



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF1-100
SHAWVILLE 230 KV
150 MW Capacity / 250 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 order to reduce delays

to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a \$10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

3 General

The Interconnection Customer (IC), has proposed a Solar and Storage generating facility located in Clearfield County, Pennsylvania. The installed facilities will have a total capability of 250 MW with 150 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is 04/01/2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF1-100
Project Name	SHAWVILLE 230 KV
State	Pennsylvania
County	Clearfield
Transmission Owner	PENELEC
MFO	250
MWE	250
MWC	150
Fuel	Solar; Storage
Basecase Study Year	2023

3.1 Point of Interconnection

3.1.1 Primary POI

The interconnection of the project at the Primary POI will be accomplished by constructing a new 230 kV breaker position on the #2 230 kV bus at Shawville substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct the new breaker position and the associated facilities. The IC will also be responsible for any necessary rough grade of the property.

Attachment 1 shows a one-line diagram of the proposed primary direct connection facilities for the AF1-100 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.

3.1.2 Secondary POI

The interconnection of the project at a Secondary POI can be accomplished by constructing a new 230 kV three (3) breaker ring bus substation and looping the Shawville - Moshannon 230 kV line into the new station. The new substation would be located approximately 3 miles from Shawville substation. A full scope of work or estimated cost is not provided for the proposed Secondary POI.

3.2 Cost Summary

The AF1-100 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$315,200
Direct Connection Network Upgrade	\$0
Non Direct Connection Network Upgrades	\$1,617,600
Total Costs	\$1,932,800

In addition, the AF1-100 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	\$558,808,350

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.

The required Attachment Facilities and Direct and Non-Direct Connection work for the interconnection of the AF1-100 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.

4 Transmission Owner Scope of Work

The interconnection of the project at the Primary POI will be accomplished by constructing a new 230 kV breaker position on the #2 230 kV bus at Shawville substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct the new breaker position and the associated facilities. The IC will also be responsible for any necessary rough grade of the property.

5 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
Provide 230 kV attachment facilities from new breaker position at Shawville 230 kV substation to the POI with AF1-100.	\$242,700
Review nameplates and Customer drawings	\$72,500
Total Attachment Facility Costs	\$315,200

6 Direct Connection Cost Estimate

Direct Connection scope of work is not required.

7 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
Provide 230 kV interconnection by expanding Shawville 230 kV bus #2 to accommodate a new circuit breaker position for AF1-100.	\$1,617,600
Total Non-Direct Connection Facility Costs	\$1,617,600

8 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 **18 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 Attachment Facility work. Full initial deposit will be required for the Non-Direct Connection work. 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 interconnection work, 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.

9 Transmission Owner Analysis

Power Flow Analysis

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

10 Interconnection Customer Requirements

10.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in 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 original one-line diagram provided by the IC depicts 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.

10.2 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 230 kV circuit breaker to protect the AF1-100 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 AF1-100 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. 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.

10.3 Power Factor Requirements

The IC shall design its solar 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.

11 Revenue Metering and SCADA Requirements

11.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

1.1.1 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

11.2 MAIT – PENELEC; 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>

12 Network Impacts – Primary POI

The Queue Project AF1-100 was evaluated as a 250.1 MW (Capacity 150.0 MW) injection at the Shawville 230 kV substation in the PENELEC area. Project AF1-100 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-100 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

12.1 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
41184061	200522	26SHADE GP	115.0	PENELE C	938380	AE1-071 TAP	115.0	PENELE C	1	PN-P1-2-PN-230-103T	single	160.0	98.22	106.0	DC	12.44
41184005	200726	26SHAWVL2	230.0	PENELE C	235248	01SHINGL	230.0	AP	1	AP-P1-3-WP-230-005	single	554.0	98.45	105.81	DC	42.29
41184006	200726	26SHAWVL2	230.0	PENELE C	235248	01SHINGL	230.0	AP	1	AP-P1-2-WP-230-005B	single	554.0	98.45	105.81	DC	42.29
41184385	999394	STAR599	1.0	PENELE C	200714	26SHAWVL1	115.0	PENELE C	1A	PN-P1-3-PN-115-005	single	126.0	99.62	112.32	DC	16.0

12.2 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
41521187	200513	26LEWISTWN	230.0	PENELE C	208005	JUNI BU2	230.0	PPL	1	AP-P2-3-WP-230-446T	breaker	624.0	94.14	107.0	DC	80.35
41789325	200513	26LEWISTWN	230.0	PENELE C	208005	JUNI BU2	230.0	PPL	1	PN-P2-2-PN-115-032	bus	624.0	96.66	106.53	DC	64.27
41521518	200713	26ROCKTON	115.0	PENELE C	200712	26DUBOIS	115.0	PENELE C	1	AP-P2-3-WP-230-443T*	breaker	190.0	88.0	103.01	DC	28.47
41521494	200714	26SHAWVL1	115.0	PENELE C	200713	26ROCKTON	115.0	PENELE C	1	AP-P2-3-WP-230-443T*	breaker	190.0	89.69	104.69	DC	28.47
41789321	200714	26SHAWVL1	115.0	PENELE C	999394	STAR599	1.0	PENELE C	1A	PN-P2-2-PN-230-014T	bus	126.0	49.65	113.23	DC	80.11
41789495	200727	26SHAW. 2	115.0	PENELE C	200714	26SHAWVL1	115.0	PENELE C	ZB	PN-P2-2-PN-230-014T	bus	191.0	46.98	121.04	DC	141.44

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
41521560	999393	STAR600	1.0	PENELE C	200727	26SHAW. 2	115.0	PENELE C	2A	AP-P2-3-WP-230-446T	breaker	148.0	88.44	108.99	DC	30.38
41521562	999393	STAR600	1.0	PENELE C	200727	26SHAW. 2	115.0	PENELE C	2A	AP-P2-2-WP-230-001T	breaker	148.0	88.37	108.92	DC	30.38
41789317	999393	STAR600	1.0	PENELE C	200727	26SHAW. 2	115.0	PENELE C	2A	PN-P2-2-PN-230-014T	bus	148.0	42.4	168.33	DC	186.39
41789318	999393	STAR600	1.0	PENELE C	200727	26SHAW. 2	115.0	PENELE C	2A	AP-P2-2-WP-230-001T	bus	148.0	88.37	108.92	DC	30.38

12.3 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
41184060	200522	26SHADE GP	115.0	PENEL EC	938380	AE1-071 TAP	115.0	PENEL EC	1	PL_P12_100618	single	160.0	100.1	107.88	DC	12.45
42137340	200593	26GLADE	230.0	PENEL EC	200811	26WARRE N	230.0	PENEL EC	1	PN-P2-3-PN-345-003A	breaker	621.0	147.7	152.59	DC	30.57
42421333	200593	26GLADE	230.0	PENEL EC	200811	26WARRE N	230.0	PENEL EC	1	Base Case	single	520.0	117.95	121.31	DC	17.57
42421335	200593	26GLADE	230.0	PENEL EC	200811	26WARRE N	230.0	PENEL EC	1	PN-P1-2-PN-345-003	single	621.0	117.44	120.34	DC	18.15
49459276	200599	26ERIE W	345.0	PENEL EC	238547	02AT	345.0	ATSI	1	Base Case	single	1560.0	104.24	104.97	DC	25.29
41184029	200674	26TOWAN DA	115.0	PENEL EC	200677	26NO MESHO	115.0	PENEL EC	1	PN-P1-2-PN-230-013A	single	202.0	122.92	126.69	DC	7.62
42421229	200675	26E.TWAN DA	230.0	PENEL EC	200924	26CANYON	230.0	PENEL EC	1	Base Case	single	515.0	103.59	106.41	DC	14.57
42137255	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOC TA	230.0	PENEL EC	1	PN_P4-500-002A	breaker	917.0	142.7	144.65	DC	39.11
42137256	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOC TA	230.0	PENEL EC	1	PN_P4-500-002F	breaker	917.0	142.71	144.66	DC	39.11
42137479	200769	26HOMER CY	345.0	PENEL EC	999392	STAR601	1.0	PENEL EC	N	PN-P2-3-PN-230-9E	breaker	807.0	123.31	124.59	DC	22.55
42137265	200795	26SHELOC TA	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN_P4-500-002F	breaker	917.0	121.74	123.95	DC	44.33
42137266	200795	26SHELOC TA	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN_P4-500-002A	breaker	917.0	121.74	123.95	DC	44.33
42137371	200810	26KEYSTO NE	230.0	PENEL EC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001A	breaker	635.0	101.69	103.48	DC	24.91
42137372	200810	26KEYSTO NE	230.0	PENEL EC	999401	STAR592	1.0	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	101.67	103.46	DC	24.91
42137618	200811	26WARRE N	230.0	PENEL EC	200918	26ERIE S TIE	230.0	PENEL EC	1	PN-P2-3-PN-115-71CT	breaker	621.0	108.19	112.41	DC	26.53
42137619	200811	26WARRE N	230.0	PENEL EC	200918	26ERIE S TIE	230.0	PENEL EC	1	PN-P2-3-PN-115-71ET	breaker	621.0	108.19	112.41	DC	26.53
46759915	200811	26WARRE N	230.0	PENEL EC	200918	26ERIE S TIE	230.0	PENEL EC	1	PN-P2-3-PN-345-003A	breaker	621.0	113.28	115.04	DC	24.25

ID	FRO M BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADI NG %	POST PROJEC T LOADI NG %	AC/D C	MW IMPA CT
415212 58	2009 04	26EAGL VAL	115. 0	PENEL EC	2005 27	26TYRONE N	115. 0	PENEL EC	1	PN-P2-3-PN- 115-28B_A	break er	191.0	105.68	110.63	DC	20.95
415212 59	2009 04	26EAGL VAL	115. 0	PENEL EC	2005 27	26TYRONE N	115. 0	PENEL EC	1	PN-P2-3-PN- 115-59B	break er	191.0	105.68	110.63	DC	20.95
417893 12	2009 04	26EAGL VAL	115. 0	PENEL EC	2005 27	26TYRONE N	115. 0	PENEL EC	1	AP-P2-2-WP- 230-005T	bus	191.0	117.74	131.52	DC	26.24
411838 61	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	Base Case	single	491.0	101.52	111.08	DC	48.5
415210 60	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-3-WP- 230-446T	break er	570.0	131.72	152.02	DC	115.6 6
415210 61	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-3-WP- 230-443T *	break er	570.0	131.58	151.88	DC	115.6 6
415210 62	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-2-WP- 230-001T	break er	570.0	131.58	151.88	DC	115.6 6
417892 25	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-2-WP- 230-001T	bus	570.0	131.58	151.88	DC	115.6 6
494589 16	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	PN-P1-2-PN- 230-004	single	570.0	101.13	110.08	DC	51.03
427040 84	2390 36	02PERRY	345. 0	ATSI	2393 34	02L.CENTE R	345. 0	ATSI	1	ATSI-P7-1- CEI-345-012	tower	1667. 0	129.64	130.4	DC	27.76
427041 54	2390 36	02PERRY	345. 0	ATSI	2386 84	02EASTLK	345. 0	ATSI	1	ATSI-P7-1- CEI-345-016	tower	1667. 0	121.91	122.65	DC	26.82
417892 44	9383 80	AE1-071 TAP	115. 0	PENEL EC	2005 20	26ROXBUR Y	115. 0	PENEL EC	1	AP-P2-3-WP- 230-001T	bus	160.0	113.95	117.87	DC	13.91
421374 84	9993 92	STAR601	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	N	PN-P2-3-PN- 230-9E	break er	807.0	123.31	124.59	DC	22.55
415213 49	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	AP-P2-3-WP- 230-446T	break er	126.0	103.68	126.65	DC	28.91
415213 50	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	AP-P2-2-WP- 230-001T	break er	126.0	103.52	126.49	DC	28.91
417894 17	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	AP-P2-2-WP- 230-001T	bus	126.0	103.52	126.49	DC	28.91
415213 14	9994 01	STAR592	1.0	PJM	2000 11	KEYSTONE	500. 0	PJM	4	PJM500_PN_ P4-500-001D	break er	634.0	101.11	102.9	DC	24.91
415213 15	9994 01	STAR592	1.0	PJM	2000 11	KEYSTONE	500. 0	PJM	4	PJM500_PN_ P4-500-001A	break er	634.0	101.11	102.9	DC	24.91

12.4 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	FRO M BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADI NG %	POST PROJEC T LOADI NG %	AC/D C	MW IMPA CT
411839 79	2005 13	26LEWIST WN	230. 0	PENEL EC	2080 05	JUNI BU2	230. 0	PPL	1	Base Case	operati on	493. 0	99.03	110.42	DC	58.45
411839 80	2005 13	26LEWIST WN	230. 0	PENEL EC	2080 05	JUNI BU2	230. 0	PPL	1	PN-P1-2-PN- 115-094-A	operati on	624. 0	96.6	106.48	DC	64.3

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADI NG %	POST PROJE CT LOADI NG %	AC D C	MW IMPA CT
41184058	200522	26SHADE GP	115.0	PENEL EC	938380	AE1-071 TAP	115.0	PENEL EC	1	PL_P12_100618	operati on	160.0	113.58	119.42	DC	20.74
42421329	200593	26GLADE	230.0	PENEL EC	200811	26WARREN	230.0	PENEL EC	1	Base Case	operati on	520.0	144.27	149.86	DC	29.28
42421330	200593	26GLADE	230.0	PENEL EC	200811	26WARREN	230.0	PENEL EC	1	PN-P1-2-PN-345-003	operati on	621.0	145.89	150.73	DC	30.24
41184841	200599	26ERIE W	345.0	PENEL EC	238547	02AT	345.0	ATSI	1	Base Case	operati on	1560.0	120.28	121.5	DC	42.15
41184842	200599	26ERIE W	345.0	PENEL EC	238547	02AT	345.0	ATSI	1	ATSI-P1-1-CEI-345-711	operati on	1900.0	110.43	111.43	DC	42.15
41184028	200674	26TOWAN DA	115.0	PENEL EC	200677	26NO MESHO	115.0	PENEL EC	1	PN-P1-2-PN-230-013A	operati on	202.0	146.45	149.32	DC	12.71
42421224	200675	26E.TWAN DA	230.0	PENEL EC	200924	26CANYON	230.0	PENEL EC	1	Base Case	operati on	515.0	120.89	123.05	DC	24.29
41184151	200714	26SHAWVL 1	115.0	PENEL EC	200872	26BIOEN TP	115.0	PENEL EC	1	AP-P1-2-WP-230-323T	operati on	185.0	92.48	107.75	DC	28.22
41184000	200726	26SHAWVL 2	230.0	PENEL EC	235248	01SHINGL	230.0	AP	1	AP-P1-3-WP-230-005	operati on	554.0	109.16	121.4	DC	70.48
41184001	200726	26SHAWVL 2	230.0	PENEL EC	235248	01SHINGL	230.0	AP	1	AP-P1-2-WP-230-005B	operati on	554.0	109.16	121.4	DC	70.48
42421249	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	PN-P1-3-PN-230-001T	operati on	917.0	137.98	139.94	DC	39.18
42421250	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	PN-P1-2-PN-230-025	operati on	917.0	137.98	139.94	DC	39.18
42421251	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	Base Case	operati on	731.0	141.91	143.73	DC	28.97
42421788	200769	26HOMER CY	345.0	PENEL EC	999392	STAR601	1.0	PENEL EC	N	PN-P1-3-PN-230-004A	operati on	807.0	105.84	107.13	DC	22.78
42421818	200769	26HOMER CY	345.0	PENEL EC	999391	STAR602	1.0	PENEL EC	S	PN-P1-3-PN-230-003A	operati on	824.0	103.09	104.35	DC	22.66
42421265	200795	26SHELOCT A	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN-P1-2-PN-230-025	operati on	917.0	116.38	118.59	DC	44.41
42421266	200795	26SHELOCT A	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN-P1-3-PN-230-001T	operati on	917.0	116.38	118.59	DC	44.41
42421267	200795	26SHELOCT A	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	Base Case	operati on	731.0	118.51	120.62	DC	33.65
42421689	200811	26WARREN	230.0	PENEL EC	200918	26ERIE S TIE	230.0	PENEL EC	1	Base Case	operati on	520.0	108.06	110.08	DC	23.19
42421693	200811	26WARREN	230.0	PENEL EC	200918	26ERIE S TIE	230.0	PENEL EC	1	PN-P1-2-PN-345-003	operati on	621.0	111.6	113.34	DC	23.95
41184013	200904	26EAGL VAL	115.0	PENEL EC	200527	26TYRONE N	115.0	PENEL EC	1	PN-P1-2-PN-115-048	operati on	191.0	105.53	110.48	DC	20.95
41184016	200904	26EAGL VAL	115.0	PENEL EC	200527	26TYRONE N	115.0	PENEL EC	1	Base Case	operati on	147.0	96.81	102.14	DC	17.35
42421349	200908	26CHAPMA N+	230.0	PENEL EC	945070	AF1-172 TAP	230.0	PENEL EC	1	Base Case	operati on	520.0	135.46	137.67	DC	11.59
49459152	200908	26CHAPMA N+	230.0	PENEL EC	945070	AF1-172 TAP	230.0	PENEL EC	1	PN-P1-2-PN-230-101T	operati on	621.0	123.17	124.99	DC	11.4
42421320	200924	26CANYON	230.0	PENEL EC	200706	26N.MESH PN	230.0	PENEL EC	1	Base Case	operati on	546.0	113.04	115.07	DC	24.29
41183855	235248	01SHINGL	230.0	AP	200513	26LEWIST WN	230.0	PENEL EC	1	Base Case	operati on	491.0	123.84	139.77	DC	80.84
41183858	235248	01SHINGL	230.0	AP	200513	26LEWIST WN	230.0	PENEL EC	1	AP-P1-2-WP-230-324T_FSA_B	operati on	570.0	115.61	131.59	DC	93.69
49458911	235248	01SHINGL	230.0	AP	200513	26LEWIST WN	230.0	PENEL EC	1	20090926LOBO+230 919490AA2-000 TAP 230 1	operati on	570.0	115.61	131.59	DC	93.69
42421375	919490	AA2-000 TAP	230.0	PENEL EC	200908	26CHAPMA N+	230.0	PENEL EC	1	Base Case	operati on	546.0	129.1	131.21	DC	11.59
49459205	919490	AA2-000 TAP	230.0	PENEL EC	200908	26CHAPMA N+	230.0	PENEL EC	1	PN-P1-2-PN-230-101T	operati on	666.0	114.92	116.62	DC	11.4
41184062	944180	AF1-086 TAP	115.0	PENEL EC	200755	26WESTOV ER	115.0	PENEL EC	1	AP-P1-2-WP-230-323T	operati on	237.0	90.64	102.55	DC	28.22

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECTIONS LOADING %	POST PROJECTIONS LOADING %	AC/D C	MW IMPACT
41184035	945070	AF1-172 TAP	230.0	PENEL EC	235220	01MOSHAN	230.0	AP	1	Base Case	operation	520.0	135.39	137.62	DC	11.59
41184039	945070	AF1-172 TAP	230.0	PENEL EC	235220	01MOSHAN	230.0	AP	1	PN-P1-2-PN-230-101T	operation	621.0	123.12	124.95	DC	11.4
42421820	999391	STAR602	1.0	PENEL EC	200767	26HOMER CT	230.0	PENEL EC	S	PN-P1-3-PN-230-003A	operation	824.0	103.08	104.34	DC	22.66
42421791	999392	STAR601	1.0	PENEL EC	200767	26HOMER CT	230.0	PENEL EC	N	PN-P1-3-PN-230-004A	operation	807.0	105.84	107.13	DC	22.78
41184645	999393	STAR600	1.0	PENEL EC	200727	26SHAW. 2	115.0	PENEL EC	2A	PN-P1-3-PN-115-004	operation	148.0	81.68	100.07	DC	27.2
41184384	999394	STAR599	1.0	PENEL EC	200714	26SHAWVL 1	115.0	PENEL EC	1A	PN-P1-3-PN-115-005	operation	126.0	95.69	116.88	DC	26.67

12.5 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
41184060,41184061	1	26SHADE GP 115.0 kV - AE1-071 TAP 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0005a : Reconnector Shade Gap - AE1-071 (~7.2 miles). Project Type : FAC Cost : \$12,852,000 Time Estimate : 6.0 Months	\$12,852,000
41789312,41521258, 41521259	19	26EAGL VAL 115.0 kV - 26TYRONE N 115.0 kV Ckt 1	<u>PENELEC</u> s1776.1: Supplemental upgrade s1776.1: Tyrone North - Construct a four breaker 115 kV ring bus. The supplemental project has a projected in-service date of 12/31/2020. Project Type: CON Cost : \$0 s1776.2: Supplemental upgrade s1776.2: Replace the Tyrone North #2 115/46 kV 45/60/75 MVA transformer. The supplemental project has a projected in-service date of 12/31/2020. Project Type: CON Cost : \$0 s1776.3: Supplemental upgrade s1776.3: Install a 46 kV 1200 A bypass switch between the Tipton and Warrior Ridge 46 kV lines. The supplemental project has a projected in-service date of 12/31/2020. Project Type: CON Cost : \$0	\$0
42137484	24	STAR601 1.0 kV - 26HOMER CT 230.0 kV Ckt N	<u>PENELEC</u> PN-AF1-F-0079 : Replace Homer City 345/230 kV North transformer Project Type : FAC Cost : \$7,140,000 Time Estimate : 24.0 Months	\$7,140,000
42137479	15	26HOMER CY 345.0 kV - STAR601 1.0 kV Ckt N		
41521560,41521562, 41789318,41789317	9	STAR600 1.0 kV - 26SHAW. 2 115.0 kV Ckt 2A	<u>PENELEC</u> PN-AF1-F-0080a : Replace Shawville 230/115 kV 2A transformer Project Type : FAC Cost : \$4,165,000 Time Estimate : 24.0 Months PN-AF1-F-0080b : Replace relays at Shawville Project Type : FAC Cost : \$416,500 Time Estimate : 12.0 Months	\$4,581,500
41184385,41521349, 41521350,41789417	3	STAR599 1.0 kV - 26SHAWVL 1 115.0 kV Ckt 1A	<u>PENELEC</u> PN-AF1-F-0081 : Replace Shawville 230/115 kV 1A transformer Project Type : FAC Cost : \$4,165,000 Time Estimate : 24.0 Months	\$4,165,000

ID	Index	Facility	Upgrade Description	Cost
42421229	13	26E.TWANDA 230.0 kV - 26CANYON 230.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0014a : Replace substation conductor at East Towanda. Replace disconnect switch at Canyon Switching Reconductor East Towanda - Canyon 230 kV (~12.3 miles) Project Type : FAC Cost : \$22,193,500 Time Estimate : 9.0 Months	\$22,193,500
41184006,41184005	2	26SHAWVL 2 230.0 kV - 01SHINGL 230.0 kV Ckt 1	<u>APS</u> WP-AF1-F-0002a : Replace Wave Trap at Shawville Project Type : FAC Cost : \$126,000 Time Estimate : 9.0 Months WP-AF1-F-0002b : Replace Wave Trap at Shingletown and CT at Shingletown Project Type : FAC Cost : \$756,000 Time Estimate : 12.0 Months WP-AF1-F-0002c : Replace substation conductor at Shingletown Project Type : FAC Cost : \$126,000 Time Estimate : 6.0 Months WP-AF1-F-0002d : Replace substation conductor at Shingletown Project Type : FAC Cost : \$126,000 Time Estimate : 6.0 Months <u>APS / PENELEC</u> s2051: Supplemental upgrade s2051: Replace terminal equipment on the Shawville – Shingletown 230 kV Line. - Shawville 230 kV Substation – Replace line trap and substation conductor on the Shawville – Shingletown 230 kV Line. (s2051.1) - Shingletown 230 kV Substation – Replace line relaying, line trap, and substation conductor on the Shawville – Shingletown 230 kV Line. (s2051.2) The supplemental project has a projected in-service date of 12/01/2020. Project Type: FAC Cost : \$0	\$2,034,000
41521187,41789325	4	26LEWISTWN 230.0 kV - JUNI BU2 230.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0003b : Reconductor Lewistown - Juniata (~24.5 miles). Project Type : FAC Cost : \$102,042,500 Time Estimate : 6.0 Months <u>PPL</u> R-PL-0006 : Re-conductor PPL's ~0.9mi LEWI-JUNI 230kV Line Project Type : FAC Cost : \$900,000 Time Estimate : 24.0 Months	\$102,942,500

ID	Index	Facility	Upgrade Description	Cost
42137618,42137619, 46759915	18	26WARREN 230.0 kV - 26ERIE S TIE 230.0 kV Ckt 1	PENELEC PN-AF1-F-0047a: Replace substation conductor at Erie South and Warren). Project Type : FAC Cost : \$119,000 Time Estimate : 6.0 Months PN-AF1-F-0047b: Reconductor line. At Erie South substation, upgrade/replace current transformers. Project Type : FAC Cost : \$714,000 Time Estimate : 12.0 Months	\$833,000
42421335,42421333, 42137340	10	26GLADE 230.0 kV - 26WARREN 230.0 kV Ckt 1	PENELEC PN-AF1-F-0011a : Replace substation conductor at Glade and Warren. Reconductor Glade - Warren 230 kV (~11.5 miles). Project Type : FAC Cost : \$20,706,000 Time Estimate : 12 Months Note: AF1-100 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 AF1-100 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, AF1-100 will have a cost responsibility for those additional mitigations. b3017 : PJM Baseline Upgrade b3017: • Rebuild Glade to Warren 230 kV line with hi-temp conductor 11.53 miles. New conductor will be 1033 ACSS. Existing conductor is 1033 ACSR. (b3017.1) • Glade substation terminal upgrades. Replace bus conductor, wave traps, and relaying. (b3017.2) • Warren substation terminal upgrades. Replace bus conductor, wave traps, and relaying. (b3017.3) The baseline project has an projected in-service date of 06/01/2021.	\$20,706,000

ID	Index	Facility	Upgrade Description	Cost
42137256,42137255	14	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
41789244	23	AE1-071 TAP 115.0 kV - 26ROXBURY 115.0 kV Ckt 1	PENELEC PN-AF1-F-0066a : Reconductor AE1-071 - Roxbury 115 kV (~6 miles) Project Type : FAC Cost : \$11,424,000 Time Estimate : 6.0 Months	\$11,424,000
42137266,42137265	16	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

ID	Index	Facility	Upgrade Description	Cost
49459276	11	26ERIE W 345.0 kV - 02AT 345.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0090a: Reconductor line (13.7 miles). Project Type : FAC Cost : \$48,909,000 Time Estimate : 36.0 Months <u>ATSI</u> AT-AF1-F-0001: Reconductor line. At Ashtabula substation, replace the line trap, disconnect switch, relaying, and bus conductor. Project Type : FAC Cost : \$88,920,000 Time Estimate : 40.0 Months	\$137,829,000
41521315,41521314	25	STAR592 1.0 kV - KEYSTONE 500.0 kV Ckt 4	<u>PENELEC</u> PJM-AF1-F-0001a: - Replace/ upgrade transformer detail - Reconductor existing section of 1033.5 AAC subconductor circular (SCCIR) Project Type : FAC Cost : \$26,180,000 Time Estimate : 20.0 Months	\$26,180,000
42137371,42137372	17	26KEYSTONE 230.0 kV - STAR592 1.0 kV Ckt 4		
41789495	8	26SHAW. 2 115.0 kV - 26SHAWVL 1 115.0 kV Ckt ZB	<u>PENELEC</u> PN-AF1-F-0022 : Replace substation conductor at Shawville Project Type : FAC Cost : \$119,000 Time Estimate : 6.0 Months	\$119,000

ID	Index	Facility	Upgrade Description	Cost
49458916,41183861, 41521061,41521060, 41521062,41789225	20	01SHINGL 230.0 kV - 26LEWISTWN 230.0 kV Ckt 1	<u>APS</u> WP-AF1-F-0005a: Replace substation conductor at Shingletown Project Type : FAC Cost : \$126,000 Time Estimate : 6.0 Months WP-AF1-F-0005b: Replace substation conductor Replace switches at Shingletown Project Type : FAC Cost : \$378,000 Time Estimate : 9.0 Months <u>PENELEC</u> PN-AF1-F-0061a : Replace substation conductor at Shingletown Project Type : FAC Cost : \$238,000 Time Estimate : 6.0 Months PN-AF1-F-0061b : Replace substation conductor at Shingletown Replace disconnect switches at Shingletown Reconductor Shingletown - Lewistown 115 kV (~26 miles) Project Type : FAC Cost : \$46,826,500 Time Estimate : 9.0 Months PN-AF1-F-0061c : Replace disconnect switches at Shingletown Replace substation conductor at Shingletown Replace relays at Lewistown and Shingletown Project Type : FAC Cost : \$714,000 Time Estimate : 12.0 Months PN-AF1-F-0061d : Replace 1600 Amp Generic circuit breaker at Shingletown Project Type : FAC Cost : \$595,000 Time Estimate : 12.0 Months	\$48,373,500
42704084	21	02PERRY 345.0 kV - 02L.CENTER 345.0 kV Ckt 1	<u>ATSI</u> CEI-002A : Reconductor the Leroy Center-Perry S6 345 kV Line (~10 miles from Leroy Center to Perry). The existing conductor is (2) 954 ACSR conductor and the new conductor is (2) 954 kcmil ACSS conductor. Upgrade terminals as required. Project Type : FAC Cost : \$29,400,000 Time Estimate : 30.0 Months	\$29,400,000
42704154	22	02PERRY 345.0 kV - 02EASTLK 345.0 kV Ckt 1	<u>ATSI</u> CEI-003A : Reconductor the Eastlake-Perry S8 345 kV Line (~22 miles from Eastlake to Perry). The existing conductor is (2) 954 ACSR conductor and the new conductor is (2) 954 kcmil ACSS conductor. Upgrade terminals as required. Project Type : FAC Cost : \$64,680,000 Time Estimate : 48.0 Months	\$64,680,000

ID	Index	Facility	Upgrade Description	Cost
41521494	6	26SHAWVL 1 115.0 kV - 26ROCKTON 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0021b: Replace wave trap at Shawville Project Type : FAC Cost : \$119,000 Time Estimate : 9.0 Months	\$119,000
41789321	7	26SHAWVL 1 115.0 kV - STAR599 1.0 kV Ckt 1A	<u>PENELEC</u> PN-AF1-F-0024 : Replace relay at Shawville Project Type : FAC Cost : \$297,500 Time Estimate : 12.0 Months	\$297,500
41184029	12	26TOWANDA 115.0 kV - 26NO MESHO 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF1-F-0012 : - Replace disconnect switch at East Towanda - Replace substation conductor at East Towanda and North Meshoppen - Replace Wave Trap at East Towanda - Reconductor East Towanda - North Meshoppen 115 kV (~21 miles) - Replace relays at East Towanda and North Meshoppen - Replace CTs at East Towanda and North Meshoppen - Replace meters at East Towanda and North Meshoppen Project Type : FAC Cost : \$39,151,000 Time Estimate : 12.0 Months	\$39,151,000
41521518	5	26ROCKTON 115.0 kV - 26DUBOIS 115.0 kV Ckt 1	PN-AF1-F-0020a : Replace wave trap at Dubois Project Type : FAC Cost : \$119,000 Time Estimate : 9.0 Months	\$119,000
			TOTAL COST	\$558,808,350

12.6 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.

12.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41184060	200522	26SHADE GP	PENELEC	938380	AE1-071 TAP	PENELEC	1	PL_P12_100618	single	160.0	100.1	107.88	DC	12.45

Bus #	Bus	MW Impact
200649	26PENNTech	0.3546
200665	26SHAWVL 3	2.0128
200666	26SHAWVL 4	1.9806
200715	26SHAWVL 1	1.3184
200722	26SHAWVL 2	1.3520
200812	26ALY HYDR	0.3758
200852	26WARR RDG	0.1074
200886	26ARWF_N39	0.1468
200905	26Q36	0.0845
200913	26SHAW-D	0.0599
203034	26NA_O38_P22	0.1284
919491	AA2-000	30.8497
930511	AB1-092	1.1327
936421	AD2-055	2.3320
936991	AD2-133 C	1.0894
939171	AE1-147 C	1.3877
940201	AE2-001 C	1.3922
940681	AE2-055 C	1.4616
941231	AE2-117 C	1.5386
941241	AE2-118 C	1.5386
941251	AE2-119 C (Withdrawn : 12/16/2019)	0.8587
941261	AE2-120 C	1.3948
941271	AE2-121 C	0.7336
941321	AE2-126 C	0.7831
941331	AE2-129 C	0.7860
941351	AE2-131 C	0.7860
942031	AE2-215 C	13.2754
942351	AE2-248 C	1.1461
942491	AE2-262 C	4.8230
942501	AE2-263 C	4.5336
942511	AE2-264 C	5.0592
943751	AF1-043	6.9961
944001	AF1-068 C O1	1.5374
944311	AF1-099 C	7.3213
944321	AF1-100 C O1	12.4470
944471	AF1-112 C	1.4251
944671	AF1-132 C O1	1.4462
944691	AF1-134 C O1	0.5562
944701	AF1-135 C	0.6674
944731	AF1-138 C O1	1.5386
944771	AF1-142 C	11.7141

Bus #	Bus	MW Impact
944841	AF1-149 C	1.3950
944881	AF1-153 C O1	0.7498
944901	AF1-155 C	0.7454
945071	AF1-172 C	10.9410
945161	AF1-181	0.0662
945171	AF1-182	0.3319
945181	AF1-183	0.0774
945481	AF1-213 C	5.7672
945491	AF1-214 C	1.3945
945551	AF1-220 C	5.5437
945771	AF1-242 C	0.7454
946091	AF1-274 C	3.2640
946311	AF1-295	4.4251
946421	AF1-306 C	3.8280
LGEE	LGEE	0.0633
WEC	WEC	0.0425
CBM-W2	CBM-W2	0.5651
CBM-W1	CBM-W1	2.0391
TVA	TVA	0.0336
CHEOAH	CHEOAH	0.0080
CBM-S1	CBM-S1	0.3408
MEC	MEC	0.1748
CALDERWOOD	CALDERWOOD	0.0060
CATAWBA	CATAWBA	0.0403

12.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41184006	200726	26SHAWVL 2	PENELEC	235248	01SHINGL	AP	1	AP-P1-2-WP-230-005B	single	554.0	98.45	105.81	DC	42.29

Bus #	Bus	MW Impact
200642	26SENECA#1	3.6203
200643	26SENECA#2	3.4192
200644	26SENECA#3	0.3418
200649	26PENNTech	1.0374
200665	26SHAWVL 3	6.7845
200666	26SHAWVL 4	6.7293
200715	26SHAWVL 1	4.2656
200722	26SHAWVL 2	4.3937
200898	26AA1-106	1.8413
200905	26Q36	0.1735
200913	26SHAW-D	0.1837
201201	26WRREN CT	0.7527
201477	26Y2-055	2.7463
203261	26BLOSSBCT	0.1992
203349	26Z1-069 C	0.1377
203351	26GROZ1-110	0.2570
203352	26CANZ2-011	0.2570
919201	AA1-144 OP	11.2160
919491	AA2-000	88.6275
922932	AB1-082 OP	1.6941
923442	AB1-160 C	0.0393
930511	AB1-092	3.2541
934801	AD1-108	0.0194
934811	AD1-109	0.0142
936421	AD2-055	6.6997
936991	AD2-133 C	2.2378
940861	AE2-074 C	1.2863
941191	AE2-113 C	8.1706
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.6318
941321	AE2-126 C	2.3491
941331	AE2-129 C	2.0046
941351	AE2-131 C	2.0046
941421	AE2-139 C	5.2304
942491	AE2-262 C	11.9610
942501	AE2-263 C	11.2433
942961	AE2-316 C	5.5239
943751	AF1-043	20.0991
944181	AF1-086 C O1	1.9969
944311	AF1-099 C	18.1568
944321	AF1-100 C O1	42.2895
944381	AF1-103 O1	1.8922

Bus #	Bus	MW Impact
944691	AF1-134 C O1	1.4964
944701	AF1-135 C	1.7957
944771	AF1-142 C	29.0509
944841	AF1-149 C	-3.8741
944881	AF1-153 C O1	2.2325
944901	AF1-155 C	2.2165
945071	AF1-172 C	31.7880
945121	AF1-177	0.4730
945161	AF1-181	0.2232
945171	AF1-182	1.1277
945181	AF1-183	0.2505
945331	AF1-198	0.1877
945481	AF1-213 C	16.6977
945551	AF1-220 C	16.3363
945771	AF1-242 C	2.2165
946091	AF1-274 C	9.7435
946131	AF1-278	16.8004
946381	AF1-302 C	2.4122
946421	AF1-306 C	11.5240
LGEE	LGEE	0.2305
CPL	CPL	0.0370
WEC	WEC	0.1380
CBM-W2	CBM-W2	2.9320
CBM-W1	CBM-W1	6.0173
TVA	TVA	0.4270
CBM-S2	CBM-S2	0.7572
CBM-S1	CBM-S1	2.7520
MEC	MEC	0.6467

12.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41789417	999394	STAR599	PENELEC	200714	26SHAWVL 1	PENELEC	1A	AP-P2-2-WP-230-001T	bus	126.0	103.52	126.49	DC	28.91

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.9147
200666	26SHAWVL 4	2.7597
235003	AC1-025 E	0.0991
236828	01GRAYMONT	0.2735
919491	AA2-000	31.0983
930511	AB1-092	1.1418
936421	AD2-055	2.3508
939171	AE1-147 C	0.8250
939172	AE1-147 E	0.5500
940201	AE2-001 C	0.8225
940202	AE2-001 E	0.5484
940681	AE2-055 C	0.7851
940682	AE2-055 E	0.5234
941261	AE2-120 C	0.8212
941262	AE2-120 E	0.5475
941271	AE2-121 C	0.4409
941272	AE2-121 E	0.2944
942351	AE2-248 C	0.6406
942352	AE2-248 E	0.4270
942491	AE2-262 C	3.9546
942492	AE2-262 E	2.6575
942501	AE2-263 C	3.7173
942502	AE2-263 E	2.4819
943751	AF1-043	3.7378
944001	AF1-068 C O1	0.4500
944002	AF1-068 E O1	0.2531
944311	AF1-099 C	3.1817
944312	AF1-099 E	2.1211
944321	AF1-100 C O1	17.3430
944322	AF1-100 E O1	11.5620
944471	AF1-112 C	0.4265
944472	AF1-112 E	0.2844
944671	AF1-132 C O1	0.4205
944672	AF1-132 E O1	0.2803
944771	AF1-142 C	5.0906
944772	AF1-142 E	3.3938
944841	AF1-149 C	0.8210
944842	AF1-149 E	0.5473
945071	AF1-172 C	6.0034
945072	AF1-172 E	4.0022
945161	AF1-181	0.0959

Bus #	Bus	MW Impact
945171	AF1-182	0.4625
945181	AF1-183	0.0432
945483	AF1-213 BAT	7.8550
945491	AF1-214 C	0.4352
945492	AF1-214 E	0.2902
DUCKCREEK	DUCKCREEK	0.2591
NEWTON	NEWTON	0.2364
FARMERCITY	FARMERCITY	0.0122
G-007A	G-007A	0.9566
VFT	VFT	2.6187
PRAIRIE	PRAIRIE	0.5553
COFFEEN	COFFEEN	0.1168
EDWARDS	EDWARDS	0.0791
CHEOAH	CHEOAH	0.0921
TILTON	TILTON	0.1424
MADISON	MADISON	0.0141
GIBSON	GIBSON	0.1212
CALDERWOOD	CALDERWOOD	0.0919
BLUEG	BLUEG	0.3837
TRIMBLE	TRIMBLE	0.1230
CATAWBA	CATAWBA	0.0543

12.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41521187	200513	26LEWISTWN	PENELEC	208005	JUNI BU2	PPL	1	AP-P2-3-WP-230-446T	breaker	624.0	94.14	107.0	DC	80.35

Bus #	Bus	MW Impact
200665	26SHAWVL 3	7.7967
200666	26SHAWVL 4	7.6716
200715	26SHAWVL 1	4.9146
200722	26SHAWVL 2	5.0397
200812	26ALY HYDR	1.1301
200852	26WARR RDG	0.3229
200883	Q-053 E	6.8957
200886	26ARWF_N39	0.4288
200894	26K02	9.1554
200898	26AA1-106	1.9579
200905	26Q36	0.2813
200913	26SHAW-D	0.2124
200915	26CHSTN_FL	0.1524
203034	26NA_O38_P22	0.3752
203905	26W1-045 C	0.6853
235003	AC1-025 E	0.6133
236828	01GRAYMONT	1.5971
290086	Q-036 E	8.0600
293301	N-039 E	12.2874
293393	V3-030E	2.7472
294515	O38_P22	10.7514
901242	W1-045 E OP1	1.1181
919491	AA2-000	117.3103
930511	AB1-092	4.3073
936421	AD2-055	8.8679
936471	AD2-062 C O1	5.0032
936472	AD2-062 E O1	2.5063
936991	AD2-133 C	3.6270
936992	AD2-133 E	16.5895
938381	AE1-071 C	13.1348
938382	AE1-071 E	8.0374
939171	AE1-147 C	4.7732
939172	AE1-147 E	3.1822
940201	AE2-001 C	4.7834
940202	AE2-001 E	3.1890
940681	AE2-055 C	4.9397
940682	AE2-055 E	3.2931
941231	AE2-117 C	4.6266
941232	AE2-117 E	3.0844
941241	AE2-118 C	4.6266
941242	AE2-118 E	3.0844

Bus #	Bus	MW Impact
941251	AE2-119 C (Withdrawn : 12/16/2019)	3.0438
941252	AE2-119 E (Withdrawn : 12/16/2019)	2.0292
941261	AE2-120 C	4.7891
941262	AE2-120 E	3.1927
941271	AE2-121 C	2.5283
941272	AE2-121 E	1.6882
941321	AE2-126 C	2.1067
941322	AE2-126 E	1.4045
941331	AE2-129 C	2.7008
941332	AE2-129 E	1.8006
941351	AE2-131 C	2.7008
941352	AE2-131 E	1.8006
941421	AE2-139 C	5.5361
941422	AE2-139 E	3.6907
942031	AE2-215 C	14.8871
942032	AE2-215 E	9.9247
942121	AE2-224 C	7.2840
942122	AE2-224 E	4.8560
942351	AE2-248 C	3.8996
942352	AE2-248 E	2.5997
942491	AE2-262 C	17.7280
942492	AE2-262 E	11.9132
942501	AE2-263 C	16.6643
942502	AE2-263 E	11.1261
942511	AE2-264 C	15.1296
942512	AE2-264 E	10.0864
943751	AF1-043	26.6038
944001	AF1-068 C O1	5.2205
944002	AF1-068 E O1	2.9365
944181	AF1-086 C O1	2.8312
944182	AF1-086 E O1	12.3174
944311	AF1-099 C	26.9111
944312	AF1-099 E	17.9407
944321	AF1-100 C O1	48.2115
944322	AF1-100 E O1	32.1410
944471	AF1-112 C	4.8575
944472	AF1-112 E	3.2383
944671	AF1-132 C O1	4.9052
944672	AF1-132 E O1	3.2702
944691	AF1-134 C O1	1.8754
944692	AF1-134 E O1	1.8754
944701	AF1-135 C	2.2505
944702	AF1-135 E	1.5003
944731	AF1-138 C O1	4.6266
944732	AF1-138 E O1	3.0844
944751	AF1-140 C	1.1435
944752	AF1-140 E	0.7623
944771	AF1-142 C	43.0578
944772	AF1-142 E	28.7052
944841	AF1-149 C	4.7897
944842	AF1-149 E	3.1931
945071	AF1-172 C	42.2760

Bus #	Bus	MW Impact
945072	AF1-172 E	28.1840
945161	AF1-181	0.2565
945171	AF1-182	1.2856
945181	AF1-183	0.2886
945481	AF1-213 C	19.9893
945482	AF1-213 E	13.3262
945491	AF1-214 C	4.7887
945492	AF1-214 E	3.1925
945551	AF1-220 C	11.0811
945552	AF1-220 E	7.3914
945901	AF1-255 C	0.2695
945902	AF1-255 E	0.3722
946091	AF1-274 C	8.1585
946092	AF1-274 E	5.4390
946241	AF1-289 C O1	1.2428
946242	AF1-289 E O1	0.8286
946311	AF1-295	4.9624
LGEE	LGEE	0.5465
CPL	CPL	0.3744
WEC	WEC	0.3115
CBM-W2	CBM-W2	7.4120
CBM-W1	CBM-W1	12.8478
TVA	TVA	1.1872
O-066	O-066	18.8832
CBM-S2	CBM-S2	3.7743
CBM-S1	CBM-S1	7.3954
G-007	G-007	2.9432
MEC	MEC	1.5207

12.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41521518	200713	26ROCKTON	PENELEC	200712	26DUBOIS	PENELEC	1	AP-P2-3-WP-230-443T *	breaker	190.0	88.0	103.01	DC	28.47

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.7651
200666	26SHAWVL 4	2.7179
200715	26SHAWVL 1	2.4750
200722	26SHAWVL 2	2.5382
200905	26Q36	0.1493
200913	26SHAW-D	0.1506
235003	AC1-025 E	0.0984
236828	01GRAYMONT	0.2698
290086	Q-036 E	4.2796
919491	AA2-000	28.5639
930511	AB1-092	1.0488
936421	AD2-055	2.1593
936991	AD2-133 C	1.9258
936992	AD2-133 E	8.8085
939171	AE1-147 C	0.8128
939172	AE1-147 E	0.5419
940201	AE2-001 C	0.8108
940202	AE2-001 E	0.5405
940681	AE2-055 C	0.7805
940682	AE2-055 E	0.5203
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.1564
941252	AE2-119 E (Withdrawn : 12/16/2019)	1.4376
941261	AE2-120 C	0.8098
941262	AE2-120 E	0.5399
941271	AE2-121 C	0.4340
941272	AE2-121 E	0.2898
941331	AE2-129 C	1.6717
941332	AE2-129 E	1.1145
941351	AE2-131 C	1.6717
941352	AE2-131 E	1.1145
942351	AE2-248 C	0.6345
942352	AE2-248 E	0.4230
942491	AE2-262 C	3.8054
942492	AE2-262 E	2.5573
942501	AE2-263 C	3.5771
942502	AE2-263 E	2.3883
943751	AF1-043	3.4332
944001	AF1-068 C O1	0.4463
944002	AF1-068 E O1	0.2510
944181	AF1-086 C O1	0.6200
944182	AF1-086 E O1	2.6972

Bus #	Bus	MW Impact
944311	AF1-099 C	3.0616
944312	AF1-099 E	2.0411
944321	AF1-100 C O1	17.0805
944322	AF1-100 E O1	11.3870
944382	AF1-103 BAT	1.3802
944471	AF1-112 C	0.4222
944472	AF1-112 E	0.2814
944671	AF1-132 C O1	0.4172
944672	AF1-132 E O1	0.2782
944691	AF1-134 C O1	1.1545
944692	AF1-134 E O1	1.1545
944701	AF1-135 C	1.3854
944702	AF1-135 E	0.9236
944771	AF1-142 C	4.8986
944772	AF1-142 E	3.2657
944841	AF1-149 C	0.8096
944842	AF1-149 E	0.5397
945071	AF1-172 C	5.6006
945072	AF1-172 E	3.7337
945161	AF1-181	0.0910
945171	AF1-182	0.4555
945181	AF1-183	0.1453
945481	AF1-213 C	13.3514
945482	AF1-213 E	8.9009
945491	AF1-214 C	0.4292
945492	AF1-214 E	0.2861
946423	AF1-306 BAT	38.2104
DUCKCREEK	DUCKCREEK	0.3362
NEWTON	NEWTON	0.3030
FARMERCITY	FARMERCITY	0.0155
G-007A	G-007A	1.1196
VFT	VFT	3.0315
NY	NY	0.0481
PRAIRIE	PRAIRIE	0.7052
COFFEEN	COFFEEN	0.1496
EDWARDS	EDWARDS	0.1029
CHEOAH	CHEOAH	0.1086
TILTON	TILTON	0.1833
MADISON	MADISON	0.0181
GIBSON	GIBSON	0.1551
CALDERWOOD	CALDERWOOD	0.1088
BLUEG	BLUEG	0.4878
TRIMBLE	TRIMBLE	0.1564
CATAWBA	CATAWBA	0.0595

12.6.6 Index 6

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
41521494	200714	26SHAWVL 1	PENELEC	200713	26ROCKTON	PENELEC	1	AP-P2-3-WP-230-443T *	breaker	190.0	89.69	104.69	DC	28.47

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.7651
200666	26SHAWVL 4	2.7179
200715	26SHAWVL 1	2.4750
200722	26SHAWVL 2	2.5382
200905	26Q36	0.1493
200913	26SHAW-D	0.1506
235003	AC1-025 E	0.0984
236828	01GRAYMONT	0.2698
290086	Q-036 E	4.2796
919491	AA2-000	28.5639
930511	AB1-092	1.0488
936421	AD2-055	2.1593
936991	AD2-133 C	1.9258
936992	AD2-133 E	8.8085
939171	AE1-147 C	0.8128
939172	AE1-147 E	0.5419
940201	AE2-001 C	0.8108
940202	AE2-001 E	0.5405
940681	AE2-055 C	0.7805
940682	AE2-055 E	0.5203
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.1564
941252	AE2-119 E (Withdrawn : 12/16/2019)	1.4376
941261	AE2-120 C	0.8098
941262	AE2-120 E	0.5399
941271	AE2-121 C	0.4340
941272	AE2-121 E	0.2898
941331	AE2-129 C	1.6717
941332	AE2-129 E	1.1145
941351	AE2-131 C	1.6717
941352	AE2-131 E	1.1145
942351	AE2-248 C	0.6345
942352	AE2-248 E	0.4230
942491	AE2-262 C	3.8054
942492	AE2-262 E	2.5573
942501	AE2-263 C	3.5771
942502	AE2-263 E	2.3883
943751	AF1-043	3.4332
944001	AF1-068 C O1	0.4463
944002	AF1-068 E O1	0.2510
944181	AF1-086 C O1	0.6200
944182	AF1-086 E O1	2.6972

Bus #	Bus	MW Impact
944311	AF1-099 C	3.0616
944312	AF1-099 E	2.0411
944321	AF1-100 C O1	17.0805
944322	AF1-100 E O1	11.3870
944382	AF1-103 BAT	1.3802
944471	AF1-112 C	0.4222
944472	AF1-112 E	0.2814
944671	AF1-132 C O1	0.4172
944672	AF1-132 E O1	0.2782
944691	AF1-134 C O1	1.1545
944692	AF1-134 E O1	1.1545
944701	AF1-135 C	1.3854
944702	AF1-135 E	0.9236
944771	AF1-142 C	4.8986
944772	AF1-142 E	3.2657
944841	AF1-149 C	0.8096
944842	AF1-149 E	0.5397
945071	AF1-172 C	5.6006
945072	AF1-172 E	3.7337
945161	AF1-181	0.0910
945171	AF1-182	0.4555
945181	AF1-183	0.1453
945481	AF1-213 C	13.3514
945482	AF1-213 E	8.9009
945491	AF1-214 C	0.4292
945492	AF1-214 E	0.2861
946423	AF1-306 BAT	38.2104
DUCKCREEK	DUCKCREEK	0.3362
NEWTON	NEWTON	0.3030
FARMERCITY	FARMERCITY	0.0155
G-007A	G-007A	1.1196
VFT	VFT	3.0315
NY	NY	0.0481
PRAIRIE	PRAIRIE	0.7052
COFFEEN	COFFEEN	0.1496
EDWARDS	EDWARDS	0.1029
CHEOAH	CHEOAH	0.1086
TILTON	TILTON	0.1833
MADISON	MADISON	0.0181
GIBSON	GIBSON	0.1551
CALDERWOOD	CALDERWOOD	0.1088
BLUEG	BLUEG	0.4878
TRIMBLE	TRIMBLE	0.1564
CATAWBA	CATAWBA	0.0595

12.6.7 Index 7

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
41789321	200714	26SHAWVL 1	PENELEC	999394	STAR599	PENELEC	1A	PN-P2-2-PN-230-014T	bus	126.0	49.65	113.23	DC	80.11

Bus #	Bus	MW Impact
200722	26SHAWVL 2	5.5954
200805	26COLVER13 (Deactivation : 09/01/20)	5.3622
200883	Q-053 E	2.8740
200905	26Q36	0.2661
200913	26SHAW-D	0.2690
235007	AC1-025 BAT	0.0869
236828	01GRAYMONT	-0.2139
290086	Q-036 E	7.6260
293393	V3-030E	1.6446
936991	AD2-133 C	3.4317
936992	AD2-133 E	15.6962
941251	AE2-119 C (Withdrawn : 12/16/2019)	3.8524
941252	AE2-119 E (Withdrawn : 12/16/2019)	2.5682
941321	AE2-126 C	2.0305
941322	AE2-126 E	1.3537
941331	AE2-129 C	2.9881
941332	AE2-129 E	1.9921
941351	AE2-131 C	2.9881
941352	AE2-131 E	1.9921
944181	AF1-086 C O1	2.6632
944182	AF1-086 E O1	11.5864
944313	AF1-099 BAT	3.6183
944321	AF1-100 C O1	48.0690
944322	AF1-100 E O1	32.0460
944691	AF1-134 C O1	2.1188
944692	AF1-134 E O1	2.1188
944701	AF1-135 C	2.5426
944702	AF1-135 E	1.6950
944773	AF1-142 BAT	5.7720
944841	AF1-149 C	-0.6423
944842	AF1-149 E	-0.4282
945481	AF1-213 C	24.1098
945482	AF1-213 E	16.0732
945551	AF1-220 C	2.6438
945552	AF1-220 E	1.7635
946091	AF1-274 C	7.0819
946092	AF1-274 E	4.7212
LGEE	LGEE	0.0685
CPL	CPL	0.0549
WEC	WEC	0.0381
CBM-W2	CBM-W2	0.9419

Bus #	Bus	MW Impact
NY	NY	0.3069
CBM-W1	CBM-W1	1.5262
TVA	TVA	0.1540
O-066	O-066	2.0429
CBM-S2	CBM-S2	0.5260
CBM-S1	CBM-S1	0.9542
G-007	G-007	0.3026
MEC	MEC	0.1891

12.6.8 Index 8

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
41789495	200727	26SHAW.2	PENELEC	200714	26SHAWVL1	PENELEC	ZB	PN-P2-2-PN-230-014T	bus	191.0	46.98	121.04	DC	141.44

Bus #	Bus	MW Impact
200722	26SHAWVL 2	5.8121
200883	Q-053 E	7.4352
200905	26Q36	0.6622
200915	26CHSTN_FL	0.1643
290086	Q-036 E	18.9760
293603	O-018 E	2.3289
296332	R-032 E	2.6872
936991	AD2-133 C	8.5392
936992	AD2-133 E	39.0574
938991	AE1-128 C	3.3317
938992	AE1-128 E	2.2212
941331	AE2-129 C	7.5421
941332	AE2-129 E	5.0281
941351	AE2-131 C	7.5421
941352	AE2-131 E	5.0281
942361	AE2-249 C	0.3748
942362	AE2-249 E	0.2499
944321	AF1-100 C O1	84.8670
944322	AF1-100 E O1	56.5780
944751	AF1-140 C	0.3497
944752	AF1-140 E	0.2331
945483	AF1-213 BAT	7.2129
945901	AF1-255 C	0.1635
945902	AF1-255 E	0.2258
946241	AF1-289 C O1	0.8295
946242	AF1-289 E O1	0.5530
LGEE	LGEE	0.0080
CPLE	CPLE	0.0205
WEC	WEC	0.0031
CBM-W2	CBM-W2	0.1310
NY	NY	0.2527
CBM-W1	CBM-W1	0.0500
TVA	TVA	0.0280
O-066	O-066	0.6653
CBM-S2	CBM-S2	0.1618
CBM-S1	CBM-S1	0.1619
G-007	G-007	0.0926
MEC	MEC	0.0191

12.6.9 Index 9

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
41789317	999393	STAR600	PENELEC	200727	26SHAW. 2	PENELEC	2A	PN-P2-2-PN-230-014T	bus	148.0	42.4	168.33	DC	186.39

Bus #	Bus	MW Impact
200722	26SHAWVL 2	8.9363
944321	AF1-100 C O1	111.8325
944322	AF1-100 E O1	74.5550
DUCKCREEK	DUCKCREEK	0.0403
NEWTON	NEWTON	0.0376
FARMERCITY	FARMERCITY	0.0020
NY	NY	0.0188
PRAIRIE	PRAIRIE	0.0904
O-066	O-066	0.2352
COFFEEN	COFFEEN	0.0185
EDWARDS	EDWARDS	0.0122
CHEOAH	CHEOAH	0.0175
TILTON	TILTON	0.0220
G-007	G-007	0.0364
GIBSON	GIBSON	0.0191
CALDERWOOD	CALDERWOOD	0.0174
BLUEG	BLUEG	0.0608
TRIMBLE	TRIMBLE	0.0195
CATAWBA	CATAWBA	0.0122

12.6.10 Index 10

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
42137340	200593	26GLADE	PENELEC	200811	26WARREN	PENELEC	1	PN-P2-3-PN-345-003A	breaker	621.0	147.7	152.59	DC	30.57

Bus #	Bus	MW Impact
200642	26SENECA#1	11.2398
200643	26SENECA#2	10.6153
200644	26SENECA#3	1.0612
200649	26PENNTech	1.0703
200665	26SHAWVL 3	2.9713
200666	26SHAWVL 4	2.9187
200894	26K02	3.9122
200898	26AA1-106	1.2431
235003	AC1-025 E	0.1202
236828	01GRAYMONT	0.3311
290086	Q-036 E	2.7363
915952	Y3-092 NFTWR	143.9500
916202	Z1-069 E	5.4537
919491	AA2-000	41.4133
922932	AB1-082 OP	2.9396
923443	AB1-160 E	1.5582
923821	AB2-019 FTWR	4.0306
930511	AB1-092	1.5206
936421	AD2-055	3.1306
936991	AD2-133 C	1.2313
936992	AD2-133 E	5.6320
939171	AE1-147 C	0.9983
939172	AE1-147 E	0.6655
940201	AE2-001 C	0.9954
940202	AE2-001 E	0.6636
940681	AE2-055 C	0.9525
940682	AE2-055 E	0.6350
940861	AE2-074 C	2.2320
940862	AE2-074 E	2.9382
941191	AE2-113 C	11.0858
941192	AE2-113 E	11.9359
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.1559
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7706
941261	AE2-120 C	0.9939
941262	AE2-120 E	0.6626
941271	AE2-121 C	0.5334
941272	AE2-121 E	0.3561
941321	AE2-126 C	1.7676
941322	AE2-126 E	1.1784
941331	AE2-129 C	0.9711
941332	AE2-129 E	0.6474

Bus #	Bus	MW Impact
941351	AE2-131 C	0.9711
941352	AE2-131 E	0.6474
942351	AE2-248 C	0.7763
942352	AE2-248 E	0.5176
942491	AE2-262 C	4.7536
942492	AE2-262 E	3.1944
942501	AE2-263 C	4.4684
942502	AE2-263 E	2.9834
942813	AE2-299 BAT	29.7008
942961	AE2-316 C	3.6176
942962	AE2-316 E	5.1587
943751	AF1-043	4.9776
944001	AF1-068 C O1	0.5456
944002	AF1-068 E O1	0.3069
944311	AF1-099 C	3.8245
944312	AF1-099 E	2.5497
944321	AF1-100 C O1	18.3420
944322	AF1-100 E O1	12.2280
944382	AF1-103 BAT	10.7388
944392	AF1-104 BAT	3.0956
944471	AF1-112 C	0.5168
944472	AF1-112 E	0.3445
944671	AF1-132 C O1	0.5098
944672	AF1-132 E O1	0.3399
944691	AF1-134 C O1	0.3673
944692	AF1-134 E O1	0.3673
944701	AF1-135 C	0.4408
944702	AF1-135 E	0.2939
944771	AF1-142 C	6.1192
944772	AF1-142 E	4.0794
944841	AF1-149 C	0.9938
944842	AF1-149 E	0.6625
944881	AF1-153 C O1	1.6386
944882	AF1-153 E O1	1.0924
944901	AF1-155 C	1.6288
944902	AF1-155 E	1.0858
945071	AF1-172 C	7.6042
945072	AF1-172 E	5.0695
945161	AF1-181	0.0978
945171	AF1-182	0.4891
945181	AF1-183	0.0531
945331	AF1-198	0.0858
945481	AF1-213 C	3.9764
945482	AF1-213 E	2.6509
945491	AF1-214 C	0.5268
945492	AF1-214 E	0.3512
945551	AF1-220 C	15.5337
945552	AF1-220 E	10.3615
945771	AF1-242 C	1.6288
945772	AF1-242 E	1.0858
946091	AF1-274 C	7.8581
946092	AF1-274 E	5.2387

Bus #	Bus	MW Impact
946131	AF1-278	42.0788
946381	AF1-302 C	0.8373
946382	AF1-302 E	1.1163
946421	AF1-306 C	9.4557
946422	AF1-306 E	37.8230
DUCKCREEK	DUCKCREEK	1.5845
NEWTON	NEWTON	1.4216
FARMERCITY	FARMERCITY	0.0731
G-007A	G-007A	3.6418
VFT	VFT	9.9330
PRAIRIE	PRAIRIE	3.3088
COFFEEN	COFFEEN	0.7034
EDWARDS	EDWARDS	0.4854
CHEOAH	CHEOAH	0.5090
TILTON	TILTON	0.8625
MADISON	MADISON	0.0444
GIBSON	GIBSON	0.7240
CALDERWOOD	CALDERWOOD	0.5089
BLUEG	BLUEG	2.2672
TRIMBLE	TRIMBLE	0.7285
CATAWBA	CATAWBA	0.2835

12.6.11 Index 11

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
49459276	200599	26ERIE W	PENELEC	238547	02AT	ATSI	1	Base Case	single	1560.0	104.24	104.97	DC	25.29

Bus #	Bus	MW Impact
200608	26PINEY #1	1.0365
200642	26SENECA#1	9.8431
200643	26SENECA#2	9.2963
200644	26SENECA#3	0.9293
200649	26PENNTech	1.2689
200662	26SCRUB GR	4.0539
200805	26COLVER13 (Deactivation : 09/01/20)	12.9404
200828	26HNSMLK 1	2.7282
200829	26HNSMLK 2	2.7282
200830	26HNSMLK 3	2.7282
200831	26HNSMLK 4	2.7282
200832	26HNSMLK 5	2.7282
200849	26LAKVU GN	0.3599
200898	26AA1-106	2.5433
201144	W3-099 C OP1	6.4428
201201	26WRREN CT	2.8418
201477	26Y2-055	10.3498
203910	26Z1-091	2.3793
915951	Y3-092 FTIR	588.3200
919201	AA1-144 OP	19.2529
919491	AA2-000	63.2750
920341	AA2-132	2.5685
922932	AB1-082 OP	4.2204
930511	AB1-092	2.3233
935191	AD1-154	3.2292
936421	AD2-055	4.7832
936991	AD2-133 C	2.1296
938951	AE1-123	4.1434
939171	AE1-147 C	1.4423
939291	AE1-160 C	4.6863
939381	AE1-169 C O1	18.2141
940201	AE2-001 C	1.4391
940861	AE2-074 C	3.2045
941191	AE2-113 C	13.8465
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.6880
941261	AE2-120 C	1.4374
941271	AE2-121 C	0.7697
941321	AE2-126 C	1.9350
941331	AE2-129 C	1.5399
941351	AE2-131 C	1.5399
941421	AE2-139 C	7.2982
942351	AE2-248 C	1.1288

Bus #	Bus	MW Impact
942491	AE2-262 C	6.6768
942501	AE2-263 C	6.2761
942811	AE2-299 C	15.7184
942961	AE2-316 C	6.6875
943151	AE2-344 C	35.4183
943351	AF1-006 C	6.7809
943751	AF1-043	7.6053
943871	AF1-055 C O1	17.5857
944001	AF1-068 C O1	0.7943
944181	AF1-086 C O1	1.3393
944261	AF1-094 C	5.4823
944281	AF1-096 C	4.4280
944301	AF1-098 C	22.9061
944311	AF1-099 C	5.3717
944321	AF1-100 C O1	11.3938
944381	AF1-103 O1	7.1436
944391	AF1-104 O1	11.2794
944411	AF1-106 O1	1.4398
944471	AF1-112 C	0.7506
944671	AF1-132 C O1	0.7428
944691	AF1-134 C O1	0.6922
944701	AF1-135 C	0.8307
944741	AF1-139 C O1	0.8209
944771	AF1-142 C	8.5947
944841	AF1-149 C	1.4372
944881	AF1-153 C O1	1.0525
944901	AF1-155 C	1.0529
945021	AF1-167 C	0.7979
945051	AF1-170 C	24.9728
945071	AF1-172 C	11.1039
945121	AF1-177	1.7859
945161	AF1-181	0.0608
945171	AF1-182	0.3038
945181	AF1-183	0.0753
945331	AF1-198	0.1826
945451	AF1-210 C	0.7391
945481	AF1-213 C	6.5400
945491	AF1-214 C	0.7619
945551	AF1-220 C	18.7806
945751	AF1-240 C O1	1.0269
945771	AF1-242 C	1.0529
946091	AF1-274 C	4.4697
946131	AF1-278	47.4740
946211	AF1-286 C O1	0.5831
946221	AF1-287 C	6.0526
946381	AF1-302 C	1.5478
946401	AF1-304 C	21.0258
946421	AF1-306 C	5.2606
946771	AF1-217 C O1	6.0526
DUCKCREEK	DUCKCREEK	3.9681
NEWTON	NEWTON	3.5437
FARMERCITY	FARMERCITY	0.1822

Bus #	Bus	MW Impact
G-007A	G-007A	8.9475
VFT	VFT	24.3810
PRAIRIE	PRAIRIE	8.2294
COFFEEN	COFFEEN	1.7546
EDWARDS	EDWARDS	1.2166
CHEOAH	CHEOAH	1.2397
TILTON	TILTON	2.1565
MADISON	MADISON	0.0907
GIBSON	GIBSON	1.8040
CALDERWOOD	CALDERWOOD	1.2405
BLUEG	BLUEG	5.6368
TRIMBLE	TRIMBLE	1.8103
CATAWBA	CATAWBA	0.6755

12.6.12 Index 12

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
41184029	200674	26TOWANDA	PENELEC	200677	26NO MESHO	PENELEC	1	PN-P1-2-PN-230-013A	single	202.0	122.92	126.69	DC	7.62

Bus #	Bus	MW Impact
200649	26PENNTech	0.3018
200665	26SHAWVL 3	1.2430
200666	26SHAWVL 4	1.2132
200887	26ARMNA MT	0.4796
200898	26AA1-106	3.3133
200949	26X1-109	21.2878
203261	26BLOSSBCT	0.3948
203283	26MANOR_T86	0.0421
203349	26Z1-069 C	0.2024
203350	26MILZ1-092	0.4868
203351	26GROZ1-110	0.4625
203352	26CANZ2-011	0.4625
919201	AA1-144 OP	32.0050
919491	AA2-000	44.7721
920351	AA2-133	0.1861
922932	AB1-082 OP	1.6286
923442	AB1-160 C	0.0578
930511	AB1-092	1.6439
934801	AD1-108	0.0349
934811	AD1-109	0.0256
935061	AD1-142	0.0269
936421	AD2-055	3.3845
940861	AE2-074 C	1.2366
941191	AE2-113 C	3.4868
941421	AE2-139 C	10.9402
942491	AE2-262 C	2.5255
942501	AE2-263 C	2.3740
943751	AF1-043	10.1535
944311	AF1-099 C	3.8337
944321	AF1-100 C O1	7.6245
944411	AF1-106 O1	3.5054
944771	AF1-142 C	6.1339
945071	AF1-172 C	12.0300
945161	AF1-181	0.0409
945171	AF1-182	0.2033
945331	AF1-198	0.3721
946131	AF1-278	9.9041
946211	AF1-286 C O1	1.4197
LGEE	LGEE	0.3041
CPL	CPL	0.2117
WEC	WEC	0.1739

Bus #	Bus	MW Impact
CBM-W2	CBM-W2	4.1359
CBM-W1	CBM-W1	7.2058
TVA	TVA	0.6622
CBM-S2	CBM-S2	2.1155
CBM-S1	CBM-S1	4.1237
MEC	MEC	0.8485

12.6.13 Index 13

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
42421229	200675	26E.TWANDA	PENELEC	200924	26CANYON	PENELEC	1	Base Case	single	515.0	103.59	106.41	DC	14.57

Bus #	Bus	MW Impact
200642	26SENECA#1	2.7894
200643	26SENECA#2	2.6344
200649	26PENNTech	0.5618
200665	26SHAWVL 3	2.3763
200666	26SHAWVL 4	2.3188
200715	26SHAWVL 1	1.5716
200722	26SHAWVL 2	1.6043
200887	26ARMNA MT	0.6693
200898	26AA1-106	6.0058
200913	26SHAW-D	0.0723
200949	26X1-109	42.4561
201477	26Y2-055	1.9054
203261	26BLOSSBCT	0.6572
203283	26MANOR_T86	0.0501
203349	26Z1-069 C	0.3211
203350	26MILZ1-092	0.7063
203351	26GROZ1-110	0.8383
203352	26CANZ2-011	0.8383
919201	AA1-144 OP	63.7835
919491	AA2-000	87.5163
920351	AA2-133	0.3184
922932	AB1-082 OP	2.7054
923442	AB1-160 C	0.0917
930511	AB1-092	3.2133
934801	AD1-108	0.0632
934811	AD1-109	0.0463
935061	AD1-142	0.0390
936421	AD2-055	6.6157
939171	AE1-147 C	0.8133
940201	AE2-001 C	0.8099
940681	AE2-055 C	0.7569
940861	AE2-074 C	2.0542
941191	AE2-113 C	6.3051
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.0362
941261	AE2-120 C	0.8079
941271	AE2-121 C	0.4356
941321	AE2-126 C	1.0838
941331	AE2-129 C	0.7609
941351	AE2-131 C	0.7609
941421	AE2-139 C	21.7122
942351	AE2-248 C	0.6232
942491	AE2-262 C	4.8485

Bus #	Bus	MW Impact
942501	AE2-263 C	4.5576
942961	AE2-316 C	2.5479
943751	AF1-043	19.8471
944001	AF1-068 C O1	0.4366
944311	AF1-099 C	7.3600
944321	AF1-100 C O1	14.5725
944381	AF1-103 O1	0.6960
944411	AF1-106 O1	5.0856
944471	AF1-112 C	0.4159
944671	AF1-132 C O1	0.4073
944771	AF1-142 C	11.7760
944841	AF1-149 C	0.8077
944881	AF1-153 C O1	1.0640
944901	AF1-155 C	1.0591
945071	AF1-172 C	23.3955
945121	AF1-177	0.1740
945161	AF1-181	0.0782
945171	AF1-182	0.3886
945181	AF1-183	0.0923
945331	AF1-198	0.6195
945481	AF1-213 C	3.1726
945491	AF1-214 C	0.4283
945551	AF1-220 C	8.4685
945771	AF1-242 C	1.0591
946091	AF1-274 C	4.6466
946131	AF1-278	17.9548
946211	AF1-286 C O1	2.0597
946381	AF1-302 C	0.5897
946421	AF1-306 C	5.4706
LGEE	LGEE	0.5414
CPLE	CPLE	0.3698
WEC	WEC	0.3100
CBM-W2	CBM-W2	7.3546
CBM-W1	CBM-W1	12.8728
TVA	TVA	1.1746
CBM-S2	CBM-S2	3.7223
CBM-S1	CBM-S1	7.3187
MEC	MEC	1.5111

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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
42137256	200767	26HOMER CT	PENELEC	200795	26SHELOCTA	PENELEC	1	PN_P4-500-002F	breaker	917.0	142.71	144.66	DC	39.11

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	28.9164
200794	26CONEMAGH	0.4629
200805	26COLVER13 (Deactivation : 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

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

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

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

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
42137479	200769	26HOMER CY	PENELEC	999392	STAR601	PENELEC	N	PN-P2-3-PN-230-9E	breaker	807.0	123.31	124.59	DC	22.55

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2695
200830	26HNSMLK 3	1.8760
200831	26HNSMLK 4	1.8760
200832	26HNSMLK 5	1.8760
200838	26HOMER C2	45.1077
200839	26HOMER C3	47.7524
200894	26K02	6.9091
200898	26AA1-106	3.0352
201144	W3-099 C OP1	1.8313
201477	26Y2-055	4.7720
203349	26Z1-069 C	0.4984
203907	26Y2-042	1.4811
203909	26Z1-038	2.2372
203910	26Z1-091	3.0422
203999	P-047 E	16.3426
294573	P-028 E	13.6170
903644	W3-099 E OP1	12.2557
915951	Y3-092 FTIR	139.8800
916202	Z1-069 E	15.2211
917672	Z2-108 E	-1.9186
917673	Z2-108 BAT	2.2572
918682	AA1-082 E	8.2095
919201	AA1-144 OP	23.0963
919491	AA2-000	46.7537
920341	AA2-132	3.4204
922932	AB1-082 OP	5.4301
923442	AB1-160 C	0.1424
923443	AB1-160 E	4.3489
930511	AB1-092	1.7167
936421	AD2-055	3.5343
938352	AE1-053 BAT	1.2540
938882	AE1-116 BAT	1.3081
938951	AE1-123	1.9587
939291	AE1-160 C	1.6593
939292	AE1-160 E	0.9538
939381	AE1-169 C O1	6.6451
939382	AE1-169 E O1	4.4301
940861	AE2-074 C	4.1231
940862	AE2-074 E	5.4274
941191	AE2-113 C	11.7440
941192	AE2-113 E	12.6445

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1333
941322	AE2-126 E	0.7555
941421	AE2-139 C	8.2218
941422	AE2-139 E	5.4812
942491	AE2-262 C	3.4582
942492	AE2-262 E	2.3239
942501	AE2-263 C	3.2507
942502	AE2-263 E	2.1704
942811	AE2-299 C	4.5557
942812	AE2-299 E	18.2229
942961	AE2-316 C	5.6140
942962	AE2-316 E	8.0056
943151	AE2-344 C	9.6181
943152	AE2-344 E	6.4121
943351	AF1-006 C	0.8869
943352	AF1-006 E	0.4989
943751	AF1-043	5.6195
943871	AF1-055 C O1	3.6302
943872	AF1-055 E O1	2.4201
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8310
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5963
944302	AF1-098 E	2.3975
944311	AF1-099 C	2.7823
944312	AF1-099 E	1.8549
944321	AF1-100 C O1	6.0959
944322	AF1-100 E O1	4.0640
944381	AF1-103 O1	1.7437
944391	AF1-104 O1	1.3164
944411	AF1-106 O1	1.9691
944741	AF1-139 C O1	1.0931
944742	AF1-139 E O1	0.7288
944771	AF1-142 C	4.4516
944772	AF1-142 E	2.9678
944881	AF1-153 C O1	0.7105
944882	AF1-153 E O1	0.4736
944901	AF1-155 C	0.7125
944902	AF1-155 E	0.4750
945021	AF1-167 C	0.6319
945022	AF1-167 E	0.4212
945051	AF1-170 C	3.2227
945052	AF1-170 E	2.1485
945071	AF1-172 C	7.4637
945072	AF1-172 E	4.9758
945121	AF1-177	0.4359
945161	AF1-181	0.0326
945171	AF1-182	0.1626
945331	AF1-198	0.2584
945451	AF1-210 C	0.6033
945452	AF1-210 E	0.4022

Bus #	Bus	MW Impact
945551	AF1-220 C	5.8816
945552	AF1-220 E	3.9232
945673	AF1-232 BAT	2.9052
945771	AF1-242 C	0.7125
945772	AF1-242 E	0.4750
946091	AF1-274 C	2.7681
946092	AF1-274 E	1.8454
946131	AF1-278	51.5931
946211	AF1-286 C O1	0.7975
946212	AF1-286 E O1	0.5415
946221	AF1-287 C	0.8792
946222	AF1-287 E	0.5861
946381	AF1-302 C	1.2993
946382	AF1-302 E	1.7324
946401	AF1-304 C	4.1369
946402	AF1-304 E	2.7580
946421	AF1-306 C	3.4691
946422	AF1-306 E	13.8766
946771	AF1-217 C O1	0.8792
946772	AF1-217 E O1	0.5861
LGEE	LGEE	0.0217
WEC	WEC	0.0454
CBM-W1	CBM-W1	3.6654
O-066	O-066	4.6435
CHEOAH	CHEOAH	0.1211
G-007	G-007	0.8382
MEC	MEC	0.1208
CALDERWOOD	CALDERWOOD	0.1168
CATAWBA	CATAWBA	0.1551

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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
42137266	200795	26SHELOCTA	PENELEC	200810	26KEYSTONE	PENELEC	1	PN_P4-500-002A	breaker	917.0	121.74	123.95	DC	44.33

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	32.5076
200636	26IUP CO-G	0.6752
200794	26CONEMAGH	0.5468
200805	26COLVER13 (Deactivation : 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

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

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

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

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
42137372	200810	26KEYSTONE	PENELEC	999401	STAR592	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	101.67	103.46	DC	24.91

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	16.7325
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	26COLVER13 (Deactivation : 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

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

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

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

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
46759915	200811	26WARREN	PENELEC	200918	26ERIE S TIE	PENELEC	1	PN-P2-3-PN-345-003A	breaker	621.0	113.28	115.04	DC	24.25

Bus #	Bus	MW Impact
200642	26SENECA#1	8.8930
200643	26SENECA#2	8.3989
200644	26SENECA#3	0.8396
200649	26PENNTech	0.8482
200894	26K02	3.1059
200898	26AA1-106	0.9872
201201	26WRREN CT	2.5169
201477	26Y2-055	9.1985
203999	P-047 E	3.7552
235003	AC1-025 E	0.0953
236828	01GRAYMONT	0.2626
290086	Q-036 E	2.1740
915952	Y3-092 NFTWR	115.7800
916202	Z1-069 E	4.3265
919491	AA2-000	32.8614
922932	AB1-082 OP	2.3303
923443	AB1-160 E	1.2361
923821	AB2-019 FTWR	3.2418
930511	AB1-092	1.2066
936421	AD2-055	2.4841
936991	AD2-133 C	0.9783
936992	AD2-133 E	4.4746
939171	AE1-147 C	0.7918
939172	AE1-147 E	0.5279
940201	AE2-001 C	0.7896
940202	AE2-001 E	0.5264
940681	AE2-055 C	0.7554
940682	AE2-055 E	0.5036
940861	AE2-074 C	1.7694
940862	AE2-074 E	2.3291
941191	AE2-113 C	8.7853
941192	AE2-113 E	9.4589
941251	AE2-119 C (Withdrawn : 12/16/2019)	0.9177
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.6118
941261	AE2-120 C	0.7884
941262	AE2-120 E	0.5256
941271	AE2-121 C	0.4230
941272	AE2-121 E	0.2825
941321	AE2-126 C	1.4018
941322	AE2-126 E	0.9346
941331	AE2-129 C	0.7713

Bus #	Bus	MW Impact
941332	AE2-129 E	0.5142
941351	AE2-131 C	0.7713
941352	AE2-131 E	0.5142
941421	AE2-139 C	2.7596
941422	AE2-139 E	1.8397
942351	AE2-248 C	0.6158
942352	AE2-248 E	0.4105
942491	AE2-262 C	3.7710
942492	AE2-262 E	2.5341
942501	AE2-263 C	3.5448
942502	AE2-263 E	2.3667
942813	AE2-299 BAT	23.1728
942961	AE2-316 C	2.8790
942962	AE2-316 E	4.1055
943751	AF1-043	3.9498
944001	AF1-068 C O1	0.4327
944002	AF1-068 E O1	0.2434
944311	AF1-099 C	3.0339
944312	AF1-099 E	2.0226
944321	AF1-100 C O1	6.5555
944322	AF1-100 E O1	4.3703
944381	AF1-103 O1	6.3268
944392	AF1-104 BAT	2.3720
944471	AF1-112 C	0.4099
944472	AF1-112 E	0.2733
944671	AF1-132 C O1	0.4044
944672	AF1-132 E O1	0.2696
944691	AF1-134 C O1	0.2930
944692	AF1-134 E O1	0.2930
944701	AF1-135 C	0.3516
944702	AF1-135 E	0.2344
944771	AF1-142 C	4.8543
944772	AF1-142 E	3.2362
944841	AF1-149 C	0.7882
944842	AF1-149 E	0.5254
944881	AF1-153 C O1	1.3018
944882	AF1-153 E O1	0.8678
944901	AF1-155 C	1.2941
944902	AF1-155 E	0.8627
945071	AF1-172 C	6.0331
945072	AF1-172 E	4.0221
945121	AF1-177	1.5817
945161	AF1-181	0.0349
945171	AF1-182	0.1748
945181	AF1-183	0.0422
945331	AF1-198	0.0682
945481	AF1-213 C	3.1635
945482	AF1-213 E	2.1090
945491	AF1-214 C	0.4178
945492	AF1-214 E	0.2786
945551	AF1-220 C	12.3132
945552	AF1-220 E	8.2133

Bus #	Bus	MW Impact
945771	AF1-242 C	1.2941
945772	AF1-242 E	0.8627
946091	AF1-274 C	6.2312
946092	AF1-274 E	4.1541
946131	AF1-278	33.3216
946381	AF1-302 C	0.6663
946382	AF1-302 E	0.8884
946421	AF1-306 C	7.4982
946422	AF1-306 E	29.9930
DUCKCREEK	DUCKCREEK	1.2943
NEWTON	NEWTON	1.1615
FARMERCITY	FARMERCITY	0.0598
G-007A	G-007A	2.8602
VFT	VFT	7.8045
PRAIRIE	PRAIRIE	2.7044
COFFEEN	COFFEEN	0.5745
EDWARDS	EDWARDS	0.3966
CHEOAH	CHEOAH	0.4184
TILTON	TILTON	0.7043
MADISON	MADISON	0.0343
GIBSON	GIBSON	0.5919
CALDERWOOD	CALDERWOOD	0.4185
BLUEG	BLUEG	1.8540
TRIMBLE	TRIMBLE	0.5955
CATAWBA	CATAWBA	0.2345

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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
41789312	200904	26EAGL VAL	PENELEC	200527	26TYRONE N	PENELEC	1	AP-P2-2-WP-230-005T	bus	191.0	117.74	131.52	DC	26.24

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.5507
200666	26SHAWVL 4	2.5057
200715	26SHAWVL 1	2.2589
200722	26SHAWVL 2	2.3221
200905	26Q36	0.7172
200913	26SHAW-D	0.1365
235003	AC1-025 E	0.1219
236828	01GRAYMONT	0.3194
290086	Q-036 E	20.5528
919491	AA2-000	28.5206
930511	AB1-092	1.0472
936421	AD2-055	2.1560
936991	AD2-133 C	9.2488
936992	AD2-133 E	42.3028
939171	AE1-147 C	0.9548
939172	AE1-147 E	0.6365
940201	AE2-001 C	0.9570
940202	AE2-001 E	0.6380
940681	AE2-055 C	0.9910
940682	AE2-055 E	0.6607
941191	AE2-113 C	2.9319
941192	AE2-113 E	3.1567
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.9591
941252	AE2-119 E (Withdrawn : 12/16/2019)	1.3061
941261	AE2-120 C	0.9578
941262	AE2-120 E	0.6385
941271	AE2-121 C	0.5067
941272	AE2-121 E	0.3383
941321	AE2-126 C	1.4356
941322	AE2-126 E	0.9570
941331	AE2-129 C	4.2805
941332	AE2-129 E	2.8537
941351	AE2-131 C	4.2805
941352	AE2-131 E	2.8537
942351	AE2-248 C	0.7794
942352	AE2-248 E	0.5196
942491	AE2-262 C	3.9032
942492	AE2-262 E	2.6230
942501	AE2-263 C	3.6690
942502	AE2-263 E	2.4496
943751	AF1-043	3.4280

Bus #	Bus	MW Impact
944001	AF1-068 C O1	0.5542
944002	AF1-068 E O1	0.3117
944181	AF1-086 C O1	0.4667
944182	AF1-086 E O1	2.0305
944311	AF1-099 C	3.1403
944312	AF1-099 E	2.0935
944321	AF1-100 C O1	15.7470
944322	AF1-100 E O1	10.4980
944471	AF1-112 C	0.5150
944472	AF1-112 E	0.3433
944671	AF1-132 C O1	0.5210
944672	AF1-132 E O1	0.3473
944691	AF1-134 C O1	0.4449
944692	AF1-134 E O1	0.4449
944701	AF1-135 C	0.5338
944702	AF1-135 E	0.3559
944771	AF1-142 C	5.0244
944772	AF1-142 E	3.3496
944841	AF1-149 C	0.9578
944842	AF1-149 E	0.6385
944881	AF1-153 C O1	0.3827
944882	AF1-153 E O1	0.2552
944901	AF1-155 C	0.3798
944902	AF1-155 E	0.2532
945071	AF1-172 C	5.4317
945072	AF1-172 E	3.6211
945161	AF1-181	0.0839
945171	AF1-182	0.4199
945181	AF1-183	0.1327
945481	AF1-213 C	11.8213
945482	AF1-213 E	7.8808
945491	AF1-214 C	0.5076
945492	AF1-214 E	0.3384
945551	AF1-220 C	3.6798
945552	AF1-220 E	2.4545
945771	AF1-242 C	0.3798
945772	AF1-242 E	0.2532
946091	AF1-274 C	5.6595
946092	AF1-274 E	3.7730
946421	AF1-306 C	2.0125
946422	AF1-306 E	8.0498
DUCKCREEK	DUCKCREEK	0.0115
NEWTON	NEWTON	0.0161
FARMERCITY	FARMERCITY	0.0009
CBM-W1	CBM-W1	0.0375
PRAIRIE	PRAIRIE	0.0465
O-066	O-066	0.3494
COFFEEN	COFFEEN	0.0074
EDWARDS	EDWARDS	0.0032
CHEOAH	CHEOAH	0.0205
TILTON	TILTON	0.0069
G-007	G-007	0.0686

Bus #	Bus	MW Impact
GIBSON	GIBSON	0.0082
CALDERWOOD	CALDERWOOD	0.0199
BLUEG	BLUEG	0.0278
TRIMBLE	TRIMBLE	0.0089
CATAWBA	CATAWBA	0.0203

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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
41521060	235248	01SHINGL	AP	200513	26LEWISTWN	PENELEC	1	AP-P2-3-WP-230-446T	breaker	570.0	131.72	152.02	DC	115.66

Bus #	Bus	MW Impact
200665	26SHAWVL 3	11.2213
200666	26SHAWVL 4	11.0429
200715	26SHAWVL 1	6.8508
200722	26SHAWVL 2	7.0237
200894	26K02	13.1208
200898	26AA1-106	2.6976
200905	26Q36	0.2708
200913	26SHAW-D	0.2828
203352	26CANZ2-011	0.4430
235003	AC1-025 E	0.9180
236828	01GRAYMONT	2.3847
290086	Q-036 E	7.7608
919491	AA2-000	169.8793
930511	AB1-092	6.2375
936421	AD2-055	12.8419
936991	AD2-133 C	3.4924
936992	AD2-133 E	15.9737
939171	AE1-147 C	7.1243
939172	AE1-147 E	4.7495
940201	AE2-001 C	7.1412
940202	AE2-001 E	4.7608
940681	AE2-055 C	7.3998
940682	AE2-055 E	4.9332
941251	AE2-119 C (Withdrawn : 12/16/2019)	4.0520
941252	AE2-119 E (Withdrawn : 12/16/2019)	2.7014
941261	AE2-120 C	7.1504
941262	AE2-120 E	4.7670
941271	AE2-121 C	3.7720
941272	AE2-121 E	2.5186
941321	AE2-126 C	2.6525
941322	AE2-126 E	1.7683
941331	AE2-129 C	3.1049
941332	AE2-129 E	2.0699
941351	AE2-131 C	3.1049
941352	AE2-131 E	2.0699
941421	AE2-139 C	7.8236
941422	AE2-139 E	5.2157
942351	AE2-248 C	5.8335
942352	AE2-248 E	3.8890
942491	AE2-262 C	26.1095
942492	AE2-262 E	17.5456

Bus #	Bus	MW Impact
942501	AE2-263 C	24.5429
942502	AE2-263 E	16.3863
943751	AF1-043	38.5255
944001	AF1-068 C O1	7.8127
944002	AF1-068 E O1	4.3947
944181	AF1-086 C O1	1.2931
944182	AF1-086 E O1	5.6255
944311	AF1-099 C	39.6342
944312	AF1-099 E	26.4228
944321	AF1-100 C O1	69.3975
944322	AF1-100 E O1	46.2650
944471	AF1-112 C	7.2636
944472	AF1-112 E	4.8424
944671	AF1-132 C O1	7.3427
944672	AF1-132 E O1	4.8951
944691	AF1-134 C O1	2.2470
944692	AF1-134 E O1	2.2470
944701	AF1-135 C	2.6964
944702	AF1-135 E	1.7976
944771	AF1-142 C	63.4148
944772	AF1-142 E	42.2765
944841	AF1-149 C	7.1515
944842	AF1-149 E	4.7677
945071	AF1-172 C	61.3380
945072	AF1-172 E	40.8920
945161	AF1-181	0.3692
945171	AF1-182	1.8506
945181	AF1-183	0.4023
945481	AF1-213 C	25.4386
945482	AF1-213 E	16.9591
945491	AF1-214 C	7.1500
945492	AF1-214 E	4.7666
945551	AF1-220 C	5.7668
945552	AF1-220 E	3.8467
946091	AF1-274 C	10.0853
946092	AF1-274 E	6.7235
946312	AF1-295 BAT	1.5296
LGEE	LGEE	0.0673
WEC	WEC	0.0444
CBM-W2	CBM-W2	0.6962
CBM-W1	CBM-W1	2.1267
TVA	TVA	0.0672
O-066	O-066	5.0266
CBM-S1	CBM-S1	0.5197
G-007	G-007	0.8403
MEC	MEC	0.1907
CATAWBA	CATAWBA	0.0231

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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
42704084	239036	02PERRY	ATSI	239334	02L.CENTER	ATSI	1	ATSI-P7-1-CEI-345-012	tower	1667.0	129.64	130.4	DC	27.76

Bus #	Bus	MW Impact
200828	26HNSMLK 1	1.8459
200829	26HNSMLK 2	1.8459
200830	26HNSMLK 3	1.8459
200831	26HNSMLK 4	1.8459
200832	26HNSMLK 5	1.8459
200849	26LAKVU GN	0.2451
200894	26K02	4.6600
200898	26AA1-106	1.6646
201144	W3-099 C OP1	4.3853
201477	26Y2-055	5.9490
203999	P-047 E	7.1703
239035	02PERRG1 (Deactivation : 05/31/21)	86.6075
903644	W3-099 E OP1	29.3477
915951	Y3-092 FTIR	401.4900
916202	Z1-069 E	6.1087
919491	AA2-000	41.5667
920341	AA2-132	1.6820
922932	AB1-082 OP	2.3870
923443	AB1-160 E	1.7453
930511	AB1-092	1.5262
935191	AD1-154	2.1388
936421	AD2-055	3.1422
938951	AE1-123	2.3510
939291	AE1-160 C	3.1714
939292	AE1-160 E	1.8230
939381	AE1-169 C O1	10.4699
939382	AE1-169 E O1	6.9799
940861	AE2-074 C	1.8125
940862	AE2-074 E	2.3858
941191	AE2-113 C	7.8448
941192	AE2-113 E	8.4463
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.1107
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7405
941321	AE2-126 C	1.2815
941322	AE2-126 E	0.8544
941331	AE2-129 C	1.0082
941332	AE2-129 E	0.6721
941351	AE2-131 C	1.0082
941352	AE2-131 E	0.6721
941421	AE2-139 C	4.7616
941422	AE2-139 E	3.1744

Bus #	Bus	MW Impact
942491	AE2-262 C	4.3809
942492	AE2-262 E	2.9440
942501	AE2-263 C	4.1180
942502	AE2-263 E	2.7495
942811	AE2-299 C	10.6970
942812	AE2-299 E	42.7878
942961	AE2-316 C	4.4304
942962	AE2-316 E	6.3178
943151	AE2-344 C	24.1162
943152	AE2-344 E	16.0775
943351	AF1-006 C	4.6204
943352	AF1-006 E	2.5990
943751	AF1-043	4.9961
943871	AF1-055 C O1	11.9345
943872	AF1-055 E O1	7.9564
944181	AF1-086 C O1	0.8747
944182	AF1-086 E O1	3.8055
944261	AF1-094 C	3.7262
944262	AF1-094 E	2.4842
944281	AF1-096 C	2.9966
944282	AF1-096 E	1.9978
944301	AF1-098 C	15.5808
944302	AF1-098 E	10.3872
944311	AF1-099 C	3.5246
944312	AF1-099 E	2.3497
944321	AF1-100 C O1	7.5035
944322	AF1-100 E O1	5.0024
944381	AF1-103 O1	2.1763
944391	AF1-104 O1	7.6928
944411	AF1-106 O1	0.9455
944691	AF1-134 C O1	0.4537
944692	AF1-134 E O1	0.4537
944701	AF1-135 C	0.5444
944702	AF1-135 E	0.3629
944741	AF1-139 C O1	0.5376
944742	AF1-139 E O1	0.3584
944771	AF1-142 C	5.6394
944772	AF1-142 E	3.7596
944881	AF1-153 C O1	0.6979
944882	AF1-153 E O1	0.4653
944901	AF1-155 C	0.6981
944902	AF1-155 E	0.4654
945021	AF1-167 C	0.5280
945022	AF1-167 E	0.3520
945051	AF1-170 C	17.0195
945052	AF1-170 E	11.3463
945071	AF1-172 C	7.3028
945072	AF1-172 E	4.8686
945121	AF1-177	0.5441
945161	AF1-181	0.0400
945171	AF1-182	0.2001
945181	AF1-183	0.0496

Bus #	Bus	MW Impact
945331	AF1-198	0.1200
945451	AF1-210 C	0.4873
945452	AF1-210 E	0.3249
945481	AF1-213 C	4.2944
945482	AF1-213 E	2.8629
945551	AF1-220 C	5.6238
945552	AF1-220 E	3.7512
945751	AF1-240 C O1	0.6801
945752	AF1-240 E O1	0.4534
945771	AF1-242 C	0.6981
945772	AF1-242 E	0.4654
946091	AF1-274 C	2.9636
946092	AF1-274 E	1.9757
946131	AF1-278	14.3242
946211	AF1-286 C O1	0.3829
946212	AF1-286 E O1	0.2600
946221	AF1-287 C	4.1209
946222	AF1-287 E	2.7473
946381	AF1-302 C	1.0254
946382	AF1-302 E	1.3672
946401	AF1-304 C	6.4026
946402	AF1-304 E	4.2684
946421	AF1-306 C	3.4932
946422	AF1-306 E	13.9727
946771	AF1-217 C O1	4.1209
946772	AF1-217 E O1	2.7473
DUCKCREEK	DUCKCREEK	3.4130
NEWTON	NEWTON	3.0752
FARMERCITY	FARMERCITY	0.1585
G-007A	G-007A	4.8382
VFT	VFT	13.2289
PRAIRIE	PRAIRIE	7.1911
COFFEEN	COFFEEN	1.5205
EDWARDS	EDWARDS	1.0448
CHEOAH	CHEOAH	1.1461
TILTON	TILTON	1.8579
MADISON	MADISON	0.0625
GIBSON	GIBSON	1.5648
CALDERWOOD	CALDERWOOD	1.1451
BLUEG	BLUEG	4.9059
TRIMBLE	TRIMBLE	1.5749
CATAWBA	CATAWBA	0.6685

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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
42704154	239036	02PERRY	ATSI	238684	02EASTLK	ATSI	1	ATSI-P7-1-CEI-345-016	tower	1667.0	121.91	122.65	DC	26.82

Bus #	Bus	MW Impact
200828	26HNSMLK 1	1.7839
200829	26HNSMLK 2	1.7839
200830	26HNSMLK 3	1.7839
200831	26HNSMLK 4	1.7839
200832	26HNSMLK 5	1.7839
200849	26LAKVU GN	0.2369
200894	26K02	4.5011
200898	26AA1-106	1.6078
201144	W3-099 C OP1	4.2385
201477	26Y2-055	5.7491
203999	P-047 E	6.9260
239035	02PERRG1 (Deactivation : 05/31/21)	81.5353
903644	W3-099 E OP1	28.3655
915951	Y3-092 FTIR	388.0700
916202	Z1-069 E	5.9015
919491	AA2-000	40.1539
920341	AA2-132	1.6247
922932	AB1-082 OP	2.3062
923443	AB1-160 E	1.6861
930511	AB1-092	1.4743
935191	AD1-154	2.0660
936421	AD2-055	3.0354
938951	AE1-123	2.2713
939291	AE1-160 C	3.0649
939292	AE1-160 E	1.7617
939381	AE1-169 C O1	10.1175
939382	AE1-169 E O1	6.7450
940861	AE2-074 C	1.7511
940862	AE2-074 E	2.3050
941191	AE2-113 C	7.5792
941192	AE2-113 E	8.1604
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.0728
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7152
941321	AE2-126 C	1.2381
941322	AE2-126 E	0.8254
941331	AE2-129 C	0.9737
941332	AE2-129 E	0.6491
941351	AE2-131 C	0.9737
941352	AE2-131 E	0.6491
941421	AE2-139 C	4.5986
941422	AE2-139 E	3.0657

Bus #	Bus	MW Impact
942491	AE2-262 C	4.2317
942492	AE2-262 E	2.8437
942501	AE2-263 C	3.9778
942502	AE2-263 E	2.6558
942811	AE2-299 C	10.3389
942812	AE2-299 E	41.3555
942961	AE2-316 C	4.2798
942962	AE2-316 E	6.1030
943151	AE2-344 C	23.3096
943152	AE2-344 E	15.5397
943351	AF1-006 C	4.4658
943352	AF1-006 E	2.5120
943751	AF1-043	4.8263
943871	AF1-055 C O1	11.5342
943872	AF1-055 E O1	7.6895
944181	AF1-086 C O1	0.8447
944182	AF1-086 E O1	3.6750
944261	AF1-094 C	3.6013
944262	AF1-094 E	2.4009
944281	AF1-096 C	2.8960
944282	AF1-096 E	1.9306
944301	AF1-098 C	15.0590
944302	AF1-098 E	10.0394
944311	AF1-099 C	3.4046
944312	AF1-099 E	2.2697
944321	AF1-100 C O1	7.2481
944322	AF1-100 E O1	4.8321
944381	AF1-103 O1	2.1031
944391	AF1-104 O1	7.4356
944411	AF1-106 O1	0.9133
944691	AF1-134 C O1	0.4382
944692	AF1-134 E O1	0.4382
944701	AF1-135 C	0.5258
944702	AF1-135 E	0.3505
944741	AF1-139 C O1	0.5192
944742	AF1-139 E O1	0.3462
944771	AF1-142 C	5.4473
944772	AF1-142 E	3.6316
944881	AF1-153 C O1	0.6742
944882	AF1-153 E O1	0.4495
944901	AF1-155 C	0.6744
944902	AF1-155 E	0.4496
945021	AF1-167 C	0.5100
945022	AF1-167 E	0.3400
945051	AF1-170 C	16.4503
945052	AF1-170 E	10.9669
945071	AF1-172 C	7.0542
945072	AF1-172 E	4.7028
945121	AF1-177	0.5258
945161	AF1-181	0.0387
945171	AF1-182	0.1933
945181	AF1-183	0.0479

Bus #	Bus	MW Impact
945331	AF1-198	0.1159
945451	AF1-210 C	0.4706
945452	AF1-210 E	0.3137
945481	AF1-213 C	4.1479
945482	AF1-213 E	2.7653
945551	AF1-220 C	5.4331
945552	AF1-220 E	3.6241
945751	AF1-240 C O1	0.6570
945752	AF1-240 E O1	0.4380
945771	AF1-242 C	0.6744
945772	AF1-242 E	0.4496
946091	AF1-274 C	2.8630
946092	AF1-274 E	1.9087
946131	AF1-278	13.8404
946211	AF1-286 C O1	0.3699
946212	AF1-286 E O1	0.2512
946221	AF1-287 C	3.9829
946222	AF1-287 E	2.6553
946381	AF1-302 C	0.9905
946382	AF1-302 E	1.3207
946401	AF1-304 C	6.1872
946402	AF1-304 E	4.1248
946421	AF1-306 C	3.3746
946422	AF1-306 E	13.4982
946771	AF1-217 C O1	3.9829
946772	AF1-217 E O1	2.6553
DUCKCREEK	DUCKCREEK	3.2587
NEWTON	NEWTON	2.9366
FARMERCITY	FARMERCITY	0.1514
G-007A	G-007A	4.6607
VFT	VFT	12.7452
PRAIRIE	PRAIRIE	6.8682
COFFEEN	COFFEEN	1.4518
EDWARDS	EDWARDS	0.9975
CHEOAH	CHEOAH	1.0961
TILTON	TILTON	1.7741
MADISON	MADISON	0.0645
GIBSON	GIBSON	1.4944
CALDERWOOD	CALDERWOOD	1.0944
BLUEG	BLUEG	4.6872
TRIMBLE	TRIMBLE	1.5048
CATAWBA	CATAWBA	0.6395

12.6.23 Index 23

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
41789244	938380	AE1-071 TAP	PENELEC	200520	26ROXBURY	PENELEC	1	AP-P2-2-WP-230-001T	bus	160.0	113.95	117.87	DC	13.91

Bus #	Bus	MW Impact
235003	AC1-025 E	0.0892
236828	01GRAYMONT	0.2325
938381	AE1-071 C	39.2279
938382	AE1-071 E	24.0042
939171	AE1-147 C	0.6950
939172	AE1-147 E	0.4634
940201	AE2-001 C	0.6965
940202	AE2-001 E	0.4643
940681	AE2-055 C	0.7179
940682	AE2-055 E	0.4786
941231	AE2-117 C	0.6693
941232	AE2-117 E	0.4462
941241	AE2-118 C	0.6693
941242	AE2-118 E	0.4462
941261	AE2-120 C	0.6973
941262	AE2-120 E	0.4648
941271	AE2-121 C	0.3682
941272	AE2-121 E	0.2459
942031	AE2-215 C	10.8814
942032	AE2-215 E	7.2542
942351	AE2-248 C	0.5671
942352	AE2-248 E	0.3781
942491	AE2-262 C	2.6001
942492	AE2-262 E	1.7473
942501	AE2-263 C	2.4441
942502	AE2-263 E	1.6319
942511	AE2-264 C	2.2028
942512	AE2-264 E	1.4685
944001	AF1-068 C O1	0.4023
944002	AF1-068 E O1	0.2263
944311	AF1-099 C	2.0919
944312	AF1-099 E	1.3946
944321	AF1-100 C O1	3.7599
944322	AF1-100 E O1	2.5066
944471	AF1-112 C	0.3745
944472	AF1-112 E	0.2496
944671	AF1-132 C O1	0.3780
944672	AF1-132 E O1	0.2520
944731	AF1-138 C O1	0.3547
944732	AF1-138 E O1	0.2365
944771	AF1-142 C	3.3471

Bus #	Bus	MW Impact
944772	AF1-142 E	2.2314
944841	AF1-149 C	0.6973
944842	AF1-149 E	0.4648
945161	AF1-181	0.0200
945171	AF1-182	0.1003
945181	AF1-183	0.0226
945491	AF1-214 C	0.3695
945492	AF1-214 E	0.2463
946311	AF1-295	3.6271
DUCKCREEK	DUCKCREEK	0.1578
NEWTON	NEWTON	0.1569
FARMERCITY	FARMERCITY	0.0086
G-007A	G-007A	0.9350
VFT	VFT	2.6445
PRAIRIE	PRAIRIE	0.4081
COFFEEN	COFFEEN	0.0772
EDWARDS	EDWARDS	0.0469
CHEOAH	CHEOAH	0.1136
TILTON	TILTON	0.0857
GIBSON	GIBSON	0.0781
CALDERWOOD	CALDERWOOD	0.1113
BLUEG	BLUEG	0.2500
TRIMBLE	TRIMBLE	0.0796
CATAWBA	CATAWBA	0.1011

12.6.24 Index 24

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
42137484	999392	STAR601	PENELEC	200767	26HOMER CT	PENELEC	N	PN-P2-3-PN-230-9E	breaker	807.0	123.31	124.59	DC	22.55

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2695
200830	26HNSMLK 3	1.8760
200831	26HNSMLK 4	1.8760
200832	26HNSMLK 5	1.8760
200838	26HOMER C2	45.1077
200839	26HOMER C3	47.7524
200894	26K02	6.9091
200898	26AA1-106	3.0352
201144	W3-099 C OP1	1.8313
201477	26Y2-055	4.7720
203349	26Z1-069 C	0.4984
203907	26Y2-042	1.4811
203909	26Z1-038	2.2372
203910	26Z1-091	3.0422
203999	P-047 E	16.3426
294573	P-028 E	13.6170
903644	W3-099 E OP1	12.2557
915951	Y3-092 FTIR	139.8800
916202	Z1-069 E	15.2211
917672	Z2-108 E	-1.9186
917673	Z2-108 BAT	2.2572
918682	AA1-082 E	8.2095
919201	AA1-144 OP	23.0963
919491	AA2-000	46.7537
920341	AA2-132	3.4204
922932	AB1-082 OP	5.4301
923442	AB1-160 C	0.1424
923443	AB1-160 E	4.3489
930511	AB1-092	1.7167
936421	AD2-055	3.5343
938352	AE1-053 BAT	1.2540
938882	AE1-116 BAT	1.3081
938951	AE1-123	1.9587
939291	AE1-160 C	1.6593
939292	AE1-160 E	0.9538
939381	AE1-169 C O1	6.6451
939382	AE1-169 E O1	4.4301
940861	AE2-074 C	4.1231
940862	AE2-074 E	5.4274
941191	AE2-113 C	11.7440
941192	AE2-113 E	12.6445

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1333
941322	AE2-126 E	0.7555
941421	AE2-139 C	8.2218
941422	AE2-139 E	5.4812
942491	AE2-262 C	3.4582
942492	AE2-262 E	2.3239
942501	AE2-263 C	3.2507
942502	AE2-263 E	2.1704
942811	AE2-299 C	4.5557
942812	AE2-299 E	18.2229
942961	AE2-316 C	5.6140
942962	AE2-316 E	8.0056
943151	AE2-344 C	9.6181
943152	AE2-344 E	6.4121
943351	AF1-006 C	0.8869
943352	AF1-006 E	0.4989
943751	AF1-043	5.6195
943871	AF1-055 C O1	3.6302
943872	AF1-055 E O1	2.4201
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8310
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5963
944302	AF1-098 E	2.3975
944311	AF1-099 C	2.7823
944312	AF1-099 E	1.8549
944321	AF1-100 C O1	6.0959
944322	AF1-100 E O1	4.0640
944381	AF1-103 O1	1.7437
944391	AF1-104 O1	1.3164
944411	AF1-106 O1	1.9691
944741	AF1-139 C O1	1.0931
944742	AF1-139 E O1	0.7288
944771	AF1-142 C	4.4516
944772	AF1-142 E	2.9678
944881	AF1-153 C O1	0.7105
944882	AF1-153 E O1	0.4736
944901	AF1-155 C	0.7125
944902	AF1-155 E	0.4750
945021	AF1-167 C	0.6319
945022	AF1-167 E	0.4212
945051	AF1-170 C	3.2227
945052	AF1-170 E	2.1485
945071	AF1-172 C	7.4637
945072	AF1-172 E	4.9758
945121	AF1-177	0.4359
945161	AF1-181	0.0326
945171	AF1-182	0.1626
945331	AF1-198	0.2584
945451	AF1-210 C	0.6033
945452	AF1-210 E	0.4022

Bus #	Bus	MW Impact
945551	AF1-220 C	5.8816
945552	AF1-220 E	3.9232
945673	AF1-232 BAT	2.9052
945771	AF1-242 C	0.7125
945772	AF1-242 E	0.4750
946091	AF1-274 C	2.7681
946092	AF1-274 E	1.8454
946131	AF1-278	51.5931
946211	AF1-286 C O1	0.7975
946212	AF1-286 E O1	0.5415
946221	AF1-287 C	0.8792
946222	AF1-287 E	0.5861
946381	AF1-302 C	1.2993
946382	AF1-302 E	1.7324
946401	AF1-304 C	4.1369
946402	AF1-304 E	2.7580
946421	AF1-306 C	3.4691
946422	AF1-306 E	13.8766
946771	AF1-217 C O1	0.8792
946772	AF1-217 E O1	0.5861
LGEE	LGEE	0.0217
WEC	WEC	0.0454
CBM-W1	CBM-W1	3.6654
O-066	O-066	4.6435
CHEOAH	CHEOAH	0.1211
G-007	G-007	0.8382
MEC	MEC	0.1208
CALDERWOOD	CALDERWOOD	0.1168
CATAWBA	CATAWBA	0.1551

12.6.25 Index 25

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
41521315	999401	STAR592	PJM	200011	KEYSTONE	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	101.11	102.9	DC	24.91

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	16.7325
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	26COLVER13 (Deactivation : 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

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

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

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

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

Affected Systems

12.7 Affected Systems

12.7.1 LG&E

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

12.7.2 MISO

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

12.7.3 TVA

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

12.7.4 Duke Energy Progress

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

12.7.5 NYISO

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

12.8 Contingency Definitions

Contingency Name	Contingency Definition
PN-P2-3-PN-345-003A	CONTINGENCY 'PN-P2-3-PN-345-003A' /* WAYNE 345KV STUCK BREAKER DISCONNECT BUS 200595 /* 26WAYNE 345 END
AP-P2-3-WP-230-443T *	CONTINGENCY 'AP-P2-3-WP-230-443T *' / UPDATED CON AJK 3-31-16 DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 DISCONNECT BUS 235158 END
AP-P1-2-WP-230-005B	CONTINGENCY 'AP-P1-2-WP-230-005B' /* QUEUE AE2-262 - MOSHANNON 230KV DISCONNECT BRANCH FROM BUS 942490 TO BUS 235219 CKT 1 /* AE2-262 TAP 230 01MILES B 230 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-P2-3-PN-115-28B_A	CONTINGENCY 'PN-P2-3-PN-115-28B_A' /* 630 DISCONNECT BRANCH FROM BUS 200755 TO BUS 200801 CKT 1 /* 26WESTOVER 115 26GARMAN 115 DISCONNECT BRANCH FROM BUS 200682 TO BUS 200755 CKT 1 /* 26WEST.SOU 35 26WESTOVER 115 DISCONNECT BRANCH FROM BUS 200524 TO BUS 200801 CKT 1 /* 26SPANGLER 115 26GARMAN 115 DISCONNECT BRANCH FROM BUS 200524 TO BUS 200533 CKT 2 /* 26SPANGLER 115 26SPANGLER 46 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-115-094-A	CONTINGENCY 'PN-P1-2-PN-115-094-A' /* ROXBURY - SHADE GAP 115KV DISCONNECT BRANCH FROM BUS 200520 TO BUS 938380 CKT 1 /* 26ROXBURY 115 AE1-071 TAP 115 END
PN-P2-2-PN-115-032	CONTINGENCY 'PN-P2-2-PN-115-032' /* ROXBURY 115KV BUS FAULT DISCONNECT BUS 200520 /* 26ROXBURY 115 END

Contingency Name	Contingency Definition
AP-P2-2-WP-230-005T	CONTINGENCY 'AP-P2-2-WP-230-005T' /* SHINGLETOWN #2 230KV BUS DISCONNECT BRANCH FROM BUS 235248 TO BUS 235970 CKT 1 /* 01SHINGL 230 01DALE 230 DISCONNECT BRANCH FROM BUS 235248 TO BUS 200513 CKT 1 /* 01SHINGL 230 26LEWISTWN 230 DISCONNECT BRANCH FROM BUS 235248 TO BUS 236711 CKT 82 /* 01SHINGL 230 01SHINGLTN 46 DISCONNECT BUS 237058 /*SHINGLETOWN 230 KV CAPACITOR END
PN-P1-2-PN-230-004	CONTINGENCY 'PN-P1-2-PN-230-004' /* GLADE - WARREN 230KV DISCONNECT BRANCH FROM BUS 200811 TO BUS 200593 CKT 1 /* 26WARREN 230 26GLADE 230 END
ATSI-P7-1-CEI-345-012	CONTINGENCY 'ATSI-P7-1-CEI-345-012' /* PERRY-EASTLAKE AND PERRY-NORTHFIELD 345KV LINE OUTAGES DISCONNECT BRANCH FROM BUS 238684 TO BUS 239036 CKT 1 /* 02EASTLK 345 02PERRY 345 DISCONNECT BRANCH FROM BUS 239358 TO BUS 239036 CKT 1 /* 02NFIELD 345 02PERRY 345 END
AP-P2-2-WP-230-001T	CONTINGENCY 'AP-P2-2-WP-230-001T' /* ELKO #2 230KV BUS DISCONNECT BRANCH FROM BUS 235175 TO BUS 235158 CKT 1 /* 01ELKO 230 01CARB 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 200726 CKT 1 /* 01ELKO 230 26SHAWVL 2 230 REDUCE BUS 237007 SHUNT BY 100 PERCENT /* 01ELKO CAP 138 DISCONNECT BUS 237007 /* 01ELKO CAP 138 END
PN-P1-2-PN-115-048	CONTINGENCY 'PN-P1-2-PN-115-048' /* GARMAN - SPANGLER 115KV DISCONNECT BRANCH FROM BUS 200801 TO BUS 200524 CKT 1 /* 26GARMAN 115 26SPANGLER 115 DISCONNECT BRANCH FROM BUS 200524 TO BUS 200533 CKT 2 /* 26SPANGLER 115 26SPANGLER 46 DISCONNECT BRANCH FROM BUS 200801 TO BUS 200755 CKT 1 /* 26GARMAN 115 26WESTOVER 115 DISCONNECT BUS 200524 /* 26SPANGLER 115 END
ATSI-P7-1-CEI-345-016	CONTINGENCY 'ATSI-P7-1-CEI-345-016' /* PERRY-NORTHFEILD AND PERRY-LC 345KV LINE OUTAGES DISCONNECT BRANCH FROM BUS 239036 TO BUS 239358 CKT 1 /* 02PERRY 345 02NFIELD 345 DISCONNECT BRANCH FROM BUS 239036 TO BUS 239334 CKT 1 /* 02PERRY 345 02L.CENTER 345 END
AP-P1-2-WP-230-324T_FSA_B	CONTINGENCY 'AP-P1-2-WP-230-324T_FSA_B' /* MOSHANNON-MARSHALL 230KV APS-PN TIE DISCONNECT BRANCH FROM BUS 919490 TO BUS 200909 CKT 1 /* AA2-000 TAP 230 26LOBO+ 230 DISCONNECT BRANCH FROM BUS 200857 TO BUS 200909 CKT 1 /* 26MARSHALL 230 26LOBO+ 230 DISCONNECT BRANCH FROM BUS 236829 TO BUS 200909 CKT 81 /* 01LOBO 46 46 26LOBO+ 230 REMOVE LOAD 1 FROM BUS 236829 /* 01LOBO 46 46 END

Contingency Name	Contingency Definition
PN-P1-2-PN-230-013A	CONTINGENCY 'PN-P1-2-PN-230-013A' /* EAST TOWANDA - NORTH MESHOPPEN 230KV DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /* 26E.TWANDA 230 26CANYON 230 DISCONNECT BRANCH FROM BUS 200924 TO BUS 200706 CKT 1 /* 26CANYON 230 26N.MESHPN 230 END
AP-P1-2-WP-230-323T	CONTINGENCY 'AP-P1-2-WP-230-323T' /* SHINGLETOWN-LEWISTOWN 230KV APS-PN TIE DISCONNECT BRANCH FROM BUS 235248 TO BUS 200513 CKT 1 /* 01SHINGL 230 26LEWISTWN 230 END
PN-P2-3-PN-115-59B	CONTINGENCY 'PN-P2-3-PN-115-59B' /* GARMAN 115 KV STUCK CB - CB (SPANGLER - WESTOVER SOUTH) DISCONNECT BRANCH FROM BUS 200755 TO BUS 944180 CKT 1 /* WESTOVER-AF1-086 TAP DISCONNECT BUS 200755 DISCONNECT BRANCH FROM BUS 200801 TO BUS 200524 CKT 1 /* GARMAN-SPANGLER DISCONNECT BRANCH FROM BUS 200524 TO BUS 200533 CKT 2 /* SPANGLER TR2 DISCONNECT BUS 200524 END
PN-P2-3-PN-230-9E	CONTINGENCY 'PN-P2-3-PN-230-9E' /* 575 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 200837 CKT 1 /* 26HOMER CT 230 26HOMER C1 20 REMOVE MACHINE 1 FROM BUS 200837 /* 26HOMER C1 20 END
PN-P2-3-PN-115-71CT	CONTINGENCY 'PN-P2-3-PN-115-71CT' /* WARREN 115 KV STUCK CB - CBA (WARREN - WARREN2) DISCONNECT BRANCH FROM BUS 135277 TO BUS 200579 CKT 1 /* FALCONER 115 26WARREN 115 DISCONNECT BRANCH FROM BUS 200570 TO BUS 200579 CKT 1 /* 26CORY E. 115 26WARREN 115 DISCONNECT BRANCH FROM BUS 200579 TO BUS 200818 CKT ZB /* 26WARREN 115 26WARREN 2 115 DISCONNECT BRANCH FROM BUS 201201 TO BUS 200579 CKT 1 /* 26WRREN CT 14 26WARREN 115 DISCONNECT BRANCH FROM BUS 200579 TO BUS 201206 CKT 1 /* 26WARREN 115 26WARRN #1 35 DISCONNECT BRANCH FROM BUS 200579 TO BUS 200863 TO BUS 201202 CKT 2/* 26WARREN 115 26WARRN #2 35 26WRREN #2 12.00 DISCONNECT BRANCH FROM BUS 200580 TO BUS 200604 CKT 1 /* 26WARREN S 115 26WARREN S 35 DISCONNECT BRANCH FROM BUS 200818 TO BUS 201210 TO BUS 201202 CKT A/* 26WARREN 2 115 26FURN.BKR 35 26WRREN #2 12.00 REDUCE BUS 200579 SHUNT BY 100 PERCENT /* 26WARREN 115 END
PN-P1-3-PN-115-004	CONTINGENCY 'PN-P1-3-PN-115-004' /* SHAWVILLE 1A 230/115KV XFMR FAULT DISCONNECT BRANCH FROM BUS 200710 TO BUS 200714 TO BUS 200715 CKT 1A/* 26SHAWVL 1 230 26SHAWVL 1 115 26SHAWVL 1 18.00 DISCONNECT BRANCH FROM BUS 200714 TO BUS 200715 CKT 1B /* 26SHAWVL 1 115 26SHAWVL 1 18 DISCONNECT BUS 200715 /* 26SHAWVL 1 18 END

Contingency Name	Contingency Definition
PN-P1-3-PN-115-005	CONTINGENCY 'PN-P1-3-PN-115-005' /* SHAWVILLE 2A 230/115KV XFMR FAULT DISCONNECT BRANCH FROM BUS 200726 TO BUS 200727 TO BUS 200722 CKT 2A/* 26SHAWVL 2 230 26SHAW. 2 115 26SHAWVL 2 18.00 DISCONNECT BRANCH FROM BUS 200714 TO BUS 200722 CKT 2B /* 26SHAWVL 1 115 26SHAWVL 2 18 DISCONNECT BUS 200722 /* 26SHAWVL 2 18 END
PN-P1-3-PN-230-004A	CONTINGENCY 'PN-P1-3-PN-230-004A' /* HOMER CITY SOUTH 345/230KV XFMR DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202641 CKT S/* 26HOMER CY 345 26HOMER CT 230 26HOMERCITYS 23.00 END
PN-P2-2-PN-230-014T	CONTINGENCY 'PN-P2-2-PN-230-014T' /* SHAWVILLE #2 230KV BUS DISCONNECT BRANCH FROM BUS 200726 TO BUS 235248 CKT 1 /* 26SHAWVL 2 230 01SHINGL 230 DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 /* 26SHAWVL 2 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 200726 TO BUS 200666 CKT 1 /* 26SHAWVL 2 230 26SHAWVL 4 22 DISCONNECT BRANCH FROM BUS 200726 TO BUS 200710 CKT ZB /* 26SHAWVL 2 230 26SHAWVL 1 230 END
PN-P2-3-PN-115-71ET	CONTINGENCY 'PN-P2-3-PN-115-71ET' /* WARREN 115 KV STUCK CB - CBP (WARREN - CORRY EAST) DISCONNECT BRANCH FROM BUS 135277 TO BUS 200579 CKT 1 /* FALCONER 115 26WARREN 115 DISCONNECT BRANCH FROM BUS 200570 TO BUS 200579 CKT 1 /* 26CORY E. 115 26WARREN 115 DISCONNECT BRANCH FROM BUS 200579 TO BUS 200818 CKT ZB /* 26WARREN 115 26WARREN 2 115 DISCONNECT BRANCH FROM BUS 201201 TO BUS 200579 CKT 1 /* 26WRREN CT 14 26WARREN 115 DISCONNECT BRANCH FROM BUS 200579 TO BUS 201206 CKT 1 /* 26WARREN 115 26WARRN #1 35 DISCONNECT BRANCH FROM BUS 200579 TO BUS 200863 TO BUS 201202 CKT 2/* 26WARREN 115 26WARRN #2 35 26WRREN #2 12.00 DISCONNECT BRANCH FROM BUS 200580 TO BUS 200604 CKT 1 /* 26WARREN S 115 26WARREN S 35 DISCONNECT BRANCH FROM BUS 200570 TO BUS 200622 CKT 3 /* 26CORY E. 115 26CORY E. 35 REDUCE BUS 200579 SHUNT BY 100 PERCENT /* 26WARREN 115 END
Base Case	
200909 26LOBO+ 230 919490 AA2-000 TAP 230 1	CONTINGENCY '200909 26LOBO+ 230 919490 AA2-000 TAP 230 1' OPEN BRANCH FROM BUS 200909 TO BUS 919490 CKT 1 END
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

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-345-003	CONTINGENCY 'PN-P1-2-PN-345-003' /* HANDSOME LAKE - WAYNE 345KV DISCONNECT BRANCH FROM BUS 200826 TO BUS 200595 CKT 1 /* 26HANDSMK 345 26WAYNE 345 END
AP-P1-3-WP-230-005	CONTINGENCY 'AP-P1-3-WP-230-005' /* MILESBUrg #82 230/46KV XFMR DISCONNECT BRANCH FROM BUS 235219 TO BUS 236745 CKT 82 /* 01MILESB 230 01MILESBG 46 DISCONNECT BRANCH FROM BUS 942490 TO BUS 235219 CKT 1 /* AE2-262 TAP 230 01MILESB 230 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
PN-P1-2-PN-230-103T	CONTINGENCY 'PN-P1-2-PN-230-103T' /** 26LEWISTWN - JUNI BU2 230.00 LINE DISCONNECT BRANCH FROM BUS 200513 TO BUS 208005 CKT 1 /* 26LEWISTWN - JUNI BU2 230.00 LINE END
AP-P2-3-WP-230-446T	CONTINGENCY 'AP-P2-3-WP-230-446T' /* ELKO-MOSHANNON STK BKR AT ELKO DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 /* 26SHAWVL 2 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 235158 TO BUS 235175 CKT 1 /* 01CARB 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /* 01MOSHAN 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /* 01QUEHAN 230 01QUEHANNA 46 END
PN-P1-3-PN-230-003A	CONTINGENCY 'PN-P1-3-PN-230-003A' /* HOMER CITY NORTH 345/230KV XFMR DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/* 26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00 END
PL_P12_100618	CONTINGENCY 'PL_P12_100618' /* JUNIATA 230/69KV TR4 OUT" DISCONNECT BRANCH FROM BUS 208005 TO BUS 209997 CKT 4 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 207955 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 200009 CKT 2 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 208006 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 208004 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 200513 CKT 1 /* END

Contingency Name	Contingency Definition
PN-P1-2-PN-230-101T	CONTINGENCY 'PN-P1-2-PN-230-101T' /* EAST TOWANDA - HILLSIDE 230KV DISCONNECT BRANCH FROM BUS 200675 TO BUS 130763 CKT 1 /* 26E.TWANDA 230 HILSD230 230 END
ATSI-P1-1-CEI-345-711	CONTINGENCY 'ATSI-P1-1-CEI-345-711' /* GEN 02PERRG1 22.0 UNIT 1 REMOVE MACHINE 1 FROM BUS 239035 /* 02PERRG1 22 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

12.9 Short Circuit

The following Breakers are overduty:

None.

13 Network Impacts – Secondary POI

The Queue Project AF1-100 was evaluated as a 250.1 MW (Capacity 150.0 MW) injection tapping the Shawville to Moshannon 230 kV line in the PENELEC area. Project AF1-100 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-100 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

13.1 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
41184061	200522	26SHADE GP	115.0	PENELEC	938380	AE1-071 TAP	115.0	PENELEC	1	PN-P1-2-PN-230-103T	single	160.0	98.16	105.89	DC	12.37
41184005	200726	26SHAWV L2	230.0	PENELEC	235248	01SHINGL	230.0	AP	1	AP-P1-3-WP-230-005	single	554.0	98.41	105.43	DC	40.4
41184006	200726	26SHAWV L2	230.0	PENELEC	235248	01SHINGL	230.0	AP	1	AP-P1-2-WP-230-005B	single	554.0	98.41	105.43	DC	40.4
41184385	999394	STAR599	1.0	PENELEC	200714	26SHAWV L1	115.0	PENELEC	1A	PN-P1-3-PN-115-005	single	126.0	99.62	111.74	DC	15.27

13.2 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
41521187	200513	26LEWISTW N	230.0	PENELEC	208005	JUNI BU2	230.0	PPL	1	AP-P2-3-WP-230-446T	breaker	624.0	94.06	106.91	DC	80.2
41521188	200513	26LEWISTW N	230.0	PENELEC	208005	JUNI BU2	230.0	PPL	1	AP-P2-3-WP-230-443T *	breaker	624.0	93.97	106.81	DC	80.2
41521189	200513	26LEWISTW N	230.0	PENELEC	208005	JUNI BU2	230.0	PPL	1	AP-P2-2-WP-230-001T	breaker	624.0	93.97	106.81	DC	80.2
41789325	200513	26LEWISTW N	230.0	PENELEC	208005	JUNI BU2	230.0	PPL	1	PN-P2-2-PN-115-032	bus	624.0	96.59	106.4	DC	63.86
41789326	200513	26LEWISTW N	230.0	PENELEC	208005	JUNI BU2	230.0	PPL	1	AP-P2-2-WP-230-001T	bus	624.0	93.97	106.81	DC	80.2
41521516	200713	26ROCKTO N	115.0	PENELEC	200712	26DUBOIS	115.0	PENELEC	1	AP-P2-3-WP-230-446T	breaker	190.0	88.18	102.61	DC	27.4

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
41521517	200713	26ROCKTON	115.0	PENELEC	200712	26DUBOIS	115.0	PENELEC	1	AP-P2-2-WP-230-001T	breaker	190.0	88.07	102.51	DC	27.4
41521518	200713	26ROCKTON	115.0	PENELEC	200712	26DUBOIS	115.0	PENELEC	1	AP-P2-3-WP-230-443T*	breaker	190.0	88.02	102.46	DC	27.39
41789516	200713	26ROCKTON	115.0	PENELEC	200712	26DUBOIS	115.0	PENELEC	1	AP-P2-2-WP-230-001T	bus	190.0	88.07	102.51	DC	27.4
41521492	200714	26SHAWVL1	115.0	PENELEC	200713	26ROCKTON	115.0	PENELEC	1	AP-P2-3-WP-230-446T	breaker	190.0	89.81	104.25	DC	27.4
41521493	200714	26SHAWVL1	115.0	PENELEC	200713	26ROCKTON	115.0	PENELEC	1	AP-P2-2-WP-230-001T	breaker	190.0	89.76	104.19	DC	27.4
41521494	200714	26SHAWVL1	115.0	PENELEC	200713	26ROCKTON	115.0	PENELEC	1	AP-P2-3-WP-230-443T*	breaker	190.0	89.65	104.09	DC	27.39
41789506	200714	26SHAWVL1	115.0	PENELEC	200713	26ROCKTON	115.0	PENELEC	1	AP-P2-2-WP-230-001T	bus	190.0	89.76	104.19	DC	27.4
41521560	999393	STAR600	1.0	PENELEC	200727	26SHAW. 2	115.0	PENELEC	2A	AP-P2-3-WP-230-446T	breaker	148.0	88.51	107.6	DC	28.22
41521562	999393	STAR600	1.0	PENELEC	200727	26SHAW. 2	115.0	PENELEC	2A	AP-P2-2-WP-230-001T	breaker	148.0	88.37	107.47	DC	28.22
41789318	999393	STAR600	1.0	PENELEC	200727	26SHAW. 2	115.0	PENELEC	2A	AP-P2-2-WP-230-001T	bus	148.0	88.37	107.47	DC	28.22

13.3 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
41184060	200522	26SHADE GP	115.0	PENEL EC	938380	AE1-071 TAP	115.0	PENEL EC	1	PL_P12_100618	single	160.0	100.04	107.78	DC	12.38

ID	FRO M BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADI NG %	POST PROJEC T LOADI NG %	AC D C	MW IMPA CT
421373 40	2005 93	26GLADE	230. 0	PENEL EC	2008 11	26WARRE N	230. 0	PENEL EC	1	PN-P2-3-PN- 345-003A	break er	621.0	147.7	152.59	DC	30.57
424213 33	2005 93	26GLADE	230. 0	PENEL EC	2008 11	26WARRE N	230. 0	PENEL EC	1	Base Case	single	520.0	117.95	121.31	DC	17.58
424213 35	2005 93	26GLADE	230. 0	PENEL EC	2008 11	26WARRE N	230. 0	PENEL EC	1	PN-P1-2-PN- 345-003	single	621.0	117.44	120.34	DC	18.15
494592 76	2005 99	26ERIE W	345. 0	PENEL EC	2385 47	02AT	345. 0	ATSI	1	Base Case	single	1560. 0	104.27	105.0	DC	25.31
411840 29	2006 74	26TOWAN DA	115. 0	PENEL EC	2006 77	26NO MESHO	115. 0	PENEL EC	1	PN-P1-2-PN- 345-013A	single	202.0	122.77	126.68	DC	7.9
424212 29	2006 75	26E.TWAN DA	230. 0	PENEL EC	2009 24	26CANYON	230. 0	PENEL EC	1	Base Case	single	515.0	103.47	106.4	DC	15.13
421372 55	2007 67	26HOMER CT	230. 0	PENEL EC	2007 95	26SHELOC TA	230. 0	PENEL EC	1	PN_P4-500- 002A	break er	917.0	142.65	144.6	DC	38.97
421372 56	2007 67	26HOMER CT	230. 0	PENEL EC	2007 95	26SHELOC TA	230. 0	PENEL EC	1	PN_P4-500- 002F	break er	917.0	142.66	144.61	DC	38.97
424212 55	2007 67	26HOMER CT	230. 0	PENEL EC	2007 95	26SHELOC TA	230. 0	PENEL EC	1	Base Case	single	731.0	108.46	109.55	DC	17.36
424212 56	2007 67	26HOMER CT	230. 0	PENEL EC	2007 95	26SHELOC TA	230. 0	PENEL EC	1	PN-P1-3-PN- 230-001T	single	917.0	100.73	101.9	DC	23.43
424212 57	2007 67	26HOMER CT	230. 0	PENEL EC	2007 95	26SHELOC TA	230. 0	PENEL EC	1	PN-P1-2-PN- 230-025	single	917.0	100.73	101.9	DC	23.43
419602 16	2007 69	26HOMER CY	345. 0	PENEL EC	9993 91	STAR602	1.0	PENEL EC	S	PN-P2-3-PN- 230-001T	bus	824.0	104.06	105.35	DC	23.21
421374 79	2007 69	26HOMER CY	345. 0	PENEL EC	9993 92	STAR601	1.0	PENEL EC	N	PN-P2-3-PN- 230-9E	break er	807.0	123.29	124.61	DC	23.13
421377 05	2007 69	26HOMER CY	345. 0	PENEL EC	9993 91	STAR602	1.0	PENEL EC	S	PN-P2-3-PN- 230-9I	break er	824.0	104.06	105.35	DC	23.21
421372 65	2007 95	26SHELOC TA	230. 0	PENEL EC	2008 10	26KEYSTO NE	230. 0	PENEL EC	1	PN_P4-500- 002F	break er	917.0	121.7	123.9	DC	44.01
421372 66	2007 95	26SHELOC TA	230. 0	PENEL EC	2008 10	26KEYSTO NE	230. 0	PENEL EC	1	PN_P4-500- 002A	break er	917.0	121.7	123.9	DC	44.01
421373 71	2008 10	26KEYSTO NE	230. 0	PENEL EC	9994 01	STAR592	1.0	PJM	4	PJM500_PN_ P4-500-001A	break er	635.0	101.65	103.43	DC	24.75
421373 72	2008 10	26KEYSTO NE	230. 0	PENEL EC	9994 01	STAR592	1.0	PJM	4	PJM500_PN_ P4-500-001D	break er	635.0	101.65	103.43	DC	24.75
411838 61	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	Base Case	single	491.0	101.47	110.99	DC	48.29
415210 60	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-3-WP- 230-446T	break er	570.0	131.67	151.97	DC	115.7 2
415210 61	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-3-WP- 230-443T *	break er	570.0	131.53	151.83	DC	115.7 2
417892 25	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P2-2-WP- 230-001T	bus	570.0	131.51	151.81	DC	115.7 2
494589 16	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	PN-P1-2-PN- 230-004	single	570.0	101.07	109.98	DC	50.82
427040 84	2390 36	02PERRY	345. 0	ATSI	2393 34	02L.CENTE R	345. 0	ATSI	1	ATSI-P7-1- CEI-345-012	tower	1667. 0	129.68	130.45	DC	27.78
427041 54	2390 36	02PERRY	345. 0	ATSI	2386 84	02EASTLK	345. 0	ATSI	1	ATSI-P7-1- CEI-345-016	tower	1667. 0	121.95	122.69	DC	26.84
417892 44	9383 80	AE1-071 TAP	115. 0	PENEL EC	2005 20	26ROXBUR Y	115. 0	PENEL EC	1	AP-P2-2-WP- 230-001T	bus	160.0	113.95	117.87	DC	13.9
419602 18	9993 91	STAR602	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	S	PN-P2-2-PN- 230-001T	bus	824.0	104.06	105.35	DC	23.21
421377 09	9993 91	STAR602	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	S	PN-P2-3-PN- 230-9I	break er	824.0	104.06	105.35	DC	23.21
421374 84	9993 92	STAR601	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	N	PN-P2-3-PN- 230-9E	break er	807.0	123.29	124.61	DC	23.13
415213 49	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	AP-P2-2-WP- 230-446T	break er	126.0	103.68	126.63	DC	28.88
415213 52	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	PN-P2-3-PN- 230-21HT	break er	126.0	105.12	133.89	DC	36.23
417894 17	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	AP-P2-2-WP- 230-001T	bus	126.0	103.52	126.47	DC	28.88
415213 14	9994 01	STAR592	1.0	PJM	2000 11	KEYSTONE	500. 0	PJM	4	PJM500_PN_ P4-500-001D	break er	634.0	101.08	102.87	DC	24.75

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE T LOADI NG %	POST PROJE T LOADI NG %	AC D C	MW IMPA CT
41521315	999401	STAR592	1.0	PJM	200011	KEYSTONE	500.0	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	101.08	102.87	DC	24.75

13.4 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE T LOADI NG %	POST PROJE T LOADI NG %	AC D C	MW IMPA CT
41183979	200513	26LEWIST WN	230.0	PENEL EC	208005	JUNI BU2	230.0	PPL	1	Base Case	operation	493.0	101.15	112.46	DC	58.07
41183980	200513	26LEWIST WN	230.0	PENEL EC	208005	JUNI BU2	230.0	PPL	1	PN-P1-2-PN-115-094-A	operation	624.0	96.53	106.35	DC	63.89
41184058	200522	26SHADE GP	115.0	PENEL EC	938380	AE1-071 TAP	115.0	PENEL EC	1	PL_P12_100618	operation	160.0	113.52	119.33	DC	20.63
42421329	200593	26GLADE	230.0	PENEL EC	200811	26WARREN	230.0	PENEL EC	1	Base Case	operation	520.0	144.27	149.87	DC	29.29
42421330	200593	26GLADE	230.0	PENEL EC	200811	26WARREN	230.0	PENEL EC	1	PN-P1-2-PN-345-003	operation	621.0	145.89	150.73	DC	30.25
41184841	200599	26ERIE W	345.0	PENEL EC	238547	02AT	345.0	ATSI	1	Base Case	operation	1560.0	120.34	121.56	DC	42.19
41184842	200599	26ERIE W	345.0	PENEL EC	238547	02AT	345.0	ATSI	1	ATSI-P1-1-CEI-345-711	operation	1900.0	110.48	111.48	DC	42.19
41184028	200674	26TOWAN DA	115.0	PENEL EC	200677	26NO MESHO	115.0	PENEL EC	1	PN-P1-2-PN-230-013A	operation	202.0	146.31	149.28	DC	13.17
42421224	200675	26E.TWAN DA	230.0	PENEL EC	200924	26CANYON	230.0	PENEL EC	1	Base Case	operation	515.0	120.78	123.02	DC	25.21
41184151	200714	26SHAWVL 1	115.0	PENEL EC	200872	26BIOEN TP	115.0	PENEL EC	1	AP-P1-2-WP-230-323T	operation	185.0	92.48	107.26	DC	27.32
41184000	200726	26SHAWVL 2	230.0	PENEL EC	235248	01SHINGL	230.0	AP	1	AP-P1-3-WP-230-005	operation	554.0	109.11	120.8	DC	67.34
41184001	200726	26SHAWVL 2	230.0	PENEL EC	235248	01SHINGL	230.0	AP	1	AP-P1-2-WP-230-005B	operation	554.0	109.11	120.8	DC	67.34
42421249	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	PN-P1-3-PN-230-001T	operation	917.0	137.93	139.89	DC	39.04
42421250	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	PN-P1-2-PN-230-025	operation	917.0	137.93	139.89	DC	39.04
42421251	200767	26HOMER CT	230.0	PENEL EC	200795	26SHELOCT A	230.0	PENEL EC	1	Base Case	operation	731.0	141.87	143.69	DC	28.94
42421278	200769	26HOMER CY	345.0	PENEL EC	999392	STAR601	1.0	PENEL EC	N	PN-P1-3-PN-230-004A	operation	807.0	105.82	107.15	DC	23.36
42421218	200769	26HOMER CY	345.0	PENEL EC	999391	STAR602	1.0	PENEL EC	S	PN-P1-3-PN-230-003A	operation	824.0	103.07	104.37	DC	23.23
42421265	200795	26SHELOCT A	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN-P1-2-PN-230-025	operation	917.0	116.34	118.54	DC	44.08
42421266	200795	26SHELOCT A	230.0	PENEL EC	200810	26KEYSTO NE	230.0	PENEL EC	1	PN-P1-3-PN-230-001T	operation	917.0	116.34	118.54	DC	44.08

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADI NG %	POST PROJE CT LOADI NG %	AC/D C	MW IMPA CT
424212 67	2007 95	26SHELOCT A	230. 0	PENEL EC	2008 10	26KEYSTO NE	230. 0	PENEL EC	1	Base Case	operati on	731. 0	118.47	120.56	DC	33.43
494593 71	2008 10	26KEYSTO NE	230. 0	PENEL EC	9994 01	STAR592	1.0	PJM	4	PN-P1-2-PN-345-107T	operati on	635. 0	102.02	103.51	DC	20.7
494593 72	2008 10	26KEYSTO NE	230. 0	PENEL EC	9994 01	STAR592	1.0	PJM	4	ATSI-P1-2-CEI-345-700T	operati on	635. 0	102.02	103.51	DC	20.7
424216 89	2008 11	26WARREN	230. 0	PENEL EC	2009 18	26ERIE S TIE	230. 0	PENEL EC	1	Base Case	operati on	520. 0	108.06	110.08	DC	23.2
424216 90	2008 11	26WARREN	230. 0	PENEL EC	2009 18	26ERIE S TIE	230. 0	PENEL EC	1	PN-P1-2-PN-115-100-A	operati on	621. 0	108.97	113.2	DC	26.51
411840 11	2009 04	26EAGL VAL	115. 0	PENEL EC	2005 27	26TYRONE N	115. 0	PENEL EC	1	AP-P1-2-WP-230-323T	operati on	191. 0	116.52	129.8	DC	25.32
411840 16	2009 04	26EAGL VAL	115. 0	PENEL EC	2005 27	26TYRONE N	115. 0	PENEL EC	1	Base Case	operati on	147. 0	96.81	101.9	DC	16.59
424213 49	2009 08	26CHAPMA N+	230. 0	PENEL EC	9450 70	AF1-172 TAP	230. 0	PENEL EC	1	Base Case	operati on	520. 0	135.44	137.79	DC	12.29
494591 52	2009 08	26CHAPMA N+	230. 0	PENEL EC	9450 70	AF1-172 TAP	230. 0	PENEL EC	1	PN-P1-2-PN-230-101T	operati on	621. 0	123.17	125.1	DC	12.07
424213 20	2009 24	26CANYON	230. 0	PENEL EC	2007 06	26N.MESH PN	230. 0	PENEL EC	1	Base Case	operati on	546. 0	112.93	115.04	DC	25.21
411838 55	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	Base Case	operati on	491. 0	123.79	139.65	DC	80.48
411838 58	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	AP-P1-2-WP-230-324T_FSA_B	operati on	570. 0	115.56	131.61	DC	94.1
494589 11	2352 48	01SHINGL	230. 0	AP	2005 13	26LEWIST WN	230. 0	PENEL EC	1	200909 26LOBO+ 230 919490 AA2-000 TAP 230 1	operati on	570. 0	115.56	131.61	DC	94.1
424213 75	9194 90	AA2-000 TAP	230. 0	PENEL EC	2009 08	26CHAPMA N+	230. 0	PENEL EC	1	Base Case	operati on	546. 0	129.06	131.3	DC	12.29
494592 05	9194 90	AA2-000 TAP	230. 0	PENEL EC	2009 08	26CHAPMA N+	230. 0	PENEL EC	1	PN-P1-2-PN-230-101T	operati on	666. 0	114.91	116.71	DC	12.07
411840 35	9450 70	AF1-172 TAP	230. 0	PENEL EC	2352 20	01MOSHA N	230. 0	AP	1	Base Case	operati on	520. 0	135.37	137.73	DC	12.29
411840 39	9450 70	AF1-172 TAP	230. 0	PENEL EC	2352 20	01MOSHA N	230. 0	AP	1	PN-P1-2-PN-230-101T	operati on	621. 0	123.12	125.06	DC	12.07
424218 20	9993 91	STAR602	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	S	PN-P1-3-PN-230-003A	operati on	824. 0	103.07	104.37	DC	23.23
424217 91	9993 92	STAR601	1.0	PENEL EC	2007 67	26HOMER CT	230. 0	PENEL EC	N	PN-P1-3-PN-230-004A	operati on	807. 0	105.82	107.15	DC	23.36
411843 84	9993 94	STAR599	1.0	PENEL EC	2007 14	26SHAWVL 1	115. 0	PENEL EC	1A	PN-P1-3-PN-115-005	operati on	126. 0	95.69	115.91	DC	25.44
494593 89	9994 01	STAR592	1.0	PJM	2000 11	KEYSTONE	500. 0	PJM	4	ATSI-P1-2-CEI-345-700T	operati on	634. 0	101.46	102.95	DC	20.7
494593 90	9994 01	STAR592	1.0	PJM	2000 11	KEYSTONE	500. 0	PJM	4	PN-P1-2-PN-345-107T	operati on	634. 0	101.46	102.95	DC	20.7

13.5 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.

13.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41184060	200522	26SHADE GP	PENELEC	938380	AE1-071 TAP	PENELEC	1	PL_P12_100618	single	160.0	100.04	107.78	DC	12.38

Bus #	Bus	MW Impact
200649	26PENNTech	0.3546
200665	26SHAWVL 3	2.0128
200666	26SHAWVL 4	1.9806
200715	26SHAWVL 1	1.3184
200722	26SHAWVL 2	1.3520
200812	26ALY HYDR	0.3758
200852	26WARR RDG	0.1074
200886	26ARWF_N39	0.1468
200905	26Q36	0.0845
200913	26SHAW-D	0.0599
203034	26NA_O38_P22	0.1284
919491	AA2-000	30.8497
930511	AB1-092	1.1327
936421	AD2-055	2.3320
936991	AD2-133 C	1.0894
939171	AE1-147 C	1.3877
940201	AE2-001 C	1.3922
940681	AE2-055 C	1.4616
941231	AE2-117 C	1.5386
941241	AE2-118 C	1.5386
941251	AE2-119 C (Withdrawn : 12/16/2019)	0.8587
941261	AE2-120 C	1.3948
941271	AE2-121 C	0.7336
941321	AE2-126 C	0.7831
941331	AE2-129 C	0.7860
941351	AE2-131 C	0.7860
942031	AE2-215 C	13.2754
942351	AE2-248 C	1.1461
942491	AE2-262 C	4.8230
942501	AE2-263 C	4.5336
942511	AE2-264 C	5.0592
943751	AF1-043	6.9961
944001	AF1-068 C O2	1.5398
944311	AF1-099 C	7.3213
944321	AF1-100 C O2	12.3750
944471	AF1-112 C	1.4249
944671	AF1-132 C O2	1.4436
944691	AF1-134 C O1	0.5562
944701	AF1-135 C	0.6674
944731	AF1-138 C O2	1.5386
944771	AF1-142 C	11.7141

Bus #	Bus	MW Impact
944841	AF1-149 C	1.3950
944881	AF1-153 C O2	0.7498
944901	AF1-155 C	0.7454
945071	AF1-172 C	10.9410
945161	AF1-181	0.0662
945171	AF1-182	0.3319
945181	AF1-183	0.0774
945481	AF1-213 C	5.7672
945491	AF1-214 C	1.3945
945551	AF1-220 C	5.5437
945771	AF1-242 C	0.7454
946091	AF1-274 C	3.2640
946311	AF1-295	4.4251
946421	AF1-306 C	3.8280
LGEE	LGEE	0.0633
WEC	WEC	0.0425
CBM-W2	CBM-W2	0.5651
CBM-W1	CBM-W1	2.0391
TVA	TVA	0.0336
CHEOAH	CHEOAH	0.0080
CBM-S1	CBM-S1	0.3408
MEC	MEC	0.1748
CALDERWOOD	CALDERWOOD	0.0060
CATAWBA	CATAWBA	0.0403

13.5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41184006	200726	26SHAWVL 2	PENELEC	235248	01SHINGL	AP	1	AP-P1-2-WP-230-005B	single	554.0	98.41	105.43	DC	40.4

Bus #	Bus	MW Impact
200642	26SENECA#1	3.6203
200643	26SENECA#2	3.4192
200644	26SENECA#3	0.3418
200649	26PENNTech	1.0374
200665	26SHAWVL 3	6.7845
200666	26SHAWVL 4	6.7293
200715	26SHAWVL 1	4.2656
200722	26SHAWVL 2	4.3937
200898	26AA1-106	1.8413
200905	26Q36	0.1735
200913	26SHAW-D	0.1837
201201	26WRREN CT	0.7527
201477	26Y2-055	2.7463
203261	26BLOSSBCT	0.1992
203349	26Z1-069 C	0.1377
203351	26GROZ1-110	0.2570
203352	26CANZ2-011	0.2570
919201	AA1-144 OP	11.2160
919491	AA2-000	88.6275
922932	AB1-082 OP	1.6941
923442	AB1-160 C	0.0393
930511	AB1-092	3.2541
934801	AD1-108	0.0194
934811	AD1-109	0.0142
936421	AD2-055	6.6997
936991	AD2-133 C	2.2378
940861	AE2-074 C	1.2863
941191	AE2-113 C	8.1706
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.6318
941321	AE2-126 C	2.3491
941331	AE2-129 C	2.0046
941351	AE2-131 C	2.0046
941421	AE2-139 C	5.2304
942491	AE2-262 C	11.9610
942501	AE2-263 C	11.2433
942961	AE2-316 C	5.5239
943751	AF1-043	20.0991
944181	AF1-086 C O2	1.9659
944311	AF1-099 C	18.1568
944321	AF1-100 C O2	40.4010
944381	AF1-103 O2	1.8922

Bus #	Bus	MW Impact
944691	AF1-134 C O1	1.4964
944701	AF1-135 C	1.7957
944771	AF1-142 C	29.0509
944841	AF1-149 C	-3.8741
944881	AF1-153 C O2	2.2325
944901	AF1-155 C	2.2165
945071	AF1-172 C	31.7880
945121	AF1-177	0.4730
945161	AF1-181	0.2232
945171	AF1-182	1.1277
945181	AF1-183	0.2505
945331	AF1-198	0.1877
945481	AF1-213 C	16.6977
945551	AF1-220 C	16.3363
945771	AF1-242 C	2.2165
946091	AF1-274 C	9.7435
946131	AF1-278	16.8004
946381	AF1-302 C	2.4122
946421	AF1-306 C	11.5240
LGEE	LGEE	0.2305
CPL	CPL	0.0370
WEC	WEC	0.1380
CBM-W2	CBM-W2	2.9320
CBM-W1	CBM-W1	6.0173
TVA	TVA	0.4270
CBM-S2	CBM-S2	0.7572
CBM-S1	CBM-S1	2.7520
MEC	MEC	0.6467

13.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41521352	999394	STAR599	PENELEC	200714	26SHAWVL 1	PENELEC	1A	PN-P2-3-PN-230-21HT	breaker	126.0	105.12	133.89	DC	36.23

Bus #	Bus	MW Impact
200665	26SHAWVL 3	3.8615
200894	26K02	2.3986
235003	AC1-025 E	0.0736
236828	01GRAYMONT	0.2131
919491	AA2-000	31.6886
930511	AB1-092	1.1635
936421	AD2-055	2.3955
939171	AE1-147 C	0.6474
939172	AE1-147 E	0.4316
940201	AE2-001 C	0.6428
940202	AE2-001 E	0.4285
940681	AE2-055 C	0.5737
940682	AE2-055 E	0.3825
941261	AE2-120 C	0.6404
941262	AE2-120 E	0.4269
941271	AE2-121 C	0.3484
941272	AE2-121 E	0.2326
942351	AE2-248 C	0.4820
942352	AE2-248 E	0.3213
942491	AE2-262 C	3.6525
942492	AE2-262 E	2.4544
942501	AE2-263 C	3.4333
942502	AE2-263 E	2.2923
943751	AF1-043	3.8088
944001	AF1-068 C O2	0.3345
944002	AF1-068 E O2	0.1881
944311	AF1-099 C	2.9385
944312	AF1-099 E	1.9590
944321	AF1-100 C O2	21.7380
944322	AF1-100 E O2	14.4920
944471	AF1-112 C	0.3234
944472	AF1-112 E	0.2156
944671	AF1-132 C O2	0.3135
944672	AF1-132 E O2	0.2090
944771	AF1-142 C	4.7017
944772	AF1-142 E	3.1344
944841	AF1-149 C	0.6400
944842	AF1-149 E	0.4267
945071	AF1-172 C	6.0858
945072	AF1-172 E	4.0572
945161	AF1-181	0.1270

Bus #	Bus	MW Impact
945181	AF1-183	0.0232
945483	AF1-213 BAT	13.5114
945491	AF1-214 C	0.3394
945492	AF1-214 E	0.2263
DUCKCREEK	DUCKCREEK	0.1647
NEWTON	NEWTON	0.1515
FARMERCITY	FARMERCITY	0.0078
G-007A	G-007A	0.6449
VFT	VFT	1.7931
PRAIRIE	PRAIRIE	0.3590
COFFEEN	COFFEEN	0.0745
EDWARDS	EDWARDS	0.0500
CHEOAH	CHEOAH	0.0641
TILTON	TILTON	0.0901
MADISON	MADISON	0.0081
GIBSON	GIBSON	0.0775
CALDERWOOD	CALDERWOOD	0.0636
BLUEG	BLUEG	0.2465
TRIMBLE	TRIMBLE	0.0796
CATAWBA	CATAWBA	0.0403

13.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41789326	200513	26LEWISTWN	PENELEC	208005	JUNI BU2	PPL	1	AP-P2-2-WP-230-001T	bus	624.0	93.97	106.81	DC	80.2

Bus #	Bus	MW Impact
200665	26SHAWVL 3	7.7967
200666	26SHAWVL 4	7.6716
200715	26SHAWVL 1	4.9146
200722	26SHAWVL 2	5.0397
200812	26ALY HYDR	1.1301
200852	26WARR RDG	0.3229
200883	Q-053 E	6.8957
200886	26ARWF_N39	0.4288
200894	26K02	9.1554
200898	26AA1-106	1.9579
200905	26Q36	0.2813
200913	26SHAW-D	0.2124
200915	26CHSTN_FL	0.1524
203034	26NA_O38_P22	0.3752
203905	26W1-045 C	0.6853
235003	AC1-025 E	0.6133
236828	01GRAYMONT	1.5971
290086	Q-036 E	8.0600
293301	N-039 E	12.2874
293393	V3-030E	2.7472
294515	O38_P22	10.7514
901242	W1-045 E OP1	1.1181
919491	AA2-000	117.3103
930511	AB1-092	4.3073
936421	AD2-055	8.8679
936471	AD2-062 C O1	5.0032
936472	AD2-062 E O1	2.5063
936991	AD2-133 C	3.6270
936992	AD2-133 E	16.5895
938381	AE1-071 C	13.1348
938382	AE1-071 E	8.0374
939171	AE1-147 C	4.7732
939172	AE1-147 E	3.1822
940201	AE2-001 C	4.7834
940202	AE2-001 E	3.1890
940681	AE2-055 C	4.9397
940682	AE2-055 E	3.2931
941231	AE2-117 C	4.6266
941232	AE2-117 E	3.0844
941241	AE2-118 C	4.6266
941242	AE2-118 E	3.0844

Bus #	Bus	MW Impact
941251	AE2-119 C (Withdrawn : 12/16/2019)	3.0438
941252	AE2-119 E (Withdrawn : 12/16/2019)	2.0292
941261	AE2-120 C	4.7891
941262	AE2-120 E	3.1927
941271	AE2-121 C	2.5283
941272	AE2-121 E	1.6882
941321	AE2-126 C	2.1067
941322	AE2-126 E	1.4045
941331	AE2-129 C	2.7008
941332	AE2-129 E	1.8006
941351	AE2-131 C	2.7008
941352	AE2-131 E	1.8006
941421	AE2-139 C	5.5361
941422	AE2-139 E	3.6907
942031	AE2-215 C	14.8871
942032	AE2-215 E	9.9247
942121	AE2-224 C	7.2840
942122	AE2-224 E	4.8560
942351	AE2-248 C	3.8996
942352	AE2-248 E	2.5997
942491	AE2-262 C	17.7280
942492	AE2-262 E	11.9132
942501	AE2-263 C	16.6643
942502	AE2-263 E	11.1261
942511	AE2-264 C	15.1296
942512	AE2-264 E	10.0864
943751	AF1-043	26.6038
944001	AF1-068 C O2	5.2259
944002	AF1-068 E O2	2.9395
944181	AF1-086 C O2	2.8019
944182	AF1-086 E O2	12.1896
944311	AF1-099 C	26.9111
944312	AF1-099 E	17.9407
944321	AF1-100 C O2	48.1185
944322	AF1-100 E O2	32.0790
944471	AF1-112 C	4.8571
944472	AF1-112 E	3.2381
944671	AF1-132 C O2	4.8992
944672	AF1-132 E O2	3.2662
944691	AF1-134 C O1	1.8754
944692	AF1-134 E O1	1.8754
944701	AF1-135 C	2.2505
944702	AF1-135 E	1.5003
944731	AF1-138 C O2	4.6266
944732	AF1-138 E O2	3.0844
944751	AF1-140 C	1.1435
944752	AF1-140 E	0.7623
944771	AF1-142 C	43.0578
944772	AF1-142 E	28.7052
944841	AF1-149 C	4.7897
944842	AF1-149 E	3.1931
945071	AF1-172 C	42.2760

Bus #	Bus	MW Impact
945072	AF1-172 E	28.1840
945161	AF1-181	0.2565
945171	AF1-182	1.2856
945181	AF1-183	0.2886
945481	AF1-213 C	19.9893
945482	AF1-213 E	13.3262
945491	AF1-214 C	4.7887
945492	AF1-214 E	3.1925
945551	AF1-220 C	11.0811
945552	AF1-220 E	7.3914
945901	AF1-255 C	0.2695
945902	AF1-255 E	0.3722
946091	AF1-274 C	8.1585
946092	AF1-274 E	5.4390
946241	AF1-289 C O2	1.2500
946242	AF1-289 E O2	0.8333
946311	AF1-295	4.9624
LGEE	LGEE	0.5465
CPL	CPL	0.3744
WEC	WEC	0.3115
CBM-W2	CBM-W2	7.4120
CBM-W1	CBM-W1	12.8478
TVA	TVA	1.1872
O-066	O-066	18.8832
CBM-S2	CBM-S2	3.7743
CBM-S1	CBM-S1	7.3954
G-007	G-007	2.9432
MEC	MEC	1.5207

13.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41789516	200713	26ROCKTON	PENELEC	200712	26DUBOIS	PENELEC	1	AP-P2-2-WP-230-001T	bus	190.0	88.07	102.51	DC	27.4

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.7651
200666	26SHAWVL 4	2.7179
200715	26SHAWVL 1	2.4750
200722	26SHAWVL 2	2.5383
200905	26Q36	0.1493
200913	26SHAW-D	0.1506
235003	AC1-025 E	0.0984
236828	01GRAYMONT	0.2698
290086	Q-036 E	4.2796
919491	AA2-000	28.5639
930511	AB1-092	1.0488
936421	AD2-055	2.1593
936991	AD2-133 C	1.9258
936992	AD2-133 E	8.8085
939171	AE1-147 C	0.8128
939172	AE1-147 E	0.5419
940201	AE2-001 C	0.8108
940202	AE2-001 E	0.5405
940681	AE2-055 C	0.7805
940682	AE2-055 E	0.5203
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.1564
941252	AE2-119 E (Withdrawn : 12/16/2019)	1.4376
941261	AE2-120 C	0.8098
941262	AE2-120 E	0.5399
941271	AE2-121 C	0.4340
941272	AE2-121 E	0.2898
941331	AE2-129 C	1.6717
941332	AE2-129 E	1.1145
941351	AE2-131 C	1.6717
941352	AE2-131 E	1.1145
942351	AE2-248 C	0.6345
942352	AE2-248 E	0.4230
942491	AE2-262 C	3.8054
942492	AE2-262 E	2.5573
942501	AE2-263 C	3.5771
942502	AE2-263 E	2.3883
943751	AF1-043	3.4332
944001	AF1-068 C O2	0.4457
944002	AF1-068 E O2	0.2507
944181	AF1-086 C O2	0.6070
944182	AF1-086 E O2	2.6408

Bus #	Bus	MW Impact
944311	AF1-099 C	3.0616
944312	AF1-099 E	2.0411
944321	AF1-100 C O2	16.4370
944322	AF1-100 E O2	10.9580
944382	AF1-103 BAT	1.3802
944471	AF1-112 C	0.4222
944472	AF1-112 E	0.2814
944671	AF1-132 C O2	0.4178
944672	AF1-132 E O2	0.2786
944691	AF1-134 C O1	1.1545
944692	AF1-134 E O1	1.1545
944701	AF1-135 C	1.3854
944702	AF1-135 E	0.9236
944771	AF1-142 C	4.8986
944772	AF1-142 E	3.2657
944841	AF1-149 C	0.8097
944842	AF1-149 E	0.5398
945071	AF1-172 C	5.6013
945072	AF1-172 E	3.7342
945161	AF1-181	0.0910
945171	AF1-182	0.4555
945181	AF1-183	0.1453
945481	AF1-213 C	13.3514
945482	AF1-213 E	8.9009
945491	AF1-214 C	0.4292
945492	AF1-214 E	0.2861
946423	AF1-306 BAT	38.2075
DUCKCREEK	DUCKCREEK	0.3362
NEWTON	NEWTON	0.3030
FARMERCITY	FARMERCITY	0.0155
G-007A	G-007A	1.1196
VFT	VFT	3.0315
NY	NY	0.0481
PRAIRIE	PRAIRIE	0.7052
COFFEEN	COFFEEN	0.1496
EDWARDS	EDWARDS	0.1029
CHEOAH	CHEOAH	0.1086
TILTON	TILTON	0.1833
MADISON	MADISON	0.0181
GIBSON	GIBSON	0.1551
CALDERWOOD	CALDERWOOD	0.1088
BLUEG	BLUEG	0.4878
TRIMBLE	TRIMBLE	0.1564
CATAWBA	CATAWBA	0.0595

13.5.6 Index 6

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
41789506	200714	26SHAWVL 1	PENELEC	200713	26ROCKTON	PENELEC	1	AP-P2-2-WP-230-001T	bus	190.0	89.76	104.19	DC	27.4

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.7651
200666	26SHAWVL 4	2.7179
200715	26SHAWVL 1	2.4750
200722	26SHAWVL 2	2.5383
200905	26Q36	0.1493
200913	26SHAW-D	0.1506
235003	AC1-025 E	0.0984
236828	01GRAYMONT	0.2698
290086	Q-036 E	4.2796
919491	AA2-000	28.5639
930511	AB1-092	1.0488
936421	AD2-055	2.1593
936991	AD2-133 C	1.9258
936992	AD2-133 E	8.8085
939171	AE1-147 C	0.8128
939172	AE1-147 E	0.5419
940201	AE2-001 C	0.8108
940202	AE2-001 E	0.5405
940681	AE2-055 C	0.7805
940682	AE2-055 E	0.5203
941251	AE2-119 C (Withdrawn : 12/16/2019)	2.1564
941252	AE2-119 E (Withdrawn : 12/16/2019)	1.4376
941261	AE2-120 C	0.8098
941262	AE2-120 E	0.5399
941271	AE2-121 C	0.4340
941272	AE2-121 E	0.2898
941331	AE2-129 C	1.6717
941332	AE2-129 E	1.1145
941351	AE2-131 C	1.6717
941352	AE2-131 E	1.1145
942351	AE2-248 C	0.6345
942352	AE2-248 E	0.4230
942491	AE2-262 C	3.8054
942492	AE2-262 E	2.5573
942501	AE2-263 C	3.5771
942502	AE2-263 E	2.3883
943751	AF1-043	3.4332
944001	AF1-068 C O2	0.4457
944002	AF1-068 E O2	0.2507
944181	AF1-086 C O2	0.6070
944182	AF1-086 E O2	2.6408

Bus #	Bus	MW Impact
944311	AF1-099 C	3.0616
944312	AF1-099 E	2.0411
944321	AF1-100 C O2	16.4370
944322	AF1-100 E O2	10.9580
944382	AF1-103 BAT	1.3802
944471	AF1-112 C	0.4222
944472	AF1-112 E	0.2814
944671	AF1-132 C O2	0.4178
944672	AF1-132 E O2	0.2786
944691	AF1-134 C O1	1.1545
944692	AF1-134 E O1	1.1545
944701	AF1-135 C	1.3854
944702	AF1-135 E	0.9236
944771	AF1-142 C	4.8986
944772	AF1-142 E	3.2657
944841	AF1-149 C	0.8097
944842	AF1-149 E	0.5398
945071	AF1-172 C	5.6013
945072	AF1-172 E	3.7342
945161	AF1-181	0.0910
945171	AF1-182	0.4555
945181	AF1-183	0.1453
945481	AF1-213 C	13.3514
945482	AF1-213 E	8.9009
945491	AF1-214 C	0.4292
945492	AF1-214 E	0.2861
946423	AF1-306 BAT	38.2075
DUCKCREEK	DUCKCREEK	0.3362
NEWTON	NEWTON	0.3030
FARMERCITY	FARMERCITY	0.0155
G-007A	G-007A	1.1196
VFT	VFT	3.0315
NY	NY	0.0481
PRAIRIE	PRAIRIE	0.7052
COFFEEN	COFFEEN	0.1496
EDWARDS	EDWARDS	0.1029
CHEOAH	CHEOAH	0.1086
TILTON	TILTON	0.1833
MADISON	MADISON	0.0181
GIBSON	GIBSON	0.1551
CALDERWOOD	CALDERWOOD	0.1088
BLUEG	BLUEG	0.4878
TRIMBLE	TRIMBLE	0.1564
CATAWBA	CATAWBA	0.0595

13.5.7 Index 7

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
41789318	999393	STAR600	PENELEC	200727	26SHAW. 2	PENELEC	2A	AP-P2-2-WP-230-001T	bus	148.0	88.37	107.47	DC	28.22

Bus #	Bus	MW Impact
200665	26SHAWVL 3	2.8447
200666	26SHAWVL 4	2.9005
235003	AC1-025 E	0.1005
236828	01GRAYMONT	0.2760
919491	AA2-000	30.5395
930511	AB1-092	1.1213
936421	AD2-055	2.3086
939171	AE1-147 C	0.8319
939172	AE1-147 E	0.5546
940201	AE2-001 C	0.8298
940202	AE2-001 E	0.5532
940681	AE2-055 C	0.7967
940682	AE2-055 E	0.5311
941261	AE2-120 C	0.8285
941262	AE2-120 E	0.5524
941271	AE2-121 C	0.4443
941272	AE2-121 E	0.2967
942351	AE2-248 C	0.6484
942352	AE2-248 E	0.4323
942491	AE2-262 C	3.9236
942492	AE2-262 E	2.6367
942501	AE2-263 C	3.6882
942502	AE2-263 E	2.4625
943751	AF1-043	3.6707
944001	AF1-068 C O2	0.4553
944002	AF1-068 E O2	0.2561
944311	AF1-099 C	3.1567
944312	AF1-099 E	2.1045
944321	AF1-100 C O2	16.9350
944322	AF1-100 E O2	11.2900
944471	AF1-112 C	0.4315
944472	AF1-112 E	0.2877
944671	AF1-132 C O2	0.4268
944672	AF1-132 E O2	0.2845
944771	AF1-142 C	5.0507
944772	AF1-142 E	3.3671
944841	AF1-149 C	0.8284
944842	AF1-149 E	0.5523
945071	AF1-172 C	5.8966
945072	AF1-172 E	3.9311
945161	AF1-181	0.0936

Bus #	Bus	MW Impact
945171	AF1-182	0.4861
945483	AF1-213 BAT	7.7918
945491	AF1-214 C	0.4392
945492	AF1-214 E	0.2928
DUCKCREEK	DUCKCREEK	0.2602
NEWTON	NEWTON	0.2385
FARMERCITY	FARMERCITY	0.0122
G-007A	G-007A	0.9590
VFT	VFT	2.6251
PRAIRIE	PRAIRIE	0.5579
COFFEEN	COFFEEN	0.1173
EDWARDS	EDWARDS	0.0798
CHEOAH	CHEOAH	0.0921
TILTON	TILTON	0.1430
MADISON	MADISON	0.0161
GIBSON	GIBSON	0.1218
CALDERWOOD	CALDERWOOD	0.0924
BLUEG	BLUEG	0.3854
TRIMBLE	TRIMBLE	0.1235
CATAWBA	CATAWBA	0.0546

13.5.8 Index 8

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
42137340	200593	26GLADE	PENELEC	200811	26WARREN	PENELEC	1	PN-P2-3-PN-345-003A	breaker	621.0	147.7	152.59	DC	30.57

Bus #	Bus	MW Impact
200642	26SENECA#1	11.2398
200643	26SENECA#2	10.6153
200644	26SENECA#3	1.0612
200649	26PENNTech	1.0703
200665	26SHAWVL 3	2.9713
200666	26SHAWVL 4	2.9187
200894	26K02	3.9122
200898	26AA1-106	1.2431
235003	AC1-025 E	0.1202
236828	01GRAYMONT	0.3311
290086	Q-036 E	2.7363
915952	Y3-092 NFTWR	143.9500
916202	Z1-069 E	5.4537
919491	AA2-000	41.4133
922932	AB1-082 OP	2.9396
923443	AB1-160 E	1.5582
923821	AB2-019 FTWR	4.0306
930511	AB1-092	1.5206
936421	AD2-055	3.1306
936991	AD2-133 C	1.2313
936992	AD2-133 E	5.6320
939171	AE1-147 C	0.9983
939172	AE1-147 E	0.6655
940201	AE2-001 C	0.9954
940202	AE2-001 E	0.6636
940681	AE2-055 C	0.9525
940682	AE2-055 E	0.6350
940861	AE2-074 C	2.2320
940862	AE2-074 E	2.9382
941191	AE2-113 C	11.0858
941192	AE2-113 E	11.9359
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.1559
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7706
941261	AE2-120 C	0.9939
941262	AE2-120 E	0.6626
941271	AE2-121 C	0.5334
941272	AE2-121 E	0.3561
941321	AE2-126 C	1.7676
941322	AE2-126 E	1.1784
941331	AE2-129 C	0.9711
941332	AE2-129 E	0.6474

Bus #	Bus	MW Impact
941351	AE2-131 C	0.9711
941352	AE2-131 E	0.6474
942351	AE2-248 C	0.7763
942352	AE2-248 E	0.5176
942491	AE2-262 C	4.7536
942492	AE2-262 E	3.1944
942501	AE2-263 C	4.4684
942502	AE2-263 E	2.9834
942813	AE2-299 BAT	29.7024
942961	AE2-316 C	3.6176
942962	AE2-316 E	5.1587
943751	AF1-043	4.9776
944001	AF1-068 C O2	0.5448
944002	AF1-068 E O2	0.3064
944311	AF1-099 C	3.8245
944312	AF1-099 E	2.5497
944321	AF1-100 C O2	18.3450
944322	AF1-100 E O2	12.2300
944382	AF1-103 BAT	10.7388
944392	AF1-104 BAT	3.0956
944471	AF1-112 C	0.5169
944472	AF1-112 E	0.3446
944671	AF1-132 C O2	0.5107
944672	AF1-132 E O2	0.3405
944691	AF1-134 C O1	0.3673
944692	AF1-134 E O1	0.3673
944701	AF1-135 C	0.4408
944702	AF1-135 E	0.2939
944771	AF1-142 C	6.1192
944772	AF1-142 E	4.0794
944841	AF1-149 C	0.9938
944842	AF1-149 E	0.6625
944881	AF1-153 C O2	1.6386
944882	AF1-153 E O2	1.0924
944901	AF1-155 C	1.6288
944902	AF1-155 E	1.0858
945071	AF1-172 C	7.6042
945072	AF1-172 E	5.0695
945161	AF1-181	0.0978
945171	AF1-182	0.4891
945181	AF1-183	0.0531
945331	AF1-198	0.0858
945481	AF1-213 C	3.9764
945482	AF1-213 E	2.6509
945491	AF1-214 C	0.5268
945492	AF1-214 E	0.3512
945551	AF1-220 C	15.5337
945552	AF1-220 E	10.3615
945771	AF1-242 C	1.6288
945772	AF1-242 E	1.0858
946091	AF1-274 C	7.8581
946092	AF1-274 E	5.2387

Bus #	Bus	MW Impact
946131	AF1-278	42.0788
946381	AF1-302 C	0.8373
946382	AF1-302 E	1.1163
946421	AF1-306 C	9.4557
946422	AF1-306 E	37.8230
DUCKCREEK	DUCKCREEK	1.5845
NEWTON	NEWTON	1.4216
FARMERCITY	FARMERCITY	0.0731
G-007A	G-007A	3.6418
VFT	VFT	9.9330
PRAIRIE	PRAIRIE	3.3088
COFFEEN	COFFEEN	0.7034
EDWARDS	EDWARDS	0.4854
CHEOAH	CHEOAH	0.5090
TILTON	TILTON	0.8625
MADISON	MADISON	0.0444
GIBSON	GIBSON	0.7240
CALDERWOOD	CALDERWOOD	0.5089
BLUEG	BLUEG	2.2672
TRIMBLE	TRIMBLE	0.7285
CATAWBA	CATAWBA	0.2835

13.5.9 Index 9

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
49459276	200599	26ERIE W	PENELEC	238547	02AT	ATSI	1	Base Case	single	1560.0	104.27	105.0	DC	25.31

Bus #	Bus	MW Impact
200608	26PINEY #1	1.0365
200642	26SENECA#1	9.8431
200643	26SENECA#2	9.2963
200644	26SENECA#3	0.9293
200649	26PENNTech	1.2689
200662	26SCRUB GR	4.0539
200805	26COLVER13 (Deactivation : 09/01/20)	12.9404
200828	26HNSMLK 1	2.7282
200829	26HNSMLK 2	2.7282
200830	26HNSMLK 3	2.7282
200831	26HNSMLK 4	2.7282
200832	26HNSMLK 5	2.7282
200849	26LAKVU GN	0.3599
200898	26AA1-106	2.5433
201144	W3-099 C OP1	6.4428
201201	26WRREN CT	2.8418
201477	26Y2-055	10.3498
203910	26Z1-091	2.3793
915951	Y3-092 FTIR	588.3200
919201	AA1-144 OP	19.2529
919491	AA2-000	63.2750
920341	AA2-132	2.5685
922932	AB1-082 OP	4.2204
930511	AB1-092	2.3233
935191	AD1-154	3.2292
936421	AD2-055	4.7832
936991	AD2-133 C	2.1296
938951	AE1-123	4.1434
939171	AE1-147 C	1.4423
939291	AE1-160 C	4.6863
939381	AE1-169 C O1	18.2141
940201	AE2-001 C	1.4391
940861	AE2-074 C	3.2045
941191	AE2-113 C	13.8465
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.6880
941261	AE2-120 C	1.4374
941271	AE2-121 C	0.7697
941321	AE2-126 C	1.9350
941331	AE2-129 C	1.5399
941351	AE2-131 C	1.5399
941421	AE2-139 C	7.2982
942351	AE2-248 C	1.1288

Bus #	Bus	MW Impact
942491	AE2-262 C	6.6768
942501	AE2-263 C	6.2761
942811	AE2-299 C	15.7184
942961	AE2-316 C	6.6875
943151	AE2-344 C	35.4183
943351	AF1-006 C	6.7809
943751	AF1-043	7.6053
943871	AF1-055 C O2	18.2679
944001	AF1-068 C O2	0.7933
944181	AF1-086 C O2	1.3369
944261	AF1-094 C	5.4823
944281	AF1-096 C	4.4280
944301	AF1-098 C	22.9061
944311	AF1-099 C	5.3717
944321	AF1-100 C O2	11.4040
944381	AF1-103 O2	7.1436
944391	AF1-104 O2	11.2794
944411	AF1-106 O2	1.4398
944471	AF1-112 C	0.7507
944671	AF1-132 C O2	0.7438
944691	AF1-134 C O1	0.6922
944701	AF1-135 C	0.8307
944741	AF1-139 C O1	0.8209
944771	AF1-142 C	8.5947
944841	AF1-149 C	1.4372
944881	AF1-153 C O2	1.0525
944901	AF1-155 C	1.0529
945021	AF1-167 C	0.7979
945051	AF1-170 C	24.9728
945071	AF1-172 C	11.1039
945121	AF1-177	1.7859
945161	AF1-181	0.0608
945171	AF1-182	0.3038
945181	AF1-183	0.0753
945331	AF1-198	0.1826
945451	AF1-210 C	0.7391
945481	AF1-213 C	6.5400
945491	AF1-214 C	0.7619
945521	AF1-217 C O2	6.0526
945551	AF1-220 C	18.7806
945751	AF1-240 C O2	1.0269
945771	AF1-242 C	1.0529
946091	AF1-274 C	4.4697
946131	AF1-278	47.4740
946211	AF1-286 C O2	0.5831
946221	AF1-287 C	6.0526
946381	AF1-302 C	1.5478
946401	AF1-304 C	21.0258
946421	AF1-306 C	5.2606
DUCKCREEK	DUCKCREEK	3.9681
NEWTON	NEWTON	3.5437
FARMERCITY	FARMERCITY	0.1822

Bus #	Bus	MW Impact
G-007A	G-007A	8.9475
VFT	VFT	24.3810
PRAIRIE	PRAIRIE	8.2294
COFFEEN	COFFEEN	1.7546
EDWARDS	EDWARDS	1.2166
CHEOAH	CHEOAH	1.2397
TILTON	TILTON	2.1565
MADISON	MADISON	0.0907
GIBSON	GIBSON	1.8040
CALDERWOOD	CALDERWOOD	1.2405
BLUEG	BLUEG	5.6368
TRIMBLE	TRIMBLE	1.8103
CATAWBA	CATAWBA	0.6755

13.5.10 Index 10

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
41184029	200674	26TOWANDA	PENELEC	200677	26NO MESHO	PENELEC	1	PN-P1-2-PN-230-013A	single	202.0	122.77	126.68	DC	7.9

Bus #	Bus	MW Impact
200649	26PENNTech	0.3018
200665	26SHAWVL 3	1.2430
200666	26SHAWVL 4	1.2132
200887	26ARMNA MT	0.4796
200898	26AA1-106	3.3133
200949	26X1-109	21.2878
203261	26BLOSSBCT	0.3948
203283	26MANOR_T86	0.0421
203349	26Z1-069 C	0.2024
203350	26MILZ1-092	0.4868
203351	26GROZ1-110	0.4625
203352	26CANZ2-011	0.4625
919201	AA1-144 OP	32.0050
919491	AA2-000	44.7721
920351	AA2-133	0.1861
922932	AB1-082 OP	1.6286
923442	AB1-160 C	0.0578
930511	AB1-092	1.6439
934801	AD1-108	0.0349
934811	AD1-109	0.0256
935061	AD1-142	0.0269
936421	AD2-055	3.3845
940861	AE2-074 C	1.2366
941191	AE2-113 C	3.4868
941421	AE2-139 C	10.9402
942491	AE2-262 C	2.5255
942501	AE2-263 C	2.3740
943751	AF1-043	10.1535
944311	AF1-099 C	3.8337
944321	AF1-100 C O2	7.9020
944411	AF1-106 O2	3.5054
944771	AF1-142 C	6.1339
945071	AF1-172 C	12.0300
945161	AF1-181	0.0409
945171	AF1-182	0.2033
945331	AF1-198	0.3721
946131	AF1-278	9.9041
946211	AF1-286 C O2	1.4197
LGEE	LGEE	0.3041
CPL	CPL	0.2117
WEC	WEC	0.1739

Bus #	Bus	MW Impact
CBM-W2	CBM-W2	4.1359
CBM-W1	CBM-W1	7.2058
TVA	TVA	0.6622
CBM-S2	CBM-S2	2.1155
CBM-S1	CBM-S1	4.1237
MEC	MEC	0.8485

13.5.11 Index 11

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
42421229	200675	26E.TWANDA	PENELEC	200924	26CANYON	PENELEC	1	Base Case	single	515.0	103.47	106.4	DC	15.13

Bus #	Bus	MW Impact
200642	26SENECA#1	2.7894
200643	26SENECA#2	2.6344
200649	26PENNTech	0.5618
200665	26SHAWVL 3	2.3763
200666	26SHAWVL 4	2.3188
200715	26SHAWVL 1	1.5716
200722	26SHAWVL 2	1.6043
200887	26ARMNA MT	0.6693
200898	26AA1-106	6.0058
200913	26SHAW-D	0.0723
200949	26X1-109	42.4561
201477	26Y2-055	1.9054
203261	26BLOSSBCT	0.6572
203283	26MANOR_T86	0.0501
203349	26Z1-069 C	0.3211
203350	26MILZ1-092	0.7063
203351	26GROZ1-110	0.8383
203352	26CANZ2-011	0.8383
919201	AA1-144 OP	63.7835
919491	AA2-000	87.5163
920351	AA2-133	0.3184
922932	AB1-082 OP	2.7054
923442	AB1-160 C	0.0917
930511	AB1-092	3.2133
934801	AD1-108	0.0632
934811	AD1-109	0.0463
935061	AD1-142	0.0390
936421	AD2-055	6.6157
939171	AE1-147 C	0.8133
940201	AE2-001 C	0.8099
940681	AE2-055 C	0.7569
940861	AE2-074 C	2.0542
941191	AE2-113 C	6.3051
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.0362
941261	AE2-120 C	0.8079
941271	AE2-121 C	0.4356
941321	AE2-126 C	1.0838
941331	AE2-129 C	0.7609
941351	AE2-131 C	0.7609
941421	AE2-139 C	21.7122
942351	AE2-248 C	0.6232
942491	AE2-262 C	4.8485

Bus #	Bus	MW Impact
942501	AE2-263 C	4.5576
942961	AE2-316 C	2.5479
943751	AF1-043	19.8471
944001	AF1-068 C O2	0.4357
944311	AF1-099 C	7.3600
944321	AF1-100 C O2	15.1290
944381	AF1-103 O2	0.6960
944411	AF1-106 O2	5.0856
944471	AF1-112 C	0.4160
944671	AF1-132 C O2	0.4084
944771	AF1-142 C	11.7760
944841	AF1-149 C	0.8077
944881	AF1-153 C O2	1.0640
944901	AF1-155 C	1.0591
945071	AF1-172 C	23.3955
945121	AF1-177	0.1740
945161	AF1-181	0.0782
945171	AF1-182	0.3886
945181	AF1-183	0.0923
945331	AF1-198	0.6195
945481	AF1-213 C	3.1726
945491	AF1-214 C	0.4283
945551	AF1-220 C	8.4685
945771	AF1-242 C	1.0591
946091	AF1-274 C	4.6466
946131	AF1-278	17.9548
946211	AF1-286 C O2	2.0597
946381	AF1-302 C	0.5897
946421	AF1-306 C	5.4706
LGEE	LGEE	0.5414
CPLE	CPLE	0.3698
WEC	WEC	0.3100
CBM-W2	CBM-W2	7.3546
CBM-W1	CBM-W1	12.8728
TVA	TVA	1.1746
CBM-S2	CBM-S2	3.7223
CBM-S1	CBM-S1	7.3187
MEC	MEC	1.5111

13.5.12 Index 12

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
42137256	200767	26HOMER CT	PENELEC	200795	26SHELOCTA	PENELEC	1	PN_P4-500-002F	breaker	917.0	142.66	144.61	DC	38.97

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	28.9164
200794	26CONEMAGH	0.4629
200805	26COLVER13 (Deactivation : 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

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

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

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

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

13.5.13 Index 13

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
42137705	200769	26HOMER CY	PENELEC	999391	STAR602	PENELEC	S	PN-P2-3-PN-230-9I	breaker	824.0	104.06	105.35	DC	23.21

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2717
200830	26HNSMLK 3	1.8721
200831	26HNSMLK 4	1.8721
200832	26HNSMLK 5	1.8721
200838	26HOMER C2	44.9320
200839	26HOMER C3	47.5664
200894	26K02	6.9120
200898	26AA1-106	3.0332
201144	W3-099 C OP1	1.8308
201477	26Y2-055	4.7671
203349	26Z1-069 C	0.4972
203907	26Y2-042	1.4864
203909	26Z1-038	2.2394
203910	26Z1-091	3.0401
203999	P-047 E	16.3118
294573	P-028 E	13.6303
903644	W3-099 E OP1	12.2520
915951	Y3-092 FTIR	139.9800
916202	Z1-069 E	15.1860
917672	Z2-108 E	-1.8948
917673	Z2-108 BAT	2.2291
918682	AA1-082 E	8.2061
919201	AA1-144 OP	23.0880
919491	AA2-000	46.8364
920341	AA2-132	3.4162
922932	AB1-082 OP	5.4174
923442	AB1-160 C	0.1421
923443	AB1-160 E	4.3388
930511	AB1-092	1.7197
936421	AD2-055	3.5405
938352	AE1-053 BAT	1.2384
938882	AE1-116 BAT	1.2931
938951	AE1-123	1.9612
939291	AE1-160 C	1.6595
939292	AE1-160 E	0.9539
939381	AE1-169 C O1	6.6460
939382	AE1-169 E O1	4.4307
940861	AE2-074 C	4.1134
940862	AE2-074 E	5.4147
941191	AE2-113 C	11.7254
941192	AE2-113 E	12.6244

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1359
941322	AE2-126 E	0.7572
941421	AE2-139 C	8.2208
941422	AE2-139 E	5.4805
942491	AE2-262 C	3.4757
942492	AE2-262 E	2.3356
942501	AE2-263 C	3.2671
942502	AE2-263 E	2.1813
942811	AE2-299 C	4.5541
942812	AE2-299 E	18.2164
942961	AE2-316 C	5.6133
942962	AE2-316 E	8.0046
943151	AE2-344 C	9.6163
943152	AE2-344 E	6.4109
943351	AF1-006 C	0.8870
943352	AF1-006 E	0.4989
943751	AF1-043	5.6295
943871	AF1-055 C O2	3.8939
943872	AF1-055 E O2	2.5960
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8311
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5950
944302	AF1-098 E	2.3967
944311	AF1-099 C	2.7963
944312	AF1-099 E	1.8642
944321	AF1-100 C O2	6.2750
944322	AF1-100 E O2	4.1833
944381	AF1-103 O2	1.7418
944391	AF1-104 O2	1.3169
944411	AF1-106 O2	1.9661
944741	AF1-139 C O1	1.0918
944742	AF1-139 E O1	0.7279
944771	AF1-142 C	4.4741
944772	AF1-142 E	2.9827
944881	AF1-153 C O2	0.7112
944882	AF1-153 E O2	0.4741
944901	AF1-155 C	0.7133
944902	AF1-155 E	0.4755
945021	AF1-167 C	0.6321
945022	AF1-167 E	0.4214
945051	AF1-170 C	3.2231
945052	AF1-170 E	2.1487
945071	AF1-172 C	7.4806
945072	AF1-172 E	4.9870
945121	AF1-177	0.4355
945161	AF1-181	0.0327
945171	AF1-182	0.1632
945331	AF1-198	0.2579
945451	AF1-210 C	0.6037
945452	AF1-210 E	0.4024

Bus #	Bus	MW Impact
945521	AF1-217 C O2	0.8790
945522	AF1-217 E O2	0.5860
945551	AF1-220 C	5.8845
945552	AF1-220 E	3.9252
945673	AF1-232 BAT	2.8720
945771	AF1-242 C	0.7133
945772	AF1-242 E	0.4755
946091	AF1-274 C	2.7727
946092	AF1-274 E	1.8485
946131	AF1-278	51.4694
946211	AF1-286 C O2	0.7963
946212	AF1-286 E O2	0.5407
946221	AF1-287 C	0.8790
946222	AF1-287 E	0.5860
946381	AF1-302 C	1.2991
946382	AF1-302 E	1.7322
946401	AF1-304 C	4.1375
946402	AF1-304 E	2.7583
946421	AF1-306 C	3.4725
946422	AF1-306 E	13.8902
LGEE	LGEE	0.0713
WEC	WEC	0.0728
CBM-W2	CBM-W2	0.4423
CBM-W1	CBM-W1	4.7413
O-066	O-066	4.0320
CHEOAH	CHEOAH	0.0771
G-007	G-007	0.7426
MEC	MEC	0.2590
CALDERWOOD	CALDERWOOD	0.0731
CATAWBA	CATAWBA	0.1239

13.5.14 Index 14

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
42137479	200769	26HOMER CY	PENELEC	999392	STAR601	PENELEC	N	PN-P2-3-PN-230-9E	breaker	807.0	123.29	124.61	DC	23.13

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2695
200830	26HNSMLK 3	1.8760
200831	26HNSMLK 4	1.8760
200832	26HNSMLK 5	1.8760
200838	26HOMER C2	45.1077
200839	26HOMER C3	47.7524
200894	26K02	6.9091
200898	26AA1-106	3.0352
201144	W3-099 C OP1	1.8313
201477	26Y2-055	4.7720
203349	26Z1-069 C	0.4984
203907	26Y2-042	1.4811
203909	26Z1-038	2.2372
203910	26Z1-091	3.0422
203999	P-047 E	16.3426
294573	P-028 E	13.6170
903644	W3-099 E OP1	12.2557
915951	Y3-092 FTIR	139.8800
916202	Z1-069 E	15.2211
917672	Z2-108 E	-1.9186
917673	Z2-108 BAT	2.2572
918682	AA1-082 E	8.2095
919201	AA1-144 OP	23.0963
919491	AA2-000	46.7537
920341	AA2-132	3.4204
922932	AB1-082 OP	5.4301
923442	AB1-160 C	0.1424
923443	AB1-160 E	4.3489
930511	AB1-092	1.7167
936421	AD2-055	3.5343
938352	AE1-053 BAT	1.2540
938882	AE1-116 BAT	1.3081
938951	AE1-123	1.9587
939291	AE1-160 C	1.6593
939292	AE1-160 E	0.9538
939381	AE1-169 C O1	6.6451
939382	AE1-169 E O1	4.4301
940861	AE2-074 C	4.1231
940862	AE2-074 E	5.4274
941191	AE2-113 C	11.7440
941192	AE2-113 E	12.6445

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1333
941322	AE2-126 E	0.7555
941421	AE2-139 C	8.2218
941422	AE2-139 E	5.4812
942491	AE2-262 C	3.4582
942492	AE2-262 E	2.3239
942501	AE2-263 C	3.2507
942502	AE2-263 E	2.1704
942811	AE2-299 C	4.5557
942812	AE2-299 E	18.2229
942961	AE2-316 C	5.6140
942962	AE2-316 E	8.0056
943151	AE2-344 C	9.6181
943152	AE2-344 E	6.4121
943351	AF1-006 C	0.8869
943352	AF1-006 E	0.4989
943751	AF1-043	5.6195
943871	AF1-055 C O2	3.8992
943872	AF1-055 E O2	2.5995
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8310
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5963
944302	AF1-098 E	2.3975
944311	AF1-099 C	2.7823
944312	AF1-099 E	1.8549
944321	AF1-100 C O2	6.2514
944322	AF1-100 E O2	4.1676
944381	AF1-103 O2	1.7437
944391	AF1-104 O2	1.3164
944411	AF1-106 O2	1.9691
944741	AF1-139 C O1	1.0931
944742	AF1-139 E O1	0.7288
944771	AF1-142 C	4.4516
944772	AF1-142 E	2.9678
944881	AF1-153 C O2	0.7105
944882	AF1-153 E O2	0.4736
944901	AF1-155 C	0.7125
944902	AF1-155 E	0.4750
945021	AF1-167 C	0.6319
945022	AF1-167 E	0.4212
945051	AF1-170 C	3.2227
945052	AF1-170 E	2.1485
945071	AF1-172 C	7.4637
945072	AF1-172 E	4.9758
945121	AF1-177	0.4359
945161	AF1-181	0.0326
945171	AF1-182	0.1626
945331	AF1-198	0.2584
945451	AF1-210 C	0.6033
945452	AF1-210 E	0.4022

Bus #	Bus	MW Impact
945521	AF1-217 C O2	0.8792
945522	AF1-217 E O2	0.5861
945551	AF1-220 C	5.8816
945552	AF1-220 E	3.9232
945673	AF1-232 BAT	2.9054
945771	AF1-242 C	0.7125
945772	AF1-242 E	0.4750
946091	AF1-274 C	2.7681
946092	AF1-274 E	1.8454
946131	AF1-278	51.5931
946211	AF1-286 C O2	0.7975
946212	AF1-286 E O2	0.5415
946221	AF1-287 C	0.8792
946222	AF1-287 E	0.5861
946381	AF1-302 C	1.2993
946382	AF1-302 E	1.7324
946401	AF1-304 C	4.1369
946402	AF1-304 E	2.7580
946421	AF1-306 C	3.4691
946422	AF1-306 E	13.8766
LGEE	LGEE	0.0217
WEC	WEC	0.0454
CBM-W1	CBM-W1	3.6654
O-066	O-066	4.6435
CHEOAH	CHEOAH	0.1211
G-007	G-007	0.8382
MEC	MEC	0.1208
CALDERWOOD	CALDERWOOD	0.1168
CATAWBA	CATAWBA	0.1551

13.5.15 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
42137266	200795	26SHELOCTA	PENELEC	200810	26KEYSTONE	PENELEC	1	PN_P4-500-002A	breaker	917.0	121.7	123.9	DC	44.01

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	32.5076
200636	26IUP CO-G	0.6752
200794	26CONEMAGH	0.5468
200805	26COLVER13 (Deactivation : 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

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

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

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

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
42137372	200810	26KEYSTONE	PENELEC	999401	STAR592	PJM	4	PJM500_PN_P4-500-001D	breaker	635.0	101.65	103.43	DC	24.75

Bus #	Bus	MW Impact
200503	26C.SLOPE (Deactivation : 06/07/19)	16.7325
200636	26IUP CO-G	0.4069
200794	26CONEMAGH	0.2755
200805	26COLVER13 (Deactivation : 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

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

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

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

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
41789225	235248	01SHINGL	AP	200513	26LEWISTWN	PENELEC	1	AP-P2-2-WP-230-001T	bus	570.0	131.51	151.81	DC	115.72

Bus #	Bus	MW Impact
200665	26SHAWVL 3	11.2213
200666	26SHAWVL 4	11.0429
200715	26SHAWVL 1	6.8508
200722	26SHAWVL 2	7.0238
200894	26K02	13.1208
200898	26AA1-106	2.6976
200905	26Q36	0.2708
200913	26SHAW-D	0.2828
203352	26CANZ2-011	0.4430
235003	AC1-025 E	0.9180
236828	01GRAYMONT	2.3847
290086	Q-036 E	7.7608
919491	AA2-000	169.8793
930511	AB1-092	6.2375
936421	AD2-055	12.8419
936991	AD2-133 C	3.4924
936992	AD2-133 E	15.9737
939171	AE1-147 C	7.1243
939172	AE1-147 E	4.7495
940201	AE2-001 C	7.1412
940202	AE2-001 E	4.7608
940681	AE2-055 C	7.3998
940682	AE2-055 E	4.9332
941251	AE2-119 C (Withdrawn : 12/16/2019)	4.0520
941252	AE2-119 E (Withdrawn : 12/16/2019)	2.7014
941261	AE2-120 C	7.1504
941262	AE2-120 E	4.7670
941271	AE2-121 C	3.7720
941272	AE2-121 E	2.5186
941321	AE2-126 C	2.6525
941322	AE2-126 E	1.7683
941331	AE2-129 C	3.1049
941332	AE2-129 E	2.0699
941351	AE2-131 C	3.1049
941352	AE2-131 E	2.0699
941421	AE2-139 C	7.8236
941422	AE2-139 E	5.2157
942351	AE2-248 C	5.8335
942352	AE2-248 E	3.8890
942491	AE2-262 C	26.1095
942492	AE2-262 E	17.5456

Bus #	Bus	MW Impact
942501	AE2-263 C	24.5429
942502	AE2-263 E	16.3863
943751	AF1-043	38.5255
944001	AF1-068 C O2	7.8216
944002	AF1-068 E O2	4.3996
944181	AF1-086 C O2	1.2704
944182	AF1-086 E O2	5.5268
944311	AF1-099 C	39.6342
944312	AF1-099 E	26.4228
944321	AF1-100 C O2	69.4320
944322	AF1-100 E O2	46.2880
944471	AF1-112 C	7.2631
944472	AF1-112 E	4.8421
944671	AF1-132 C O2	7.3327
944672	AF1-132 E O2	4.8885
944691	AF1-134 C O1	2.2470
944692	AF1-134 E O1	2.2470
944701	AF1-135 C	2.6964
944702	AF1-135 E	1.7976
944771	AF1-142 C	63.4148
944772	AF1-142 E	42.2765
944841	AF1-149 C	7.1515
944842	AF1-149 E	4.7677
945071	AF1-172 C	61.3380
945072	AF1-172 E	40.8920
945161	AF1-181	0.3692
945171	AF1-182	1.8506
945181	AF1-183	0.4023
945481	AF1-213 C	25.4386
945482	AF1-213 E	16.9591
945491	AF1-214 C	7.1500
945492	AF1-214 E	4.7666
945551	AF1-220 C	5.7668
945552	AF1-220 E	3.8467
946091	AF1-274 C	10.0853
946092	AF1-274 E	6.7235
946312	AF1-295 BAT	1.5296
LGEE	LGEE	0.0673
WEC	WEC	0.0444
CBM-W2	CBM-W2	0.6962
CBM-W1	CBM-W1	2.1267
TVA	TVA	0.0672
O-066	O-066	5.0266
CBM-S1	CBM-S1	0.5197
G-007	G-007	0.8403
MEC	MEC	0.1907
CATAWBA	CATAWBA	0.0231

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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
42704084	239036	02PERRY	ATSI	239334	02L.CENTER	ATSI	1	ATSI-P7-1-CEI-345-012	tower	1667.0	129.68	130.45	DC	27.78

Bus #	Bus	MW Impact
200828	26HNSMLK 1	1.8459
200829	26HNSMLK 2	1.8459
200830	26HNSMLK 3	1.8459
200831	26HNSMLK 4	1.8459
200832	26HNSMLK 5	1.8459
200849	26LAKVU GN	0.2451
200894	26K02	4.6600
200898	26AA1-106	1.6646
201144	W3-099 C OP1	4.3853
201477	26Y2-055	5.9490
203999	P-047 E	7.1703
239035	02PERRG1 (Deactivation : 05/31/21)	86.6075
903644	W3-099 E OP1	29.3477
915951	Y3-092 FTIR	401.5000
916202	Z1-069 E	6.1087
919491	AA2-000	41.5667
920341	AA2-132	1.6820
922932	AB1-082 OP	2.3870
923443	AB1-160 E	1.7453
930511	AB1-092	1.5262
935191	AD1-154	2.1388
936421	AD2-055	3.1422
938951	AE1-123	2.3510
939291	AE1-160 C	3.1714
939292	AE1-160 E	1.8230
939381	AE1-169 C O1	10.4699
939382	AE1-169 E O1	6.9799
940861	AE2-074 C	1.8125
940862	AE2-074 E	2.3858
941191	AE2-113 C	7.8448
941192	AE2-113 E	8.4463
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.1107
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7405
941321	AE2-126 C	1.2815
941322	AE2-126 E	0.8544
941331	AE2-129 C	1.0082
941332	AE2-129 E	0.6721
941351	AE2-131 C	1.0082
941352	AE2-131 E	0.6721
941421	AE2-139 C	4.7616
941422	AE2-139 E	3.1744

Bus #	Bus	MW Impact
942491	AE2-262 C	4.3809
942492	AE2-262 E	2.9440
942501	AE2-263 C	4.1180
942502	AE2-263 E	2.7495
942811	AE2-299 C	10.6970
942812	AE2-299 E	42.7878
942961	AE2-316 C	4.4304
942962	AE2-316 E	6.3178
943151	AE2-344 C	24.1162
943152	AE2-344 E	16.0775
943351	AF1-006 C	4.6204
943352	AF1-006 E	2.5990
943751	AF1-043	4.9961
943871	AF1-055 C O2	12.4066
943872	AF1-055 E O2	8.2711
944181	AF1-086 C O2	0.8730
944182	AF1-086 E O2	3.7982
944261	AF1-094 C	3.7262
944262	AF1-094 E	2.4842
944281	AF1-096 C	2.9966
944282	AF1-096 E	1.9978
944301	AF1-098 C	15.5808
944302	AF1-098 E	10.3872
944311	AF1-099 C	3.5246
944312	AF1-099 E	2.3497
944321	AF1-100 C O2	7.5103
944322	AF1-100 E O2	5.0069
944381	AF1-103 O2	2.1763
944391	AF1-104 O2	7.6928
944411	AF1-106 O2	0.9455
944691	AF1-134 C O1	0.4537
944692	AF1-134 E O1	0.4537
944701	AF1-135 C	0.5444
944702	AF1-135 E	0.3629
944741	AF1-139 C O1	0.5376
944742	AF1-139 E O1	0.3584
944771	AF1-142 C	5.6394
944772	AF1-142 E	3.7596
944881	AF1-153 C O2	0.6979
944882	AF1-153 E O2	0.4653
944901	AF1-155 C	0.6981
944902	AF1-155 E	0.4654
945021	AF1-167 C	0.5280
945022	AF1-167 E	0.3520
945051	AF1-170 C	17.0195
945052	AF1-170 E	11.3463
945071	AF1-172 C	7.3028
945072	AF1-172 E	4.8686
945121	AF1-177	0.5441
945161	AF1-181	0.0400
945171	AF1-182	0.2001
945181	AF1-183	0.0496

Bus #	Bus	MW Impact
945331	AF1-198	0.1200
945451	AF1-210 C	0.4873
945452	AF1-210 E	0.3249
945481	AF1-213 C	4.2944
945482	AF1-213 E	2.8629
945521	AF1-217 C O2	4.1209
945522	AF1-217 E O2	2.7473
945551	AF1-220 C	5.6238
945552	AF1-220 E	3.7512
945751	AF1-240 C O2	0.6801
945752	AF1-240 E O2	0.4534
945771	AF1-242 C	0.6981
945772	AF1-242 E	0.4654
946091	AF1-274 C	2.9636
946092	AF1-274 E	1.9757
946131	AF1-278	14.3242
946211	AF1-286 C O2	0.3829
946212	AF1-286 E O2	0.2600
946221	AF1-287 C	4.1209
946222	AF1-287 E	2.7473
946381	AF1-302 C	1.0254
946382	AF1-302 E	1.3672
946401	AF1-304 C	6.4026
946402	AF1-304 E	4.2684
946421	AF1-306 C	3.4932
946422	AF1-306 E	13.9727
DUCKCREEK	DUCKCREEK	3.4130
NEWTON	NEWTON	3.0752
FARMERCITY	FARMERCITY	0.1585
G-007A	G-007A	4.8382
VFT	VFT	13.2289
PRAIRIE	PRAIRIE	7.1911
COFFEEN	COFFEEN	1.5205
EDWARDS	EDWARDS	1.0448
CHEOAH	CHEOAH	1.1461
TILTON	TILTON	1.8579
MADISON	MADISON	0.0625
GIBSON	GIBSON	1.5648
CALDERWOOD	CALDERWOOD	1.1451
BLUEG	BLUEG	4.9059
TRIMBLE	TRIMBLE	1.5749
CATAWBA	CATAWBA	0.6685

13.5.19 Index 19

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
42704154	239036	02PERRY	ATSI	238684	02EASTLK	ATSI	1	ATSI-P7-1-CEI-345-016	tower	1667.0	121.95	122.69	DC	26.84

Bus #	Bus	MW Impact
200828	26HNSMLK 1	1.7839
200829	26HNSMLK 2	1.7839
200830	26HNSMLK 3	1.7839
200831	26HNSMLK 4	1.7839
200832	26HNSMLK 5	1.7839
200849	26LAKVU GN	0.2369
200894	26K02	4.5011
200898	26AA1-106	1.6078
201144	W3-099 C OP1	4.2385
201477	26Y2-055	5.7491
203999	P-047 E	6.9260
239035	02PERRG1 (Deactivation : 05/31/21)	81.5353
903644	W3-099 E OP1	28.3655
915951	Y3-092 FTIR	388.0700
916202	Z1-069 E	5.9015
919491	AA2-000	40.1539
920341	AA2-132	1.6247
922932	AB1-082 OP	2.3062
923443	AB1-160 E	1.6861
930511	AB1-092	1.4743
935191	AD1-154	2.0660
936421	AD2-055	3.0354
938951	AE1-123	2.2713
939291	AE1-160 C	3.0649
939292	AE1-160 E	1.7617
939381	AE1-169 C O1	10.1175
939382	AE1-169 E O1	6.7450
940861	AE2-074 C	1.7511
940862	AE2-074 E	2.3050
941191	AE2-113 C	7.5792
941192	AE2-113 E	8.1604
941251	AE2-119 C (Withdrawn : 12/16/2019)	1.0728
941252	AE2-119 E (Withdrawn : 12/16/2019)	0.7152
941321	AE2-126 C	1.2381
941322	AE2-126 E	0.8254
941331	AE2-129 C	0.9737
941332	AE2-129 E	0.6491
941351	AE2-131 C	0.9737
941352	AE2-131 E	0.6491
941421	AE2-139 C	4.5986
941422	AE2-139 E	3.0657

Bus #	Bus	MW Impact
942491	AE2-262 C	4.2317
942492	AE2-262 E	2.8437
942501	AE2-263 C	3.9778
942502	AE2-263 E	2.6558
942811	AE2-299 C	10.3389
942812	AE2-299 E	41.3555
942961	AE2-316 C	4.2798
942962	AE2-316 E	6.1030
943151	AE2-344 C	23.3096
943152	AE2-344 E	15.5397
943351	AF1-006 C	4.4658
943352	AF1-006 E	2.5120
943751	AF1-043	4.8263
943871	AF1-055 C O2	11.9908
943872	AF1-055 E O2	7.9939
944181	AF1-086 C O2	0.8432
944182	AF1-086 E O2	3.6682
944261	AF1-094 C	3.6013
944262	AF1-094 E	2.4009
944281	AF1-096 C	2.8960
944282	AF1-096 E	1.9306
944301	AF1-098 C	15.0590
944302	AF1-098 E	10.0394
944311	AF1-099 C	3.4046
944312	AF1-099 E	2.2697
944321	AF1-100 C O2	7.2549
944322	AF1-100 E O2	4.8366
944381	AF1-103 O2	2.1031
944391	AF1-104 O2	7.4356
944411	AF1-106 O2	0.9133
944691	AF1-134 C O1	0.4382
944692	AF1-134 E O1	0.4382
944701	AF1-135 C	0.5258
944702	AF1-135 E	0.3505
944741	AF1-139 C O1	0.5192
944742	AF1-139 E O1	0.3462
944771	AF1-142 C	5.4473
944772	AF1-142 E	3.6316
944881	AF1-153 C O2	0.6742
944882	AF1-153 E O2	0.4495
944901	AF1-155 C	0.6744
944902	AF1-155 E	0.4496
945021	AF1-167 C	0.5100
945022	AF1-167 E	0.3400
945051	AF1-170 C	16.4503
945052	AF1-170 E	10.9669
945071	AF1-172 C	7.0542
945072	AF1-172 E	4.7028
945121	AF1-177	0.5258
945161	AF1-181	0.0387
945171	AF1-182	0.1933
945181	AF1-183	0.0479

Bus #	Bus	MW Impact
945331	AF1-198	0.1159
945451	AF1-210 C	0.4706
945452	AF1-210 E	0.3137
945481	AF1-213 C	4.1479
945482	AF1-213 E	2.7653
945521	AF1-217 C O2	3.9829
945522	AF1-217 E O2	2.6553
945551	AF1-220 C	5.4331
945552	AF1-220 E	3.6241
945751	AF1-240 C O2	0.6570
945752	AF1-240 E O2	0.4380
945771	AF1-242 C	0.6744
945772	AF1-242 E	0.4496
946091	AF1-274 C	2.8630
946092	AF1-274 E	1.9087
946131	AF1-278	13.8404
946211	AF1-286 C O2	0.3699
946212	AF1-286 E O2	0.2512
946221	AF1-287 C	3.9829
946222	AF1-287 E	2.6553
946381	AF1-302 C	0.9905
946382	AF1-302 E	1.3207
946401	AF1-304 C	6.1872
946402	AF1-304 E	4.1248
946421	AF1-306 C	3.3746
946422	AF1-306 E	13.4982
DUCKCREEK	DUCKCREEK	3.2587
NEWTON	NEWTON	2.9366
FARMERCITY	FARMERCITY	0.1514
G-007A	G-007A	4.6607
VFT	VFT	12.7452
PRAIRIE	PRAIRIE	6.8682
COFFEEN	COFFEEN	1.4518
EDWARDS	EDWARDS	0.9975
CHEOAH	CHEOAH	1.0961
TILTON	TILTON	1.7741
MADISON	MADISON	0.0645
GIBSON	GIBSON	1.4944
CALDERWOOD	CALDERWOOD	1.0944
BLUEG	BLUEG	4.6872
TRIMBLE	TRIMBLE	1.5048
CATAWBA	CATAWBA	0.6395

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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
41789244	938380	AE1-071 TAP	PENELEC	200520	26ROXBURY	PENELEC	1	AP-P2-2-WP-230-001T	bus	160.0	113.95	117.87	DC	13.9

Bus #	Bus	MW Impact
235003	AC1-025 E	0.0892
236828	01GRAYMONT	0.2325
938381	AE1-071 C	39.2279
938382	AE1-071 E	24.0042
939171	AE1-147 C	0.6950
939172	AE1-147 E	0.4634
940201	AE2-001 C	0.6965
940202	AE2-001 E	0.4643
940681	AE2-055 C	0.7179
940682	AE2-055 E	0.4786
941231	AE2-117 C	0.6693
941232	AE2-117 E	0.4462
941241	AE2-118 C	0.6693
941242	AE2-118 E	0.4462
941261	AE2-120 C	0.6973
941262	AE2-120 E	0.4648
941271	AE2-121 C	0.3682
941272	AE2-121 E	0.2459
942031	AE2-215 C	10.8814
942032	AE2-215 E	7.2542
942351	AE2-248 C	0.5671
942352	AE2-248 E	0.3781
942491	AE2-262 C	2.6001
942492	AE2-262 E	1.7473
942501	AE2-263 C	2.4441
942502	AE2-263 E	1.6319
942511	AE2-264 C	2.2028
942512	AE2-264 E	1.4685
944001	AF1-068 C O2	0.4027
944002	AF1-068 E O2	0.2265
944311	AF1-099 C	2.0919
944312	AF1-099 E	1.3946
944321	AF1-100 C O2	3.7572
944322	AF1-100 E O2	2.5048
944471	AF1-112 C	0.3745
944472	AF1-112 E	0.2496
944671	AF1-132 C O2	0.3775
944672	AF1-132 E O2	0.2517
944731	AF1-138 C O2	0.3547
944732	AF1-138 E O2	0.2365
944771	AF1-142 C	3.3471

Bus #	Bus	MW Impact
944772	AF1-142 E	2.2314
944841	AF1-149 C	0.6973
944842	AF1-149 E	0.4648
945161	AF1-181	0.0200
945171	AF1-182	0.1003
945181	AF1-183	0.0226
945491	AF1-214 C	0.3695
945492	AF1-214 E	0.2463
946311	AF1-295	3.6271
DUCKCREEK	DUCKCREEK	0.1578
NEWTON	NEWTON	0.1569
FARMERCITY	FARMERCITY	0.0086
G-007A	G-007A	0.9350
VFT	VFT	2.6445
PRAIRIE	PRAIRIE	0.4081
COFFEEN	COFFEEN	0.0772
EDWARDS	EDWARDS	0.0469
CHEOAH	CHEOAH	0.1136
TILTON	TILTON	0.0857
GIBSON	GIBSON	0.0781
CALDERWOOD	CALDERWOOD	0.1113
BLUEG	BLUEG	0.2500
TRIMBLE	TRIMBLE	0.0796
CATAWBA	CATAWBA	0.1011

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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
42137709	999391	STAR602	PENELEC	200767	26HOMER CT	PENELEC	S	PN-P2-3-PN-230-9I	breaker	824.0	104.06	105.35	DC	23.21

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2717
200830	26HNSMLK 3	1.8721
200831	26HNSMLK 4	1.8721
200832	26HNSMLK 5	1.8721
200838	26HOMER C2	44.9320
200839	26HOMER C3	47.5664
200894	26K02	6.9120
200898	26AA1-106	3.0332
201144	W3-099 C OP1	1.8308
201477	26Y2-055	4.7671
203349	26Z1-069 C	0.4972
203907	26Y2-042	1.4864
203909	26Z1-038	2.2394
203910	26Z1-091	3.0401
203999	P-047 E	16.3118
294573	P-028 E	13.6303
903644	W3-099 E OP1	12.2520
915951	Y3-092 FTIR	139.9800
916202	Z1-069 E	15.1860
917672	Z2-108 E	-1.8948
917673	Z2-108 BAT	2.2291
918682	AA1-082 E	8.2061
919201	AA1-144 OP	23.0880
919491	AA2-000	46.8364
920341	AA2-132	3.4162
922932	AB1-082 OP	5.4174
923442	AB1-160 C	0.1421
923443	AB1-160 E	4.3388
930511	AB1-092	1.7197
936421	AD2-055	3.5405
938352	AE1-053 BAT	1.2384
938882	AE1-116 BAT	1.2931
938951	AE1-123	1.9612
939291	AE1-160 C	1.6595
939292	AE1-160 E	0.9539
939381	AE1-169 C O1	6.6460
939382	AE1-169 E O1	4.4307
940861	AE2-074 C	4.1134
940862	AE2-074 E	5.4147
941191	AE2-113 C	11.7254
941192	AE2-113 E	12.6244

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1359
941322	AE2-126 E	0.7572
941421	AE2-139 C	8.2208
941422	AE2-139 E	5.4805
942491	AE2-262 C	3.4757
942492	AE2-262 E	2.3356
942501	AE2-263 C	3.2671
942502	AE2-263 E	2.1813
942811	AE2-299 C	4.5541
942812	AE2-299 E	18.2164
942961	AE2-316 C	5.6133
942962	AE2-316 E	8.0046
943151	AE2-344 C	9.6163
943152	AE2-344 E	6.4109
943351	AF1-006 C	0.8870
943352	AF1-006 E	0.4989
943751	AF1-043	5.6295
943871	AF1-055 C O2	3.8939
943872	AF1-055 E O2	2.5960
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8311
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5950
944302	AF1-098 E	2.3967
944311	AF1-099 C	2.7963
944312	AF1-099 E	1.8642
944321	AF1-100 C O2	6.2750
944322	AF1-100 E O2	4.1833
944381	AF1-103 O2	1.7418
944391	AF1-104 O2	1.3169
944411	AF1-106 O2	1.9661
944741	AF1-139 C O1	1.0918
944742	AF1-139 E O1	0.7279
944771	AF1-142 C	4.4741
944772	AF1-142 E	2.9827
944881	AF1-153 C O2	0.7112
944882	AF1-153 E O2	0.4741
944901	AF1-155 C	0.7133
944902	AF1-155 E	0.4755
945021	AF1-167 C	0.6321
945022	AF1-167 E	0.4214
945051	AF1-170 C	3.2231
945052	AF1-170 E	2.1487
945071	AF1-172 C	7.4806
945072	AF1-172 E	4.9870
945121	AF1-177	0.4355
945161	AF1-181	0.0327
945171	AF1-182	0.1632
945331	AF1-198	0.2579
945451	AF1-210 C	0.6037
945452	AF1-210 E	0.4024

Bus #	Bus	MW Impact
945521	AF1-217 C O2	0.8790
945522	AF1-217 E O2	0.5860
945551	AF1-220 C	5.8845
945552	AF1-220 E	3.9252
945673	AF1-232 BAT	2.8720
945771	AF1-242 C	0.7133
945772	AF1-242 E	0.4755
946091	AF1-274 C	2.7727
946092	AF1-274 E	1.8485
946131	AF1-278	51.4694
946211	AF1-286 C O2	0.7963
946212	AF1-286 E O2	0.5407
946221	AF1-287 C	0.8790
946222	AF1-287 E	0.5860
946381	AF1-302 C	1.2991
946382	AF1-302 E	1.7322
946401	AF1-304 C	4.1375
946402	AF1-304 E	2.7583
946421	AF1-306 C	3.4725
946422	AF1-306 E	13.8902
LGEE	LGEE	0.0713
WEC	WEC	0.0728
CBM-W2	CBM-W2	0.4423
CBM-W1	CBM-W1	4.7413
O-066	O-066	4.0320
CHEOAH	CHEOAH	0.0771
G-007	G-007	0.7426
MEC	MEC	0.2590
CALDERWOOD	CALDERWOOD	0.0731
CATAWBA	CATAWBA	0.1239

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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
42137484	999392	STAR601	PENELEC	200767	26HOMER CT	PENELEC	N	PN-P2-3-PN-230-9E	breaker	807.0	123.29	124.61	DC	23.13

Bus #	Bus	MW Impact
200823	26MHP_X3-003	2.2695
200830	26HNSMLK 3	1.8760
200831	26HNSMLK 4	1.8760
200832	26HNSMLK 5	1.8760
200838	26HOMER C2	45.1077
200839	26HOMER C3	47.7524
200894	26K02	6.9091
200898	26AA1-106	3.0352
201144	W3-099 C OP1	1.8313
201477	26Y2-055	4.7720
203349	26Z1-069 C	0.4984
203907	26Y2-042	1.4811
203909	26Z1-038	2.2372
203910	26Z1-091	3.0422
203999	P-047 E	16.3426
294573	P-028 E	13.6170
903644	W3-099 E OP1	12.2557
915951	Y3-092 FTIR	139.8800
916202	Z1-069 E	15.2211
917672	Z2-108 E	-1.9186
917673	Z2-108 BAT	2.2572
918682	AA1-082 E	8.2095
919201	AA1-144 OP	23.0963
919491	AA2-000	46.7537
920341	AA2-132	3.4204
922932	AB1-082 OP	5.4301
923442	AB1-160 C	0.1424
923443	AB1-160 E	4.3489
930511	AB1-092	1.7167
936421	AD2-055	3.5343
938352	AE1-053 BAT	1.2540
938882	AE1-116 BAT	1.3081
938951	AE1-123	1.9587
939291	AE1-160 C	1.6593
939292	AE1-160 E	0.9538
939381	AE1-169 C O1	6.6451
939382	AE1-169 E O1	4.4301
940861	AE2-074 C	4.1231
940862	AE2-074 E	5.4274
941191	AE2-113 C	11.7440
941192	AE2-113 E	12.6445

Bus #	Bus	MW Impact
941321	AE2-126 C	1.1333
941322	AE2-126 E	0.7555
941421	AE2-139 C	8.2218
941422	AE2-139 E	5.4812
942491	AE2-262 C	3.4582
942492	AE2-262 E	2.3239
942501	AE2-263 C	3.2507
942502	AE2-263 E	2.1704
942811	AE2-299 C	4.5557
942812	AE2-299 E	18.2229
942961	AE2-316 C	5.6140
942962	AE2-316 E	8.0056
943151	AE2-344 C	9.6181
943152	AE2-344 E	6.4121
943351	AF1-006 C	0.8869
943352	AF1-006 E	0.4989
943751	AF1-043	5.6195
943871	AF1-055 C O2	3.8992
943872	AF1-055 E O2	2.5995
944261	AF1-094 C	0.8477
944262	AF1-094 E	0.5651
944281	AF1-096 C	0.8310
944282	AF1-096 E	0.5540
944301	AF1-098 C	3.5963
944302	AF1-098 E	2.3975
944311	AF1-099 C	2.7823
944312	AF1-099 E	1.8549
944321	AF1-100 C O2	6.2514
944322	AF1-100 E O2	4.1676
944381	AF1-103 O2	1.7437
944391	AF1-104 O2	1.3164
944411	AF1-106 O2	1.9691
944741	AF1-139 C O1	1.0931
944742	AF1-139 E O1	0.7288
944771	AF1-142 C	4.4516
944772	AF1-142 E	2.9678
944881	AF1-153 C O2	0.7105
944882	AF1-153 E O2	0.4736
944901	AF1-155 C	0.7125
944902	AF1-155 E	0.4750
945021	AF1-167 C	0.6319
945022	AF1-167 E	0.4212
945051	AF1-170 C	3.2227
945052	AF1-170 E	2.1485
945071	AF1-172 C	7.4637
945072	AF1-172 E	4.9758
945121	AF1-177	0.4359
945161	AF1-181	0.0326
945171	AF1-182	0.1626
945331	AF1-198	0.2584
945451	AF1-210 C	0.6033
945452	AF1-210 E	0.4022

Bus #	Bus	MW Impact
945521	AF1-217 C O2	0.8792
945522	AF1-217 E O2	0.5861
945551	AF1-220 C	5.8816
945552	AF1-220 E	3.9232
945673	AF1-232 BAT	2.9054
945771	AF1-242 C	0.7125
945772	AF1-242 E	0.4750
946091	AF1-274 C	2.7681
946092	AF1-274 E	1.8454
946131	AF1-278	51.5931
946211	AF1-286 C O2	0.7975
946212	AF1-286 E O2	0.5415
946221	AF1-287 C	0.8792
946222	AF1-287 E	0.5861
946381	AF1-302 C	1.2993
946382	AF1-302 E	1.7324
946401	AF1-304 C	4.1369
946402	AF1-304 E	2.7580
946421	AF1-306 C	3.4691
946422	AF1-306 E	13.8766
LGEE	LGEE	0.0217
WEC	WEC	0.0454
CBM-W1	CBM-W1	3.6654
O-066	O-066	4.6435
CHEOAH	CHEOAH	0.1211
G-007	G-007	0.8382
MEC	MEC	0.1208
CALDERWOOD	CALDERWOOD	0.1168
CATAWBA	CATAWBA	0.1551

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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
41521315	999401	STAR592	PJM	200011	KEYSTONE	PJM	4	PJM500_PN_P4-500-001A	breaker	634.0	101.08	102.87	DC	24.75

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

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

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

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

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

Affected Systems

13.6 Affected Systems

13.6.1 LG&E

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

13.6.2 MISO

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

13.6.3 TVA

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

13.6.4 Duke Energy Progress

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

13.6.5 NYISO

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

13.7 Contingency Definitions

Contingency Name	Contingency Definition
PN-P2-3-PN-345-003A	CONTINGENCY 'PN-P2-3-PN-345-003A' /* WAYNE 345KV STUCK BREAKER DISCONNECT BUS 200595 /* 26WAYNE 345 END
PN-P2-2-PN-230-001T	CONTINGENCY 'PN-P2-2-PN-230-001T' /* HOMER CITY NORTH 230KV BUS DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/* 26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1 /* 26HOMER CT 230 26PIERC230 230 REMOVE MACHINE 1 FROM BUS 200809 /* 26SITHE 138 DISCONNECT BUS 200807 /* 26PIERC230 230 DISCONNECT BUS 200808 /* 26PIERC138 138 DISCONNECT BUS 200809 /* 26SITHE 138 END
AP-P2-3-WP-230-443T *	CONTINGENCY 'AP-P2-3-WP-230-443T *' / UPDATED CON AJK 3-31-16 DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 DISCONNECT BUS 235158 END
PN-P2-3-PN-230-21HT	CONTINGENCY 'PN-P2-3-PN-230-21HT' /* SHAWVILLE 230 KV STUCK CB - CB23 (SHAWVILLE UNIT #2) DISCONNECT BRANCH FROM BUS 200726 TO BUS 235248 CKT 1 /* 26SHAWVL 2 230 01SHINGL 230 DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 /* 26SHAWVL 2 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 200710 TO BUS 200726 CKT ZB /* 26SHAWVL 1 230 26SHAWVL 2 230 DISCONNECT BRANCH FROM BUS 200666 TO BUS 200726 CKT 1 /* 26SHAWVL 4 22 26SHAWVL 2 230 DISCONNECT BRANCH FROM BUS 200726 TO BUS 200727 TO BUS 200722 CKT 2A/* 26SHAWVL 2 230 26SHAW. 2 115 26SHAWVL 2 18.00 DISCONNECT BRANCH FROM BUS 200714 TO BUS 200722 CKT 2B /* 26SHAWVL 1 115 26SHAWVL 2 18 END
AP-P1-2-WP-230-005B	CONTINGENCY 'AP-P1-2-WP-230-005B' /* QUEUE AE2-262 - MOSHANNON 230KV DISCONNECT BRANCH FROM BUS 942490 TO BUS 235219 CKT 1 /* AE2-262 TAP 230 01MILES B 230 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

Contingency Name	Contingency Definition
PN-P1-2-PN-115-094-A	CONTINGENCY 'PN-P1-2-PN-115-094-A' /* ROXBURY - SHADE GAP 115KV DISCONNECT BRANCH FROM BUS 200520 TO BUS 938380 CKT 1 /* 26ROXBURY 115 AE1-071 TAP 115 END
PN-P2-2-PN-115-032	CONTINGENCY 'PN-P2-2-PN-115-032' /* ROXBURY 115KV BUS FAULT DISCONNECT BUS 200520 /* 26ROXBURY 115 END
PN-P1-2-PN-230-004	CONTINGENCY 'PN-P1-2-PN-230-004' /* GLADE - WARREN 230KV DISCONNECT BRANCH FROM BUS 200811 TO BUS 200593 CKT 1 /* 26WARREN 230 26GLADE 230 END
ATSI-P7-1-CEI-345-012	CONTINGENCY 'ATSI-P7-1-CEI-345-012' /* PERRY-EASTLAKE AND PERRY-NORTHFIELD 345KV LINE OUTAGES DISCONNECT BRANCH FROM BUS 238684 TO BUS 239036 CKT 1 /* 02EASTLK 345 02PERRY 345 DISCONNECT BRANCH FROM BUS 239358 TO BUS 239036 CKT 1 /* 02NFIELD 345 02PERRY 345 END
AP-P2-2-WP-230-001T	CONTINGENCY 'AP-P2-2-WP-230-001T' /* ELKO #2 230KV BUS DISCONNECT BRANCH FROM BUS 235175 TO BUS 235158 CKT 1 /* 01ELKO 230 01CARB 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 200726 CKT 1 /* 01ELKO 230 26SHAWVL 2 230 REDUCE BUS 237007 SHUNT BY 100 PERCENT /* 01ELKO CAP 138 DISCONNECT BUS 237007 /* 01ELKO CAP 138 END
ATSI-P7-1-CEI-345-016	CONTINGENCY 'ATSI-P7-1-CEI-345-016' /* PERRY-NORTHFEILD AND PERRY-LC 345KV LINE OUTAGES DISCONNECT BRANCH FROM BUS 239036 TO BUS 239358 CKT 1 /* 02PERRY 345 02NFIELD 345 DISCONNECT BRANCH FROM BUS 239036 TO BUS 239334 CKT 1 /* 02PERRY 345 02L.CENTER 345 END
AP-P1-2-WP-230-324T_FSA_B	CONTINGENCY 'AP-P1-2-WP-230-324T_FSA_B' /* MOSHANNON-MARSHALL 230KV APS-PN TIE DISCONNECT BRANCH FROM BUS 919490 TO BUS 200909 CKT 1 /* AA2-000 TAP 230 26LOBO+ 230 DISCONNECT BRANCH FROM BUS 200857 TO BUS 200909 CKT 1 /* 26MARSHALL 230 26LOBO+ 230 DISCONNECT BRANCH FROM BUS 236829 TO BUS 200909 CKT 81 /* 01LOBO 46 46 26LOBO+ 230 REMOVE LOAD 1 FROM BUS 236829 /* 01LOBO 46 46 END
PN-P2-3-PN-230-9I	CONTINGENCY 'PN-P2-3-PN-230-9I' /* 579 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1 /* 26HOMER CT 230 26PIERC230 230 DISCONNECT BRANCH FROM BUS 200807 TO BUS 200808 CKT 1 /* 26PIERC230 230 26PIERC138 138 DISCONNECT BRANCH FROM BUS 200808 TO BUS 200809 CKT 1 /* 26PIERC138 138 26SITHE 138 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202640 CKT N/* 26HOMER CT 230 26HOMER CY 345 26HOMERCITYN 23.00 REMOVE MACHINE 1 FROM BUS 200809 /* 26SITHE 138 END

Contingency Name	Contingency Definition
PN-P1-2-PN-230-013A	CONTINGENCY 'PN-P1-2-PN-230-013A' /* EAST TOWANDA - NORTH MESHOPPEN 230KV DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /* 26E.TWANDA 230 26CANYON 230 DISCONNECT BRANCH FROM BUS 200924 TO BUS 200706 CKT 1 /* 26CANYON 230 26N.MESHPN 230 END
AP-P1-2-WP-230-323T	CONTINGENCY 'AP-P1-2-WP-230-323T' /* SHINGLETOWN-LEWISTOWN 230KV APS-PN TIE DISCONNECT BRANCH FROM BUS 235248 TO BUS 200513 CKT 1 /* 01SHINGL 230 26LEWISTWN 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
PN-P2-3-PN-230-9E	CONTINGENCY 'PN-P2-3-PN-230-9E' /* 575 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 200837 CKT 1 /* 26HOMER CT 230 26HOMER C1 20 REMOVE MACHINE 1 FROM BUS 200837 /* 26HOMER C1 20 END
PN-P1-3-PN-230-003A	CONTINGENCY 'PN-P1-3-PN-230-003A' /* HOMER CITY NORTH 345/230KV XFMR DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/* 26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00 END
PN-P1-3-PN-115-005	CONTINGENCY 'PN-P1-3-PN-115-005' /* SHAWVILLE 2A 230/115KV XFMR FAULT DISCONNECT BRANCH FROM BUS 200726 TO BUS 200727 TO BUS 200722 CKT 2A/* 26SHAWVL 2 230 26SHAW. 2 115 26SHAWVL 2 18.00 DISCONNECT BRANCH FROM BUS 200714 TO BUS 200722 CKT 2B /* 26SHAWVL 1 115 26SHAWVL 2 18 DISCONNECT BUS 200722 /* 26SHAWVL 2 18 END
PN-P1-3-PN-230-004A	CONTINGENCY 'PN-P1-3-PN-230-004A' /* HOMER CITY SOUTH 345/230KV XFMR DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202641 CKT S/* 26HOMER CY 345 26HOMER CT 230 26HOMERCITYS 23.00 END
Base Case	
200909 26LOBO+ 230 919490 AA2-000 TAP 230 1	CONTINGENCY '200909 26LOBO+ 230 919490 AA2-000 TAP 230 1' OPEN BRANCH FROM BUS 200909 TO BUS 919490 CKT 1 END

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
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-345-003	CONTINGENCY 'PN-P1-2-PN-345-003' /* HANDSOME LAKE - WAYNE 345KV DISCONNECT BRANCH FROM BUS 200826 TO BUS 200595 CKT 1 /* 26HANDSMLK 345 26WAYNE 345 END
AP-P1-3-WP-230-005	CONTINGENCY 'AP-P1-3-WP-230-005' /* MILESBERG #82 230/46KV XFMR DISCONNECT BRANCH FROM BUS 235219 TO BUS 236745 CKT 82 /* 01MILES B 230 01MILES B 46 DISCONNECT BRANCH FROM BUS 942490 TO BUS 235219 CKT 1 /* AE2-262 TAP 230 01MILES B 230 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
PN-P1-2-PN-230-103T	CONTINGENCY 'PN-P1-2-PN-230-103T' /** 26LEWISTWN - JUNI BU2 230.00 LINE DISCONNECT BRANCH FROM BUS 200513 TO BUS 208005 CKT 1 /* 26LEWISTWN - JUNI BU2 230.00 LINE 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
AP-P2-3-WP-230-446T	CONTINGENCY 'AP-P2-3-WP-230-446T' /* ELKO-MOSHANNON STK BKR AT ELKO DISCONNECT BRANCH FROM BUS 200726 TO BUS 235175 CKT 1 /* 26SHAWVL 2 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 235158 TO BUS 235175 CKT 1 /* 01CARB 230 01ELKO 230 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /* 01MOSHAN 230 01QUEHAN 230 DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /* 01QUEHAN 230 01QUEHANNA 46 END

Contingency Name	Contingency Definition
PL_P12_100618	CONTINGENCY 'PL_P12_100618' /* JUNIATA 230/69KV TR4 OUT" DISCONNECT BRANCH FROM BUS 208005 TO BUS 209997 CKT 4 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 207955 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 200009 CKT 2 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 208006 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 208004 CKT 1 /* DISCONNECT BRANCH FROM BUS 208005 TO BUS 200513 CKT 1 /* END
PN-P1-2-PN-230-101T	CONTINGENCY 'PN-P1-2-PN-230-101T' /* EAST TOWANDA - HILLSIDE 230KV DISCONNECT BRANCH FROM BUS 200675 TO BUS 130763 CKT 1 /* 26E.TWANDA 230 HILSD230 230 END
ATSI-P1-1-CEI-345-711	CONTINGENCY 'ATSI-P1-1-CEI-345-711' /* GEN 02PERRG1 22.0 UNIT 1 REMOVE MACHINE 1 FROM BUS 239035 /* 02PERRG1 22 END
PN-P1-2-PN-115-100-A	CONTINGENCY 'PN-P1-2-PN-115-100-A' /* CORRY EAST - FOUR MILE JCT. 115KV LINE DISCONNECT BRANCH FROM BUS 200927 TO BUS 944300 CKT 1 /* 26FOURMILE 115 AF1-098 TAP 115 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

13.8 Short Circuit

The following Breakers are overduty:

None.

14 Attachment 1 – One Line