Generation Interconnection

Feasibility Study Report

for

Queue Project AF1-087

BAKERS POND-BELL AVE 115 KV

0 MW Capacity / 0 MW Energy

January, 2020

Table of Contents

1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between, the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Virginia Electric and Power Company (VEPCO).

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.

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.

3 General

The Interconnection Customer (IC), has proposed adding a storage generation to the AE1-085 solar project located in Sussex County, Virginia. The request will not increase the facility output above the 75 MW of the AE1-085 project. The AF1-087 will be a 40 MW storage project. The proposed in-service date for this project is 06/01/2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF1-087
Project Name	BAKERS POND-BELL AVE 115 KV
State	Virginia
County	Sussex
Transmission Owner	Dominion
MFO	75
MWE	0
MWC	0
Fuel	Storage
Basecase Study Year	2023

3.1 Point of Interconnection

AF1-087 will interconnect with the Dominion transmission system as an uprate to AE1-085 tapping the Bakers Pond to Bell Ave 115 kV line.

3.2 Cost Summary

The AF1-087 project will utilize the interconnection facilities being developed under the AE1-085 project.

In addition, the AF1-087 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	$ 56,641,000

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

The Feasibility Study is used to make a preliminary determination of the type and scope of Attachment Facilities, Local Upgrades, and Network Upgrades that will be necessary to accommodate the Interconnection Request and to provide the Interconnection Customer a preliminary estimate of the time that will be required

to construct any necessary facilities and upgrades and the Interconnection Customer's cost responsibility. The System Impact Study provides refined and comprehensive estimates of cost responsibility and construction lead times for new facilities and system upgrades. Facilities Studies will include, commensurate with the degree of engineering specificity as provided in the Facilities Study Agreement, good faith estimates of the cost, determined in accordance with Section 217 of the Tariff,

(a) to be charged to each affected New Service Customer for the Facilities and System Upgrades that are necessary to accommodate this queue project;

(b) the time required to complete detailed design and construction of the facilities and upgrades; and

(c) a description of any site-specific environmental issues or requirements that could reasonably be anticipated to affect the cost or time required to complete construction of such facilities and upgrades.

4 Transmission Owner Scope of Work

Dominion assessed the impact of the proposed Queue Project AF1-087. The project was evaluated as a 0 MW Capacity (0 MW energy) injection at the existing AE1-085 substation in the Dominion Transmission System, for compliance with NERC Reliability Criteria on Dominion Transmission System. The system was assessed using the summer 2023 AF1 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.

The 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.

5 Non-Direct Connection Cost Estimate

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.

6 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.

7 Transmission Owner Analysis

7.1 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.

7.2 Short Circuit Analysis

PJM performed a short circuit analysis and the results were verified by Dominion. The connection of AF1-087 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

7.3 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.

8 Interconnection Customer Requirements

8.1 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.

8.2 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.

8.3 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.

9 Revenue Metering and SCADA Requirements

9.1 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.

9.2 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.

10 Network Impacts

The Queue Project AF1-087 was evaluated as a 40 MW load and as a 0 MW (Capacity 0.0 MW) uprate to the AE1-085 project tapping the Bakers Pond to Bell Ave 115 kV line in the Dominion area. Project AF1-087 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-087 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

10.1 Generation Deliverability

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

None

10.2 Multiple Facility Contingency

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

None

10.3 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
4606223 3	313879	3BELL AVE 2	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	DVP_P4-2: 56372	breaker	136.0	112.97	121.43	DC	11.51
4606214 9	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	DVP_P4-5: POEL652	breaker	136.0	159.63	189.04	DC	40.0
4606215 0	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	DVP_P4-5: L552	breaker	136.0	159.63	189.04	DC	40.0
4606215 1	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	DVP_P4-2: 1552	breaker	136.0	159.63	189.04	DC	40.0
4606213 4	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	DVP_P4-5: L552	breaker	136.0	168.01	197.43	DC	40.0
4606213 5	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	DVP_P4-5: POEL652	breaker	136.0	168.01	197.43	DC	40.0
4606213 6	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	DVP_P4-2: 1552	breaker	136.0	168.01	197.43	DC	40.0
4606210 9	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	DVP_P4-5: POEL652	breaker	136.0	185.81	215.22	DC	40.0
4606211 0	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	DVP_P4-2: 1552	breaker	136.0	185.81	215.22	DC	40.0
4606211 1	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	DVP_P4-5: L552	breaker	136.0	185.81	215.22	DC	40.0
4606212 4	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	DVP_P4-5: L552	breaker	136.0	168.01	197.43	DC	40.0
4606212 5	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	DVP_P4-5: POEL652	breaker	136.0	168.01	197.43	DC	40.0
4606212 6	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	DVP_P4-2: 1552	breaker	136.0	168.01	197.43	DC	40.0

10.4 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
4606271 4	313879	3BELL AVE 2	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	DVP_P1-3: 8CARSON-TX#2	operation	110.92	128.71	139.13	DC	11.56
4606271 5	313879	3BELL AVE 2	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	Base Case	operation	110.92	120.71	130.93	DC	11.34
4606250 5	314273	3BAKRS P	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	DVP_P1-2: LN 23-B	operation	110.92	181.75	217.81	DC	40.0
4606250 6	314273	3BAKRS P	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	3145283IVOR106 115 932590 AC2-079 TAP 1151	operation	110.92	181.75	217.81	DC	40.0
4606250 7	314273	3BAKRS P	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	3145323OAKRI23 115 932590 AC2-079 TAP 1151	operation	110.92	181.75	217.81	DC	40.0
4606251 0	314273	3BAKRS P	115.0	DVP	938630	AE1-085 TAP	115.0	DVP	1	Base Case	operation	110.92	102.7	128.54	DC	28.66
4606249 9	314280	3NEWBOHE	115.0	DVP	314273	3BAKRS P	115.0	DVP	1	DVP_P1-2: LN 23-B	operation	110.92	196.0	232.06	DC	40.0
4606250 0	314280	3NEWBOHE	115.0	DVP	314273	3BAKRS P	115.0	DVP	1	3145323OAKRI23 115 932590 AC2-079 TAP 1151	operation	110.92	196.0	232.06	DC	40.0
4606250 4	314280	3NEWBOHE	115.0	DVP	314273	3BAKRS P	115.0	DVP	1	Base Case	operation	110.92	116.85	142.69	DC	28.66
4606247 8	314329	3POE	115.0	DVP	314280	3NEWBOHE	115.0	DVP	1	DVP_P1-2: LN 23-B	operation	110.92	206.0	242.07	DC	40.0
4606247 9	314329	3POE	115.0	DVP	314280	3NEWBOHE	115.0	DVP	1	3145323OAKRI23 115 932590 AC2-079 TAP 1151	operation	110.92	206.0	242.07	DC	40.0
4606248 0	314329	3POE	115.0	DVP	314280	3NEWBOHE	115.0	DVP	1	3145283IVOR106 115 932590 AC2-079 TAP 1151	operation	110.92	206.0	242.07	DC	40.0
4606248 3	314329	3POE	115.0	DVP	314280	3NEWBOHE	115.0	DVP	1	Base Case	operation	110.92	126.86	152.7	DC	28.66
4606258 2	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	DVP_P1-2: LN 106-B	operation	110.92	171.47	207.54	DC	40.0

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
46062583	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	3142733BAKRSP 115 938630 AE1-085 TAP 1151	operation	110.92	171.47	207.54	DC	40.0
46062586	314528	3IVOR106	115.0	DVP	313879	3BELL AVE 2	115.0	DVP	1	Base Case	operation	110.92	99.95	109.59	DC	11.34
46062516	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	DVP_P1-2: LN 106-B	operation	110.92	181.75	217.81	DC	40.0
46062517	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	3142733BAKRSP 115 938630 AE1-085 TAP 1151	operation	110.92	181.75	217.81	DC	40.0
46062520	314532	3OAKRI23	115.0	DVP	932590	AC2-079 TAP	115.0	DVP	1	Base Case	operation	110.92	91.16	100.27	DC	11.34
46062484	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	DVP_P1-2: LN 106-B	operation	110.92	203.57	239.63	DC	40.0
46062485	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	3142733BAKRSP 115 938630 AE1-085 TAP 1151	operation	110.92	203.57	239.63	DC	40.0
46062488	314536	3SUFFOLK	115.0	DVP	314532	3OAKRI23	115.0	DVP	1	Base Case	operation	110.92	112.98	122.09	DC	11.34
46062511	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	3142733BAKRSP 115 938630 AE1-085 TAP 1151	operation	110.92	181.75	217.81	DC	40.0
46062512	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	DVP_P1-2: LN 106-B	operation	110.92	181.75	217.81	DC	40.0
46062515	932590	AC2-079 TAP	115.0	DVP	314528	3IVOR106	115.0	DVP	1	Base Case	operation	110.92	110.23	119.87	DC	11.34

10.5 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
46062125,46062124, 46062126	5	AC2-079 TAP 115.0 kV - 3IVOR106 115.0 kV Ckt 1	n6174 (514) : Rebuild 9 miles of 115 kV Line 23 from AC2-079 to Ivor with 636 ACSR. Cost : $11,700,000 Time Estimate : 30-36 Months	$11,700,000
46062233	1	3BELL AVE 2 115.0 kV - AE1-085 TAP 115.0 kV Ckt 1	n6173 (513) : Rebuild 20.5 miles of 115 kV Line 106 from Bell Ave to AE1-085 Tap with 636 ACSR. Cost : $26,650,000 Time Estimate : 36-40 Months	$26,650,000
46062150,46062151, 46062149	2	3IVOR106 115.0 kV - 3BELL AVE 2 115.0 kV Ckt 1	n6171 (510) : Rebuild 0.97 miles of 115 kV Line 23 from AC2-079 Tap to Ivor with 636 ACSR. Cost : $1,261,000 Time Estimate : 30-36 Months	$1,261,000
46062136,46062134, 46062135	3	3OAKRI23 115.0 kV - AC2-079 TAP 115.0 kV Ckt 1	n6176 (515) : Rebuild 10.5 miles of 115 kV Line 23 from Oak Ridge to AC2-079 with 636 ACSR. Cost : $13,650,000 Time Estimate : 30-36 Months	$13,650,000
46062110,46062111, 46062109	4	3SUFFOLK 115.0 kV - 3OAKRI23 115.0 kV Ckt 1	dom-014 (288) : Rebuild 2.59 miles of 115 kV Line 23 from Suffolk to Oak Ridge with 636 ACSR. Cost : $3,380,000 Time Estimate : 30-36 Months	$3,380,000
			TOTAL COST	**$56,641,000**

10.6 Flow Gate Details

The following indices contain additional information about each flowgate presented in the body of the report. For each index, 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.

10.6.1 Contingency Descriptions

Contingency Name	Contingency Definition
DVP_P1-3: 8CARSON-TX#2	CONTINGENCY 'DVP_P1-3: 8CARSON-TX#2' OPEN BRANCH FROM BUS 314282 TO BUS 314902 CKT 1 /* 6CARSON 230.00 - 8CARSON 500.00 END
314528 3IVOR106 115 932590 AC2-079 TAP 115 1	CONTINGENCY '314528 3IVOR106 115 932590 AC2-079 TAP 115 1' OPEN BRANCH FROM BUS 314528 TO BUS 932590 CKT 1 END
DVP_P4-2: 1552	CONTINGENCY 'DVP_P4-2: 1552' /* POE 115 KV OPEN BRANCH FROM BUS 939190 TO BUS 314329 CKT 1 /* AE1-149 TAP 115.00 - 3POE 115.00 OPEN BUS 314329 /* 3POE 115.00 KV OPEN BUS 314454 /* ISLAND: 3POE_1 115.00 END
DVP_P4-5: POE L652	CONTINGENCY 'DVP_P4-5: POE L652' /* POE 115 KV OPEN BRANCH FROM BUS 314263 TO BUS 314287 CKT 1 /* 6TYLER1 230.00 - 6CHESTF B 230.00 OPEN BRANCH FROM BUS 314263 TO BUS 314299 CKT 1 /* 6TYLER1 230.00 - 6HARROWG 230.00 OPEN BRANCH FROM BUS 314299 TO BUS 314331 CKT 1 /* 6HARROWG 230.00 - 6POE 230.00 OPEN BRANCH FROM BUS 314329 TO BUS 314331 CKT 2 /* 3POE 115.00 - 6POE 230.00 OPEN BUS 314263 /* ISLAND: 6TYLER1 230.00 OPEN BUS 314299 /* ISLAND: 6HARROWG 230.00 OPEN BUS 314329 /* 3POE 115.00 KV OPEN BUS 314454 /* ISLAND: 3POE_1 115.00 END
DVP_P4-2: 56372	CONTINGENCY 'DVP_P4-2: 56372' /* CARSON 500 KV OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 OPEN BRANCH FROM BUS 314282 TO BUS 314902 CKT 1 /* 6CARSON 230.00 - 8CARSON 500.00 END
314532 3OAKRI23 115 932590 AC2-079 TAP 115 1	CONTINGENCY '314532 3OAKRI23 115 932590 AC2-079 TAP 115 1' OPEN BRANCH FROM BUS 314532 TO BUS 932590 CKT 1 END

Contingency Name	Contingency Definition
DVP_P1-2: LN 23-B	CONTINGENCY 'DVP_P1-2: LN 23-B' OPEN BRANCH FROM BUS 314206 TO BUS 314529 CKT 1 /* 3OAKRIDG 115.00 - 3KINGFORK 115.00 OPEN BRANCH FROM BUS 314206 TO BUS 314532 CKT Z1 /* 3OAKRIDG 115.00 - 3OAKRI23 115.00 OPEN BRANCH FROM BUS 932590 TO BUS 314532 CKT 1 /* AC2-079 TAP 115.00 - 3OAKRI23 115.00 OPEN BRANCH FROM BUS 314532 TO BUS 314536 CKT 1 /* 3OAKRI23 115.00 - 3SUFFOLK 115.00 OPEN BUS 314206 /* ISLAND: 3OAKRIDG 115.00 OPEN BUS 314261 /* ISLAND: 3OAKRI_1 115.00 OPEN BUS 314529 /* ISLAND: 3KINGFORK 115.00 OPEN BUS 314532 /* ISLAND: 3OAKRI23 115.00 END
DVP_P1-2: LN 106-B	CONTINGENCY 'DVP_P1-2: LN 106-B' OPEN BRANCH FROM BUS 938630 TO BUS 314273 CKT 1 /* AE1-085 TAP 115.00 - 3BAKRS P 115.00 OPEN BRANCH FROM BUS 314262 TO BUS 314280 CKT 1 /* 3NEWBO_1 115.00 - 3NEWBOHE 115.00 OPEN BRANCH FROM BUS 314273 TO BUS 314280 CKT 1 /* 3BAKRS P 115.00 - 3NEWBOHE 115.00 OPEN BRANCH FROM BUS 314280 TO BUS 314329 CKT 1 /* 3NEWBOHE 115.00 - 3POE 115.00 OPEN BUS 314262 /* ISLAND: 3NEWBO_1 115.00 OPEN BUS 314273 /* ISLAND: 3BAKRS P 115.00 OPEN BUS 314280 /* ISLAND: 3NEWBOHE 115.00 END
DVP_P4-5: L552	CONTINGENCY 'DVP_P4-5: L552' /* POE 115 KV OPEN BRANCH FROM BUS 314282 TO BUS 314331 CKT 1 /* 6CARSON 230.00 - 6POE 230.00 OPEN BRANCH FROM BUS 314329 TO BUS 314331 CKT 1 /* 3POE 115.00 - 6POE 230.00 OPEN BUS 314329 /* 3POE 115.00 KV OPEN BUS 314454 /* ISLAND: 3POE_1 115.00 END
Base Case	
314273 3BAKRS P 115 938630 AE1-085 TAP 115 1	CONTINGENCY '314273 3BAKRS P 115 938630 AE1-085 TAP 115 1' OPEN BRANCH FROM BUS 314273 TO BUS 938630 CKT 1 END

10.6.2 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
46062233	313879	3BELL AVE 2	DVP	938630	AE1-085 TAP	DVP	1	DVP_P4-2: 56372	breaker	136.0	112.97	121.43	DC	11.51

Bus #	Bus	MW Impact
925061	AB2-161 C O1	7.8685
925062	AB2-161 E O1	12.8380
932591	AC2-079 C O1	8.3121
932592	AC2-079 E O1	13.5618
934571	AD1-082 C	17.9318
934572	AD1-082 E	10.2290
940061	AE2-000BC O1	37.2717
940062	AE2-000BE O1	24.8478
940652	AE2-052 BAT	1.1376
941101	AE2-104 C O1	0.8743
941102	AE2-104 E O1	1.3890
941533	AE2-150 BAT	11.5136
943451	AF1-016 C O1	0.1816
943452	AF1-016 E O1	0.2888
944191	AF1-087 BAT	11.5136
LGEE	LGEE	0.0456
CPLE	CPLE	0.2646
WEC	WEC	0.0239
CBM-W2	CBM-W2	0.9828
NY	NY	0.0354
CBM-W1	CBM-W1	0.8882
TVA	TVA	0.2100
O-066	O-066	0.4973
CBM-S2	CBM-S2	1.7860
CBM-S1	CBM-S1	1.1672
G-007	G-007	0.0780
MADISON	MADISON	0.0605
MEC	MEC	0.1478

10.6.3 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
46062151	314528	3IVOR106	DVP	313879	3BELL AVE 2	DVP	1	DVP_P4-2: 1552	breaker	136.0	159.63	189.04	DC	40.0

Bus #	Bus	MW Impact
940063	AE2-000B BAT	150.0000
941533	AE2-150 BAT	40.0000
944191	AF1-087 BAT	40.0000

10.6.4 Index 3

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
46062136	314532	3OAKRI23	DVP	932590	AC2-079 TAP	DVP	1	DVP_P4-2: 1552	breaker	136.0	168.01	197.43	DC	40.0

Bus #	Bus	MW Impact
940063	AE2-000B BAT	150.0000
941533	AE2-150 BAT	40.0000
944191	AF1-087 BAT	40.0000

10.6.5 Index 4

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
46062111	314536	3SUFFOLK	DVP	314532	3OAKRI23	DVP	1	DVP_P4-5: L552	breaker	136.0	185.81	215.22	DC	40.0

Bus #	Bus	MW Impact
940063	AE2-000B BAT	150.0000
941533	AE2-150 BAT	40.0000
944191	AF1-087 BAT	40.0000

10.6.6 Index 5

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
46062126	932590	AC2-079 TAP	DVP	314528	3IVOR106	DVP	1	DVP_P4-2: 1552	breaker	136.0	168.01	197.43	DC	40.0

Bus #	Bus	MW Impact
940063	AE2-000B BAT	150.0000
941533	AE2-150 BAT	40.0000
944191	AF1-087 BAT	40.0000

Short Circuit

10.7 Short Circuit

The following Breakers are overdutied:

None

Affected Systems

11 Affected Systems

11.1 Duke Energy Progress

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

Attachment 1

System Configuration