591' /* RAWLINGS 500 KV OPEN BRANCH FROM BUS 942930 TO BUS 314936 CKT 1 /* AE2-313 TAP 500.00 - 8RAWLINGS 500.00 OPEN BRANCH FROM BUS 314935 TO BUS 314936 CKT 1 /* 8HERITAGE 500.00 - 8RAWLINGS 500.00 END

Short Circuit

20 Short Circuit

The following Breakers are overduty:

None

21 Attachment 1: One Line Diagram