Generation Interconnection

Feasibility Study Report

for

Queue Project AF1-273

ALLEGHENY 115 KV

60 MW Capacity / 100 MW Energy

January 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 Mid-Atlantic Interstate Transmission (MAIT) (Penelec zone).

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.

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

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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.

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3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Somerset County, Pennsylvania. The installed facilities will have a total capability of 100 MW with 60 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	**AF1-273**
Project Name	ALLEGHENY 115 KV
State	None
County	Somerset
Transmission Owner	PENELEC
MFO	100
MWE	100
MWC	60
Fuel	Solar
Basecase Study Year	2023

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4 Point of Interconnection

4.1 Primary POI

The interconnection of the project at the Primary POI will be accomplished by expanding Allegheny 115 kV substation to a six (6) breaker ring bus configuration by installing one (1) 115 kV circuit breaker. This scope of work assumes work completed for AF1-232 has already been completed. Delay or withdrawal of the AF1-232 project may result in additional work to interconnect the AF1-273 project to the FirstEnergy transmission system.

Attachment 1 shows a one-line diagram of the proposed primary direct connection facilities for the AF1-273 generation project to connect to the FirstEnergy ("FE") transmission system. IC will be responsible for constructing the facilities on its side of the POI, including the attachment facilities which connect the generator to the FE transmission system's direct connection facilities.

4.2 Secondary POI

The interconnection of the project at a Secondary POI can be accomplished by constructing a new 115 kV three (3) breaker ring bus substation and looping the Allegheny - Somerset 115 kV line into the new station. The new substation would be located approximately 3.7 miles from Allegheny substation. A full scope of work or estimated cost is not provided for the proposed Secondary POI.

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5 Cost Summary

The AF1-273 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$309,600
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$1,555,900
Total Costs	**$1,865,500**

In addition, the AF1-273 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	**$85,967,350**

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.

The costs provided above exclude the Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross Up charge. If, at a future date, it is determined that the CIAC Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

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The costs provided above exclude the Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross Up charge. If, at a future date, it is determined that the CIAC Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

The required Attachment Facilities and Direct and Non-Direct Connection work for the interconnection of the AF1-273 generation project to the FE Transmission System is detailed in the following sections. The associated one-line with the generation project Attachment Facilities and the Primary Direct and Non-Direct Connection facilities are shown in Attachment 1.

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6 Transmission Owner Scope of Work

Primary POI

The interconnection of the project at the Primary POI will be accomplished by expanding Allegheny 115 kV substation to a six (6) breaker ring bus configuration by installing one (1) 115 kV circuit breaker. This scope of work assumes work completed for AF1-232 has already been completed. Delay or withdrawal of the AF1-232 project may result in additional work to interconnect the AF1-273 project to the FirstEnergy transmission system.

Attachment 1 shows a one-line diagram of the proposed primary direct connection facilities for the AF1-273 generation project to connect to the FirstEnergy ("FE") transmission system. IC will be responsible for constructing the facilities on its side of the POI, including the attachment facilities which connect the generator to the FE transmission system's direct connection facilities.

7 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.

Description	Total Cost
Review drawings and provide nameplates for customer substation.	$66,900
Install 115 kV terminal position for the AF1-273 generator lead line.	$242,700
Total Attachment Facility Costs	**$309,600**

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8 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

9 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.

Description	Total Cost
Install one 115 kV breaker at Allegheny substation to create a six breaker ring bus.	$1,555,900
Total Non-Direct Connection Facility Costs	**$1,555,900**

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10 Schedule

Based on the scope of work for the Attachment Facilities and the Direct and/or Non-Direct Connection facilities, it is expected to take a minimum of **15 months** after the signing of an Interconnection Construction Service Agreement to complete the installation. This includes the requirement for the IC to make a preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the Attachment Facilities work. Full initial deposit will be required for the Non-Direct Connection work identified. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined connection and network upgrades, and that all transmission system outages will be allowed when requested.

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.

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11 Transmission Owner Analysis

Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AF1-273 project did not contribute to any overloads on the FE transmission <100 kV system.

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12 Interconnection Customer Requirements

12.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

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.

The IC has requested a non-standard GSU transformer winding configuration. This transformer is in violation of section 14.2.6 of FE's "Requirements for Transmission Connected Facilities" document and will not be accepted. The GSU transformer must have a grounded wye connection on the high (utility) side and a delta connection on the low (generator) side.

12.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated 115 kV circuit breaker to protect the AF1-273 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.

2. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. 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 FE Transmission System Control Center.

4. Compliance with the FE and PJM generator power factor and voltage control requirements.

5. The execution of a back-up service agreement to serve the customer load supplied from the AF1-273 generation project metering point when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

The IC will also be required to meet all PJM, ReliabilityFirst, 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 ReliabilityFirst audits.

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Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

12.3 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 FE transmission system.

13 Revenue Metering and SCADA Requirements

13.1 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.

13.1.1 Meteorological Data Reporting Requirement

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance
- Forced outage data

13.2 FirstEnergy Requirements

The IC will be required to comply with all FE revenue metering requirements for generation interconnection customers which can be found in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

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14 Network Impacts – Primary POI

The Queue Project AF1-273 was evaluated as a 100.0 MW (Capacity 60.0 MW) injection at the Allegheny 115 kV substation in the PENELEC area. Project AF1-273 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-273 was studied with a commercial probability of 53%. Potential network impacts were as follows:

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Summer Peak Load Flow

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14.1 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	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
4137184 8	200745	26ALLEGHEN	115.0	PENELEC	202647	26KIMRUN TAP	115.0	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0
4137184 9	200745	26ALLEGHEN	115.0	PENELEC	202647	26KIMRUN TAP	115.0	PENELEC	1	PN-P1-2-PN-115-075	single	160.0	64.37	101.88	DC	60.0
4137179 6	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	AP-P1-2-WP-500-008	single	160.0	98.61	104.54	DC	9.48
4137183 3	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-2-PN-115-074B	single	160.0	68.91	106.41	DC	60.0
4137183 4	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-2-PN-115-074A	single	160.0	68.35	105.85	DC	60.0
4137183 5	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-3-PN-115-025	single	160.0	68.35	105.85	DC	60.0
4137185 5	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	66.41	103.91	DC	60.0
4137184 1	202647	26KIMRUN TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0
4137184 2	202647	26KIMRUN TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-075	single	160.0	64.37	101.88	DC	60.0

14.2 Multiple Facility Contingency

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

None

14.3 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)

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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
41372508	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PJM_P1_APS_B_G692	single	364.0	104.3	105.57	DC	4.64
41682827	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PN_P4-500-001J	breaker	364.0	112.97	114.0	DC	8.29
41682356	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	160.0	118.26	158.07	DC	63.69
41059103	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	118.23	131.85	DC	24.38
41682402	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	179.0	135.57	155.85	DC	36.29
41682319	200747	26PENN-MAR	115.0	PENELEC	946190	AF1-284 TAP	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	167.0	163.75	185.48	DC	36.29
41371794	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	Base Case	single	133.0	104.4	111.44	DC	9.36
41682821	200766	26FLORENCE	115.0	PENELEC	200740	26BLRSVL E	115.0	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.49	107.28	DC	10.68
42281177	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN_P4-500-002A	breaker	917.0	162.97	166.23	DC	29.39
42281178	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN_P4-500-002F	breaker	917.0	162.98	166.24	DC	29.39
42594725	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	Base Case	single	731.0	119.96	121.69	DC	12.46
42594726	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-3-PN-230-001T	single	917.0	113.62	115.58	DC	17.65
42594727	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-2-PN-230-025	single	917.0	113.62	115.58	DC	17.65
42281187	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN_P4-500-002F	breaker	917.0	149.89	153.43	DC	32.01
42281188	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN_P4-500-002A	breaker	917.0	149.89	153.43	DC	32.01
42594740	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	AP-P1-2-WP-345-311T	single	917.0	103.45	105.15	DC	15.42
42594744	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PJM_P1__P1_20A_CONEMAGH-KEYSTONE	single	917.0	103.46	105.03	DC	14.28
42281293	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001A	breaker	635.0	125.01	127.73	DC	17.0
42281294	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	125.0	127.71	DC	17.0
41682344	202650	26HIGHPOINT	115.0	PENELEC	200747	26PENN-MAR	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	153.97	174.82	DC	36.29
41682500	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PJM500_PN_P4-500-001D	breaker	634.0	124.47	127.19	DC	17.0
41682501	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	124.47	127.19	DC	17.0

14.4 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.

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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
41372505	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PJM_P1_APS_B_G692	operation	364.0	111.9	112.86	DC	7.74
41372506	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	Base Case	operation	291.0	105.05	106.19	DC	7.35
41372544	200741	26SEWARD	115.0	PENELEC	200766	26FLORENCE	115.0	PENELEC	1	PN-P1_2-PN-230-0104	operation	282.0	102.69	106.36	DC	10.35
41372365	200742	26TOWER 51	115.0	PENELEC	200741	26SEWARD	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	185.0	94.39	110.89	DC	30.53
41372075	200743	26HOOVER SV	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	172.0	114.6	132.56	DC	30.88
41372080	200743	26HOOVER SV	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	Base Case	operation	137.0	88.15	106.78	DC	25.52
41372372	200744	26SOMERS T	115.0	PENELEC	200743	26HOOVER SV	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	190.0	97.86	115.32	DC	33.18
41372529	200744	26SOMERS T	115.0	PENELEC	200802	26RALPHTON	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	185.0	86.63	101.66	DC	27.82
41371843	200745	26ALLEGHEN	115.0	PENELEC	202647	26KIMRUN TAP	115.0	PENELEC	1	PN-P1-2-PN-115-076	operation	160.0	129.6	192.1	DC	99.99
41371845	200745	26ALLEGHEN	115.0	PENELEC	202647	26KIMRUN TAP	115.0	PENELEC	1	Base Case	operation	133.0	110.13	158.02	DC	63.69
41371992	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P1-2-PN-115-074B	operation	160.0	97.5	160.0	DC	100.0
41371997	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	Base Case	operation	133.0	77.49	104.79	DC	36.31
41372196	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	Base Case	operation	148.0	126.67	137.23	DC	15.62
41371908	200747	26PENN-MAR	115.0	PENELEC	946190	AF1-284 TAP	115.0	PENELEC	1	Base Case	operation	137.0	152.5	163.9	DC	15.62
41371791	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	Base Case	operation	133.0	165.91	177.65	DC	15.61
41372548	200766	26FLORENCE	115.0	PENELEC	200740	26BLRSVLE	115.0	PENELEC	1	PN-P1_2-PN-230-0104	operation	282.0	102.48	106.15	DC	10.35
42594719	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-3-PN-230-001T	operation	917.0	158.28	161.54	DC	29.41
42594720	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-2-PN-230-025	operation	917.0	158.28	161.54	DC	29.41
42594721	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	Base Case	operation	731.0	160.34	163.23	DC	20.77
42594735	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN-P1-2-PN-230-025	operation	917.0	144.56	148.11	DC	32.05
42594736	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN-P1-3-PN-230-001T	operation	917.0	144.56	148.11	DC	32.05
42594737	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	Base Case	operation	731.0	145.86	149.04	DC	22.94
42594935	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PN-P1-3-PN-500-001AT	operation	635.0	118.65	121.37	DC	17.03
42594938	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	Base Case	operation	494.0	100.14	102.48	DC	11.39
41371828	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-2-PN-115-074B	operation	160.0	130.16	192.66	DC	99.99
41371832	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	Base Case	operation	133.0	98.18	125.48	DC	36.3
41371850	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	PN-P1-2-PN-115-076	operation	160.0	127.66	190.16	DC	99.99
41371852	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	Base Case	operation	133.0	107.72	155.61	DC	63.69
41371836	202647	26KIMRUN TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-076	operation	160.0	129.6	192.1	DC	99.99
41371838	202647	26KIMRUN TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	Base Case	operation	133.0	110.13	158.02	DC	63.69
41371959	202650	26HIGHPOINT	115.0	PENELEC	200747	26PENN-MAR	115.0	PENELEC	1	Base Case	operation	137.0	148.47	159.87	DC	15.62
41371859	946190	AF1-284 TAP	115.0	PENELEC	200762	26GARRETT	115.0	PENELEC	1	Base Case	operation	137.0	152.56	163.96	DC	15.62
41372228	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PN-P1-3-PN-500-001AT	operation	634.0	118.11	120.83	DC	17.03

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
41372231	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	Base Case	operation	493.0	99.41	101.75	DC	11.39

14.5 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
42281294,42281293	13	26KEYSTONE 230.0 kV - STAR592 1.0 kV Ckt 4	**PENELEC** **PN-AF1-F-0046a: Replace transformer** **Replace substation conductor at Keystone (3A)** **Project Type : FAC** **Cost : $26,180,000** **Time Estimate : 24.0 Months** **PN-AF1-F-0046b: Replace relay at Keystone (3A)** **Project Type : FAC** **Cost : $357,000** **Time Estimate : 12.0 Months**	$26,537,000
41682500,41682501	15	STAR592 1.0 kV - KEYSTONE 500.0 kV Ckt 4		
41371794,41371796	2	26GARRETT 115.0 kV - 01GARRET 115.0 kV Ckt 1	**APS** **WP-AF1-F-0003: Reconductor Garrett Tap - Garrett (~2.0 miles)** **Project Type : FAC** **Cost : $3,780,000** **Time Estimate : 6.0 Months** **PENELEC** **PN-AF1-F-0038 : Replace substation conductor at Garrett** **Project Type : FAC** **Cost : $119,000** **Time Estimate : 6.0 Months**	$3,899,000
41682319	9	26PENN-MAR 115.0 kV - AF1-284 TAP 115.0 kV Ckt 1	**PENELEC** **PN-AF1-F-0037: Reconductor Penn Mar - AF1-284 115 kV (~4 miles)** **Project Type : FAC** **Cost : $7,497,000** **Time Estimate : 6.0 Months**	$7,497,000

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ID	Index	Facility	Upgrade Description	Cost
41682827,41372508	6	26BLRSVL E 115.0 kV - 26BLAIRSVL 138.0 kV Ckt 1	**PENELEC** **PN-AF1-F-0088a: At Blairsville East substation, replace the 138/115 kV transformer.** **Project Type : FAC** **Cost : $4,165,000** **Time Estimate : 24.0 Months** **PN-AF1-F-0088b: At Blairsville East, replace the transformer circuit breaker.** **Project Type : FAC** **Cost : $595,000** **Time Estimate : 12.0 Months** **PN-AF1-F-0088c: At Blairsville, replace disconnect switches.** **Project Type : FAC** **Cost : $714,000** **Time Estimate : 12.0 Months** **PN-AF1-F-0088d: At Blairsville East, replace disconnect switches and bus conductor.** **Project Type : FAC** **Cost : $714,000** **Time Estimate : 12.0 Months** **Note: AF1-273 currently has a cost responsibility for the above upgrade. The following baseline project is "on-hold"; if the following baseline project is approved for construction, then AF1-273 will not have a cost responsibility and can take advantage of the following baseline project. If additional mitigations beyond the following baseline project are needed, AF1-273 will have a cost responsibility for those additional mitigations.** **b3073 : PJM Baseline Upgrade b3073: Replace the Blairsville East 138/115 kV transformer and associated equipment such as breaker disconnects and bus conductor. The baseline project has a projected in-service date of 06/01/2022.**	$6,188,000
41682821	10	26FLORENCE 115.0 kV - 26BLRSVL E 115.0 kV Ckt 1	**PENELEC** **PN-AF1-F-0039 : Replace circuit breaker at Blairsville East** **Project Type : FAC** **Cost : $595,000** **Time Estimate : 12.0 Months**	$595,000

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ID	Index	Facility	Upgrade Description	Cost
42594725,42594727, 42281178,42281177, 42594726	11	26HOMER CT 230.0 kV - 26SHELOCTA 230.0 kV Ckt 1	**PENELEC** **PN-AF1-F-0040a : Replace Wave Trap at Homer City** **Project Type : FAC** **Cost : $119,000** **Time Estimate : 9.0 Months** **PN-AF1-F-0040b : Reconductor Homer City - Sheloctoa 230 kV (~11 miles)** **Project Type : FAC** **Cost : $19,188,750** **Time Estimate : 6.0 Months** **PN-AF1-F-0040c : Replace line drops at Shelocta** **Project Type : FAC** **Cost : $119,000** **Time Estimate : 6.0 Months** **PN-AF1-F-0040d : Replace disconnect switch at Shelocta** **Project Type : FAC** **Cost : $119,000** **Time Estimate : 9.0 Months**	$19,545,750
41371841,41371842	5	26KIMRUN TAP 115.0 kV - 26PRIDE 115.0 kV Ckt 1	**PENELEC** **PN-AF1-F-0059 : Reconductor Allegheny - Pride 115 kV (~3 spans)** **Project Type : FAC** **Cost : $238,000** **Time Estimate : 6.0 Months**	$238,000
41059103,41682402	8	26ROCKWOOD 115.0 kV - 26HIGHPOINT 115.0 kV Ckt 1	**PENELEC** **s1770.1: Supplemental upgrade s1770.1: Penn Mar – High Point – Rockwood 115 kV Line, Rebuild/reconductor approximately 14.8 miles of wood pole construction. The supplemental project has a projected in-service date of 06/01/2020.** **Project Type: CON** **Cost : $0** **s1770.2: Supplemental upgrade s1770.2: Rockwood 115 kV Substation - Adjust CT ratios and replace substation conductor and breaker disconnect (on Penn Mar – High Point – Rockwood 115 kV Line). The supplemental project has a projected in-service date of 06/01/2020.** **Project Type: CON** **Cost : $0** **s1770.3: Supplemental upgrade s1770.3: Penn Mar 115 kV Substation - Adjust relaying and replace CTs, substation conductor, line drops, circuit breaker and disconnect switches (on Penn Mar – High Point – Rockwood 115 kV Line). The supplemental project has a projected in-service date of 06/01/2020.** **Project Type: CON** **Cost : $0**	$0
41682344	14	26HIGHPOINT 115.0 kV - 26PENN-MAR 115.0 kV Ckt 1		

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ID	Index	Facility	Upgrade Description	Cost
41371848,41371849	1	26ALLEGHEN 115.0 kV - 26KIMRUN TAP 115.0 kV Ckt 1	PENELEC PN-AF1-F-0039 : Replace circuit breaker at Blairsville East Project Type : FAC Cost : $595,000 Time Estimate : 12.0 Months	$595,000
42281188,42594740, 42281187,42594744	12	26SHELOCTA 230.0 kV - 26KEYSTONE 230.0 kV Ckt 1	PENELEC PN-AF1-F-0044a : Replace Wave Trap at Keystone Project Type : FAC Cost : $119,000 Time Estimate : 9.0 Months PN-AF1-F-0044b : Reconductor Shelocta - Keystone 230 kV (~3 miles) Project Type : FAC Cost : $4,034,100 Time Estimate : 6.0 Months PN-AF1-F-0044c : Replace substation conductor at Shelocta and Keystone Project Type : FAC Cost : $178,500 Time Estimate : 6.0 Months PN-AF1-F-0044d : Replace disconnect switch at Shelocta Project Type : FAC Cost : $178,500 Time Estimate : 6.0 Months	$4,510,100
41371855	4	26PRIDE 115.0 kV - 26SOMERST 115.0 kV Ckt 1	PENELEC PN-AF1-F-0058 : Reconductor Pride - Somerset 115 kV (~6 miles) Project Type : FAC Cost : $9,758,000 Time Estimate : 6.0 Months	$9,758,000
41682356	7	26ALLEGHEN 115.0 kV - 26NEW BALT 115.0 kV Ckt 1	PENELEC PN-AF1-F-0034a : Reconductor Allegheny - New Baltimore 115 kV (~4 miles) Project Type : FAC Cost : $6,366,500 Time Estimate : 6.0 Months PN-AF1-F-0034b : Replace substation conductor at Allegheny Project Type : FAC Cost : $119,000 Time Estimate : 6.0 Months	$6,485,500
41371833,41371835, 41371834	3	26NEW BALT 115.0 kV - 26BDFORD N 115.0 kV Ckt 1	PENELEC PN-AF1-F-0050 : Reconductor New Baltimore - Bedford North 115 kV (~11 miles) Project Type : FAC Cost : $119,000 Time Estimate : 6.0 Months	$119,000
			TOTAL COST	$85,967,350

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14.6 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.

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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
41371848	200745	26ALLEGHEN	PENELEC	202647	26KIMRUN TAP	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O1	103.9938
946081	AF1-273 C O1	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41371794	200762	26GARRETT	PENELEC	235470	01GARRET	AP	1	Base Case	single	133.0	104.4	111.44	DC	9.36

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**4.9114**
200813	26YOUGH	0.4383
200834	26SW_E13_K22	0.0463
200835	26DSGENWIN	0.4427
200840	26DEEPCRK1	1.0127
200841	26DEEPCRK2	1.0127
200846	26FORWARD	0.0803
200888	26HIGHLAND	0.1237
200889	26STNY CRK	0.2156
200890	26BF_G21_K23	0.2171
200891	26CSLMN_L13	0.3406
200892	26LOOKOUT	0.3235
200915	26CHSTN_FL	0.0578
200925	26R32	0.1427
202225	26SCI_S29B	0.0721
202652	26RGH_Y1-033	0.3163
938351	AE1-053	3.0498
938881	AE1-116	0.8296
938991	AE1-128 C	7.2202
942361	AE2-249 C	0.8123
943711	AF1-039 C O1	4.0949
944751	AF1-140 C	0.6909
944781	AF1-143 C	18.2988
945671	AF1-232 C O1	16.2302
945901	AF1-255 C	0.5040
946081	AF1-273 C O1	9.3636
946191	AF1-284 C O1	7.2747
946241	AF1-289 C O1	1.7707
946571	AF1-321 C O1	1.1873
DUCKCREEK	DUCKCREEK	0.3524
NEWTON	NEWTON	0.3385
FARMERCITY	FARMERCITY	0.0177
G-007A	G-007A	0.9638
VFT	VFT	2.6445
PRAIRIE	PRAIRIE	0.8266
COFFEEN	COFFEEN	0.1654
EDWARDS	EDWARDS	0.1067
CHEOAH	CHEOAH	0.1782
TILTON	TILTON	0.1940
GIBSON	GIBSON	0.1720
CALDERWOOD	CALDERWOOD	0.1769
BLUEG	BLUEG	0.5538

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Bus #	Bus	MW Impact
TRIMBLE	TRIMBLE	0.1770
CATAWBA	CATAWBA	0.1320

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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
41371833	200884	26NEW BALT	PENELEC	200501	26BDFORD N	PENELEC	1	PN-P1-2-PN-115-074B	single	160.0	68.91	106.41	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O1	103.9938
946081	AF1-273 C O1	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41371855	202637	26PRIDE	PENELEC	200744	26SOMERST	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	66.41	103.91	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O1	103.9938
946081	AF1-273 C O1	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41371841	202647	26KIMRUN TAP	PENELEC	202637	26PRIDE	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O1	103.9938
946081	AF1-273 C O1	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41682827	200740	26BLRSVLE	PENELEC	200763	26BLAIRSVL	PENELEC	1	PN_P4-500-001J	breaker	364.0	112.97	114.0	DC	8.29

Bus #	Bus	MW Impact
200636	26IUP CO-G	0.2723
200794	26CONEMAGH	0.1881
200805	**26COLVER13 (Deativation : 09/01/20)**	**11.8140**
200864	K-013 E	1.7770
200883	Q-053 E	3.4276
202158	26CON.GEN1	0.0485
202160	26CON.GEN2	0.0989
290086	Q-036 E	2.2304
292350	K-023	1.8658
292542	L-013 1	1.8148
293301	N-039 E	3.6481
293393	V3-030E	2.3416
293432	R-040 E	0.1021
293603	O-018 E	4.0717
293902	O-048 E	1.6333
294515	O38_P22	3.1921
294903	P-060 E	2.9877
296332	R-032 E	4.6981
917672	Z2-108 E	1.0208
935191	AD1-154	1.0416
936991	AD2-133 C	1.0037
936992	AD2-133 E	4.5907
938351	AE1-053	0.5671
938362	AE1-054 BAT	1.0105
938881	AE1-116	0.3078
938991	AE1-128 C	5.3691
938992	AE1-128 E	3.5794
941331	AE2-129 C	0.5873
941332	AE2-129 E	0.3915
941351	AE2-131 C	0.5873
941352	AE2-131 E	0.3915
942121	AE2-224 C	3.7475
942122	AE2-224 E	2.4983
942361	AE2-249 C	0.6040
942362	AE2-249 E	0.4027
942511	AE2-264 C	2.2636
942512	AE2-264 E	1.5091
944181	AF1-086 C O1	0.8374
944182	AF1-086 E O1	3.6432
944691	AF1-134 C O1	0.3250
944692	AF1-134 E O1	0.3250

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Bus #	Bus	MW Impact
944701	AF1-135 C	0.3900
944702	AF1-135 E	0.2600
944751	AF1-140 C	0.3899
944752	AF1-140 E	0.2599
944781	AF1-143 C	1.8034
944782	AF1-143 E	1.2023
945481	AF1-213 C	2.4767
945482	AF1-213 E	1.6511
945671	AF1-232 C O1	3.8850
945672	AF1-232 E O1	2.0919
945751	AF1-240 C O1	0.3312
945752	AF1-240 E O1	0.2208
945901	AF1-255 C	0.2249
945902	AF1-255 E	0.3105
946071	AF1-272 C O1	12.2977
946072	AF1-272 E O1	8.1985
946081	AF1-273 C O1	2.2413
946082	AF1-273 E O1	1.4942
946241	AF1-289 C O1	0.9560
946242	AF1-289 E O1	0.6373
946431	AF1-307 C	4.7625
946432	AF1-307 E	3.1750
946571	AF1-321 C O1	0.4904
946572	AF1-321 E O1	0.3269
DUCKCREEK	DUCKCREEK	1.1250
NEWTON	NEWTON	1.0358
FARMERCITY	FARMERCITY	0.0530
G-007A	G-007A	2.9489
VFT	VFT	7.9980
PRAIRIE	PRAIRIE	2.4306
COFFEEN	COFFEEN	0.5089
EDWARDS	EDWARDS	0.3433
CHEOAH	CHEOAH	0.4114
TILTON	TILTON	0.6180
MADISON	MADISON	0.0907
GIBSON	GIBSON	0.5302
CALDERWOOD	CALDERWOOD	0.4110
BLUEG	BLUEG	1.6909
TRIMBLE	TRIMBLE	0.5426
CATAWBA	CATAWBA	0.2460

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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
41682356	200745	26ALLEGHEN	PENELEC	200884	26NEW BALT	PENELEC	1	PN-P2-3-PN-115-35E	breaker	160.0	118.26	158.07	DC	63.69

Bus #	Bus	MW Impact
200813	26YOUGH	0.2589
200834	26SW_E13_K22	0.1329
200835	26DSGENWIN	0.6544
200840	26DEEPCRK1	0.2393
200841	26DEEPCRK2	0.2393
200890	26BF_G21_K23	0.3209
200891	26CSLMN_L13	0.5033
200892	26LOOKOUT	0.4782
202225	26SCI_S29B	0.2068
202652	26RGH_Y1-033	0.2457
235013	01AB1-065 C	0.0587
292350	K-023	14.8300
292542	L-013 1	14.4243
293432	R-040 E	0.8114
293902	O-048 E	12.9819
913142	Y1-033 E OP1	12.0240
917672	Z2-108 E	8.1137
930262	AB1-065 E	0.6975
938351	AE1-053	4.5076
938881	AE1-116	2.3805
943301	AF1-001 C	0.6667
943302	AF1-001 E	0.7436
943711	AF1-039 C O1	3.1810
943712	AF1-039 E O1	2.1206
944781	AF1-143 C	27.0456
944782	AF1-143 E	18.0304
945671	AF1-232 C O1	66.2355
945672	AF1-232 E O1	35.6653
946081	AF1-273 C O1	38.2128
946082	AF1-273 E O1	25.4752
946191	AF1-284 C O1	3.3882
946192	AF1-284 E O1	2.0330
LGEE	LGEE	0.1095
CPLE	CPLE	0.1555
WEC	WEC	0.0570
CBM-W2	CBM-W2	1.6134
NY	NY	0.3185
CBM-W1	CBM-W1	2.0892
TVA	TVA	0.2898
O-066	O-066	2.0227
CBM-S2	CBM-S2	1.3236

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Bus #	Bus	MW Impact
CBM-S1	CBM-S1	1.7381
G-007	G-007	0.3047
MEC	MEC	0.2971

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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
41682402	200746	26ROCKWOOD	PENELEC	202650	26HIGHPOINT	PENELEC	1	PN-P2-3-PN-115-35E	breaker	179.0	135.57	155.85	DC	36.29

Bus #	Bus	MW Impact
200834	26SW_E13_K22	0.1183
200835	26DSGENWIN	0.7970
200864	K-013 E	1.7939
200889	26STNY CRK	0.4819
200890	26BF_G21_K23	0.3909
200891	26CSLMN_L13	0.6131
200892	26LOOKOUT	0.5825
202225	26SCI_S29B	0.1840
292350	K-023	18.0637
292542	L-013 1	17.5696
293432	R-040 E	0.9883
293902	O-048 E	15.8126
294903	P-060 E	13.8109
917672	Z2-108 E	9.8829
938351	AE1-053	5.4905
938881	AE1-116	2.1186
938991	AE1-128 C	10.8202
938992	AE1-128 E	7.2134
942361	AE2-249 C	1.2173
942362	AE2-249 E	0.8115
944751	AF1-140 C	0.3547
944752	AF1-140 E	0.2365
944781	AF1-143 C	32.9430
944782	AF1-143 E	21.9620
945671	AF1-232 C O1	37.7437
945672	AF1-232 E O1	20.3235
945901	AF1-255 C	0.7001
945902	AF1-255 E	0.9668
946081	AF1-273 C O1	21.7752
946082	AF1-273 E O1	14.5168
946241	AF1-289 C O1	0.9506
946242	AF1-289 E O1	0.6337
946571	AF1-321 C O1	0.4119
946572	AF1-321 E O1	0.2746
DUCKCREEK	DUCKCREEK	0.2338
NEWTON	NEWTON	0.2246
FARMERCITY	FARMERCITY	0.0118
G-007A	G-007A	0.6545
VFT	VFT	1.7996
PRAIRIE	PRAIRIE	0.5476

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Bus #	Bus	MW Impact
COFFEEN	COFFEEN	0.1099
EDWARDS	EDWARDS	0.0707
CHEOAH	CHEOAH	0.1176
TILTON	TILTON	0.1285
GIBSON	GIBSON	0.1141
CALDERWOOD	CALDERWOOD	0.1168
BLUEG	BLUEG	0.3663
TRIMBLE	TRIMBLE	0.1174
CATAWBA	CATAWBA	0.0868

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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
41682319	200747	26PENN-MAR	PENELEC	946190	AF1-284 TAP	PENELEC	1	PN-P2-3-PN-115-35E	breaker	167.0	163.75	185.48	DC	36.29

Bus #	Bus	MW Impact
200813	26YOUGH	0.5784
200834	26SW_E13_K22	0.1183
200835	26DSGENWIN	0.7969
200864	K-013 E	1.7927
200889	26STNY CRK	0.4819
200890	26BF_G21_K23	0.3908
200891	26CSLMN_L13	0.6130
200892	26LOOKOUT	0.5824
202225	26SCI_S29B	0.1840
202652	26RGH_Y1-033	0.4493
292350	K-023	18.0618
292542	L-013 1	17.5677
293432	R-040 E	0.9882
293902	O-048 E	15.8109
294903	P-060 E	13.8083
913142	Y1-033 E OP1	21.9875
917672	Z2-108 E	9.8818
938351	AE1-053	5.4899
938881	AE1-116	2.1183
938991	AE1-128 C	10.8166
938992	AE1-128 E	7.2110
942361	AE2-249 C	1.2169
942362	AE2-249 E	0.8112
943711	AF1-039 C O1	5.8168
943712	AF1-039 E O1	3.8779
944781	AF1-143 C	32.9394
944782	AF1-143 E	21.9596
945671	AF1-232 C O1	37.7374
945672	AF1-232 E O1	20.3202
945901	AF1-255 C	0.6997
945902	AF1-255 E	0.9663
946081	AF1-273 C O1	21.7716
946082	AF1-273 E O1	14.5144
946241	AF1-289 C O1	0.9499
946242	AF1-289 E O1	0.6333
DUCKCREEK	DUCKCREEK	0.2407
NEWTON	NEWTON	0.2310
FARMERCITY	FARMERCITY	0.0121
G-007A	G-007A	0.6401
VFT	VFT	1.7609
PRAIRIE	PRAIRIE	0.5631

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Bus #	Bus	MW Impact
COFFEEN	COFFEEN	0.1131
EDWARDS	EDWARDS	0.0728
CHEOAH	CHEOAH	0.1206
TILTON	TILTON	0.1323
GIBSON	GIBSON	0.1174
CALDERWOOD	CALDERWOOD	0.1198
BLUEG	BLUEG	0.3767
TRIMBLE	TRIMBLE	0.1208
CATAWBA	CATAWBA	0.0889

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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
41682821	200766	26FLORENCE	PENELEC	200740	26BLRSVLE	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.49	107.28	DC	10.68

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**11.3225**
200794	26CONEMAGH	0.2498
200834	26SW_E13_K22	0.0262
200846	26FORWARD	0.0940
200864	K-013 E	2.6940
200883	Q-053 E	4.8898
200888	26HIGHLAND	0.2125
200889	26STNY CRK	0.1577
200915	26CHSTN_FL	0.1081
200925	26R32	0.2451
202225	26SCI_S29B	0.0408
290086	Q-036 E	2.4283
292350	K-023	2.4511
292542	L-013 1	2.3841
293301	N-039 E	4.4108
293393	V3-030E	1.8653
293432	R-040 E	0.1341
293603	O-018 E	6.0882
293902	O-048 E	2.1457
294515	O38_P22	3.8594
294903	P-060 E	4.5184
296332	R-032 E	7.0248
913142	Y1-033 E OP1	1.9314
917672	Z2-108 E	1.3410
936991	AD2-133 C	1.0927
936992	AD2-133 E	4.9980
938351	AE1-053	0.7450
938881	AE1-116	0.4699
938991	AE1-128 C	8.0323
938992	AE1-128 E	5.3549
941231	AE2-117 C	0.5474
941232	AE2-117 E	0.3650
941241	AE2-118 C	0.5474
941242	AE2-118 E	0.3650
941331	AE2-129 C	0.5910
941332	AE2-129 E	0.3940
941351	AE2-131 C	0.5910
941352	AE2-131 E	0.3940
942121	AE2-224 C	4.6170
942122	AE2-224 E	3.0780

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Bus #	Bus	MW Impact
942361	AE2-249 C	0.9036
942362	AE2-249 E	0.6024
942511	AE2-264 C	2.6181
942512	AE2-264 E	1.7454
943711	AF1-039 C O1	0.2708
943712	AF1-039 E O1	0.1805
944731	AF1-138 C O1	0.2901
944732	AF1-138 E O1	0.1934
944751	AF1-140 C	1.0815
944752	AF1-140 E	0.7210
944781	AF1-143 C	2.3692
944782	AF1-143 E	1.5795
945671	AF1-232 C O1	11.1103
945672	AF1-232 E O1	5.9825
945901	AF1-255 C	0.6304
945902	AF1-255 E	0.8705
946081	AF1-273 C O1	6.4098
946082	AF1-273 E O1	4.2732
946241	AF1-289 C O1	2.6563
946242	AF1-289 E O1	1.7709
946431	AF1-307 C	6.2803
946432	AF1-307 E	4.1868
946571	AF1-321 C O1	1.4070
946572	AF1-321 E O1	0.9380
DUCKCREEK	DUCKCREEK	0.5953
NEWTON	NEWTON	0.5534
FARMERCITY	FARMERCITY	0.0284
G-007A	G-007A	1.3210
VFT	VFT	3.6120
PRAIRIE	PRAIRIE	1.3096
COFFEEN	COFFEEN	0.2716
EDWARDS	EDWARDS	0.1813
CHEOAH	CHEOAH	0.2342
TILTON	TILTON	0.3276
MADISON	MADISON	0.0444
GIBSON	GIBSON	0.2834
CALDERWOOD	CALDERWOOD	0.2336
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2910
CATAWBA	CATAWBA	0.1484

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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
42281178	200767	26HOMER CT	PENELEC	200795	26SHELOCTA	PENELEC	1	PN_P4-500-002F	breaker	917.0	162.98	166.24	DC	29.39

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**28.9164**
200794	26CONEMAGH	0.4629
200805	**26COLVER13 (Deativation : 09/01/20)**	**14.5103**
200809	26SITHE	2.2348
200823	26MHP_X3-003	1.9016
200833	26SEWRDB34	27.2507
200834	26SW_E13_K22	0.0724
200835	26DSGENWIN	0.3532
200837	26HOMER C1	38.4884
200838	26HOMER C2	32.0070
200839	26HOMER C3	33.8836
200846	26FORWARD	0.2587
200864	K-013 E	7.4126
200883	Q-053 E	13.4971
200886	26ARWF_N39	0.6904
200888	26HIGHLAND	0.5687
200889	26STNY CRK	0.4333
200890	26BF_G21_K23	0.1732
200891	26CSLMN_L13	0.2717
200892	26LOOKOUT	0.2581
200894	26K02	7.0234
200898	26AA1-106	2.6973
200905	26Q36	0.3168
200915	26CHSTN_FL	0.2983
200925	26R32	0.6562
201144	W3-099 C OP1	1.4662
201477	26Y2-055	4.1676
202225	26SCI_S29B	0.1127
203034	26NA_O38_P22	0.6041
203909	26Z1-038	1.8767
203910	26Z1-091	2.4569
203999	P-047 E	12.9768
235003	AC1-025 E	0.1729
236828	01GRAYMONT	0.4680
290086	Q-036 E	9.0772
292350	K-023	8.0052
292542	L-013 1	7.7862
293301	N-039 E	19.7843
293393	V3-030E	5.3060
293432	R-040 E	0.4380
293603	O-018 E	16.2963

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Bus #	Bus	MW Impact
293902	O-048 E	7.0076
294515	O38_P22	17.3113
294573	P-028 E	11.4097
294903	P-060 E	12.4160
296332	R-032 E	18.8034
903644	W3-099 E OP1	9.8124
913142	Y1-033 E OP1	5.4199
915951	Y3-092 FTIR	107.9900
916202	Z1-069 E	10.3402
917672	Z2-108 E	4.3798
918682	AA1-082 E	6.9637
919201	AA1-144 OP	19.7891
919491	AA2-000	59.5323
920341	AA2-132	2.7294
922932	AB1-082 OP	3.7512
923443	AB1-160 E	2.9544
930511	AB1-092	2.1859
935191	AD1-154	2.5503
936421	AD2-055	4.5003
936991	AD2-133 C	4.0847
936992	AD2-133 E	18.6831
938351	AE1-053	2.4332
938881	AE1-116	1.2972
938951	AE1-123	2.2336
938991	AE1-128 C	21.9514
938992	AE1-128 E	14.6342
939171	AE1-147 C	1.4073
939172	AE1-147 E	0.9382
939291	AE1-160 C	1.5320
939292	AE1-160 E	0.8806
939381	AE1-169 C O1	6.2038
939382	AE1-169 E O1	4.1359
940201	AE2-001 C	1.4055
940202	AE2-001 E	0.9370
940681	AE2-055 C	1.3775
940682	AE2-055 E	0.9183
940861	AE2-074 C	2.8483
940862	AE2-074 E	3.7494
941191	AE2-113 C	10.9112
941192	AE2-113 E	11.7479
941231	AE2-117 C	1.9816
941232	AE2-117 E	1.3210
941241	AE2-118 C	1.9816
941242	AE2-118 E	1.3210
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.7524**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**1.1682**
941261	AE2-120 C	1.4044
941262	AE2-120 E	0.9363
941271	AE2-121 C	0.7499
941272	AE2-121 E	0.5007
941321	AE2-126 C	1.7879
941322	AE2-126 E	1.1919

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Bus #	Bus	MW Impact
941331	AE2-129 C	2.0624
941332	AE2-129 E	1.3750
941351	AE2-131 C	2.0624
941352	AE2-131 E	1.3750
941421	AE2-139 C	7.4089
941422	AE2-139 E	4.9393
942121	AE2-224 C	21.1962
942122	AE2-224 E	14.1308
942351	AE2-248 C	1.1113
942352	AE2-248 E	0.7409
942361	AE2-249 C	2.4695
942362	AE2-249 E	1.6464
942491	AE2-262 C	6.2505
942492	AE2-262 E	4.2003
942501	AE2-263 C	5.8754
942502	AE2-263 E	3.9228
942511	AE2-264 C	11.2229
942512	AE2-264 E	7.4819
942811	AE2-299 C	3.6451
942812	AE2-299 E	14.5803
942961	AE2-316 C	5.6956
942962	AE2-316 E	8.1220
943151	AE2-344 C	7.6841
943152	AE2-344 E	5.1228
943351	AF1-006 C	0.7075
943352	AF1-006 E	0.3980
943711	AF1-039 C O1	0.7599
943712	AF1-039 E O1	0.5066
943751	AF1-043	7.1554
943871	AF1-055 C O1	2.9015
943872	AF1-055 E O1	1.9343
944001	AF1-068 C O1	0.7834
944002	AF1-068 E O1	0.4406
944181	AF1-086 C O1	1.5310
944182	AF1-086 E O1	6.6609
944261	AF1-094 C	0.7197
944262	AF1-094 E	0.4798
944281	AF1-096 C	0.7672
944282	AF1-096 E	0.5115
944301	AF1-098 C	2.9545
944302	AF1-098 E	1.9697
944311	AF1-099 C	5.0288
944312	AF1-099 E	3.3525
944321	AF1-100 C O1	10.5721
944322	AF1-100 E O1	7.0481
944381	AF1-103 O1	1.5226
944391	AF1-104 O1	1.0293
944411	AF1-106 O1	1.5776
944471	AF1-112 C	0.7379
944472	AF1-112 E	0.4919
944671	AF1-132 C O1	0.7333
944672	AF1-132 E O1	0.4889

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Bus #	Bus	MW Impact
944691	AF1-134 C O1	0.7576
944692	AF1-134 E O1	0.7576
944701	AF1-135 C	0.9091
944702	AF1-135 E	0.6061
944731	AF1-138 C O1	1.0502
944732	AF1-138 E O1	0.7001
944741	AF1-139 C O1	0.8723
944742	AF1-139 E O1	0.5815
944751	AF1-140 C	2.9287
944752	AF1-140 E	1.9525
944771	AF1-142 C	8.0460
944772	AF1-142 E	5.3640
944781	AF1-143 C	14.5992
944782	AF1-143 E	9.7328
944841	AF1-149 C	1.4043
944842	AF1-149 E	0.9362
944881	AF1-153 C O1	0.8674
944882	AF1-153 E O1	0.5783
944901	AF1-155 C	0.8670
944902	AF1-155 E	0.5780
945021	AF1-167 C	0.5944
945022	AF1-167 E	0.3963
945051	AF1-170 C	2.5442
945052	AF1-170 E	1.6961
945071	AF1-172 C	10.3025
945072	AF1-172 E	6.8683
945121	AF1-177	0.3806
945161	AF1-181	0.0564
945171	AF1-182	0.2819
945181	AF1-183	0.0738
945331	AF1-198	0.2114
945451	AF1-210 C	0.5540
945452	AF1-210 E	0.3694
945481	AF1-213 C	6.9713
945482	AF1-213 E	4.6475
945491	AF1-214 C	0.7444
945492	AF1-214 E	0.4963
945551	AF1-220 C	7.2853
945552	AF1-220 E	4.8595
945671	AF1-232 C O1	30.5604
945672	AF1-232 E O1	16.4556
945751	AF1-240 C O1	0.8110
945752	AF1-240 E O1	0.5407
945771	AF1-242 C	0.8670
945772	AF1-242 E	0.5780
945901	AF1-255 C	1.7168
945902	AF1-255 E	2.3708
946081	AF1-273 C O1	17.6310
946082	AF1-273 E O1	11.7540
946091	AF1-274 C	4.0432
946092	AF1-274 E	2.6955
946131	AF1-278	42.0132

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Bus #	Bus	MW Impact
946191	AF1-284 C O1	0.7890
946192	AF1-284 E O1	0.4734
946211	AF1-286 C O1	0.6389
946212	AF1-286 E O1	0.4338
946221	AF1-287 C	0.7027
946222	AF1-287 E	0.4684
946241	AF1-289 C O1	7.2007
946242	AF1-289 E O1	4.8005
946381	AF1-302 C	1.3182
946382	AF1-302 E	1.7576
946401	AF1-304 C	3.8864
946402	AF1-304 E	2.5909
946421	AF1-306 C	4.2972
946422	AF1-306 E	17.1887
946431	AF1-307 C	12.0207
946432	AF1-307 E	8.0138
946571	AF1-321 C O1	3.8779
946572	AF1-321 E O1	2.5853
946771	AF1-217 C O1	0.7027
946772	AF1-217 E O1	0.4684
DUCKCREEK	DUCKCREEK	0.7128
NEWTON	NEWTON	0.7049
FARMERCITY	FARMERCITY	0.0370
PRAIRIE	PRAIRIE	1.7487
O-066	O-066	1.6733
COFFEEN	COFFEEN	0.3430
EDWARDS	EDWARDS	0.2142
CHEOAH	CHEOAH	0.4109
TILTON	TILTON	0.3956
G-007	G-007	0.3588
MADISON	MADISON	0.0202
GIBSON	GIBSON	0.3593
CALDERWOOD	CALDERWOOD	0.4065
BLUEG	BLUEG	1.1735
TRIMBLE	TRIMBLE	0.3756
CATAWBA	CATAWBA	0.3206

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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
42281188	200795	26SHELOCTA	PENELEC	200810	26KEYSTONE	PENELEC	1	PN_P4-500-002A	breaker	917.0	149.89	153.43	DC	32.01

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**32.5076**
200636	26IUP CO-G	0.6752
200794	26CONEMAGH	0.5468
200805	**26COLVER13 (Deativation : 09/01/20)**	**34.8876**
200809	26SITHE	2.1598
200833	26SEWRDB34	28.3096
200834	26SW_E13_K22	0.0787
200835	26DSGENWIN	0.3844
200837	26HOMER C1	37.1972
200838	26HOMER C2	31.2734
200839	26HOMER C3	33.1070
200846	26FORWARD	0.2807
200864	K-013 E	8.0446
200883	Q-053 E	15.1296
200886	26ARWF_N39	0.7144
200888	26HIGHLAND	0.6259
200889	26STNY CRK	0.4725
200890	26BF_G21_K23	0.1885
200891	26CSLMN_L13	0.2957
200892	26LOOKOUT	0.2809
200894	26K02	7.3804
200898	26AA1-106	2.7668
200915	26CHSTN_FL	0.3344
200925	26R32	0.7222
200945	26CT_V3-030	0.2375
201144	W3-099 C OP1	1.5476
201477	26Y2-055	4.3870
202158	26CON.GEN1	0.1133
202160	26CON.GEN2	0.0848
202225	26SCI_S29B	0.1224
203034	26NA_O38_P22	0.6251
203910	26Z1-091	2.4645
203999	P-047 E	13.0226
235003	AC1-025 E	0.1912
236828	01GRAYMONT	0.5180
290086	Q-036 E	8.8754
292350	K-023	8.7126
292542	L-013 1	8.4742
293301	N-039 E	20.4723
293393	V3-030E	8.9704
293432	R-040 E	0.4052

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Bus #	Bus	MW Impact
293603	O-018 E	17.9374
293902	O-048 E	7.6268
294515	O38_P22	17.9133
294903	P-060 E	13.5395
296332	R-032 E	20.6970
903644	W3-099 E OP1	10.3567
913142	Y1-033 E OP1	5.9219
916202	Z1-069 E	10.4453
917672	Z2-108 E	4.0517
918682	AA1-082 E	7.0566
919201	AA1-144 OP	20.0981
919491	AA2-000	64.8177
920341	AA2-132	2.7367
922932	AB1-082 OP	3.8155
923443	AB1-160 E	2.9844
930511	AB1-092	2.3799
935191	AD1-154	4.1854
936421	AD2-055	4.8998
936991	AD2-133 C	3.9939
936992	AD2-133 E	18.2677
938351	AE1-053	2.2510
938881	AE1-116	1.4089
938951	AE1-123	2.9191
938991	AE1-128 C	24.0523
938992	AE1-128 E	16.0349
939171	AE1-147 C	1.5578
939172	AE1-147 E	1.0386
939291	AE1-160 C	1.8016
939292	AE1-160 E	1.0356
939381	AE1-169 C O1	7.3470
939382	AE1-169 E O1	4.8980
940201	AE2-001 C	1.5556
940202	AE2-001 E	1.0371
940681	AE2-055 C	1.5221
940682	AE2-055 E	1.0148
940861	AE2-074 C	2.8971
940862	AE2-074 E	3.8136
941191	AE2-113 C	11.4763
941192	AE2-113 E	12.3563
941231	AE2-117 C	2.0808
941232	AE2-117 E	1.3872
941241	AE2-118 C	2.0808
941242	AE2-118 E	1.3872
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**2.1153**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**1.4102**
941261	AE2-120 C	1.5544
941262	AE2-120 E	1.0363
941271	AE2-121 C	0.8303
941272	AE2-121 E	0.5544
941321	AE2-126 C	2.0539
941322	AE2-126 E	1.3692
941331	AE2-129 C	2.4166

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Bus #	Bus	MW Impact
941332	AE2-129 E	1.6111
941351	AE2-131 C	2.4166
941352	AE2-131 E	1.6111
941421	AE2-139 C	7.6068
941422	AE2-139 E	5.0712
942121	AE2-224 C	21.8082
942122	AE2-224 E	14.5388
942351	AE2-248 C	1.2289
942352	AE2-248 E	0.8193
942361	AE2-249 C	2.7059
942362	AE2-249 E	1.8039
942491	AE2-262 C	6.9530
942492	AE2-262 E	4.6724
942501	AE2-263 C	6.5358
942502	AE2-263 E	4.3637
942511	AE2-264 C	9.9878
942512	AE2-264 E	6.6586
942811	AE2-299 C	3.8423
942812	AE2-299 E	15.3691
942961	AE2-316 C	6.2990
942962	AE2-316 E	8.9823
943151	AE2-344 C	8.2183
943152	AE2-344 E	5.4789
943351	AF1-006 C	0.7537
943352	AF1-006 E	0.4239
943711	AF1-039 C O1	0.8303
943712	AF1-039 E O1	0.5535
943751	AF1-043	7.7907
943871	AF1-055 C O1	3.1386
943872	AF1-055 E O1	2.0924
944001	AF1-068 C O1	0.8661
944002	AF1-068 E O1	0.4872
944181	AF1-086 C O1	5.9075
944182	AF1-086 E O1	25.7008
944261	AF1-094 C	0.7983
944262	AF1-094 E	0.5322
944281	AF1-096 C	0.9022
944282	AF1-096 E	0.6015
944301	AF1-098 C	3.1348
944302	AF1-098 E	2.0899
944311	AF1-099 C	5.5940
944312	AF1-099 E	3.7293
944321	AF1-100 C O1	11.9824
944322	AF1-100 E O1	7.9883
944381	AF1-103 O1	1.6028
944391	AF1-104 O1	1.0955
944411	AF1-106 O1	1.5856
944471	AF1-112 C	0.8161
944472	AF1-112 E	0.5441
944671	AF1-132 C O1	0.8107
944672	AF1-132 E O1	0.5405
944691	AF1-134 C O1	1.1405

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.1405
944701	AF1-135 C	1.3686
944702	AF1-135 E	0.9124
944731	AF1-138 C O1	1.1028
944732	AF1-138 E O1	0.7352
944741	AF1-139 C O1	0.8746
944742	AF1-139 E O1	0.5831
944751	AF1-140 C	3.2443
944752	AF1-140 E	2.1629
944771	AF1-142 C	8.9503
944772	AF1-142 E	5.9669
944781	AF1-143 C	15.8892
944782	AF1-143 E	10.5928
944841	AF1-149 C	1.5543
944842	AF1-149 E	1.0362
944881	AF1-153 C O1	0.9693
944882	AF1-153 E O1	0.6462
944901	AF1-155 C	0.9691
944902	AF1-155 E	0.6461
945021	AF1-167 C	0.7104
945022	AF1-167 E	0.4736
945051	AF1-170 C	2.7153
945052	AF1-170 E	1.8102
945071	AF1-172 C	11.3364
945072	AF1-172 E	7.5576
945121	AF1-177	0.4007
945161	AF1-181	0.0639
945171	AF1-182	0.3195
945181	AF1-183	0.0864
945331	AF1-198	0.2136
945451	AF1-210 C	0.6626
945452	AF1-210 E	0.4418
945481	AF1-213 C	9.4791
945482	AF1-213 E	6.3194
945491	AF1-214 C	0.8239
945492	AF1-214 E	0.5492
945551	AF1-220 C	8.0851
945552	AF1-220 E	5.3930
945671	AF1-232 C O1	33.2946
945672	AF1-232 E O1	17.9278
945751	AF1-240 C O1	1.3310
945752	AF1-240 E O1	0.8873
945771	AF1-242 C	0.9691
945772	AF1-242 E	0.6461
945901	AF1-255 C	1.8890
945902	AF1-255 E	2.6086
946071	AF1-272 C O1	29.2485
946072	AF1-272 E O1	19.4990
946081	AF1-273 C O1	19.2084
946082	AF1-273 E O1	12.8056
946091	AF1-274 C	4.5988
946092	AF1-274 E	3.0659

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Bus #	Bus	MW Impact
946131	AF1-278	19.3364
946191	AF1-284 C O1	0.8671
946192	AF1-284 E O1	0.5203
946211	AF1-286 C O1	0.6422
946212	AF1-286 E O1	0.4360
946221	AF1-287 C	0.7518
946222	AF1-287 E	0.5012
946241	AF1-289 C O1	7.9675
946242	AF1-289 E O1	5.3117
946381	AF1-302 C	1.4578
946382	AF1-302 E	1.9438
946401	AF1-304 C	4.6208
946402	AF1-304 E	3.0805
946421	AF1-306 C	4.7503
946422	AF1-306 E	19.0010
946431	AF1-307 C	14.1382
946432	AF1-307 E	9.4254
946571	AF1-321 C O1	4.1989
946572	AF1-321 E O1	2.7993
946771	AF1-217 C O1	0.7518
946772	AF1-217 E O1	0.5012
DUCKCREEK	DUCKCREEK	0.5412
NEWTON	NEWTON	0.5491
FARMERCITY	FARMERCITY	0.0290
PRAIRIE	PRAIRIE	1.3845
O-066	O-066	3.3130
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1617
CHEOAH	CHEOAH	0.3544
TILTON	TILTON	0.3018
G-007	G-007	0.6157
MADISON	MADISON	0.0081
GIBSON	GIBSON	0.2796
CALDERWOOD	CALDERWOOD	0.3499
BLUEG	BLUEG	0.9218
TRIMBLE	TRIMBLE	0.2949
CATAWBA	CATAWBA	0.2902

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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
42281294	200810	26KEYSTONE	PENELEC	999401	STAR592	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	125.0	127.71	DC	17.0

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**16.7325**
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	**26COLVER13 (Deativation : 09/01/20)**	**19.5371**
200809	26SITHE	1.2781
200833	26SEWRDB34	13.2926
200834	26SW_E13_K22	0.0419
200835	26DSGENWIN	0.2043
200837	26HOMER C1	22.0118
200838	26HOMER C2	18.4521
200839	26HOMER C3	19.5339
200846	26FORWARD	0.1497
200864	K-013 E	4.2904
200883	Q-053 E	7.8926
200886	26ARWF_N39	0.3654
200888	26HIGHLAND	0.3256
200889	26STNY CRK	0.2507
200890	26BF_G21_K23	0.1002
200891	26CSLMN_L13	0.1571
200892	26LOOKOUT	0.1493
200894	26K02	4.2783
200898	26AA1-106	1.6183
200906	26KEYSTN#3	0.6753
200915	26CHSTN_FL	0.1744
200925	26R32	0.3757
200945	26CT_V3-030	0.1279
201144	W3-099 C OP1	0.8862
201477	26Y2-055	2.5227
202158	26CON.GEN1	0.0706
202160	26CON.GEN2	0.0494
202225	26SCI_S29B	0.0652
203034	26NA_O38_P22	0.3198
203910	26Z1-091	1.4594
203999	P-047 E	7.6636
235003	AC1-025 E	0.1066
236828	01GRAYMONT	0.2892
290086	Q-036 E	4.7474
292350	K-023	4.6300
292542	L-013 1	4.5034
293301	N-039 E	10.4723
293393	V3-030E	4.8293
293432	R-040 E	0.2153

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Bus #	Bus	MW Impact
293603	O-018 E	9.3319
293902	O-048 E	4.0530
294515	O38_P22	9.1633
294903	P-060 E	7.1841
296332	R-032 E	10.7676
903644	W3-099 E OP1	5.9308
913142	Y1-033 E OP1	3.1317
916202	Z1-069 E	6.1155
917672	Z2-108 E	2.1532
918682	AA1-082 E	4.1617
919201	AA1-144 OP	11.8405
919491	AA2-000	36.9701
920341	AA2-132	1.6166
922932	AB1-082 OP	2.2258
923443	AB1-160 E	1.7473
930511	AB1-092	1.3574
935191	AD1-154	2.3565
936421	AD2-055	2.7947
936991	AD2-133 C	2.1363
936992	AD2-133 E	9.7714
938351	AE1-053	1.1962
938881	AE1-116	0.7506
938951	AE1-123	1.6552
938991	AE1-128 C	12.7001
938992	AE1-128 E	8.4667
939171	AE1-147 C	0.8700
939172	AE1-147 E	0.5800
939291	AE1-160 C	1.0268
939292	AE1-160 E	0.5902
939381	AE1-169 C O1	4.1867
939382	AE1-169 E O1	2.7912
940201	AE2-001 C	0.8686
940202	AE2-001 E	0.5791
940681	AE2-055 C	0.8483
940682	AE2-055 E	0.5656
940861	AE2-074 C	1.6901
940862	AE2-074 E	2.2247
941191	AE2-113 C	6.6183
941192	AE2-113 E	7.1257
941231	AE2-117 C	1.0872
941232	AE2-117 E	0.7248
941241	AE2-118 C	1.0872
941242	AE2-118 E	0.7248
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.1764**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**0.7842**
941261	AE2-120 C	0.8679
941262	AE2-120 E	0.5786
941271	AE2-121 C	0.4638
941272	AE2-121 E	0.3097
941321	AE2-126 C	1.1560
941322	AE2-126 E	0.7706
941331	AE2-129 C	1.3127

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Bus #	Bus	MW Impact
941332	AE2-129 E	0.8752
941351	AE2-131 C	1.3127
941352	AE2-131 E	0.8752
941421	AE2-139 C	4.4582
941422	AE2-139 E	2.9721
942121	AE2-224 C	11.0976
942122	AE2-224 E	7.3984
942351	AE2-248 C	0.6854
942352	AE2-248 E	0.4570
942361	AE2-249 C	1.4288
942362	AE2-249 E	0.9525
942491	AE2-262 C	3.9062
942492	AE2-262 E	2.6249
942501	AE2-263 C	3.6718
942502	AE2-263 E	2.4515
942511	AE2-264 C	5.1734
942512	AE2-264 E	3.4490
942811	AE2-299 C	2.2018
942812	AE2-299 E	8.8074
942961	AE2-316 C	3.5892
942962	AE2-316 E	5.1182
943151	AE2-344 C	4.6968
943152	AE2-344 E	3.1312
943351	AF1-006 C	0.4299
943352	AF1-006 E	0.2418
943711	AF1-039 C O1	0.4391
943712	AF1-039 E O1	0.2927
943751	AF1-043	4.4436
943871	AF1-055 C O1	1.8031
943872	AF1-055 E O1	1.2020
944001	AF1-068 C O1	0.4829
944002	AF1-068 E O1	0.2717
944181	AF1-086 C O1	3.2911
944182	AF1-086 E O1	14.3182
944261	AF1-094 C	0.4556
944262	AF1-094 E	0.3037
944281	AF1-096 C	0.5142
944282	AF1-096 E	0.3428
944301	AF1-098 C	1.7941
944302	AF1-098 E	1.1961
944311	AF1-099 C	3.1427
944312	AF1-099 E	2.0951
944321	AF1-100 C O1	6.7325
944322	AF1-100 E O1	4.4883
944381	AF1-103 O1	0.9216
944391	AF1-104 O1	0.6234
944411	AF1-106 O1	0.9338
944471	AF1-112 C	0.4553
944472	AF1-112 E	0.3035
944671	AF1-132 C O1	0.4520
944672	AF1-132 E O1	0.3013
944691	AF1-134 C O1	1.4096

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.4096
944701	AF1-135 C	1.6915
944702	AF1-135 E	1.1277
944731	AF1-138 C O1	0.5762
944732	AF1-138 E O1	0.3842
944741	AF1-139 C O1	0.5167
944742	AF1-139 E O1	0.3444
944751	AF1-140 C	1.6938
944752	AF1-140 E	1.1292
944771	AF1-142 C	5.0283
944772	AF1-142 E	3.3522
944781	AF1-143 C	8.4438
944782	AF1-143 E	5.6292
944841	AF1-149 C	0.8678
944842	AF1-149 E	0.5785
944881	AF1-153 C O1	0.5496
944882	AF1-153 E O1	0.3664
944901	AF1-155 C	0.5495
944902	AF1-155 E	0.3663
945021	AF1-167 C	0.4031
945022	AF1-167 E	0.2687
945051	AF1-170 C	1.5485
945052	AF1-170 E	1.0323
945071	AF1-172 C	6.4352
945072	AF1-172 E	4.2901
945121	AF1-177	0.2304
945161	AF1-181	0.0359
945171	AF1-182	0.1795
945181	AF1-183	0.0483
945331	AF1-198	0.1254
945451	AF1-210 C	0.3750
945452	AF1-210 E	0.2500
945481	AF1-213 C	5.2754
945482	AF1-213 E	3.5170
945491	AF1-214 C	0.4601
945492	AF1-214 E	0.3067
945551	AF1-220 C	4.5899
945552	AF1-220 E	3.0616
945671	AF1-232 C O1	17.6831
945672	AF1-232 E O1	9.5217
945751	AF1-240 C O1	0.7494
945752	AF1-240 E O1	0.4996
945771	AF1-242 C	0.5495
945772	AF1-242 E	0.3663
945901	AF1-255 C	0.9932
945902	AF1-255 E	1.3715
946071	AF1-272 C O1	17.9595
946072	AF1-272 E O1	11.9730
946081	AF1-273 C O1	10.2018
946082	AF1-273 E O1	6.8012
946091	AF1-274 C	2.5949
946092	AF1-274 E	1.7299

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Bus #	Bus	MW Impact
946131	AF1-278	11.2469
946191	AF1-284 C O1	0.4553
946192	AF1-284 E O1	0.2732
946211	AF1-286 C O1	0.3782
946212	AF1-286 E O1	0.2568
946221	AF1-287 C	0.4297
946222	AF1-287 E	0.2864
946241	AF1-289 C O1	4.1647
946242	AF1-289 E O1	2.7765
946381	AF1-302 C	0.8307
946382	AF1-302 E	1.1076
946401	AF1-304 C	2.6330
946402	AF1-304 E	1.7553
946421	AF1-306 C	2.6955
946422	AF1-306 E	10.7819
946431	AF1-307 C	7.1429
946432	AF1-307 E	4.7619
946571	AF1-321 C O1	2.2446
946572	AF1-321 E O1	1.4964
946771	AF1-217 C O1	0.4297
946772	AF1-217 E O1	0.2864
DUCKCREEK	DUCKCREEK	0.5619
NEWTON	NEWTON	0.5458
FARMERCITY	FARMERCITY	0.0284
PRAIRIE	PRAIRIE	1.3354
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1698
CHEOAH	CHEOAH	0.2933
TILTON	TILTON	0.3112
G-007	G-007	0.0426
MADISON	MADISON	0.0262
GIBSON	GIBSON	0.2790
CALDERWOOD	CALDERWOOD	0.2907
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2905
CATAWBA	CATAWBA	0.2188

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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
41682344	202650	26HIGHPOINT	PENELEC	200747	26PENN-MAR	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	153.97	174.82	DC	36.29

Bus #	Bus	MW Impact
200834	26SW_E13_K22	0.1183
200835	26DSGENWIN	0.7970
200864	K-013 E	1.7933
200889	26STNY CRK	0.4819
200890	26BF_G21_K23	0.3908
200891	26CSLMN_L13	0.6131
200892	26LOOKOUT	0.5824
202225	26SCI_S29B	0.1840
202652	26RGH_Y1-033	0.4493
292350	K-023	18.0628
292542	L-013 1	17.5686
293432	R-040 E	0.9882
293902	O-048 E	15.8118
294903	P-060 E	13.8096
913142	Y1-033 E OP1	21.9885
917672	Z2-108 E	9.8824
938351	AE1-053	5.4902
938881	AE1-116	2.1185
938991	AE1-128 C	10.8187
938992	AE1-128 E	7.2125
942361	AE2-249 C	1.2171
942362	AE2-249 E	0.8114
943711	AF1-039 C O1	5.8171
943712	AF1-039 E O1	3.8780
944781	AF1-143 C	32.9412
944782	AF1-143 E	21.9608
945671	AF1-232 C O1	37.7416
945672	AF1-232 E O1	20.3224
945901	AF1-255 C	0.6999
945902	AF1-255 E	0.9665
946081	AF1-273 C O1	21.7740
946082	AF1-273 E O1	14.5160
946241	AF1-289 C O1	0.9503
946242	AF1-289 E O1	0.6335
DUCKCREEK	DUCKCREEK	0.2361
NEWTON	NEWTON	0.2267
FARMERCITY	FARMERCITY	0.0119
G-007A	G-007A	0.6497
VFT	VFT	1.7866
PRAIRIE	PRAIRIE	0.5528
COFFEEN	COFFEEN	0.1110

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Bus #	Bus	MW Impact
EDWARDS	EDWARDS	0.0714
CHEOAH	CHEOAH	0.1186
TILTON	TILTON	0.1298
GIBSON	GIBSON	0.1152
CALDERWOOD	CALDERWOOD	0.1178
BLUEG	BLUEG	0.3698
TRIMBLE	TRIMBLE	0.1185
CATAWBA	CATAWBA	0.0875

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14.21 Index 15

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
41682501	999401	STAR592	PJM	200011	KEYSTONE	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	124.47	127.19	DC	17.0

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**16.7325**
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	**26COLVER13 (Deativation : 09/01/20)**	**19.5371**
200809	26SITHE	1.2781
200833	26SEWRDB34	13.2926
200834	26SW_E13_K22	0.0419
200835	26DSGENWIN	0.2043
200837	26HOMER C1	22.0118
200838	26HOMER C2	18.4521
200839	26HOMER C3	19.5339
200846	26FORWARD	0.1497
200864	K-013 E	4.2904
200883	Q-053 E	7.8926
200886	26ARWF_N39	0.3654
200888	26HIGHLAND	0.3256
200889	26STNY CRK	0.2507
200890	26BF_G21_K23	0.1002
200891	26CSLMN_L13	0.1571
200892	26LOOKOUT	0.1493
200894	26K02	4.2783
200898	26AA1-106	1.6183
200906	26KEYSTN#3	0.6753
200915	26CHSTN_FL	0.1744
200925	26R32	0.3757
200945	26CT_V3-030	0.1279
201144	W3-099 C OP1	0.8862
201477	26Y2-055	2.5227
202158	26CON.GEN1	0.0706
202160	26CON.GEN2	0.0494
202225	26SCI_S29B	0.0652
203034	26NA_O38_P22	0.3198
203910	26Z1-091	1.4594
203999	P-047 E	7.6636
235003	AC1-025 E	0.1066
236828	01GRAYMONT	0.2892
290086	Q-036 E	4.7474
292350	K-023	4.6300
292542	L-013 1	4.5034
293301	N-039 E	10.4723
293393	V3-030E	4.8293
293432	R-040 E	0.2153

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Bus #	Bus	MW Impact
293603	O-018 E	9.3319
293902	O-048 E	4.0530
294515	O38_P22	9.1633
294903	P-060 E	7.1841
296332	R-032 E	10.7676
903644	W3-099 E OP1	5.9308
913142	Y1-033 E OP1	3.1317
916202	Z1-069 E	6.1155
917672	Z2-108 E	2.1532
918682	AA1-082 E	4.1617
919201	AA1-144 OP	11.8405
919491	AA2-000	36.9701
920341	AA2-132	1.6166
922932	AB1-082 OP	2.2258
923443	AB1-160 E	1.7473
930511	AB1-092	1.3574
935191	AD1-154	2.3565
936421	AD2-055	2.7947
936991	AD2-133 C	2.1363
936992	AD2-133 E	9.7714
938351	AE1-053	1.1962
938881	AE1-116	0.7506
938951	AE1-123	1.6552
938991	AE1-128 C	12.7001
938992	AE1-128 E	8.4667
939171	AE1-147 C	0.8700
939172	AE1-147 E	0.5800
939291	AE1-160 C	1.0268
939292	AE1-160 E	0.5902
939381	AE1-169 C O1	4.1867
939382	AE1-169 E O1	2.7912
940201	AE2-001 C	0.8686
940202	AE2-001 E	0.5791
940681	AE2-055 C	0.8483
940682	AE2-055 E	0.5656
940861	AE2-074 C	1.6901
940862	AE2-074 E	2.2247
941191	AE2-113 C	6.6183
941192	AE2-113 E	7.1257
941231	AE2-117 C	1.0872
941232	AE2-117 E	0.7248
941241	AE2-118 C	1.0872
941242	AE2-118 E	0.7248
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.1764**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**0.7842**
941261	AE2-120 C	0.8679
941262	AE2-120 E	0.5786
941271	AE2-121 C	0.4638
941272	AE2-121 E	0.3097
941321	AE2-126 C	1.1560
941322	AE2-126 E	0.7706
941331	AE2-129 C	1.3127

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Bus #	Bus	MW Impact
941332	AE2-129 E	0.8752
941351	AE2-131 C	1.3127
941352	AE2-131 E	0.8752
941421	AE2-139 C	4.4582
941422	AE2-139 E	2.9721
942121	AE2-224 C	11.0976
942122	AE2-224 E	7.3984
942351	AE2-248 C	0.6854
942352	AE2-248 E	0.4570
942361	AE2-249 C	1.4288
942362	AE2-249 E	0.9525
942491	AE2-262 C	3.9062
942492	AE2-262 E	2.6249
942501	AE2-263 C	3.6718
942502	AE2-263 E	2.4515
942511	AE2-264 C	5.1734
942512	AE2-264 E	3.4490
942811	AE2-299 C	2.2018
942812	AE2-299 E	8.8074
942961	AE2-316 C	3.5892
942962	AE2-316 E	5.1182
943151	AE2-344 C	4.6968
943152	AE2-344 E	3.1312
943351	AF1-006 C	0.4299
943352	AF1-006 E	0.2418
943711	AF1-039 C O1	0.4391
943712	AF1-039 E O1	0.2927
943751	AF1-043	4.4436
943871	AF1-055 C O1	1.8031
943872	AF1-055 E O1	1.2020
944001	AF1-068 C O1	0.4829
944002	AF1-068 E O1	0.2717
944181	AF1-086 C O1	3.2911
944182	AF1-086 E O1	14.3182
944261	AF1-094 C	0.4556
944262	AF1-094 E	0.3037
944281	AF1-096 C	0.5142
944282	AF1-096 E	0.3428
944301	AF1-098 C	1.7941
944302	AF1-098 E	1.1961
944311	AF1-099 C	3.1427
944312	AF1-099 E	2.0951
944321	AF1-100 C O1	6.7325
944322	AF1-100 E O1	4.4883
944381	AF1-103 O1	0.9216
944391	AF1-104 O1	0.6234
944411	AF1-106 O1	0.9338
944471	AF1-112 C	0.4553
944472	AF1-112 E	0.3035
944671	AF1-132 C O1	0.4520
944672	AF1-132 E O1	0.3013
944691	AF1-134 C O1	1.4096

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.4096
944701	AF1-135 C	1.6915
944702	AF1-135 E	1.1277
944731	AF1-138 C O1	0.5762
944732	AF1-138 E O1	0.3842
944741	AF1-139 C O1	0.5167
944742	AF1-139 E O1	0.3444
944751	AF1-140 C	1.6938
944752	AF1-140 E	1.1292
944771	AF1-142 C	5.0283
944772	AF1-142 E	3.3522
944781	AF1-143 C	8.4438
944782	AF1-143 E	5.6292
944841	AF1-149 C	0.8678
944842	AF1-149 E	0.5785
944881	AF1-153 C O1	0.5496
944882	AF1-153 E O1	0.3664
944901	AF1-155 C	0.5495
944902	AF1-155 E	0.3663
945021	AF1-167 C	0.4031
945022	AF1-167 E	0.2687
945051	AF1-170 C	1.5485
945052	AF1-170 E	1.0323
945071	AF1-172 C	6.4352
945072	AF1-172 E	4.2901
945121	AF1-177	0.2304
945161	AF1-181	0.0359
945171	AF1-182	0.1795
945181	AF1-183	0.0483
945331	AF1-198	0.1254
945451	AF1-210 C	0.3750
945452	AF1-210 E	0.2500
945481	AF1-213 C	5.2754
945482	AF1-213 E	3.5170
945491	AF1-214 C	0.4600
945492	AF1-214 E	0.3067
945551	AF1-220 C	4.5899
945552	AF1-220 E	3.0616
945671	AF1-232 C O1	17.6831
945672	AF1-232 E O1	9.5217
945751	AF1-240 C O1	0.7494
945752	AF1-240 E O1	0.4996
945771	AF1-242 C	0.5495
945772	AF1-242 E	0.3663
945901	AF1-255 C	0.9932
945902	AF1-255 E	1.3715
946071	AF1-272 C O1	17.9595
946072	AF1-272 E O1	11.9730
946081	AF1-273 C O1	10.2018
946082	AF1-273 E O1	6.8012
946091	AF1-274 C	2.5949
946092	AF1-274 E	1.7299

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Bus #	Bus	MW Impact
946131	AF1-278	11.2469
946191	AF1-284 C O1	0.4553
946192	AF1-284 E O1	0.2732
946211	AF1-286 C O1	0.3782
946212	AF1-286 E O1	0.2568
946221	AF1-287 C	0.4297
946222	AF1-287 E	0.2864
946241	AF1-289 C O1	4.1647
946242	AF1-289 E O1	2.7765
946381	AF1-302 C	0.8307
946382	AF1-302 E	1.1076
946401	AF1-304 C	2.6330
946402	AF1-304 E	1.7553
946421	AF1-306 C	2.6955
946422	AF1-306 E	10.7819
946431	AF1-307 C	7.1429
946432	AF1-307 E	4.7619
946571	AF1-321 C O1	2.2446
946572	AF1-321 E O1	1.4964
946771	AF1-217 C O1	0.4297
946772	AF1-217 E O1	0.2864
DUCKCREEK	DUCKCREEK	0.5619
NEWTON	NEWTON	0.5458
FARMERCITY	FARMERCITY	0.0284
PRAIRIE	PRAIRIE	1.3354
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1698
CHEOAH	CHEOAH	0.2933
TILTON	TILTON	0.3112
G-007	G-007	0.0426
MADISON	MADISON	0.0262
GIBSON	GIBSON	0.2790
CALDERWOOD	CALDERWOOD	0.2907
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2905
CATAWBA	CATAWBA	0.2188

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Affected Systems

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14.22 Affected Systems

14.22.1 LG&E

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

14.22.2 MISO

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

14.22.3 TVA

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

14.22.4 Duke Energy Progress

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

14.22.5 NYISO

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

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14.23 Contingency Definitions

Contingency Name	Contingency Definition
PN-P1-2-PN-115-076	CONTINGENCY 'PN-P1-2-PN-115-076' /* BEDFORD NORTH - NEW BALTIMORE 115KV DISCONNECT BRANCH FROM BUS 200501 TO BUS 200884 CKT 1 /* 26BDFORD N 115 26NEW BALT 115 END
PN-P1-2-PN-115-075	CONTINGENCY 'PN-P1-2-PN-115-075' /* ALLEGHENY - NEW BALTIMORE 115KV DISCONNECT BRANCH FROM BUS 200745 TO BUS 200884 CKT 1 /* 26ALLEGHEN 115 26NEW BALT 115 DISCONNECT BRANCH FROM BUS 200745 TO BUS 200792 CKT 2 /* 26ALLEGHEN 115 26ALLEG.#2 23 END
PN-P2-3-PN-115-35E	CONTINGENCY 'PN-P2-3-PN-115-35E' /* #14 STUCK TIE BREAKER BETWEEN BUSES 1 AND 2 DISCONNECT BRANCH FROM BUS 200734 TO BUS 200743 CKT 1 /* 26SCALP L. 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200802 CKT 1 /* 26HOOVERSV 115 26RALPHTON 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200776 CKT 1 /* 26HOOVERSV 115 26HOOVER#1 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 200742 TO BUS 200743 CKT 1 /* 26TOWER 51 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 END
PN_P4-500-002A	CONTINGENCY 'PN_P4-500-002A' /* CONEMAUGH 500KV BKR 1 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 DISCONNECT BUS 200031 /* CONE G2 22 END
PN_P4-500-002F	CONTINGENCY 'PN_P4-500-002F' /* CONEMAUGH 500KV BKR 6 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 DISCONNECT BUS 200030 /* CONE G1 22 END
PN-P1_2-PN-230-0104	CONTINGENCY 'PN-P1_2-PN-230-0104' /* SHELOCTA - HOMER CITY 230 KV LINE OPEN BRANCH FROM BUS 200795 TO BUS 200767 CKT 1 /* 26SHELOCTA 230.00 26HOMER CT 230.00 END

Contingency Name	Contingency Definition
PN-P1-3-PN-115-025	CONTINGENCY 'PN-P1-3-PN-115-025' /* SOMERSET #1 XFMR FAULT DISCONNECT BRANCH FROM BUS 200744 TO BUS 200774 CKT 1 /* 26SOMERST 115 26SOMRSET1 23 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200746 CKT 1 /* 26SOMERST 115 26ROCKWOOD 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 202637 CKT 1 /* 26SOMERST 115 26PRIDE 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 202647 CKT 1 /* 26PRIDE 115 26KIMRUN TAP 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200743 CKT 1 /* 26SOMERST 115 26HOOVERSV 115 END
PN-P1-3-PN-500-001AT	CONTINGENCY 'PN-P1-3-PN-500-001AT' /* KEYSTONE #3 500/230 KV XFMR OPEN BRANCH FROM BUS 200011 TO BUS 200810 CKT 3 /* KEYSTONE 500.00 26KEYSTONE 230.00 END
PN_P4-500-001J	CONTINGENCY 'PN_P4-500-001J' /* KEYSTONE 500KV BKR 16 DISCONNECT BRANCH FROM BUS 200011 TO BUS 235104 CKT 1 /* KEYSTONE 500 01CABOT 500 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 TO BUS 200907 CKT 4/* KEYSTONE 500 26KEYSTONE 230 26KEYSTN#4 20.00 REDUCE BUS 200011 SHUNT BY 100 PERCENT /* KEYSTONE 500 END
Base Case	
PN-P1-2-PN-230-025	CONTINGENCY 'PN-P1-2-PN-230-025' /* CONEMAUGH - SEWARD 230KV DISCONNECT BRANCH FROM BUS 200912 TO BUS 200793 CKT 1 /* 26CONEMAGH 230 26SEWARD 2 230 END
PJM500_PN_P4-500-001A	CONTINGENCY 'PJM500_PN_P4-500-001A' /* KEYSTONE 500KV BKR 1 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 CKT 3 /* KEYSTONE 500 26KEYSTONE 230 REMOVE MACHINE H FROM BUS 200033 /* KEYS G2 20 REMOVE MACHINE L FROM BUS 200033 /* KEYS G2 20 DISCONNECT BUS 200033 /* KEYS G2 20 END
PN-P1-2-PN-115-074B	CONTINGENCY 'PN-P1-2-PN-115-074B' /* ALLEGHENY - KIMRUN 115KV DISCONNECT BRANCH FROM BUS 202647 TO BUS 200745 CKT 1 /* 26KIMRUN TAP 115 26ALLEGHEN 115 DISCONNECT BRANCH FROM BUS 200745 TO BUS 200775 CKT 1 /* 26ALLEGHEN 115 26ALLEG.#1 23 END
PN-P1-2-PN-115-074A	CONTINGENCY 'PN-P1-2-PN-115-074A' /* KIMRUN - SOMERSET 115KV DISCONNECT BRANCH FROM BUS 200744 TO BUS 202637 CKT 1 /* 26SOMERST 115 26PRIDE 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 202647 CKT 1 /* 26PRIDE 115 26KIMRUN TAP 115 END

Contingency Name	Contingency Definition
PJM500_PN_P4-500-001D	CONTINGENCY 'PJM500_PN_P4-500-001D' /* KEYSTONE 500KV BKR 4 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 CKT 3 /* KEYSTONE 500 26KEYSTONE 230 REMOVE MACHINE H FROM BUS 200032 /* KEYS G1 20 REMOVE MACHINE L FROM BUS 200032 /* KEYS G1 20 DISCONNECT BUS 200032 /* KEYS G1 20 END
AP-P1-3-PN-115-010	CONTINGENCY 'AP-P1-3-PN-115-010' /* GARRETT 138/115KV XFMR FAULT OPEN BRANCH FROM BUS 235469 TO BUS 235470 CKT 1 /* 01GARRET 138.00 01GARRET 115.00 END
AP-P1-2-WP-500-008	CONTINGENCY 'AP-P1-2-WP-500-008' /* SOUTH BEND
AP-P1-2-WP-345-311T	CONTINGENCY 'AP-P1-2-WP-345-311T' /* ARMSTRONG -HOMERCITY 345KV DISCONNECT BRANCH FROM BUS 235129 TO BUS 200769 CKT 1 /* 01ARMSTRONG 345 26HOMER CY 345 END
PJM_P1_APS_B_G692	CONTINGENCY 'PJM_P1_APS_B_G692' / 200011 KEYSTONE 500 235104 01CABOT 500 1 OPEN BRANCH FROM BUS 200011 TO BUS 235104 CKT 1 END
PN-P2-3-PN-230-9H-A	CONTINGENCY 'PN-P2-3-PN-230-9H-A' /* HOMER CITY 230 KV STUCK BREAKER 209 (SHELOCTA/SOUTH BUS) DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/* 26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200795 CKT 1 /* 26HOMER CT 230 26SHELOCTA 230 END
PN-P7-1-PN-230-001	CONTINGENCY 'PN-P7-1-PN-230-001' /* HOMER CITY - HOOVERSVILLE 230KV & SEWARD - TOWER 51 115KV DISCONNECT BRANCH FROM BUS 200767 TO BUS 200768 CKT 1 /* 26HOMER CT 230 26QUEMAHON 230 DISCONNECT BRANCH FROM BUS 200768 TO BUS 200796 CKT 1 /* 26QUEMAHON 230 26HOOVRSVL 230 DISCONNECT BRANCH FROM BUS 200796 TO BUS 200743 CKT 3 /* 26HOOVRSVL 230 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200741 TO BUS 200742 CKT 1 /* 26SEWARD 115 26TOWER 51 115 END
PJM_P1__P1_20A_CONEMAGH-KEYSTONE	CONTINGENCY 'PJM_P1__P1_20A_CONEMAGH-KEYSTONE' DISCONNECT BRANCH FROM BUS 200005 TO BUS 200011 CKT 1 /* CONEMAGH KEYSTONE 500 500 END
PN-P1-3-PN-230-001T	CONTINGENCY 'PN-P1-3-PN-230-001T' /* CONEMAUGH #1 500/230KV XFMR DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 END

Short Circuit

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14.24 Short Circuit

The following Breakers are overduty:

None

15 Network Impacts – Secondary POI

The Queue Project AF1-273 was evaluated as a 100.0 MW (Capacity 60.0 MW) injection tapping the Allegheny to Pride 115 kV line in the PENELEC area. Project AF1-273 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-273 was studied with a commercial probability of 53%. Potential network impacts were as follows:

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Summer Peak Load Flow

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15.1 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	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
41371796	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	AP-P1-2-WP-500-008	single	160.0	99.26	105.55	DC	10.06
41371834	200884	26NEWBALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-2-PN-115-074A	single	160.0	68.35	105.85	DC	60.0
41371835	200884	26NEWBALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-3-PN-115-025	single	160.0	68.35	105.85	DC	60.0
41371855	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	66.41	103.91	DC	60.0
55379329	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	PN-P1-2-PN-115-074C	single	160.0	63.0	100.5	DC	60.0
55379411	945670	AF1-232 TAP	115.0	PENELEC	200745	26ALLEGHEN	115.0	PENELEC	1	PN-P1-3-PN-115-025	single	160.0	65.0	102.5	DC	60.0
55379412	945670	AF1-232 TAP	115.0	PENELEC	200745	26ALLEGHEN	115.0	PENELEC	1	PN-P1-2-PN-115-074A	single	160.0	65.0	102.5	DC	60.0
55379319	946080	AF1-273 TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0
55379320	946080	AF1-273 TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-074C	single	160.0	65.0	102.5	DC	60.0

15.2 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	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
41682357	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P2-3-PN-115-62E	breaker	160.0	96.94	159.44	DC	100.0

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
41682358	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P2-3-PN-115-62A	breaker	160.0	96.94	159.44	DC	100.0
41682359	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P2-3-PN-115-62E2	breaker	160.0	96.94	159.44	DC	100.0

15.3 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
41372508	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PJM_P1_APS_B_G692	single	364.0	101.07	102.34	DC	4.6
41682827	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PN_P4-500-001J	breaker	364.0	107.34	108.36	DC	8.21
41682811	200741	26SEWARD	115.0	PENELEC	200766	26FLORENCE	115.0	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.63	107.39	DC	10.6
41059103	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	118.64	132.94	DC	25.59
41682402	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	179.0	137.0	159.34	DC	39.99
41371794	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	Base Case	single	133.0	105.11	112.59	DC	9.95
41682821	200766	26FLORENCE	115.0	PENELEC	200740	26BLRSVL E	115.0	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.41	107.17	DC	10.6
42281177	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN_P4-500-002A	breaker	917.0	162.89	166.13	DC	29.19
42281178	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN_P4-500-002F	breaker	917.0	162.9	166.14	DC	29.19
42594725	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	Base Case	single	731.0	119.9	121.63	DC	12.4
42594726	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-3-PN-230-001T	single	917.0	113.46	115.4	DC	17.53
42594727	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-2-PN-230-025	single	917.0	113.46	115.4	DC	17.53
42281187	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN_P4-500-002F	breaker	917.0	144.46	147.98	DC	31.77
42281188	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN_P4-500-002A	breaker	917.0	144.46	147.98	DC	31.77
42594740	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	AP-P1-2-WP-345-311T	single	917.0	100.54	102.23	DC	15.33
42594744	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PJM_P1__P1_20A_CONEMAGH-KEYSTONE	single	917.0	101.09	102.65	DC	14.17
42281293	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001A	breaker	635.0	120.2	122.9	DC	16.89
42281294	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	120.2	122.9	DC	16.89
41682344	202650	26HIGHPOINT	115.0	PENELEC	200747	26PENN-MAR	115.0	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	150.2	173.18	DC	39.99
41682500	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PJM500_PN_P4-500-001D	breaker	634.0	119.66	122.37	DC	16.89
41682501	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	119.66	122.37	DC	16.89

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15.4 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
41372505	200740	26BLRSVL E	115.0	PENELEC	200763	26BLAIRSVL	138.0	PENELEC	1	PJM_P1_APS_B_G692	operation	364.0	106.54	107.49	DC	7.66
41372544	200741	26SEWARD	115.0	PENELEC	200766	26FLORENCE	115.0	PENELEC	1	PN-P1_2-PN-230-0104	operation	282.0	102.65	106.29	DC	10.27
41372365	200742	26TOWER 51	115.0	PENELEC	200741	26SEWARD	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	185.0	94.82	111.94	DC	31.68
41372075	200743	26HOOVER SV	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	172.0	115.08	133.71	DC	32.05
41372080	200743	26HOOVER SV	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	Base Case	operation	137.0	88.32	107.56	DC	26.36
41372372	200744	26SOMERST	115.0	PENELEC	200743	26HOOVER SV	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	190.0	99.34	118.96	DC	37.27
41372528	200744	26SOMERST	115.0	PENELEC	200802	26RALPHTON	115.0	PENELEC	1	PN-P1-2-PN-115-066	operation	185.0	83.47	107.21	DC	43.92
41371993	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P1-2-PN-115-074A	operation	160.0	96.87	159.38	DC	100.0
41371994	200745	26ALLEGHEN	115.0	PENELEC	200884	26NEW BALT	115.0	PENELEC	1	PN-P1-3-PN-115-025	operation	160.0	96.87	159.38	DC	100.0
41372196	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	Base Case	operation	148.0	127.06	138.27	DC	16.59
55379334	200747	26PENN-MAR	115.0	PENELEC	200762	26GARRETT	115.0	PENELEC	1	Base Case	operation	137.0	153.94	166.05	DC	16.59
41371791	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	Base Case	operation	133.0	167.11	179.58	DC	16.58
41372548	200766	26FLORENCE	115.0	PENELEC	200740	26BLRSVL E	115.0	PENELEC	1	PN-P1_2-PN-230-0104	operation	282.0	102.44	106.08	DC	10.27
42594719	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-3-PN-230-001T	operation	917.0	158.2	161.44	DC	29.22
42594720	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	PN-P1-2-PN-230-025	operation	917.0	158.2	161.44	DC	29.22
42594721	200767	26HOMER CT	230.0	PENELEC	200795	26SHELOCTA	230.0	PENELEC	1	Base Case	operation	731.0	160.28	163.16	DC	20.67
42594735	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN-P1-2-PN-230-025	operation	917.0	139.13	142.65	DC	31.8
42594736	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	PN-P1-3-PN-230-001T	operation	917.0	139.13	142.65	DC	31.8
42594737	200795	26SHELOCTA	230.0	PENELEC	200810	26KEYSTONE	230.0	PENELEC	1	Base Case	operation	731.0	140.22	143.39	DC	22.79
49660397	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	PN-P1-2-PN-345-107T	operation	635.0	115.66	117.62	DC	12.25
49660398	200810	26KEYSTONE	230.0	PENELEC	999401	STAR592	1.0	PJM	4	ATSI-P1-2-CEI-345-700T	operation	635.0	115.66	117.62	DC	12.25
41371829	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-3-PN-115-025	operation	160.0	129.6	192.1	DC	99.99
41371830	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	PN-P1-2-PN-115-074A	operation	160.0	129.6	192.1	DC	99.99

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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
41371832	200884	26NEW BALT	115.0	PENELEC	200501	26BDFORDN	115.0	PENELEC	1	Base Case	operation	133.0	94.14	115.66	DC	28.62
41371850	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	PN-P1-2-PN-115-076	operation	160.0	127.66	190.16	DC	99.99
41371852	202637	26PRIDE	115.0	PENELEC	200744	26SOMERST	115.0	PENELEC	1	Base Case	operation	133.0	111.71	165.37	DC	71.37
41371959	202650	26HIGHPOINT	115.0	PENELEC	200747	26PENN-MAR	115.0	PENELEC	1	Base Case	operation	137.0	143.98	156.09	DC	16.59
55379406	945670	AF1-232 TAP	115.0	PENELEC	200745	26ALLEGHEN	115.0	PENELEC	1	PN-P1-2-PN-115-074A	operation	160.0	100.0	162.5	DC	100.0
55379407	945670	AF1-232 TAP	115.0	PENELEC	200745	26ALLEGHEN	115.0	PENELEC	1	PN-P1-3-PN-115-025	operation	160.0	100.0	162.5	DC	100.0
55379314	946080	AF1-273 TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P1-2-PN-115-076	operation	160.0	129.6	192.1	DC	99.99
55379315	946080	AF1-273 TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	Base Case	operation	133.0	114.11	167.78	DC	71.37
49660415	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	ATSI-P1-2-CEI-345-700T	operation	634.0	115.12	117.08	DC	12.25
49660416	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PN-P1-2-PN-345-107T	operation	634.0	115.12	117.08	DC	12.25

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15.5 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.

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15.6 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
41371794	200762	26GARRETT	PENELEC	235470	01GARRET	AP	1	Base Case	single	133.0	105.11	112.59	DC	9.95

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**4.9114**
200813	26YOUGH	0.4383
200834	26SW_E13_K22	0.0463
200835	26DSGENWIN	0.4427
200840	26DEEPCRK1	1.0127
200841	26DEEPCRK2	1.0127
200846	26FORWARD	0.0803
200888	26HIGHLAND	0.1237
200889	26STNY CRK	0.2156
200890	26BF_G21_K23	0.2171
200891	26CSLMN_L13	0.3406
200892	26LOOKOUT	0.3235
200915	26CHSTN_FL	0.0578
200925	26R32	0.1427
202225	26SCI_S29B	0.0721
202652	26RGH_Y1-033	0.3163
938351	AE1-053	3.0498
938881	AE1-116	0.8296
938991	AE1-128 C	7.2202
942361	AE2-249 C	0.8123
943711	AF1-039 C O2	4.7098
944751	AF1-140 C	0.6909
944781	AF1-143 C	18.2988
945671	AF1-232 C O2	16.6660
945901	AF1-255 C	0.5040
946081	AF1-273 C O2	9.9462
946191	AF1-284 C O2	6.5414
946241	AF1-289 C O2	1.7455
946571	AF1-321 C O2	0.7864
DUCKCREEK	DUCKCREEK	0.3524
NEWTON	NEWTON	0.3385
FARMERCITY	FARMERCITY	0.0177
G-007A	G-007A	0.9638
VFT	VFT	2.6445
PRAIRIE	PRAIRIE	0.8266
COFFEEN	COFFEEN	0.1654
EDWARDS	EDWARDS	0.1067
CHEOAH	CHEOAH	0.1782
TILTON	TILTON	0.1940
GIBSON	GIBSON	0.1720
CALDERWOOD	CALDERWOOD	0.1769
BLUEG	BLUEG	0.5538

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Bus #	Bus	MW Impact
TRIMBLE	TRIMBLE	0.1770
CATAWBA	CATAWBA	0.1320

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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
41371835	200884	26NEW BALT	PENELEC	200501	26BDFORD N	PENELEC	1	PN-P1-3-PN-115-025	single	160.0	68.35	105.85	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O2	103.9938
946081	AF1-273 C O2	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41371855	202637	26PRIDE	PENELEC	200744	26SOMERST	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	66.41	103.91	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O2	103.9938
946081	AF1-273 C O2	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
55379412	945670	AF1-232 TAP	PENELEC	200745	26ALLEGHEN	PENELEC	1	PN-P1-2-PN-115-074A	single	160.0	65.0	102.5	DC	60.0

Bus #	Bus	MW Impact
945671	AF1-232 C O2	104.0000
946081	AF1-273 C O2	60.0000

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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
55379319	946080	AF1-273 TAP	PENELEC	202637	26PRIDE	PENELEC	1	PN-P1-2-PN-115-076	single	160.0	68.35	105.85	DC	60.0

Bus #	Bus	MW Impact
200889	26STNY CRK	1.4655
945671	AF1-232 C O2	103.9938
946081	AF1-273 C O2	59.9964
DUCKCREEK	DUCKCREEK	0.0069
NEWTON	NEWTON	0.0064
FARMERCITY	FARMERCITY	0.0003
NY	NY	0.0033
PRAIRIE	PRAIRIE	0.0155
COFFEEN	COFFEEN	0.0032
EDWARDS	EDWARDS	0.0021
CHEOAH	CHEOAH	0.0030
TILTON	TILTON	0.0038
GIBSON	GIBSON	0.0033
CALDERWOOD	CALDERWOOD	0.0030
BLUEG	BLUEG	0.0104
TRIMBLE	TRIMBLE	0.0033
CATAWBA	CATAWBA	0.0021

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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
41682359	200745	26ALLEGHEN	PENELEC	200884	26NEW BALT	PENELEC	1	PN-P2-3-PN-115-62E2	breaker	160.0	96.94	159.44	DC	100.0

Bus #	Bus	MW Impact
945671	AF1-232 C O2	104.0000
945672	AF1-232 E O2	56.0000
946081	AF1-273 C O2	60.0000
946082	AF1-273 E O2	40.0000

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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
41682827	200740	26BLRSVLE	PENELEC	200763	26BLAIRSVL	PENELEC	1	PN_P4-500-001J	breaker	364.0	107.34	108.36	DC	8.21

Bus #	Bus	MW Impact
200636	26IUP CO-G	0.2723
200794	26CONEMAGH	0.1881
200805	**26COLVER13 (Deativation : 09/01/20)**	**11.8140**
200864	K-013 E	1.7770
200883	Q-053 E	3.4276
202158	26CON.GEN1	0.0485
202160	26CON.GEN2	0.0989
290086	Q-036 E	2.2304
292350	K-023	1.8658
292542	L-013 1	1.8148
293301	N-039 E	3.6481
293393	V3-030E	2.3416
293432	R-040 E	0.1021
293603	O-018 E	4.0717
293902	O-048 E	1.6333
294515	O38_P22	3.1921
294903	P-060 E	2.9877
296332	R-032 E	4.6981
917672	Z2-108 E	1.0208
935191	AD1-154	1.0416
936991	AD2-133 C	1.0037
936992	AD2-133 E	4.5907
938351	AE1-053	0.5671
938362	AE1-054 BAT	1.0105
938881	AE1-116	0.3078
938991	AE1-128 C	5.3691
938992	AE1-128 E	3.5794
941331	AE2-129 C	0.5873
941332	AE2-129 E	0.3915
941351	AE2-131 C	0.5873
941352	AE2-131 E	0.3915
942121	AE2-224 C	3.7475
942122	AE2-224 E	2.4983
942361	AE2-249 C	0.6040
942362	AE2-249 E	0.4027
942511	AE2-264 C	2.2636
942512	AE2-264 E	1.5091
944181	AF1-086 C O2	0.8422
944182	AF1-086 E O2	3.6642
944691	AF1-134 C O1	0.3250
944692	AF1-134 E O1	0.3250

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Bus #	Bus	MW Impact
944701	AF1-135 C	0.3900
944702	AF1-135 E	0.2600
944751	AF1-140 C	0.3899
944752	AF1-140 E	0.2599
944781	AF1-143 C	1.8034
944782	AF1-143 E	1.2023
945481	AF1-213 C	2.4767
945482	AF1-213 E	1.6511
945671	AF1-232 C O2	3.8681
945672	AF1-232 E O2	2.0828
945751	AF1-240 C O2	0.3312
945752	AF1-240 E O2	0.2208
945901	AF1-255 C	0.2249
945902	AF1-255 E	0.3105
946081	AF1-273 C O2	2.2186
946082	AF1-273 E O2	1.4791
946241	AF1-289 C O2	0.9562
946242	AF1-289 E O2	0.6375
946431	AF1-307 C O2	1.3310
946432	AF1-307 E O2	0.8874
946571	AF1-321 C O2	0.4287
946572	AF1-321 E O2	0.2858
DUCKCREEK	DUCKCREEK	1.1250
NEWTON	NEWTON	1.0358
FARMERCITY	FARMERCITY	0.0530
G-007A	G-007A	2.9489
VFT	VFT	7.9980
PRAIRIE	PRAIRIE	2.4306
COFFEEN	COFFEEN	0.5089
EDWARDS	EDWARDS	0.3433
CHEOAH	CHEOAH	0.4114
TILTON	TILTON	0.6180
MADISON	MADISON	0.0907
GIBSON	GIBSON	0.5302
CALDERWOOD	CALDERWOOD	0.4110
BLUEG	BLUEG	1.6909
TRIMBLE	TRIMBLE	0.5426
CATAWBA	CATAWBA	0.2460

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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
41682811	200741	26SEWARD	PENELEC	200766	26FLORENCE	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.63	107.39	DC	10.6

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**11.3225**
200794	26CONEMAGH	0.2498
200834	26SW_E13_K22	0.0262
200846	26FORWARD	0.0940
200864	K-013 E	2.6940
200883	Q-053 E	4.8898
200888	26HIGHLAND	0.2125
200889	26STNY CRK	0.1577
200915	26CHSTN_FL	0.1081
200925	26R32	0.2451
202225	26SCI_S29B	0.0408
290086	Q-036 E	2.4283
292350	K-023	2.4511
292542	L-013 1	2.3841
293301	N-039 E	4.4108
293393	V3-030E	1.8653
293432	R-040 E	0.1341
293603	O-018 E	6.0882
293902	O-048 E	2.1457
294515	O38_P22	3.8594
294903	P-060 E	4.5184
296332	R-032 E	7.0248
913142	Y1-033 E OP1	1.9314
917672	Z2-108 E	1.3410
936991	AD2-133 C	1.0927
936992	AD2-133 E	4.9980
938351	AE1-053	0.7450
938881	AE1-116	0.4699
938991	AE1-128 C	8.0323
938992	AE1-128 E	5.3549
941231	AE2-117 C	0.5474
941232	AE2-117 E	0.3650
941241	AE2-118 C	0.5474
941242	AE2-118 E	0.3650
941331	AE2-129 C	0.5910
941332	AE2-129 E	0.3940
941351	AE2-131 C	0.5910
941352	AE2-131 E	0.3940
942121	AE2-224 C	4.6170
942122	AE2-224 E	3.0780

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Bus #	Bus	MW Impact
942361	AE2-249 C	0.9036
942362	AE2-249 E	0.6024
942511	AE2-264 C	2.6181
942512	AE2-264 E	1.7454
943711	AF1-039 C O2	0.2323
943712	AF1-039 E O2	0.1549
944731	AF1-138 C O2	0.2901
944732	AF1-138 E O2	0.1934
944751	AF1-140 C	1.0815
944752	AF1-140 E	0.7210
944781	AF1-143 C	2.3692
944782	AF1-143 E	1.5795
945671	AF1-232 C O2	11.0729
945672	AF1-232 E O2	5.9623
945901	AF1-255 C	0.6304
945902	AF1-255 E	0.8705
946081	AF1-273 C O2	6.3600
946082	AF1-273 E O2	4.2400
946191	AF1-284 C O2	0.3226
946192	AF1-284 E O2	0.1936
946241	AF1-289 C O2	2.6556
946242	AF1-289 E O2	1.7704
946431	AF1-307 C O2	1.6476
946432	AF1-307 E O2	1.0984
946571	AF1-321 C O2	1.2060
946572	AF1-321 E O2	0.8040
DUCKCREEK	DUCKCREEK	0.5953
NEWTON	NEWTON	0.5534
FARMERCITY	FARMERCITY	0.0284
G-007A	G-007A	1.3210
VFT	VFT	3.6120
PRAIRIE	PRAIRIE	1.3096
COFFEEN	COFFEEN	0.2716
EDWARDS	EDWARDS	0.1813
CHEOAH	CHEOAH	0.2342
TILTON	TILTON	0.3276
MADISON	MADISON	0.0444
GIBSON	GIBSON	0.2834
CALDERWOOD	CALDERWOOD	0.2336
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2910
CATAWBA	CATAWBA	0.1484

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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
41682402	200746	26ROCKWOOD	PENELEC	202650	26HIGHPOINT	PENELEC	1	PN-P2-3-PN-115-35E	breaker	179.0	137.0	159.34	DC	39.99

Bus #	Bus	MW Impact
200834	26SW_E13_K22	0.1183
200835	26DSGENWIN	0.7970
200864	K-013 E	1.7939
200889	26STNY CRK	0.4819
200890	26BF_G21_K23	0.3909
200891	26CSLMN_L13	0.6131
200892	26LOOKOUT	0.5825
202225	26SCI_S29B	0.1840
292350	K-023	18.0637
292542	L-013 1	17.5696
293432	R-040 E	0.9883
293902	O-048 E	15.8126
294903	P-060 E	13.8109
917672	Z2-108 E	9.8829
938351	AE1-053	5.4905
938881	AE1-116	2.1186
938991	AE1-128 C	10.8202
938992	AE1-128 E	7.2134
942361	AE2-249 C	1.2173
942362	AE2-249 E	0.8115
944751	AF1-140 C	0.3547
944752	AF1-140 E	0.2365
944781	AF1-143 C	32.9430
944782	AF1-143 E	21.9620
945671	AF1-232 C O2	39.4035
945672	AF1-232 E O2	21.2173
945901	AF1-255 C	0.7001
945902	AF1-255 E	0.9668
946081	AF1-273 C O2	23.9952
946082	AF1-273 E O2	15.9968
946241	AF1-289 C O2	0.9239
946242	AF1-289 E O2	0.6159
DUCKCREEK	DUCKCREEK	0.2338
NEWTON	NEWTON	0.2246
FARMERCITY	FARMERCITY	0.0118
G-007A	G-007A	0.6545
VFT	VFT	1.7996
PRAIRIE	PRAIRIE	0.5476
COFFEEN	COFFEEN	0.1099
EDWARDS	EDWARDS	0.0707

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Bus #	Bus	MW Impact
CHEOAH	CHEOAH	0.1176
TILTON	TILTON	0.1285
GIBSON	GIBSON	0.1141
CALDERWOOD	CALDERWOOD	0.1168
BLUEG	BLUEG	0.3663
TRIMBLE	TRIMBLE	0.1174
CATAWBA	CATAWBA	0.0868

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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
41682821	200766	26FLORENCE	PENELEC	200740	26BLRSVLE	PENELEC	1	PN-P2-3-PN-230-9H-A	breaker	282.0	103.41	107.17	DC	10.6

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**11.3225**
200794	26CONEMAGH	0.2498
200834	26SW_E13_K22	0.0262
200846	26FORWARD	0.0940
200864	K-013 E	2.6940
200883	Q-053 E	4.8898
200888	26HIGHLAND	0.2125
200889	26STNY CRK	0.1577
200915	26CHSTN_FL	0.1081
200925	26R32	0.2451
202225	26SCI_S29B	0.0408
290086	Q-036 E	2.4283
292350	K-023	2.4511
292542	L-013 1	2.3841
293301	N-039 E	4.4108
293393	V3-030E	1.8653
293432	R-040 E	0.1341
293603	O-018 E	6.0882
293902	O-048 E	2.1457
294515	O38_P22	3.8594
294903	P-060 E	4.5184
296332	R-032 E	7.0248
913142	Y1-033 E OP1	1.9314
917672	Z2-108 E	1.3410
936991	AD2-133 C	1.0927
936992	AD2-133 E	4.9980
938351	AE1-053	0.7450
938881	AE1-116	0.4699
938991	AE1-128 C	8.0323
938992	AE1-128 E	5.3549
941231	AE2-117 C	0.5474
941232	AE2-117 E	0.3650
941241	AE2-118 C	0.5474
941242	AE2-118 E	0.3650
941331	AE2-129 C	0.5910
941332	AE2-129 E	0.3940
941351	AE2-131 C	0.5910
941352	AE2-131 E	0.3940
942121	AE2-224 C	4.6170
942122	AE2-224 E	3.0780

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Bus #	Bus	MW Impact
942361	AE2-249 C	0.9036
942362	AE2-249 E	0.6024
942511	AE2-264 C	2.6181
942512	AE2-264 E	1.7454
943711	AF1-039 C O2	0.2323
943712	AF1-039 E O2	0.1549
944731	AF1-138 C O2	0.2901
944732	AF1-138 E O2	0.1934
944751	AF1-140 C	1.0815
944752	AF1-140 E	0.7210
944781	AF1-143 C	2.3692
944782	AF1-143 E	1.5795
945671	AF1-232 C O2	11.0729
945672	AF1-232 E O2	5.9623
945901	AF1-255 C	0.6304
945902	AF1-255 E	0.8705
946081	AF1-273 C O2	6.3600
946082	AF1-273 E O2	4.2400
946191	AF1-284 C O2	0.3226
946192	AF1-284 E O2	0.1936
946241	AF1-289 C O2	2.6556
946242	AF1-289 E O2	1.7704
946431	AF1-307 C O2	1.6476
946432	AF1-307 E O2	1.0984
946571	AF1-321 C O2	1.2060
946572	AF1-321 E O2	0.8040
DUCKCREEK	DUCKCREEK	0.5953
NEWTON	NEWTON	0.5534
FARMERCITY	FARMERCITY	0.0284
G-007A	G-007A	1.3210
VFT	VFT	3.6120
PRAIRIE	PRAIRIE	1.3096
COFFEEN	COFFEEN	0.2716
EDWARDS	EDWARDS	0.1813
CHEOAH	CHEOAH	0.2342
TILTON	TILTON	0.3276
MADISON	MADISON	0.0444
GIBSON	GIBSON	0.2834
CALDERWOOD	CALDERWOOD	0.2336
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2910
CATAWBA	CATAWBA	0.1484

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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
42281178	200767	26HOMER CT	PENELEC	200795	26SHELOCTA	PENELEC	1	PN_P4-500-002F	breaker	917.0	162.9	166.14	DC	29.19

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**28.9164**
200794	26CONEMAGH	0.4629
200805	**26COLVER13 (Deativation : 09/01/20)**	**14.5103**
200809	26SITHE	2.2348
200823	26MHP_X3-003	1.9016
200833	26SEWRDB34	27.2507
200834	26SW_E13_K22	0.0724
200835	26DSGENWIN	0.3532
200837	26HOMER C1	38.4884
200838	26HOMER C2	32.0070
200839	26HOMER C3	33.8836
200846	26FORWARD	0.2587
200864	K-013 E	7.4126
200883	Q-053 E	13.4971
200886	26ARWF_N39	0.6904
200888	26HIGHLAND	0.5687
200889	26STNY CRK	0.4333
200890	26BF_G21_K23	0.1732
200891	26CSLMN_L13	0.2717
200892	26LOOKOUT	0.2581
200894	26K02	7.0234
200898	26AA1-106	2.6973
200905	26Q36	0.3168
200915	26CHSTN_FL	0.2983
200925	26R32	0.6562
201144	W3-099 C OP1	1.4662
201477	26Y2-055	4.1676
202225	26SCI_S29B	0.1127
203034	26NA_O38_P22	0.6041
203909	26Z1-038	1.8767
203910	26Z1-091	2.4569
203999	P-047 E	12.9768
235003	AC1-025 E	0.1729
236828	01GRAYMONT	0.4680
290086	Q-036 E	9.0772
292350	K-023	8.0052
292542	L-013 1	7.7862
293301	N-039 E	19.7843
293393	V3-030E	5.3060
293432	R-040 E	0.4380
293603	O-018 E	16.2963

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Bus #	Bus	MW Impact
293902	O-048 E	7.0076
294515	O38_P22	17.3113
294573	P-028 E	11.4097
294903	P-060 E	12.4160
296332	R-032 E	18.8034
903644	W3-099 E OP1	9.8124
913142	Y1-033 E OP1	5.4199
915951	Y3-092 FTIR	107.9900
916202	Z1-069 E	10.3402
917672	Z2-108 E	4.3798
918682	AA1-082 E	6.9637
919201	AA1-144 OP	19.7891
919491	AA2-000	59.5323
920341	AA2-132	2.7294
922932	AB1-082 OP	3.7512
923443	AB1-160 E	2.9544
930511	AB1-092	2.1859
935191	AD1-154	2.5503
936421	AD2-055	4.5003
936991	AD2-133 C	4.0847
936992	AD2-133 E	18.6831
938351	AE1-053	2.4332
938881	AE1-116	1.2972
938951	AE1-123	2.2336
938991	AE1-128 C	21.9514
938992	AE1-128 E	14.6342
939171	AE1-147 C	1.4073
939172	AE1-147 E	0.9382
939291	AE1-160 C	1.5320
939292	AE1-160 E	0.8806
939381	AE1-169 C O1	6.2038
939382	AE1-169 E O1	4.1359
940201	AE2-001 C	1.4055
940202	AE2-001 E	0.9370
940681	AE2-055 C	1.3775
940682	AE2-055 E	0.9183
940861	AE2-074 C	2.8483
940862	AE2-074 E	3.7494
941191	AE2-113 C	10.9112
941192	AE2-113 E	11.7479
941231	AE2-117 C	1.9816
941232	AE2-117 E	1.3210
941241	AE2-118 C	1.9816
941242	AE2-118 E	1.3210
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.7524**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**1.1682**
941261	AE2-120 C	1.4044
941262	AE2-120 E	0.9363
941271	AE2-121 C	0.7499
941272	AE2-121 E	0.5007
941321	AE2-126 C	1.7879
941322	AE2-126 E	1.1919

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Bus #	Bus	MW Impact
941331	AE2-129 C	2.0624
941332	AE2-129 E	1.3750
941351	AE2-131 C	2.0624
941352	AE2-131 E	1.3750
941421	AE2-139 C	7.4089
941422	AE2-139 E	4.9393
942121	AE2-224 C	21.1962
942122	AE2-224 E	14.1308
942351	AE2-248 C	1.1113
942352	AE2-248 E	0.7409
942361	AE2-249 C	2.4695
942362	AE2-249 E	1.6464
942491	AE2-262 C	6.2505
942492	AE2-262 E	4.2003
942501	AE2-263 C	5.8754
942502	AE2-263 E	3.9228
942511	AE2-264 C	11.2229
942512	AE2-264 E	7.4819
942811	AE2-299 C	3.6451
942812	AE2-299 E	14.5803
942961	AE2-316 C	5.6956
942962	AE2-316 E	8.1220
943151	AE2-344 C	7.6841
943152	AE2-344 E	5.1228
943351	AF1-006 C	0.7075
943352	AF1-006 E	0.3980
943711	AF1-039 C O2	0.6567
943712	AF1-039 E O2	0.4378
943751	AF1-043	7.1554
943871	AF1-055 C O2	2.9939
943872	AF1-055 E O2	1.9959
944001	AF1-068 C O2	0.7828
944002	AF1-068 E O2	0.4404
944181	AF1-086 C O2	1.5303
944182	AF1-086 E O2	6.6576
944261	AF1-094 C	0.7197
944262	AF1-094 E	0.4798
944281	AF1-096 C	0.7672
944282	AF1-096 E	0.5115
944301	AF1-098 C	2.9545
944302	AF1-098 E	1.9697
944311	AF1-099 C	5.0288
944312	AF1-099 E	3.3525
944321	AF1-100 C O2	10.5343
944322	AF1-100 E O2	7.0228
944381	AF1-103 O2	1.5226
944391	AF1-104 O2	1.0293
944411	AF1-106 O2	1.5776
944471	AF1-112 C	0.7379
944472	AF1-112 E	0.4919
944671	AF1-132 C O2	0.7339
944672	AF1-132 E O2	0.4893

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Bus #	Bus	MW Impact
944691	AF1-134 C O1	0.7576
944692	AF1-134 E O1	0.7576
944701	AF1-135 C	0.9091
944702	AF1-135 E	0.6061
944731	AF1-138 C O2	1.0502
944732	AF1-138 E O2	0.7001
944741	AF1-139 C O1	0.8723
944742	AF1-139 E O1	0.5815
944751	AF1-140 C	2.9287
944752	AF1-140 E	1.9525
944771	AF1-142 C	8.0460
944772	AF1-142 E	5.3640
944781	AF1-143 C	14.5992
944782	AF1-143 E	9.7328
944841	AF1-149 C	1.4043
944842	AF1-149 E	0.9362
944881	AF1-153 C O2	0.8674
944882	AF1-153 E O2	0.5783
944901	AF1-155 C	0.8670
944902	AF1-155 E	0.5780
945021	AF1-167 C	0.5944
945022	AF1-167 E	0.3963
945051	AF1-170 C	2.5442
945052	AF1-170 E	1.6961
945071	AF1-172 C	10.3025
945072	AF1-172 E	6.8683
945121	AF1-177	0.3806
945161	AF1-181	0.0564
945171	AF1-182	0.2819
945181	AF1-183	0.0738
945331	AF1-198	0.2114
945451	AF1-210 C	0.5540
945452	AF1-210 E	0.3694
945481	AF1-213 C	6.9713
945482	AF1-213 E	4.6475
945491	AF1-214 C	0.7444
945492	AF1-214 E	0.4963
945521	AF1-217 C O2	0.7027
945522	AF1-217 E O2	0.4684
945551	AF1-220 C	7.2853
945552	AF1-220 E	4.8595
945671	AF1-232 C O2	30.4751
945672	AF1-232 E O2	16.4097
945751	AF1-240 C O2	0.8110
945752	AF1-240 E O2	0.5407
945771	AF1-242 C	0.8670
945772	AF1-242 E	0.5780
945901	AF1-255 C	1.7168
945902	AF1-255 E	2.3708
946081	AF1-273 C O2	17.5158
946082	AF1-273 E O2	11.6772
946091	AF1-274 C	4.0432

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Bus #	Bus	MW Impact
946092	AF1-274 E	2.6955
946131	AF1-278	42.0132
946191	AF1-284 C O2	0.9121
946192	AF1-284 E O2	0.5473
946211	AF1-286 C O2	0.6389
946212	AF1-286 E O2	0.4338
946221	AF1-287 C	0.7027
946222	AF1-287 E	0.4684
946241	AF1-289 C O2	7.1962
946242	AF1-289 E O2	4.7974
946381	AF1-302 C	1.3182
946382	AF1-302 E	1.7576
946401	AF1-304 C	3.8864
946402	AF1-304 E	2.5909
946421	AF1-306 C	4.2972
946422	AF1-306 E	17.1887
946431	AF1-307 C O2	15.3882
946432	AF1-307 E O2	10.2588
946571	AF1-321 C O2	4.5743
946572	AF1-321 E O2	3.0495
DUCKCREEK	DUCKCREEK	0.7128
NEWTON	NEWTON	0.7049
FARMERCITY	FARMERCITY	0.0370
PRAIRIE	PRAIRIE	1.7487
O-066	O-066	1.6733
COFFEEN	COFFEEN	0.3430
EDWARDS	EDWARDS	0.2142
CHEOAH	CHEOAH	0.4109
TILTON	TILTON	0.3956
G-007	G-007	0.3588
MADISON	MADISON	0.0202
GIBSON	GIBSON	0.3593
CALDERWOOD	CALDERWOOD	0.4065
BLUEG	BLUEG	1.1735
TRIMBLE	TRIMBLE	0.3756
CATAWBA	CATAWBA	0.3206

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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
42281188	200795	26SHELOCTA	PENELEC	200810	26KEYSTONE	PENELEC	1	PN_P4-500-002A	breaker	917.0	144.46	147.98	DC	31.77

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**32.5076**
200636	26IUP CO-G	0.6752
200794	26CONEMAGH	0.5468
200805	**26COLVER13 (Deativation : 09/01/20)**	**34.8876**
200809	26SITHE	2.1598
200833	26SEWRDB34	28.3096
200834	26SW_E13_K22	0.0787
200835	26DSGENWIN	0.3844
200837	26HOMER C1	37.1972
200838	26HOMER C2	31.2734
200839	26HOMER C3	33.1070
200846	26FORWARD	0.2807
200864	K-013 E	8.0446
200883	Q-053 E	15.1296
200886	26ARWF_N39	0.7144
200888	26HIGHLAND	0.6259
200889	26STNY CRK	0.4725
200890	26BF_G21_K23	0.1885
200891	26CSLMN_L13	0.2957
200892	26LOOKOUT	0.2809
200894	26K02	7.3804
200898	26AA1-106	2.7668
200915	26CHSTN_FL	0.3344
200925	26R32	0.7222
200945	26CT_V3-030	0.2375
201144	W3-099 C OP1	1.5476
201477	26Y2-055	4.3870
202158	26CON.GEN1	0.1133
202160	26CON.GEN2	0.0848
202225	26SCI_S29B	0.1224
203034	26NA_O38_P22	0.6251
203910	26Z1-091	2.4645
203999	P-047 E	13.0226
235003	AC1-025 E	0.1912
236828	01GRAYMONT	0.5180
290086	Q-036 E	8.8754
292350	K-023	8.7126
292542	L-013 1	8.4742
293301	N-039 E	20.4723
293393	V3-030E	8.9704
293432	R-040 E	0.4052

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Bus #	Bus	MW Impact
293603	O-018 E	17.9374
293902	O-048 E	7.6268
294515	O38_P22	17.9133
294903	P-060 E	13.5395
296332	R-032 E	20.6970
903644	W3-099 E OP1	10.3567
913142	Y1-033 E OP1	5.9219
916202	Z1-069 E	10.4453
917672	Z2-108 E	4.0517
918682	AA1-082 E	7.0566
919201	AA1-144 OP	20.0981
919491	AA2-000	64.8177
920341	AA2-132	2.7367
922932	AB1-082 OP	3.8155
923443	AB1-160 E	2.9844
930511	AB1-092	2.3799
935191	AD1-154	4.1854
936421	AD2-055	4.8998
936991	AD2-133 C	3.9939
936992	AD2-133 E	18.2677
938351	AE1-053	2.2510
938881	AE1-116	1.4089
938951	AE1-123	2.9191
938991	AE1-128 C	24.0523
938992	AE1-128 E	16.0349
939171	AE1-147 C	1.5577
939172	AE1-147 E	1.0385
939291	AE1-160 C	1.8016
939292	AE1-160 E	1.0356
939381	AE1-169 C O1	7.3470
939382	AE1-169 E O1	4.8980
940201	AE2-001 C	1.5556
940202	AE2-001 E	1.0371
940681	AE2-055 C	1.5221
940682	AE2-055 E	1.0148
940861	AE2-074 C	2.8971
940862	AE2-074 E	3.8136
941191	AE2-113 C	11.4763
941192	AE2-113 E	12.3563
941231	AE2-117 C	2.0808
941232	AE2-117 E	1.3872
941241	AE2-118 C	2.0808
941242	AE2-118 E	1.3872
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**2.1153**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**1.4102**
941261	AE2-120 C	1.5544
941262	AE2-120 E	1.0363
941271	AE2-121 C	0.8303
941272	AE2-121 E	0.5544
941321	AE2-126 C	2.0539
941322	AE2-126 E	1.3692
941331	AE2-129 C	2.4166

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Bus #	Bus	MW Impact
941332	AE2-129 E	1.6111
941351	AE2-131 C	2.4166
941352	AE2-131 E	1.6111
941421	AE2-139 C	7.6068
941422	AE2-139 E	5.0712
942121	AE2-224 C	21.8082
942122	AE2-224 E	14.5388
942351	AE2-248 C	1.2289
942352	AE2-248 E	0.8193
942361	AE2-249 C	2.7059
942362	AE2-249 E	1.8039
942491	AE2-262 C	6.9530
942492	AE2-262 E	4.6724
942501	AE2-263 C	6.5358
942502	AE2-263 E	4.3637
942511	AE2-264 C	9.9878
942512	AE2-264 E	6.6586
942811	AE2-299 C	3.8423
942812	AE2-299 E	15.3691
942961	AE2-316 C	6.2990
942962	AE2-316 E	8.9823
943151	AE2-344 C	8.2183
943152	AE2-344 E	5.4789
943351	AF1-006 C	0.7537
943352	AF1-006 E	0.4239
943711	AF1-039 C O2	0.7195
943712	AF1-039 E O2	0.4797
943751	AF1-043	7.7907
943871	AF1-055 C O2	3.1500
943872	AF1-055 E O2	2.1000
944001	AF1-068 C O2	0.8654
944002	AF1-068 E O2	0.4868
944181	AF1-086 C O2	5.9280
944182	AF1-086 E O2	25.7902
944261	AF1-094 C	0.7983
944262	AF1-094 E	0.5322
944281	AF1-096 C	0.9022
944282	AF1-096 E	0.6015
944301	AF1-098 C	3.1348
944302	AF1-098 E	2.0899
944311	AF1-099 C	5.5940
944312	AF1-099 E	3.7293
944321	AF1-100 C O2	11.8952
944322	AF1-100 E O2	7.9302
944381	AF1-103 O2	1.6028
944391	AF1-104 O2	1.0955
944411	AF1-106 O2	1.5856
944471	AF1-112 C	0.8161
944472	AF1-112 E	0.5441
944671	AF1-132 C O2	0.8113
944672	AF1-132 E O2	0.5409
944691	AF1-134 C O1	1.1405

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.1405
944701	AF1-135 C	1.3686
944702	AF1-135 E	0.9124
944731	AF1-138 C O2	1.1028
944732	AF1-138 E O2	0.7352
944741	AF1-139 C O1	0.8746
944742	AF1-139 E O1	0.5831
944751	AF1-140 C	3.2443
944752	AF1-140 E	2.1629
944771	AF1-142 C	8.9503
944772	AF1-142 E	5.9669
944781	AF1-143 C	15.8892
944782	AF1-143 E	10.5928
944841	AF1-149 C	1.5543
944842	AF1-149 E	1.0362
944881	AF1-153 C O2	0.9693
944882	AF1-153 E O2	0.6462
944901	AF1-155 C	0.9691
944902	AF1-155 E	0.6461
945021	AF1-167 C	0.7104
945022	AF1-167 E	0.4736
945051	AF1-170 C	2.7153
945052	AF1-170 E	1.8102
945071	AF1-172 C	11.3364
945072	AF1-172 E	7.5576
945121	AF1-177	0.4007
945161	AF1-181	0.0639
945171	AF1-182	0.3195
945181	AF1-183	0.0864
945331	AF1-198	0.2136
945451	AF1-210 C	0.6626
945452	AF1-210 E	0.4418
945481	AF1-213 C	9.4791
945482	AF1-213 E	6.3194
945491	AF1-214 C	0.8239
945492	AF1-214 E	0.5492
945521	AF1-217 C O2	0.7518
945522	AF1-217 E O2	0.5012
945551	AF1-220 C	8.0851
945552	AF1-220 E	5.3930
945671	AF1-232 C O2	33.1864
945672	AF1-232 E O2	17.8696
945751	AF1-240 C O2	1.3310
945752	AF1-240 E O2	0.8873
945771	AF1-242 C	0.9691
945772	AF1-242 E	0.6461
945901	AF1-255 C	1.8890
945902	AF1-255 E	2.6086
946081	AF1-273 C O2	19.0632
946082	AF1-273 E O2	12.7088
946091	AF1-274 C	4.5988
946092	AF1-274 E	3.0659

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Bus #	Bus	MW Impact
946131	AF1-278	19.3364
946191	AF1-284 C O2	0.9993
946192	AF1-284 E O2	0.5996
946211	AF1-286 C O2	0.6422
946212	AF1-286 E O2	0.4360
946221	AF1-287 C	0.7518
946222	AF1-287 E	0.5012
946241	AF1-289 C O2	7.9654
946242	AF1-289 E O2	5.3102
946381	AF1-302 C	1.4578
946382	AF1-302 E	1.9438
946401	AF1-304 C	4.6208
946402	AF1-304 E	3.0805
946421	AF1-306 C	4.7503
946422	AF1-306 E	19.0010
946431	AF1-307 C O2	15.5810
946432	AF1-307 E O2	10.3873
946571	AF1-321 C O2	4.6567
946572	AF1-321 E O2	3.1045
DUCKCREEK	DUCKCREEK	0.5412
NEWTON	NEWTON	0.5491
FARMERCITY	FARMERCITY	0.0290
PRAIRIE	PRAIRIE	1.3845
O-066	O-066	3.3130
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1617
CHEOAH	CHEOAH	0.3544
TILTON	TILTON	0.3018
G-007	G-007	0.6157
MADISON	MADISON	0.0081
GIBSON	GIBSON	0.2796
CALDERWOOD	CALDERWOOD	0.3499
BLUEG	BLUEG	0.9218
TRIMBLE	TRIMBLE	0.2949
CATAWBA	CATAWBA	0.2902

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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
42281294	200810	26KEYSTONE	PENELEC	999401	STAR592	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	120.2	122.9	DC	16.89

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**16.7325**
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	**26COLVER13 (Deativation : 09/01/20)**	**19.5371**
200809	26SITHE	1.2781
200833	26SEWRDB34	13.2926
200834	26SW_E13_K22	0.0419
200835	26DSGENWIN	0.2043
200837	26HOMER C1	22.0118
200838	26HOMER C2	18.4521
200839	26HOMER C3	19.5339
200846	26FORWARD	0.1497
200864	K-013 E	4.2904
200883	Q-053 E	7.8926
200886	26ARWF_N39	0.3654
200888	26HIGHLAND	0.3256
200889	26STNY CRK	0.2507
200890	26BF_G21_K23	0.1002
200891	26CSLMN_L13	0.1571
200892	26LOOKOUT	0.1493
200894	26K02	4.2783
200898	26AA1-106	1.6183
200906	26KEYSTN#3	0.6753
200915	26CHSTN_FL	0.1744
200925	26R32	0.3757
200945	26CT_V3-030	0.1279
201144	W3-099 C OP1	0.8862
201477	26Y2-055	2.5227
202158	26CON.GEN1	0.0706
202160	26CON.GEN2	0.0494
202225	26SCI_S29B	0.0652
203034	26NA_O38_P22	0.3198
203910	26Z1-091	1.4594
203999	P-047 E	7.6636
235003	AC1-025 E	0.1066
236828	01GRAYMONT	0.2892
290086	Q-036 E	4.7474
292350	K-023	4.6300
292542	L-013 1	4.5034
293301	N-039 E	10.4723
293393	V3-030E	4.8293
293432	R-040 E	0.2153

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Bus #	Bus	MW Impact
293603	O-018 E	9.3319
293902	O-048 E	4.0530
294515	O38_P22	9.1633
294903	P-060 E	7.1841
296332	R-032 E	10.7676
903644	W3-099 E OP1	5.9308
913142	Y1-033 E OP1	3.1317
916202	Z1-069 E	6.1155
917672	Z2-108 E	2.1532
918682	AA1-082 E	4.1617
919201	AA1-144 OP	11.8405
919491	AA2-000	36.9701
920341	AA2-132	1.6166
922932	AB1-082 OP	2.2258
923443	AB1-160 E	1.7473
930511	AB1-092	1.3574
935191	AD1-154	2.3565
936421	AD2-055	2.7947
936991	AD2-133 C	2.1363
936992	AD2-133 E	9.7714
938351	AE1-053	1.1962
938881	AE1-116	0.7506
938951	AE1-123	1.6552
938991	AE1-128 C	12.7001
938992	AE1-128 E	8.4667
939171	AE1-147 C	0.8700
939172	AE1-147 E	0.5800
939291	AE1-160 C	1.0268
939292	AE1-160 E	0.5902
939381	AE1-169 C O1	4.1867
939382	AE1-169 E O1	2.7912
940201	AE2-001 C	0.8686
940202	AE2-001 E	0.5791
940681	AE2-055 C	0.8483
940682	AE2-055 E	0.5656
940861	AE2-074 C	1.6901
940862	AE2-074 E	2.2247
941191	AE2-113 C	6.6183
941192	AE2-113 E	7.1257
941231	AE2-117 C	1.0872
941232	AE2-117 E	0.7248
941241	AE2-118 C	1.0872
941242	AE2-118 E	0.7248
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.1764**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**0.7842**
941261	AE2-120 C	0.8679
941262	AE2-120 E	0.5786
941271	AE2-121 C	0.4638
941272	AE2-121 E	0.3097
941321	AE2-126 C	1.1560
941322	AE2-126 E	0.7706
941331	AE2-129 C	1.3127

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Bus #	Bus	MW Impact
941332	AE2-129 E	0.8752
941351	AE2-131 C	1.3127
941352	AE2-131 E	0.8752
941421	AE2-139 C	4.4582
941422	AE2-139 E	2.9721
942121	AE2-224 C	11.0976
942122	AE2-224 E	7.3984
942351	AE2-248 C	0.6854
942352	AE2-248 E	0.4570
942361	AE2-249 C	1.4288
942362	AE2-249 E	0.9525
942491	AE2-262 C	3.9062
942492	AE2-262 E	2.6249
942501	AE2-263 C	3.6718
942502	AE2-263 E	2.4515
942511	AE2-264 C	5.1734
942512	AE2-264 E	3.4490
942811	AE2-299 C	2.2018
942812	AE2-299 E	8.8074
942961	AE2-316 C	3.5892
942962	AE2-316 E	5.1182
943151	AE2-344 C	4.6968
943152	AE2-344 E	3.1312
943351	AF1-006 C	0.4299
943352	AF1-006 E	0.2418
943711	AF1-039 C O2	0.3793
943712	AF1-039 E O2	0.2528
943751	AF1-043	4.4436
943871	AF1-055 C O2	1.8147
943872	AF1-055 E O2	1.2098
944001	AF1-068 C O2	0.4826
944002	AF1-068 E O2	0.2715
944181	AF1-086 C O2	3.3026
944182	AF1-086 E O2	14.3682
944261	AF1-094 C	0.4556
944262	AF1-094 E	0.3037
944281	AF1-096 C	0.5142
944282	AF1-096 E	0.3428
944301	AF1-098 C	1.7941
944302	AF1-098 E	1.1961
944311	AF1-099 C	3.1427
944312	AF1-099 E	2.0951
944321	AF1-100 C O2	6.6899
944322	AF1-100 E O2	4.4599
944381	AF1-103 O2	0.9216
944391	AF1-104 O2	0.6234
944411	AF1-106 O2	0.9338
944471	AF1-112 C	0.4553
944472	AF1-112 E	0.3035
944671	AF1-132 C O2	0.4524
944672	AF1-132 E O2	0.3016
944691	AF1-134 C O1	1.4096

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.4096
944701	AF1-135 C	1.6915
944702	AF1-135 E	1.1277
944731	AF1-138 C O2	0.5762
944732	AF1-138 E O2	0.3842
944741	AF1-139 C O1	0.5167
944742	AF1-139 E O1	0.3444
944751	AF1-140 C	1.6938
944752	AF1-140 E	1.1292
944771	AF1-142 C	5.0283
944772	AF1-142 E	3.3522
944781	AF1-143 C	8.4438
944782	AF1-143 E	5.6292
944841	AF1-149 C	0.8678
944842	AF1-149 E	0.5785
944881	AF1-153 C O2	0.5496
944882	AF1-153 E O2	0.3664
944901	AF1-155 C	0.5495
944902	AF1-155 E	0.3663
945021	AF1-167 C	0.4031
945022	AF1-167 E	0.2687
945051	AF1-170 C	1.5485
945052	AF1-170 E	1.0323
945071	AF1-172 C	6.4352
945072	AF1-172 E	4.2901
945121	AF1-177	0.2304
945161	AF1-181	0.0359
945171	AF1-182	0.1795
945181	AF1-183	0.0483
945331	AF1-198	0.1254
945451	AF1-210 C	0.3750
945452	AF1-210 E	0.2500
945481	AF1-213 C	5.2754
945482	AF1-213 E	3.5170
945491	AF1-214 C	0.4601
945492	AF1-214 E	0.3067
945521	AF1-217 C O2	0.4297
945522	AF1-217 E O2	0.2864
945551	AF1-220 C	4.5899
945552	AF1-220 E	3.0616
945671	AF1-232 C O2	17.6332
945672	AF1-232 E O2	9.4948
945751	AF1-240 C O2	0.7494
945752	AF1-240 E O2	0.4996
945771	AF1-242 C	0.5495
945772	AF1-242 E	0.3663
945901	AF1-255 C	0.9932
945902	AF1-255 E	1.3715
946081	AF1-273 C O2	10.1352
946082	AF1-273 E O2	6.7568
946091	AF1-274 C	2.5949
946092	AF1-274 E	1.7299

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Bus #	Bus	MW Impact
946131	AF1-278	11.2469
946191	AF1-284 C O2	0.5267
946192	AF1-284 E O2	0.3160
946211	AF1-286 C O2	0.3782
946212	AF1-286 E O2	0.2568
946221	AF1-287 C	0.4297
946222	AF1-287 E	0.2864
946241	AF1-289 C O2	4.1618
946242	AF1-289 E O2	2.7746
946381	AF1-302 C	0.8307
946382	AF1-302 E	1.1076
946401	AF1-304 C	2.6330
946402	AF1-304 E	1.7553
946421	AF1-306 C	2.6955
946422	AF1-306 E	10.7819
946431	AF1-307 C O2	8.2138
946432	AF1-307 E O2	5.4759
946571	AF1-321 C O2	2.6302
946572	AF1-321 E O2	1.7534
DUCKCREEK	DUCKCREEK	0.5619
NEWTON	NEWTON	0.5458
FARMERCITY	FARMERCITY	0.0284
PRAIRIE	PRAIRIE	1.3354
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1698
CHEOAH	CHEOAH	0.2933
TILTON	TILTON	0.3112
G-007	G-007	0.0426
MADISON	MADISON	0.0262
GIBSON	GIBSON	0.2790
CALDERWOOD	CALDERWOOD	0.2907
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2905
CATAWBA	CATAWBA	0.2188

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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
41682344	202650	26HIGHPOINT	PENELEC	200747	26PENN-MAR	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	150.2	173.18	DC	39.99

Bus #	Bus	MW Impact
200834	26SW_E13_K22	0.1183
200835	26DSGENWIN	0.7970
200864	K-013 E	1.7933
200889	26STNY CRK	0.4819
200890	26BF_G21_K23	0.3908
200891	26CSLMN_L13	0.6131
200892	26LOOKOUT	0.5824
202225	26SCI_S29B	0.1840
202652	26RGH_Y1-033	0.4493
292350	K-023	18.0628
292542	L-013 1	17.5686
293432	R-040 E	0.9882
293902	O-048 E	15.8118
294903	P-060 E	13.8096
913142	Y1-033 E OP1	21.9885
917672	Z2-108 E	9.8824
938351	AE1-053	5.4902
938881	AE1-116	2.1185
938991	AE1-128 C	10.8187
938992	AE1-128 E	7.2125
942361	AE2-249 C	1.2171
942362	AE2-249 E	0.8114
944751	AF1-140 C	0.3546
944752	AF1-140 E	0.2364
944781	AF1-143 C	32.9412
944782	AF1-143 E	21.9608
945671	AF1-232 C O2	39.4004
945672	AF1-232 E O2	21.2156
945901	AF1-255 C	0.6999
945902	AF1-255 E	0.9665
946081	AF1-273 C O2	23.9934
946082	AF1-273 E O2	15.9956
946241	AF1-289 C O2	0.9236
946242	AF1-289 E O2	0.6157
DUCKCREEK	DUCKCREEK	0.2361
NEWTON	NEWTON	0.2267
FARMERCITY	FARMERCITY	0.0119
G-007A	G-007A	0.6497
VFT	VFT	1.7866
PRAIRIE	PRAIRIE	0.5528
COFFEEN	COFFEEN	0.1110

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Bus #	Bus	MW Impact
EDWARDS	EDWARDS	0.0714
CHEOAH	CHEOAH	0.1186
TILTON	TILTON	0.1298
GIBSON	GIBSON	0.1152
CALDERWOOD	CALDERWOOD	0.1178
BLUEG	BLUEG	0.3698
TRIMBLE	TRIMBLE	0.1185
CATAWBA	CATAWBA	0.0875

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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
41682501	999401	STAR592	PJM	200011	KEYSTONE	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	119.66	122.37	DC	16.89

Bus #	Bus	MW Impact
200503	**26C.SLOPE (Deativation : 06/07/19)**	**16.7325**
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	**26COLVER13 (Deativation : 09/01/20)**	**19.5371**
200809	26SITHE	1.2781
200833	26SEWRDB34	13.2926
200834	26SW_E13_K22	0.0419
200835	26DSGENWIN	0.2043
200837	26HOMER C1	22.0118
200838	26HOMER C2	18.4521
200839	26HOMER C3	19.5339
200846	26FORWARD	0.1497
200864	K-013 E	4.2904
200883	Q-053 E	7.8926
200886	26ARWF_N39	0.3654
200888	26HIGHLAND	0.3256
200889	26STNY CRK	0.2507
200890	26BF_G21_K23	0.1002
200891	26CSLMN_L13	0.1571
200892	26LOOKOUT	0.1493
200894	26K02	4.2783
200898	26AA1-106	1.6183
200906	26KEYSTN#3	0.6753
200915	26CHSTN_FL	0.1744
200925	26R32	0.3757
200945	26CT_V3-030	0.1279
201144	W3-099 C OP1	0.8862
201477	26Y2-055	2.5227
202158	26CON.GEN1	0.0706
202160	26CON.GEN2	0.0494
202225	26SCI_S29B	0.0652
203034	26NA_O38_P22	0.3198
203910	26Z1-091	1.4594
203999	P-047 E	7.6636
235003	AC1-025 E	0.1066
236828	01GRAYMONT	0.2892
290086	Q-036 E	4.7474
292350	K-023	4.6300
292542	L-013 1	4.5034
293301	N-039 E	10.4723
293393	V3-030E	4.8293
293432	R-040 E	0.2153

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Bus #	Bus	MW Impact
293603	O-018 E	9.3319
293902	O-048 E	4.0530
294515	O38_P22	9.1633
294903	P-060 E	7.1841
296332	R-032 E	10.7676
903644	W3-099 E OP1	5.9308
913142	Y1-033 E OP1	3.1317
916202	Z1-069 E	6.1155
917672	Z2-108 E	2.1532
918682	AA1-082 E	4.1617
919201	AA1-144 OP	11.8405
919491	AA2-000	36.9701
920341	AA2-132	1.6166
922932	AB1-082 OP	2.2258
923443	AB1-160 E	1.7473
930511	AB1-092	1.3574
935191	AD1-154	2.3565
936421	AD2-055	2.7947
936991	AD2-133 C	2.1363
936992	AD2-133 E	9.7714
938351	AE1-053	1.1962
938881	AE1-116	0.7506
938951	AE1-123	1.6552
938991	AE1-128 C	12.7001
938992	AE1-128 E	8.4667
939171	AE1-147 C	0.8700
939172	AE1-147 E	0.5800
939291	AE1-160 C	1.0268
939292	AE1-160 E	0.5902
939381	AE1-169 C O1	4.1867
939382	AE1-169 E O1	2.7912
940201	AE2-001 C	0.8686
940202	AE2-001 E	0.5791
940681	AE2-055 C	0.8483
940682	AE2-055 E	0.5656
940861	AE2-074 C	1.6901
940862	AE2-074 E	2.2247
941191	AE2-113 C	6.6183
941192	AE2-113 E	7.1257
941231	AE2-117 C	1.0872
941232	AE2-117 E	0.7248
941241	AE2-118 C	1.0872
941242	AE2-118 E	0.7248
941251	**AE2-119 C (Withdrawn : 12/16/2019)**	**1.1764**
941252	**AE2-119 E (Withdrawn : 12/16/2019)**	**0.7842**
941261	AE2-120 C	0.8679
941262	AE2-120 E	0.5786
941271	AE2-121 C	0.4638
941272	AE2-121 E	0.3097
941321	AE2-126 C	1.1560
941322	AE2-126 E	0.7706
941331	AE2-129 C	1.3127

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Bus #	Bus	MW Impact
941332	AE2-129 E	0.8752
941351	AE2-131 C	1.3127
941352	AE2-131 E	0.8752
941421	AE2-139 C	4.4582
941422	AE2-139 E	2.9721
942121	AE2-224 C	11.0976
942122	AE2-224 E	7.3984
942351	AE2-248 C	0.6854
942352	AE2-248 E	0.4570
942361	AE2-249 C	1.4288
942362	AE2-249 E	0.9525
942491	AE2-262 C	3.9062
942492	AE2-262 E	2.6249
942501	AE2-263 C	3.6718
942502	AE2-263 E	2.4515
942511	AE2-264 C	5.1734
942512	AE2-264 E	3.4490
942811	AE2-299 C	2.2018
942812	AE2-299 E	8.8074
942961	AE2-316 C	3.5892
942962	AE2-316 E	5.1182
943151	AE2-344 C	4.6968
943152	AE2-344 E	3.1312
943351	AF1-006 C	0.4299
943352	AF1-006 E	0.2418
943711	AF1-039 C O2	0.3793
943712	AF1-039 E O2	0.2528
943751	AF1-043	4.4436
943871	AF1-055 C O2	1.8147
943872	AF1-055 E O2	1.2098
944001	AF1-068 C O2	0.4826
944002	AF1-068 E O2	0.2715
944181	AF1-086 C O2	3.3026
944182	AF1-086 E O2	14.3682
944261	AF1-094 C	0.4556
944262	AF1-094 E	0.3037
944281	AF1-096 C	0.5142
944282	AF1-096 E	0.3428
944301	AF1-098 C	1.7941
944302	AF1-098 E	1.1961
944311	AF1-099 C	3.1427
944312	AF1-099 E	2.0951
944321	AF1-100 C O2	6.6899
944322	AF1-100 E O2	4.4599
944381	AF1-103 O2	0.9216
944391	AF1-104 O2	0.6234
944411	AF1-106 O2	0.9338
944471	AF1-112 C	0.4553
944472	AF1-112 E	0.3035
944671	AF1-132 C O2	0.4524
944672	AF1-132 E O2	0.3016
944691	AF1-134 C O1	1.4096

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Bus #	Bus	MW Impact
944692	AF1-134 E O1	1.4096
944701	AF1-135 C	1.6915
944702	AF1-135 E	1.1277
944731	AF1-138 C O2	0.5762
944732	AF1-138 E O2	0.3842
944741	AF1-139 C O1	0.5167
944742	AF1-139 E O1	0.3444
944751	AF1-140 C	1.6938
944752	AF1-140 E	1.1292
944771	AF1-142 C	5.0283
944772	AF1-142 E	3.3522
944781	AF1-143 C	8.4438
944782	AF1-143 E	5.6292
944841	AF1-149 C	0.8678
944842	AF1-149 E	0.5785
944881	AF1-153 C O2	0.5496
944882	AF1-153 E O2	0.3664
944901	AF1-155 C	0.5495
944902	AF1-155 E	0.3663
945021	AF1-167 C	0.4031
945022	AF1-167 E	0.2687
945051	AF1-170 C	1.5485
945052	AF1-170 E	1.0323
945071	AF1-172 C	6.4352
945072	AF1-172 E	4.2901
945121	AF1-177	0.2304
945161	AF1-181	0.0359
945171	AF1-182	0.1795
945181	AF1-183	0.0483
945331	AF1-198	0.1254
945451	AF1-210 C	0.3750
945452	AF1-210 E	0.2500
945481	AF1-213 C	5.2754
945482	AF1-213 E	3.5170
945491	AF1-214 C	0.4600
945492	AF1-214 E	0.3067
945521	AF1-217 C O2	0.4297
945522	AF1-217 E O2	0.2864
945551	AF1-220 C	4.5899
945552	AF1-220 E	3.0616
945671	AF1-232 C O2	17.6332
945672	AF1-232 E O2	9.4948
945751	AF1-240 C O2	0.7494
945752	AF1-240 E O2	0.4996
945771	AF1-242 C	0.5495
945772	AF1-242 E	0.3663
945901	AF1-255 C	0.9932
945902	AF1-255 E	1.3715
946081	AF1-273 C O2	10.1352
946082	AF1-273 E O2	6.7568
946091	AF1-274 C	2.5949
946092	AF1-274 E	1.7299

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Bus #	Bus	MW Impact
946131	AF1-278	11.2469
946191	AF1-284 C O2	0.5267
946192	AF1-284 E O2	0.3160
946211	AF1-286 C O2	0.3782
946212	AF1-286 E O2	0.2568
946221	AF1-287 C	0.4297
946222	AF1-287 E	0.2864
946241	AF1-289 C O2	4.1618
946242	AF1-289 E O2	2.7746
946381	AF1-302 C	0.8307
946382	AF1-302 E	1.1076
946401	AF1-304 C	2.6330
946402	AF1-304 E	1.7553
946421	AF1-306 C	2.6955
946422	AF1-306 E	10.7819
946431	AF1-307 C O2	8.2138
946432	AF1-307 E O2	5.4759
946571	AF1-321 C O2	2.6302
946572	AF1-321 E O2	1.7534
DUCKCREEK	DUCKCREEK	0.5619
NEWTON	NEWTON	0.5458
FARMERCITY	FARMERCITY	0.0284
PRAIRIE	PRAIRIE	1.3354
COFFEEN	COFFEEN	0.2664
EDWARDS	EDWARDS	0.1698
CHEOAH	CHEOAH	0.2933
TILTON	TILTON	0.3112
G-007	G-007	0.0426
MADISON	MADISON	0.0262
GIBSON	GIBSON	0.2790
CALDERWOOD	CALDERWOOD	0.2907
BLUEG	BLUEG	0.9062
TRIMBLE	TRIMBLE	0.2905
CATAWBA	CATAWBA	0.2188

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Affected Systems

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15.21 Affected Systems

15.21.1 LG&E

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

15.21.2 MISO

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

15.21.3 TVA

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

15.21.4 Duke Energy Progress

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

15.21.5 NYISO

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

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15.22 Contingency Descriptions

Contingency Name	Contingency Definition
PN-P1-2-PN-115-076	CONTINGENCY 'PN-P1-2-PN-115-076' /* BEDFORD NORTH - NEW BALTIMORE 115KV DISCONNECT BRANCH FROM BUS 200501 TO BUS 200884 CKT 1 /* 26BDFORD N 115 26NEW BALT 115 END
PN-P2-3-PN-115-35E	CONTINGENCY 'PN-P2-3-PN-115-35E' /* #14 STUCK TIE BREAKER BETWEEN BUSES 1 AND 2 DISCONNECT BRANCH FROM BUS 200734 TO BUS 200743 CKT 1 /* 26SCALP L. 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200802 CKT 1 /* 26HOOVERSV 115 26RALPHTON 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200776 CKT 1 /* 26HOOVERSV 115 26HOOVER#1 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 200742 TO BUS 200743 CKT 1 /* 26TOWER 51 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 END
PN_P4-500-002A	CONTINGENCY 'PN_P4-500-002A' /* CONEMAUGH 500KV BKR 1 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 DISCONNECT BUS 200031 /* CONE G2 22 END
PN-P1_2-PN-230-0104	CONTINGENCY 'PN-P1_2-PN-230-0104' /* SHELOCTA - HOMER CITY 230 KV LINE OPEN BRANCH FROM BUS 200795 TO BUS 200767 CKT 1 /* 26SHELOCTA 230.00 26HOMER CT 230.00 END
PN_P4-500-002F	CONTINGENCY 'PN_P4-500-002F' /* CONEMAUGH 500KV BKR 6 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 DISCONNECT BUS 200030 /* CONE G1 22 END
PN-P2-3-PN-230-9H-A	CONTINGENCY 'PN-P2-3-PN-230-9H-A' /* HOMER CITY 230 KV STUCK BREAKER 209 (SHELOCTA/SOUTH BUS) DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/* 26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200795 CKT 1 /* 26HOMER CT 230 26SHELOCTA 230 END
PN-P1-2-PN-345-107T	CONTINGENCY 'PN-P1-2-PN-345-107T' /* ERIE WEST - ASHTABULA - PERRY 345KV DISCONNECT BRANCH FROM BUS 200599 TO BUS 238547 CKT 1 /* 26ERIE W 345 02AT 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239082 CKT 1 /* 02AT 345 02S8-ATT 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239036 CKT 1 /* 02AT 345 02PERRY 345 DISCONNECT BUS 238547 /* 02AT 345 END

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Contingency Name	Contingency Definition
PJM500_PN_P4-500-001A	CONTINGENCY 'PJM500_PN_P4-500-001A' /* KEYSTONE 500KV BKR 1 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 CKT 3 /* KEYSTONE 500 26KEYSTONE 230 REMOVE MACHINE H FROM BUS 200033 /* KEYS G2 20 REMOVE MACHINE L FROM BUS 200033 /* KEYS G2 20 DISCONNECT BUS 200033 /* KEYS G2 20 END
PN-P1-2-PN-115-066	CONTINGENCY 'PN-P1-2-PN-115-066' /* HOOVERSVILLE - SOMERSET 115KV DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 END
PN-P1-3-PN-115-025	CONTINGENCY 'PN-P1-3-PN-115-025' /* SOMERSET #1 XFMR FAULT DISCONNECT BRANCH FROM BUS 200744 TO BUS 200774 CKT 1 /* 26SOMERST 115 26SOMRSET1 23 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200746 CKT 1 /* 26SOMERST 115 26ROCKWOOD 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 202637 CKT 1 /* 26SOMERST 115 26PRIDE 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 946080 CKT 1 /* 26PRIDE 115 AF1-273 TAP 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200743 CKT 1 /* 26SOMERST 115 26HOOVERSV 115 END
PN-P2-3-PN-115-62A	CONTINGENCY 'PN-P2-3-PN-115-62A' /* 696 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 946080 CKT 1 /* 26PRIDE 115 AF1-273 TAP 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 200744 CKT 1 /* 26PRIDE 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200774 CKT 1 /* 26SOMERST 115 26SOMRSET1 23 DISCONNECT BRANCH FROM BUS 200746 TO BUS 200773 CKT 1 /* 26ROCKWOOD 115 26ROCKWOOD 23 END
PN-P2-3-PN-115-62E	CONTINGENCY 'PN-P2-3-PN-115-62E' /* 699 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 200744 TO BUS 200774 CKT 1 /* 26SOMERST 115 26SOMRSET1 23 DISCONNECT BRANCH FROM BUS 202637 TO BUS 946080 CKT 1 /* 26PRIDE 115 AF1-273 TAP 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 200744 CKT 1 /* 26PRIDE 115 26SOMERST 115 END
PN_P4-500-001J	CONTINGENCY 'PN_P4-500-001J' /* KEYSTONE 500KV BKR 16 DISCONNECT BRANCH FROM BUS 200011 TO BUS 235104 CKT 1 /* KEYSTONE 500 01CABOT 500 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 TO BUS 200907 CKT 4/* KEYSTONE 500 26KEYSTONE 230 26KEYSTN#4 20.00 REDUCE BUS 200011 SHUNT BY 100 PERCENT /* KEYSTONE 500 END
Base Case	

Contingency Name	Contingency Definition
PN-P1-2-PN-230-025	CONTINGENCY 'PN-P1-2-PN-230-025' /* CONEMAUGH - SEWARD 230KV DISCONNECT BRANCH FROM BUS 200912 TO BUS 200793 CKT 1 /* 26CONEMAGH 230 26SEWARD 2 230 END
PN-P1-2-PN-115-074C	CONTINGENCY 'PN-P1-2-PN-115-074C' /* ALLEGHENY - KIMRUN 115KV DISCONNECT BRANCH FROM BUS 945670 TO BUS 200745 CKT 1 /* AF1-232 TAP 115 26ALLEGHEN 115 DISCONNECT BRANCH FROM BUS 200745 TO BUS 200775 CKT 1 /* 26ALLEGHEN 115 26ALLEG.#1 23 END
PN-P1-2-PN-115-074A	CONTINGENCY 'PN-P1-2-PN-115-074A' /* KIMRUN - SOMERSET 115KV DISCONNECT BRANCH FROM BUS 200744 TO BUS 202637 CKT 1 /* 26SOMERST 115 26PRIDE 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 946080 CKT 1 /* 26PRIDE 115 AF1-273 TAP 115 END
PJM500_PN_P4-500-001D	CONTINGENCY 'PJM500_PN_P4-500-001D' /* KEYSTONE 500KV BKR 4 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 CKT 3 /* KEYSTONE 500 26KEYSTONE 230 REMOVE MACHINE H FROM BUS 200032 /* KEYS G1 20 REMOVE MACHINE L FROM BUS 200032 /* KEYS G1 20 DISCONNECT BUS 200032 /* KEYS G1 20 END
AP-P1-3-PN-115-010	CONTINGENCY 'AP-P1-3-PN-115-010' /* GARRETT 138/115KV XFMR FAULT OPEN BRANCH FROM BUS 235469 TO BUS 235470 CKT 1 /* 01GARRET 138.00 01GARRET 115.00 END
AP-P1-2-WP-500-008	CONTINGENCY 'AP-P1-2-WP-500-008' /* SOUTH BEND
AP-P1-2-WP-345-311T	CONTINGENCY 'AP-P1-2-WP-345-311T' /* ARMSTRONG -HOMERCITY 345KV DISCONNECT BRANCH FROM BUS 235129 TO BUS 200769 CKT 1 /* 01ARMSTRONG 345 26HOMER CY 345 END
ATSI-P1-2-CEI-345-700T	CONTINGENCY 'ATSI-P1-2-CEI-345-700T' /* PN/ATSI ERIE WEST - ASHTABULA - PERRY 345KV DISCONNECT BRANCH FROM BUS 239036 TO BUS 238547 CKT 1 /* 02PERRY 345 02AT 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239082 CKT 1 /* 02AT 345 02S8-ATT 345 DISCONNECT BRANCH FROM BUS 239082 TO BUS 238544 CKT 8 /* 02S8-ATT 345 02ASH_3 138 DISCONNECT BRANCH FROM BUS 238547 TO BUS 200599 CKT 1 /* 02AT 345 26ERIE W 345 END
PJM_P1_APS_B_G692	CONTINGENCY 'PJM_P1_APS_B_G692' / 200011 KEYSTONE 500 235104 01CABOT 500 1 OPEN BRANCH FROM BUS 200011 TO BUS 235104 CKT 1 END
PN-P2-3-PN-115-62E2	CONTINGENCY 'PN-P2-3-PN-115-62E2' /* SOMERSET #5 DISCONNECT BRANCH FROM BUS 202637 TO BUS 946080 CKT 1 /* 26PRIDE 115 AF1-273 TAP 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 200744 CKT 1 /* 26PRIDE 115 26SOMERST 115 END

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Contingency Name	Contingency Definition
PN-P7-1-PN-230-001	CONTINGENCY 'PN-P7-1-PN-230-001' /* HOMER CITY - HOOVERSVILLE 230KV & SEWARD - TOWER 51 115KV DISCONNECT BRANCH FROM BUS 200767 TO BUS 200768 CKT 1 /* 26HOMER CT 230 26QUEMAHON 230 DISCONNECT BRANCH FROM BUS 200768 TO BUS 200796 CKT 1 /* 26QUEMAHON 230 26HOOVRSVL 230 DISCONNECT BRANCH FROM BUS 200796 TO BUS 200743 CKT 3 /* 26HOOVRSVL 230 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200741 TO BUS 200742 CKT 1 /* 26SEWARD 115 26TOWER 51 115 END
PJM_P1__P1_20A_CONEMAGH-KEYSTONE	CONTINGENCY 'PJM_P1__P1_20A_CONEMAGH-KEYSTONE' DISCONNECT BRANCH FROM BUS 200005 TO BUS 200011 CKT 1 /* CONEMAGH KEYSTONE 500 500 END
PN-P1-3-PN-230-001T	CONTINGENCY 'PN-P1-3-PN-230-001T' /* CONEMAUGH #1 500/230KV XFMR DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-GH 500 26CONEMAGH 230 END

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Short Circuit

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15.23 Short Circuit

The following Breakers are overduty:

None

16 Attachment 1 – One Line