



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-455
SPRINGBORO-VENANGO JUNCTION 115 KV
35 MW Capacity / 35 MW Energy**

January 2021

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1 Introduction

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

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

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

3 General

The Interconnection Customer (IC) has proposed an uprate to a planned/existing Storage generating facility located in Crawford, Pennsylvania. This project is an increase to the Interconnection Customer's AF1-170 project, which will share the same point of interconnection. The AG1-455 queue position is a 35 MW uprate (35 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 112.5 MW with 81.5 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this uprate project is December 31, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-455
Project Name	SPRINGBORO-VENANGO JUNCTION 115 KV
State	Pennsylvania
County	Crawford
Transmission Owner	MAIT-PENELEC
MFO	112.5
MWE	35
MWC	35
Fuel	Storage
Basecase Study Year	2024

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AG1-455 will interconnect with the PENELEC transmission system as an uprate to AF1-170 which is tapping the Springboro to Venango Junction 115 kV line.

The AG1-455 project is an uprate to the proposed AF1-170 project and the Point of Interconnection will remain unchanged. The IC will not incur any connection facility upgrade costs for this project as long as both projects are constructed concurrently.

Attachment 1 shows a one-line diagram of the proposed interconnection facilities for the AG1-455 generation project to connect to the FirstEnergy ("FE") Transmission System. The 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 interconnection facilities.

5 Cost Summary

The AG1-455 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$0
Total System Network Upgrade Costs	\$234,835,048 ¹
Total Costs	\$234,835,048

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

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

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

6 Transmission Owner Scope of Work

The AG1-455 project is an uprate to the proposed AF1-170 project and the Point of Interconnection will remain unchanged. The IC will not incur any connection facility upgrade costs for this project as long as both projects are constructed concurrently.

There is no interconnection facility scope of work.

7 Schedule

The project is an uprate to the proposed AF1-70 project and the point of interconnection will remain unchanged. There is no interconnection facility scope of work required.

If the customer is ultimately responsible for network upgrades, then the schedule for those upgrades will be refined in future study phases. The customer would need to wait for those upgrades to be completed prior to commercial operation unless determined deliverable by an interim deliverability study. The elapsed time to complete any network upgrades is provided in the System Reinforcements table of this report¹.

8 Transmission Owner Analysis

8.1 Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AG1-455 project did not contribute to any overloads on the FE Transmission <100 kV System.

9 Interconnection Customer Requirements

9.1 System Protection

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

Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

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

9.2 Compliance Issues and Interconnection Customer Requirements

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

1. The purchase and installation of a fully rated 115 kV circuit breaker to protect the 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 AG1-455 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 Transmission System.

9.3 Power Factor Requirements

The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the FE Transmission System.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

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

10.2 Interconnected Transmission Owner 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>.

11 Summer Peak - Load Flow Analysis

The Queue Project AG1-455 was evaluated as a 35.0 MW (Capacity 35.0 MW) injection as an uprate to AF1-170 which is tapping the Springboro to Venango Junction 115 kV line in the PENELEC area. Project AG1-455 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-455 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

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
164683457	200599	26ERIEW	345.0	PENELEC	238547	02AT	345.0	ATSI	1	PJM_GEN_P1-1: UNIT02PERRG1	single	1900.0	99.95	100.91	DC	18.29

11.2 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
164683236	200583	26PINEY	115.0	PENELEC	235151	01BURMA	115.0	AP	1	ATSI-P2-3-CEI-345-004D	breaker	277.0	99.97	100.51	DC	3.28

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
164683456	200599	26ERIEW	345.0	PENELEC	238547	02AT	345.0	ATSI	1	Base Case	single	1560.0	107.68	108.85	DC	18.29
166049844	200927	26FOURMILE	115.0	PENELEC	200820	26ERIE SE	115.0	PENELEC	1	PN-P2-3-PN-230-6G	breaker	245.0	143.47	144.13	DC	3.05
167534426	235121	01ARMSTR	138.0	AP	235204	01KITTAN	138.0	AP	1	ATSI-P2-3-CEI-345-004D	breaker	228.0	113.54	114.03	DC	2.47
168003935	235121	01ARMSTR	138.0	AP	235204	01KITTAN	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	228.0	100.9	101.96	DC	2.43
168003936	235121	01ARMSTR	138.0	AP	235204	01KITTAN	138.0	AP	1	PN-P1-2-PN-345-107T	single	228.0	100.9	101.96	DC	2.43
167534410	235139	01AL&D6T	138.0	AP	235138	01AL4J	138.0	AP	1	ATSI-P2-3-CEI-345-004D	breaker	151.0	124.86	125.52	DC	2.22

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
168003888	235139	01AL&D6T	138.0	AP	235138	01AL 4J	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	151.0	112.09	113.53	DC	2.18
168003889	235139	01AL&D6T	138.0	AP	235138	01AL 4J	138.0	AP	1	PN-P1-2-PN-345-107T	single	151.0	112.09	113.53	DC	2.18
167448484	235152	01BUTLER	138.0	AP	235197	01KARNSC	138.0	AP	1	ATSI-P2-3-CEI-345-004D	break er	179.0	102.16	103.18	DC	3.19
167448187	235197	01KARNSC	138.0	AP	235152	01BUTLER	138.0	AP	1	ATSI-P2-3-CEI-345-004D	break er	179.0	238.94	239.74	DC	3.19
168003605	235197	01KARNSC	138.0	AP	235152	01BUTLER	138.0	AP	1	PN-P1-2-PN-345-107T	single	179.0	187.97	189.73	DC	3.14
168003606	235197	01KARNSC	138.0	AP	235152	01BUTLER	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	179.0	187.97	189.73	DC	3.14
168003627	235203	01KISSNG	138.0	AP	235197	01KARNSC	138.0	AP	1	PN-P1-2-PN-345-107T	single	268.0	144.19	145.43	DC	3.31
168003628	235203	01KISSNG	138.0	AP	235197	01KARNSC	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	268.0	144.19	145.43	DC	3.31
167448328	235204	01KITTAN	138.0	AP	235139	01AL&D6T	138.0	AP	1	ATSI-P2-3-CEI-345-004D	break er	151.0	120.38	121.04	DC	2.22
168003901	235204	01KITTAN	138.0	AP	235139	01AL&D6T	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	151.0	107.57	109.01	DC	2.18
168003902	235204	01KITTAN	138.0	AP	235139	01AL&D6T	138.0	AP	1	PN-P1-2-PN-345-107T	single	151.0	107.57	109.01	DC	2.18
167448199	235240	01COLMBG PN	138.0	AP	235202	01KISKIV	138.0	AP	1	ATSI-P2-3-CEI-345-004D	break er	151.0	178.75	179.55	DC	2.66
168003651	235240	01COLMBG PN	138.0	AP	235202	01KISKIV	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	151.0	160.06	161.79	DC	2.61

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
168003652	235240	01COLMBG PN	138.0	AP	235202	01KISKIV	138.0	AP	1	PN-P1-2-PN-345-107T	single	151.0	160.06	161.79	DC	2.61
167448197	235282	01GAR RN	138.0	AP	235240	01COLMBG PN	138.0	AP	1	ATSI-P2-3-CEI-345-004D	break er	151.0	181.07	181.87	DC	2.66
168003639	235282	01GAR RN	138.0	AP	235240	01COLMBG PN	138.0	AP	1	ATSI-P1-2-CEI-345-700T	single	151.0	162.37	164.11	DC	2.61
168003640	235282	01GAR RN	138.0	AP	235240	01COLMBG PN	138.0	AP	1	PN-P1-2-PN-345-107T	single	151.0	162.37	164.11	DC	2.61

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
166274456	200575	26MRGAN ST	115.0	PENELE C	200573	26VENGO JT	115.0	PENELE C	1	PN-P1-2-PN-345-001	operati on	149.0	137.18	141.89	DC	7.03
166274605	200576	26UTICA JT	115.0	PENELE C	200598	26WAYNE	115.0	PENELE C	1	PN-P1-2-PN-345-003	operati on	282.0	107.9	108.54	DC	3.39
166274613	200583	26PINEY	115.0	PENELE C	200633	26HAYNIE	115.0	PENELE C	1	PN-P1-2-PN-345-003	operati on	190.0	105.06	105.65	DC	2.12
166274622	200586	26ECLIPSE	115.0	PENELE C	200576	26UTICA JT	115.0	PENELE C	1	PN-P1-2-PN-345-003	operati on	282.0	105.3	105.93	DC	3.39

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
166274544	200590	26GENEVA	115.0	PENELE C	200822	26PPGAPI	115.0	PENELE C	1	PN-P1-2-PN-345-001	operati on	239.0	116.38	119.36	DC	7.11
164683451	200599	26ERIE W	345.0	PENELE C	238547	02AT	345.0	ATSI	1	Base Case	operati on	1560.0	128.6	129.77	DC	18.29
166274579	200822	26PPGAPI	115.0	PENELE C	200920	26FRANKLN A	115.0	PENELE C	1	PN-P1-2-PN-345-001	operati on	245.0	110.59	113.49	DC	7.11
166274576	200920	26FRANKLN A	115.0	PENELE C	200575	26MRGAN ST	115.0	PENELE C	1	PN-P1-2-PN-345-001	operati on	239.0	113.28	116.26	DC	7.11
166274600	200921	26FRANKLN B	115.0	PENELE C	200590	26GENEVA	115.0	PENELE C	1	PN-P1-2-PN-345-001	operati on	245.0	106.04	108.94	DC	7.11
168003933	235121	01ARMSTR	138.0	AP	235204	01KITTAN	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	228.0	112.89	113.37	DC	2.43
168003934	235121	01ARMSTR	138.0	AP	235204	01KITTAN	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	228.0	112.89	113.37	DC	2.43
168003886	235139	01AL&D6T	138.0	AP	235138	01AL 4J	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	151.0	120.47	121.12	DC	2.18
168003887	235139	01AL&D6T	138.0	AP	235138	01AL 4J	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	151.0	120.47	121.12	DC	2.18
164683623	235151	01BURMA	115.0	AP	200583	26PINEY	115.0	PENELE C	1	PN-P1-2-PN-345-003	operati on	277.0	100.06	100.65	DC	3.07
168004023	235152	01BUTLER	138.0	AP	235197	01KARNSC	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	179.0	100.66	101.66	DC	3.14
168004024	235152	01BUTLER	138.0	AP	235197	01KARNSC	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	179.0	100.66	101.66	DC	3.14
168003603	235197	01KARNSC	138.0	AP	235152	01BUTLER	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	179.0	237.79	238.58	DC	3.14
168003604	235197	01KARNSC	138.0	AP	235152	01BUTLER	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	179.0	237.79	238.58	DC	3.14

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
1680036 25	23520 3	01KISSNG	138.0	AP	23519 7	01KARNSC	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	268.0	182.64	183.2	DC	3.31
1680036 26	23520 3	01KISSNG	138.0	AP	23519 7	01KARNSC	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	268.0	182.64	183.2	DC	3.31
1680038 99	23520 4	01KITTAN	138.0	AP	23513 9	01AL&D6T	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	151.0	115.93	116.58	DC	2.18
1680039 00	23520 4	01KITTAN	138.0	AP	23513 9	01AL&D6T	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	151.0	115.93	116.58	DC	2.18
1680036 49	23524 0	01COLMBG PN	138.0	AP	23520 2	01KISKIV	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	151.0	174.89	175.67	DC	2.61
1680036 50	23524 0	01COLMBG PN	138.0	AP	23520 2	01KISKIV	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	151.0	174.89	175.67	DC	2.61
1680036 37	23528 2	01GAR RN	138.0	AP	23524 0	01COLMBG PN	138.0	AP	1	PN-P1-2-PN-345-107T	operati on	151.0	177.2	177.98	DC	2.61
1680036 38	23528 2	01GAR RN	138.0	AP	23524 0	01COLMBG PN	138.0	AP	1	ATSI-P1-2-CEI-345-700T	operati on	151.0	177.2	177.98	DC	2.61

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
167448197,168 003640,168003 639	11	01GAR RN 138.0 kV - 01COLMBGPN 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0017 (1225) : Reconductor 10.4 miles of 4/0 CU from Columbia Big Pine - Garretts Run Jct 138 kV (99 spans). Project Type : FAC Cost : \$27,092,520 Time Estimate : 48.0 Months	\$27,092,520
168003936,168 003935,167534 426	4	01ARMSTR 138.0 kV - 01KITTAN 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0001 (1172) : Replace relaying (WT, RT) at Kittaning substation. Project Type : FAC Cost : \$455,884 Time Estimate : 12.0 Months	\$455,884
166049844	3	26FOURMILE 115.0 kV - 26ERIE SE 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0020A (1362) : Reconductor 4.62 miles of transmission line. Replace line drops at Four Mile and Erie South substations Project Type : FAC Cost : \$14,150,000 Time Estimate : 30.0 Months PN-AF2-F-0020B (1363) : Replace the substation conductor at Four Mile Project Type : FAC Cost : \$200,000 Time Estimate : 12.0 Months PN-AG1-F-0001 (1364) : Replace bus and line side disconnect switches at Erie South Project Type : FAC Cost : \$500,000 Time Estimate : 12.0 Months	\$14,850,000

ID	Idx	Facility	Upgrade Description	Cost
168003628,168003627	8	01KISSNG 138.0 kV - 01KARNSC 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0003A (1175) : Reconductor 7.5 miles of 556.5 ACSR from Karns City to Kissinger Jct (47 spans). Project Type : FAC Cost : \$19,537,875 Time Estimate : 42.0 Months WP-AG1-F-0003B (1176) : Replace relaying (RT, WT, MT, ZR, OR) at Karns City substation. Project Type : FAC Cost : \$455,884 Time Estimate : 12.0 Months WP-AG1-F-0003C (1177) : Replace 954 ACSR & 1024.5 ACAR bus conductor at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0003D (1178) : Replace 1200 A circuit breaker at Karns City substation. Project Type : FAC Cost : \$911,768 Time Estimate : 12.0 Months WP-AG1-F-0003E (1179) : Replace 954 ACSR risers at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months	\$21,166,031
167448328,168003902,168003901	9	01KITTAN 138.0 kV - 01AL&D6T 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0005A (1186) : Replace 4/0 CU line exit at All Dam 6 Tap. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0005B (1187) : Reconductor 6 miles of 4/0 CU from All Dam 6 Tap to Kittanning (49 spans). Project Type : FAC Cost : \$15,630,300 Time Estimate : 42.0 Months	\$15,760,552
164683236	2	26PINEY 115.0 kV - 01BURMA 115.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0023A (1240) : Replace 1200 A WT at Burma substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months <u>PENELEC</u> PN-AG1-F-0003A (1372) : Replace line trap at Piney Project Type : FAC Cost : \$200,000 Time Estimate : 12.0 Months	\$330,252

ID	Idx	Facility	Upgrade Description	Cost
168003889,168003888,167534410	5	01AL&D6T 138.0 kV - 01AL 4J 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0002A (1173) : Replace 4/0 CU line exit at All Dam 6 Tap. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0002B (1174) : Reconductor 7.6 miles of 4/0 CU from All Dam 6 Tap to structure 84 (66 spans). Project Type : FAC Cost : \$19,928,632 Time Estimate : 42.0 Months	\$20,058,885
167448484	6	01BUTLER 138.0 kV - 01KARNSC 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0008A (1190) : Replace 336 ACSR, 954 ACSR, & 1024.5 ACAR bus conductor at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008B (1191) : Replace 350 CU, 1.00 IPS CU, & 954 ACSR bus conductor at Butler substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008C (1192) : Replace 336 ACSR line risers at Butler substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008D (1193) : Replace 336 ACSR line risers at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months	\$521,010

ID	Idx	Facility	Upgrade Description	Cost
168003605,168 003606,167448 187	7	01KARNSC 138.0 kV - 01BUTLER 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0008A (1190) : Replace 336 ACSR, 954 ACSR, & 1024.5 ACAR bus conductor at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008B (1191) : Replace 350 CU, 1.00 IPS CU, & 954 ACSR bus conductor at Butler substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008C (1192) : Replace 336 ACSR line risers at Butler substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008D (1193) : Replace 336 ACSR line risers at Karns City substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008E (1194) : Reconductor 15.6 miles of 336 ACSR on the Butler - Karns City 138 kV line (102 spans). Project Type : FAC Cost : \$40,638,780 Time Estimate : 60.0 Months WP-AG1-F-0008F (1195) : Replace 600 A line side and bus side disconnects at Butler substation. Project Type : FAC Cost : \$390,758 Time Estimate : 12.0 Months WP-AG1-F-0008G (1196) : Replace 350 CU wire to WT at Butler substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months WP-AG1-F-0008H (1197) : Replace relaying (WT, ZR) at Butler substation. Project Type : FAC Cost : \$455,884 Time Estimate : 12.0 Months	\$44,025,345

ID	Idx	Facility	Upgrade Description	Cost
168003605,168 003606,167448 187	7	01KARNSC 138.0 kV - 01BUTLER 138.0 kV Ckt 1	<u>Continued:</u> WP-AG1-F-0008I (1198) : Replace relaying (RT, OR, WT, MT) at Karns City substation. Project Type : FAC Cost : \$455,884 Time Estimate : 12.0 Months WP-AG1-F-0008J (1199) : Replace 1200 A circuit breaker at Karns City substation. Project Type : FAC Cost : \$781,515 Time Estimate : 12.0 Months WP-AG1-F-0008K (1200) : Replace 1200 A bus & line side disconnects at Karns City substation. Project Type : FAC Cost : \$521,010 Time Estimate : 12.0 Months WP-AG1-F-0008L (1201) : Replace 1272 ACSR 45/7 SCCIR bus taps at Butler Substation. Project Type : FAC Cost : \$130,252 Time Estimate : 12.0 Months	
164683456,164 683457	1	26ERIE W 345.0 kV - 02AT 345.0 kV Ckt 1	<u>ATSI</u> CEI-001G (664) : Reconductor the ATSI owned portion of the Erie West-Ashtabula 3-point tap 345 kV Line. Project Type : Facility Cost : \$37,680,000 Time Estimate : 30.0 Months <u>PENELEC</u> PN-AG1-F-0005 (1376) : Reconductor approximately 7 miles of line. Project Type : FAC Cost : \$42,800,000 Time Estimate : 40.0 Months	\$80,480,000
168003652,168 003651,167448 199	10	01COLMBGPN 138.0 kV - 01KISKIV 138.0 kV Ckt 1	<u>APS</u> WP-AG1-F-0018A (1226) : Reconductor 3.7 miles of 4/0 CU. Project Type : FAC Cost : \$9,638,685 Time Estimate : 36.0 Months WP-AG1-F-0018B (1227) : Replace relays (RT) at Kiski Valley substation. Project Type : FAC Cost : \$455,884 Time Estimate : 12.0 Months	\$10,094,569
			TOTAL COST	\$234,835,048

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
164683456	200599	26ERIE W	PENELEC	238547	02AT	ATSI	1	Base Case	single	1560.0	107.68	108.85	DC	18.29

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200608	26PINEY #1	1.0700	80/20	1.0700
200642	26SENECA#1	11.1729	80/20	11.1729
200643	26SENECA#2	10.5522	80/20	10.5522
200644	26SENECA#3	1.1531	80/20	1.1531
200649	26PENNTech	1.4246	80/20	1.4246
200662	26SCRUB GR	4.5151	80/20	4.5151
200665	26SHAWVL 3	4.6782	80/20	4.6782
200666	26SHAWVL 4	4.5923	80/20	4.5923
200828	26HNSMLK 1	3.0375	80/20	3.0375
200829	26HNSMLK 2	3.0375	80/20	3.0375
200830	26HNSMLK 3	3.0375	80/20	3.0375
200831	26HNSMLK 4	3.0375	80/20	3.0375
200832	26HNSMLK 5	3.0375	80/20	3.0375
200849	26LAKVU GN	0.4044	80/20	0.4044
201201	26WRREN CT	3.2132	80/20	3.2132
203349	26Z1-069 C	0.4163	80/20	0.4163
915951	Y3-092 FTIR	584.3900	80/20	584.3900
920341	AA2-132 (Withdrawn : 12/07/2020)	2.6377	Adder	3.1
921642	AA2-000	63.5937	Adder	74.82
930511	AB2-092	2.3350	Adder	2.75
931091	AB1-160 C	0.1190	80/20	0.1190
935191	AD1-154	3.7186	80/20	3.7186
936421	AD2-055	4.8073	Adder	5.66
938951	AE1-123	4.0424	80/20	4.0424
939291	AE1-160 C	4.6276	80/20	4.6276
940861	AE2-074 C	3.2341	80/20	3.2341
941191	AE2-113 C	13.9172	80/20	13.9172
941321	AE2-126 C	2.2882	80/20	2.2882
942491	AE2-262 C	6.7686	Adder	7.96
942501	AE2-263 C	6.3624	Adder	7.49
942811	AE2-299 C	15.6323	80/20	15.6323
942961	AE2-316 C	7.8306	80/20	7.8306
943151	AE2-344 C	35.1576	80/20	35.1576
943351	AF1-006 C	6.7363	80/20	6.7363
943751	AF1-043	14.4219	Adder	16.97
944261	AF1-094 C	5.4366	80/20	5.4366
944281	AF1-096 C	4.3726	80/20	4.3726
944301	AF1-098 C	22.7851	80/20	22.7851
944311	AF1-099 C	10.2747	Adder	12.09
944321	AF1-100 C	25.5615	80/20	25.5615
944381	AF1-103 O1	7.1462	80/20	7.1462

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
944391	AF1-104 O1	11.2030	80/20	11.2030
944411	AF1-106 O1	2.7923	Adder	3.29
944691	AF1-134 C	1.5613	Adder	1.84
944771	AF1-142 C	16.4395	Adder	19.34
944881	AF1-153 C O1	2.3414	80/20	2.3414
944901	AF1-155 C	2.3417	80/20	2.3417
945021	AF1-167 C	1.4758	80/20	1.4758
945051	AF1-170 C	24.3060	80/20	24.3060
945121	AF1-177	0.2819	80/20	0.2819
945161	AF1-181	0.0215	80/20	0.0215
945171	AF1-182	0.1074	80/20	0.1074
945451	AF1-210 C	1.6135	80/20	1.6135
945751	AF1-240 C O1	2.2312	80/20	2.2312
946111	AF1-276 C	17.1440	80/20	17.1440
946121	AF1-277 C	17.1440	80/20	17.1440
946131	AF1-278 C	13.6742	80/20	13.6742
946211	AF1-286 C	1.1309	Adder	1.33
946221	AF1-287 C	6.0077	80/20	6.0077
946381	AF1-302 C	3.4195	80/20	3.4195
946401	AF1-304 C	19.8204	80/20	19.8204
946421	AF1-306 C	9.9773	80/20	9.9773
946771	AF1-217 C	6.0077	80/20	6.0077
957161	AF2-010 C	20.6462	80/20	20.6462
957451	AF2-039 C	1.1454	Adder	1.35
957571	AF2-051 C	14.8705	80/20	14.8705
957941	AF2-088 C	0.5515	Adder	0.65
958361	AF2-130 C	3.2471	80/20	3.2471
958731	AF2-164 C O1	17.2733	80/20	17.2733
958741	AF2-165 C	3.8864	80/20	3.8864
958751	AF2-166 C	3.2471	80/20	3.2471
959441	AF2-235 C	2.1863	80/20	2.1863
959471	AF2-238 C	1.6313	Adder	1.92
959491	AF2-240 C	0.5277	Adder	0.62
959501	AF2-241 C	1.5776	Adder	1.86
959521	AF2-243 C	2.9148	80/20	2.9148
959741	AF2-265 C	1.1691	Adder	1.38
960031	AF2-294 C	1.5906	Adder	1.87
960041	AF2-295 C	2.3417	80/20	2.3417
960051	AF2-296 C	1.5613	Adder	1.84
961141	AF2-405	1.3961	Adder	1.64
961151	AF2-406	10.4709	Adder	12.32
961201	AF2-411 O1 (Withdrawn : 12/08/2020)	51.9060	80/20	51.9060
961211	AF2-412	22.2703	80/20	22.2703
961971	AG1-040 C	5.7775	80/20	5.7775
962511	AG1-100 C	6.0356	80/20	6.0356
962891	AG1-138 C	1.2853	80/20	1.2853
962901	AG1-139 C	1.5384	80/20	1.5384
962911	AG1-140 C	0.8793	80/20	0.8793
963281	AG1-177 C O1	5.4366	80/20	5.4366
963441	AG1-193 C	4.5516	80/20	4.5516
963481	AG1-197 C	4.2939	80/20	4.2939
963491	AG1-198 C	3.2620	80/20	3.2620

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
963531	AG1-202 C	3.5200	80/20	3.5200
963571	AG1-206 C	1.2793	80/20	1.2793
963891	AG1-242 C	0.4482	Adder	0.99
963941	AG1-247 C	0.3626	Adder	0.8
963991	AG1-253 C	1.3190	80/20	1.3190
964341	AG1-296 C	1.2218	80/20	1.2218
964411	AG1-303 C O1	11.8964	80/20	11.8964
964451	AG1-308 C O1	0.5830	Adder	1.29
964701	AG1-333 C	0.3091	Adder	0.69
965201	AG1-385 C	3.0107	80/20	3.0107
965241	AG1-389 C O1	2.4252	80/20	2.4252
965251	AG1-390 C O1	2.4252	80/20	2.4252
965261	AG1-391 C O1	2.4252	80/20	2.4252
965271	AG1-392 C O1	4.8504	80/20	4.8504
965861	AG1-455	18.2949	80/20	18.2949
966121	AG1-481	5.5490	80/20	5.5490
966771	AG1-548 C	52.7953	80/20	52.7953
G-007A	G-007A	10.5610	Confirmed LTF	10.5610
VFT	VFT	28.8702	Confirmed LTF	28.8702
CALDERWOOD	CALDERWOOD	1.3131	Confirmed LTF	1.3131
PRAIRIE	PRAIRIE	8.6944	Confirmed LTF	8.6944
CHEOAH	CHEOAH	1.3123	Confirmed LTF	1.3123
CBM-N	CBM-N	5.5872	Confirmed LTF	5.5872
COTTONWOOD	COTTONWOOD	6.2412	Confirmed LTF	6.2412
HAMLET	HAMLET	1.0141	Confirmed LTF	1.0141
GIBSON	GIBSON	1.9192	Confirmed LTF	1.9192
BLUEG	BLUEG	5.9927	Confirmed LTF	5.9927
TRIMBLE	TRIMBLE	1.9244	Confirmed LTF	1.9244
CATAWBA	CATAWBA	0.7091	Confirmed LTF	0.7091

11.6.2 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
164683236	200583	26PINEY	PENELEC	235151	01BURMA	AP	1	ATSI-P2-3-CEI-345-004D	breaker	277.0	99.97	100.51	DC	3.28

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200608	26PINEY #1	2.6271	50/50	2.6271
200662	26SCRUB GR	4.2826	50/50	4.2826
200805	26COLVER13 (Deactivation : 01/09/2020)	2.3594	50/50	2.3594
293393	V3-030E	1.8565	Adder	2.18
915951	Y3-092 FTIR	82.6800	Merchant Transmission	82.6800
935191	AD1-154	7.4268	50/50	7.4268
938951	AE1-123	9.9248	50/50	9.9248
939291	AE1-160 C	3.7687	50/50	3.7687
939292	AE1-160 E	2.1663	50/50	2.1663
942811	AE2-299 C	1.9508	Adder	2.3
942812	AE2-299 E	7.8031	Adder	9.18
943151	AE2-344 C	5.7110	Adder	6.72
943152	AE2-344 E	3.8073	Adder	4.48
943351	AF1-006 C	0.9261	Adder	1.09
943352	AF1-006 E	0.5209	Adder	0.61
944181	AF1-086 C O1	1.7347	Adder	2.04
944182	AF1-086 E O1	7.5470	Adder	8.88
944261	AF1-094 C	1.9615	50/50	1.9615
944262	AF1-094 E	1.3077	50/50	1.3077
944281	AF1-096 C	3.5610	50/50	3.5610
944282	AF1-096 E	2.3740	50/50	2.3740
944301	AF1-098 C	3.0143	Adder	3.55
944302	AF1-098 E	2.0095	Adder	2.36
944391	AF1-104 O1	1.4494	Adder	1.71
944691	AF1-134 C	0.6621	Adder	0.78
944692	AF1-134 E	0.4414	Adder	0.52
945051	AF1-170 C	3.7059	Adder	4.36
945052	AF1-170 E	2.4706	Adder	2.91
945451	AF1-210 C	-1.4331	Adder	-1.69
945751	AF1-240 C O1	4.4561	50/50	4.4561
945752	AF1-240 E O1	2.9707	50/50	2.9707
946071	AF1-272 C O1	4.2019	Adder	4.94
946072	AF1-272 E O1	2.8013	Adder	3.3
946221	AF1-287 C	0.9882	Adder	1.16
946222	AF1-287 E	0.6588	Adder	0.78
946401	AF1-304 C	20.8752	50/50	20.8752
946402	AF1-304 E	13.9168	50/50	13.9168
946771	AF1-217 C	0.9882	Adder	1.16

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946772	AF1-217 E	0.6588	Adder	0.78
957161	AF2-010 C	7.8108	50/50	7.8108
957162	AF2-010 E	5.2638	50/50	5.2638
957571	AF2-051 C	4.0194	50/50	4.0194
957572	AF2-051 E	2.0706	50/50	2.0706
958361	AF2-130 C	5.5284	50/50	5.5284
958362	AF2-130 E	3.6856	50/50	3.6856
958741	AF2-165 C	4.2283	50/50	4.2283
958742	AF2-165 E	2.8189	50/50	2.8189
958751	AF2-166 C	5.5284	50/50	5.5284
958752	AF2-166 E	3.6856	50/50	3.6856
959441	AF2-235 C	1.7805	50/50	1.7805
959442	AF2-235 E	1.1870	50/50	1.1870
959521	AF2-243 C	3.1712	50/50	3.1712
959522	AF2-243 E	2.1142	50/50	2.1142
959823	AF2-273 BAT	0.2825	50/50	0.2825
960051	AF2-296 C	0.6621	Adder	0.78
960052	AF2-296 E	0.4414	Adder	0.52
961971	AG1-040 C	1.2893	50/50	1.2893
961972	AG1-040 E	0.8595	50/50	0.8595
962511	AG1-100 C	0.5311	Adder	1.18
962512	AG1-100 E	0.3541	Adder	0.79
962891	AG1-138 C	2.1883	50/50	2.1883
962892	AG1-138 E	0.1152	50/50	0.1152
962901	AG1-139 C	1.6737	50/50	1.6737
962902	AG1-139 E	0.0881	50/50	0.0881
962911	AG1-140 C	0.0582	Adder	0.13
962912	AG1-140 E	0.0265	Adder	0.06
963281	AG1-177 C O1	1.9615	50/50	1.9615
963282	AG1-177 E O1	1.3077	50/50	1.3077
963441	AG1-193 C	2.6722	50/50	2.6722
963442	AG1-193 E	1.7814	50/50	1.7814
963481	AG1-197 C	0.9886	50/50	0.9886
963482	AG1-197 E	0.6590	50/50	0.6590
963491	AG1-198 C	1.1769	50/50	1.1769
963492	AG1-198 E	0.7846	50/50	0.7846
963531	AG1-202 C	0.2716	Adder	0.6
963532	AG1-202 E	0.1399	Adder	0.31
963891	AG1-242 C	0.1901	Adder	0.42
963892	AG1-242 E	0.1023	Adder	0.23
963991	AG1-253 C	0.0872	Adder	0.19
963992	AG1-253 E	0.0420	Adder	0.09
964411	AG1-303 C O1	3.2155	50/50	3.2155
964412	AG1-303 E O1	2.1437	50/50	2.1437
965861	AG1-455	1.4784	Adder	3.28
966771	AG1-548 C	17.7537	50/50	17.7537
966772	AG1-548 E	5.4033	50/50	5.4033
G-007A	G-007A	0.5850	Confirmed LTF	0.5850
VFT	VFT	1.6061	Confirmed LTF	1.6061
CALDERWOOD	CALDERWOOD	0.1054	Confirmed LTF	0.1054
PRAIRIE	PRAIRIE	0.6225	Confirmed LTF	0.6225
CHEOAH	CHEOAH	0.1056	Confirmed LTF	0.1056

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-N	CBM-N	0.3144	Confirmed LTF	0.3144
COTTONWOOD	COTTONWOOD	0.4704	Confirmed LTF	0.4704
HAMLET	HAMLET	0.0970	Confirmed LTF	0.0970
GIBSON	GIBSON	0.1354	Confirmed LTF	0.1354
BLUEG	BLUEG	0.4305	Confirmed LTF	0.4305
TRIMBLE	TRIMBLE	0.1380	Confirmed LTF	0.1380
CATAWBA	CATAWBA	0.0640	Confirmed LTF	0.0640

11.6.3 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
166049844	200927	26FOURMILE	PENELEC	200820	26ERIE SE	PENELEC	1	PN-P2-3-PN-230-6G	breaker	245.0	143.47	144.13	DC	3.05

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200642	26SENECA#1	3.8734	50/50	3.8734
200643	26SENECA#2	3.6582	50/50	3.6582
200644	26SENECA#3	0.3997	50/50	0.3997
201201	26WRREN CT	1.3722	50/50	1.3722
203999	P-047 E	3.5684	Adder	4.2
915952	Y3-092 NFTWR	51.9200	Merchant Transmission	51.9200
916202	Z1-069 E	3.0218	Adder	3.56
920341	AA2-132 (Withdrawn : 12/07/2020)	0.9483	Adder	1.12
923821	AB2-019 FTWR	1.4538	Merchant Transmission	1.4538
931092	AB1-160 E	0.8634	Adder	1.02
940861	AE2-074 C	0.8692	Adder	1.02
940862	AE2-074 E	1.1442	Adder	1.35
941191	AE2-113 C	3.5512	Adder	4.18
941192	AE2-113 E	3.8235	Adder	4.5
942811	AE2-299 C	13.8259	50/50	13.8259
942812	AE2-299 E	55.3037	50/50	55.3037
944301	AF1-098 C	21.7925	50/50	21.7925
944302	AF1-098 E	14.5283	50/50	14.5283
944381	AF1-103 O1	3.0518	50/50	3.0518
944392	AF1-104 BAT	1.0814	Merchant Transmission	1.0814
944411	AF1-106 O1	0.9938	Adder	1.17
945121	AF1-177	0.1204	50/50	0.1204
946111	AF1-276 C	4.8140	Adder	5.66
946112	AF1-276 E	2.3711	Adder	2.79
946121	AF1-277 C	4.8140	Adder	5.66
946122	AF1-277 E	2.3711	Adder	2.79
946131	AF1-278 C	3.8397	Adder	4.52
946132	AF1-278 E	1.9083	Adder	2.25
946211	AF1-286 C	0.4025	Adder	0.47
946212	AF1-286 E	0.2733	Adder	0.32
946403	AF1-304 BAT	5.2490	Merchant Transmission	5.2490
946421	AF1-306 C	2.1904	Adder	2.58
946422	AF1-306 E	8.7615	Adder	10.31
959471	AF2-238 C	0.5178	Adder	0.61
959472	AF2-238 E	0.3452	Adder	0.41
959491	AF2-240 C	0.1878	Adder	0.22
959492	AF2-240 E	0.1600	Adder	0.19
959501	AF2-241 C	0.5615	Adder	0.66
959502	AF2-241 E	0.4323	Adder	0.51
959741	AF2-265 C	0.3711	Adder	0.44
959742	AF2-265 E	0.2761	Adder	0.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960031	AF2-294 C	0.5718	Adder	0.67
960032	AF2-294 E	0.3812	Adder	0.45
961141	AF2-405	0.4969	Adder	0.58
961151	AF2-406	3.7268	Adder	4.38
961201	AF2-411 O1 (Withdrawn : 12/08/2020)	13.7981	Adder	16.23
961211	AF2-412	5.9780	Adder	7.03
962911	AG1-140 C	0.7777	50/50	0.7777
962912	AG1-140 E	0.3543	50/50	0.3543
963571	AG1-206 C	0.1516	Adder	0.34
963572	AG1-206 E	0.0816	Adder	0.18
963941	AG1-247 C	0.1290	Adder	0.29
963942	AG1-247 E	0.0685	Adder	0.15
963991	AG1-253 C	1.1666	50/50	1.1666
963992	AG1-253 E	0.5617	50/50	0.5617
964701	AG1-333 C	0.1111	Adder	0.25
964702	AG1-333 E	0.0152	Adder	0.03
965241	AG1-389 C O1	0.3453	Adder	0.77
965242	AG1-389 E O1	0.2302	Adder	0.51
965251	AG1-390 C O1	0.3453	Adder	0.77
965252	AG1-390 E O1	0.2302	Adder	0.51
965261	AG1-391 C O1	0.3453	Adder	0.77
965262	AG1-391 E O1	0.2302	Adder	0.51
965271	AG1-392 C O1	0.6907	Adder	1.53
965272	AG1-392 E O1	0.4604	Adder	1.02
965862	AG1-455 BAT	1.6163	Merchant Transmission	1.6163
966121	AG1-481	2.3697	50/50	2.3697
966773	AG1-548 BAT	3.7852	50/50	3.7852
G-007A	G-007A	2.0139	Confirmed LTF	2.0139
VFT	VFT	5.5664	Confirmed LTF	5.5664
CALDERWOOD	CALDERWOOD	0.2326	Confirmed LTF	0.2326
PRAIRIE	PRAIRIE	1.4749	Confirmed LTF	1.4749
CHEOAH	CHEOAH	0.2327	Confirmed LTF	0.2327
CBM-N	CBM-N	1.1100	Confirmed LTF	1.1100
COTTONWOOD	COTTONWOOD	1.0815	Confirmed LTF	1.0815
HAMLET	HAMLET	0.1946	Confirmed LTF	0.1946
GIBSON	GIBSON	0.3238	Confirmed LTF	0.3238
BLUEG	BLUEG	1.0173	Confirmed LTF	1.0173
TRIMBLE	TRIMBLE	0.3267	Confirmed LTF	0.3267
CATAWBA	CATAWBA	0.1323	Confirmed LTF	0.1323

11.6.4 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
167534426	235121	01ARMSTR	AP	235204	01KITTAN	AP	1	ATSI-P2-3-CEI-345-004D	breaker	228.0	113.54	114.03	DC	2.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
915951	Y3-092 FTIR	76.5100	Merchant Transmission	76.5100
935191	AD1-154	1.0537	Adder	1.24
936881	AD2-112 C	-3.1312	Adder	-3.68
936882	AD2-112 E	-1.2425	Adder	-1.46
938951	AE1-123	1.2676	Adder	1.49
939291	AE1-160 C	0.8040	Adder	0.95
939292	AE1-160 E	0.4621	Adder	0.54
942811	AE2-299 C	1.5501	Adder	1.82
942812	AE2-299 E	6.2005	Adder	7.29
942961	AE2-316 C	3.1940	Adder	3.76
942962	AE2-316 E	4.5546	Adder	5.36
943151	AE2-344 C	4.0313	Adder	4.74
943152	AE2-344 E	2.6875	Adder	3.16
943351	AF1-006 C	0.7135	Adder	0.84
943352	AF1-006 E	0.4013	Adder	0.47
944261	AF1-094 C	0.6703	Adder	0.79
944262	AF1-094 E	0.4469	Adder	0.53
944281	AF1-096 C	0.7597	Adder	0.89
944282	AF1-096 E	0.5065	Adder	0.6
944301	AF1-098 C	2.4027	Adder	2.83
944302	AF1-098 E	1.6018	Adder	1.88
944381	AF1-103 O1	0.9289	Adder	1.09
944391	AF1-104 O1	1.2413	Adder	1.46
944881	AF1-153 C O1	0.6129	Adder	0.72
944882	AF1-153 E O1	0.4086	Adder	0.48
944901	AF1-155 C	0.6173	Adder	0.73
944902	AF1-155 E	0.4115	Adder	0.48
945021	AF1-167 C	0.4633	Adder	0.55
945022	AF1-167 E	0.3094	Adder	0.36
945051	AF1-170 C	2.7948	Adder	3.29
945052	AF1-170 E	1.8632	Adder	2.19
945751	AF1-240 C O1	0.6322	Adder	0.74
945752	AF1-240 E O1	0.4215	Adder	0.5
946111	AF1-276 C	2.8794	Adder	3.39
946112	AF1-276 E	1.4182	Adder	1.67
946121	AF1-277 C	2.8794	Adder	3.39
946122	AF1-277 E	1.4182	Adder	1.67
946131	AF1-278 C	2.2966	Adder	2.7
946132	AF1-278 E	1.1414	Adder	1.34
946221	AF1-287 C	0.6924	Adder	0.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946222	AF1-287 E	0.4616	Adder	0.54
946381	AF1-302 C	1.3947	Adder	1.64
946382	AF1-302 E	1.8597	Adder	2.19
946401	AF1-304 C	3.9698	Adder	4.67
946402	AF1-304 E	2.6466	Adder	3.11
946421	AF1-306 C	2.2469	Adder	2.64
946422	AF1-306 E	8.9878	Adder	10.57
946771	AF1-217 C	0.6925	Adder	0.81
946772	AF1-217 E	0.4617	Adder	0.54
957161	AF2-010 C	2.5857	Adder	3.04
957162	AF2-010 E	1.7425	Adder	2.05
957571	AF2-051 C	2.1133	Adder	2.49
957572	AF2-051 E	1.0887	Adder	1.28
958361	AF2-130 C	0.8255	Adder	0.97
958362	AF2-130 E	0.5503	Adder	0.65
958731	AF2-164 C O1	3.3733	Adder	3.97
958732	AF2-164 E O1	2.2489	Adder	2.65
958741	AF2-165 C	0.8070	Adder	0.95
958742	AF2-165 E	0.5380	Adder	0.63
958751	AF2-166 C	0.8255	Adder	0.97
958752	AF2-166 E	0.5503	Adder	0.65
959441	AF2-235 C	0.3798	Adder	0.45
959442	AF2-235 E	0.2532	Adder	0.3
959521	AF2-243 C	0.6053	Adder	0.71
959522	AF2-243 E	0.4035	Adder	0.47
960041	AF2-295 C	0.6173	Adder	0.73
960042	AF2-295 E	0.4115	Adder	0.48
961971	AG1-040 C	0.3866	Adder	0.86
961972	AG1-040 E	0.2578	Adder	0.57
962511	AG1-100 C	0.3757	Adder	0.83
962512	AG1-100 E	0.2505	Adder	0.56
962891	AG1-138 C	0.1732	Adder	0.38
962892	AG1-138 E	0.0091	Adder	0.02
962901	AG1-139 C	0.1693	Adder	0.38
962902	AG1-139 E	0.0089	Adder	0.02
962911	AG1-140 C	0.0462	Adder	0.1
962912	AG1-140 E	0.0211	Adder	0.05
963281	AG1-177 C O1	0.3553	Adder	0.79
963282	AG1-177 E O1	0.2369	Adder	0.53
963441	AG1-193 C	0.4288	Adder	0.95
963442	AG1-193 E	0.2859	Adder	0.63
963481	AG1-197 C	0.2933	Adder	0.65
963482	AG1-197 E	0.1956	Adder	0.43
963491	AG1-198 C	0.2132	Adder	0.47
963492	AG1-198 E	0.1421	Adder	0.32
963531	AG1-202 C	0.2122	Adder	0.47
963532	AG1-202 E	0.1093	Adder	0.24
963991	AG1-253 C	0.0693	Adder	0.15
963992	AG1-253 E	0.0334	Adder	0.07
964341	AG1-296 C	0.2926	Adder	0.65
964342	AG1-296 E	0.1576	Adder	0.35
964411	AG1-303 C O1	0.8960	Adder	1.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
964412	AG1-303 E O1	0.5974	Adder	1.33
965201	AG1-385 C	0.4177	Adder	0.93
965202	AG1-385 E	0.1237	Adder	0.27
965861	AG1-455	1.1149	Adder	2.47
966121	AG1-481	0.3823	Adder	0.85
966453	AG1-514 BAT	0.3888	Merchant Transmission	0.3888
966771	AG1-548 C	3.3737	Adder	7.49
966772	AG1-548 E	1.0268	Adder	2.28
G-007A	G-007A	1.4505	Confirmed LTF	1.4505
VFT	VFT	4.0054	Confirmed LTF	4.0054
CALDERWOOD	CALDERWOOD	0.2008	Confirmed LTF	0.2008
PRAIRIE	PRAIRIE	1.1469	Confirmed LTF	1.1469
CHEOAH	CHEOAH	0.2012	Confirmed LTF	0.2012
CBM-N	CBM-N	0.7956	Confirmed LTF	0.7956
COTTONWOOD	COTTONWOOD	0.8841	Confirmed LTF	0.8841
HAMLET	HAMLET	0.1946	Confirmed LTF	0.1946
GIBSON	GIBSON	0.2490	Confirmed LTF	0.2490
BLUEG	BLUEG	0.7916	Confirmed LTF	0.7916
TRIMBLE	TRIMBLE	0.2543	Confirmed LTF	0.2543
CATAWBA	CATAWBA	0.1257	Confirmed LTF	0.1257

11.6.5 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
167534410	235139	01AL&D6T	AP	235138	01AL 4J	AP	1	ATSI-P2-3-CEI-345-004D	breaker	151.0	124.86	125.52	DC	2.22

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235030	01MHNG-T155	0.1499	50/50	0.1499
235134	01AL&D6	0.5185	50/50	0.5185
915951	Y3-092 FTIR	68.1900	Merchant Transmission	68.1900
935191	AD1-154	0.9920	Adder	1.17
936881	AD2-112 C	-4.2604	Adder	-5.01
936882	AD2-112 E	-1.6906	Adder	-1.99
938951	AE1-123	1.1749	Adder	1.38
939291	AE1-160 C	0.7330	Adder	0.86
939292	AE1-160 E	0.4213	Adder	0.5
942811	AE2-299 C	1.3973	Adder	1.64
942812	AE2-299 E	5.5891	Adder	6.58
942961	AE2-316 C	2.8212	Adder	3.32
942962	AE2-316 E	4.0230	Adder	4.73
943151	AE2-344 C	3.6160	Adder	4.25
943152	AE2-344 E	2.4107	Adder	2.84
943351	AF1-006 C	0.6401	Adder	0.75
943352	AF1-006 E	0.3600	Adder	0.42
944261	AF1-094 C	0.6067	Adder	0.71
944262	AF1-094 E	0.4045	Adder	0.48
944281	AF1-096 C	0.6926	Adder	0.81
944282	AF1-096 E	0.4617	Adder	0.54
944301	AF1-098 C	2.1648	Adder	2.55
944302	AF1-098 E	1.4432	Adder	1.7
944391	AF1-104 O1	1.1087	Adder	1.3
944881	AF1-153 C O1	0.5584	Adder	0.66
944882	AF1-153 E O1	0.3723	Adder	0.44
944901	AF1-155 C	0.5625	Adder	0.66
944902	AF1-155 E	0.3750	Adder	0.44
945021	AF1-167 C	0.6632	Adder	0.78
945022	AF1-167 E	0.4430	Adder	0.52
945051	AF1-170 C	2.5019	Adder	2.94
945052	AF1-170 E	1.6680	Adder	1.96
945451	AF1-210 C	1.0352	50/50	1.0352
945452	AF1-210 E	0.6901	50/50	0.6901
945751	AF1-240 C O1	0.5952	Adder	0.7
945752	AF1-240 E O1	0.3968	Adder	0.47
946221	AF1-287 C	0.6211	Adder	0.73
946222	AF1-287 E	0.4141	Adder	0.49
946381	AF1-302 C	1.2320	Adder	1.45
946382	AF1-302 E	1.6426	Adder	1.93

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946401	AF1-304 C	3.6276	Adder	4.27
946402	AF1-304 E	2.4184	Adder	2.85
946771	AF1-217 C	0.6211	Adder	0.73
946772	AF1-217 E	0.4141	Adder	0.49
957161	AF2-010 C	2.3413	Adder	2.75
957162	AF2-010 E	1.5778	Adder	1.86
957571	AF2-051 C	1.8925	Adder	2.23
957572	AF2-051 E	0.9749	Adder	1.15
958361	AF2-130 C	0.7603	Adder	0.89
958362	AF2-130 E	0.5069	Adder	0.6
958731	AF2-164 C O1	2.9919	Adder	3.52
958732	AF2-164 E O1	1.9946	Adder	2.35
958741	AF2-165 C	0.7371	Adder	0.87
958742	AF2-165 E	0.4914	Adder	0.58
958751	AF2-166 C	0.7603	Adder	0.89
958752	AF2-166 E	0.5069	Adder	0.6
959441	AF2-235 C	0.3463	Adder	0.41
959442	AF2-235 E	0.2309	Adder	0.27
959521	AF2-243 C	0.5528	Adder	0.65
959522	AF2-243 E	0.3685	Adder	0.43
959822	AF2-273 E	0.3870	50/50	0.3870
960041	AF2-295 C	0.5625	Adder	0.66
960042	AF2-295 E	0.3750	Adder	0.44
960891	AF2-380 C	0.4209	Adder	0.5
960892	AF2-380 E	0.2806	Adder	0.33
961971	AG1-040 C	0.3465	Adder	0.77
961972	AG1-040 E	0.2310	Adder	0.51
962511	AG1-100 C	0.3367	Adder	0.75
962512	AG1-100 E	0.2245	Adder	0.5
962891	AG1-138 C	0.1595	Adder	0.35
962892	AG1-138 E	0.0084	Adder	0.02
962901	AG1-139 C	0.1546	Adder	0.34
962902	AG1-139 E	0.0081	Adder	0.02
962911	AG1-140 C	0.0417	Adder	0.09
962912	AG1-140 E	0.0190	Adder	0.04
963281	AG1-177 C O1	0.3215	Adder	0.71
963282	AG1-177 E O1	0.2144	Adder	0.48
963441	AG1-193 C	0.3869	Adder	0.86
963442	AG1-193 E	0.2579	Adder	0.57
963481	AG1-197 C	0.2628	Adder	0.58
963482	AG1-197 E	0.1752	Adder	0.39
963491	AG1-198 C	0.1929	Adder	0.43
963492	AG1-198 E	0.1286	Adder	0.29
963531	AG1-202 C	0.1898	Adder	0.42
963532	AG1-202 E	0.0978	Adder	0.22
963991	AG1-253 C	0.0625	Adder	0.14
963992	AG1-253 E	0.0301	Adder	0.07
964341	AG1-296 C	0.2575	Adder	0.57
964342	AG1-296 E	0.1386	Adder	0.31
964411	AG1-303 C O1	0.8024	Adder	1.78
964412	AG1-303 E O1	0.5350	Adder	1.19
965201	AG1-385 C	0.3806	Adder	0.84

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965202	AG1-385 E	0.1127	Adder	0.25
965861	AG1-455	0.9981	Adder	2.22
966453	AG1-514 BAT	1.0000	50/50	1.0000
966771	AG1-548 C	3.0520	Adder	6.77
966772	AG1-548 E	0.9289	Adder	2.06
G-007A	G-007A	1.3929	Confirmed LTF	1.3929
VFT	VFT	3.8442	Confirmed LTF	3.8442
CALDERWOOD	CALDERWOOD	0.1854	Confirmed LTF	0.1854
PRAIRIE	PRAIRIE	1.0539	Confirmed LTF	1.0539
CHEOAH	CHEOAH	0.1862	Confirmed LTF	0.1862
CBM-N	CBM-N	0.7608	Confirmed LTF	0.7608
COTTONWOOD	COTTONWOOD	0.8148	Confirmed LTF	0.8148
HAMLET	HAMLET	0.1808	Confirmed LTF	0.1808
GIBSON	GIBSON	0.2288	Confirmed LTF	0.2288
BLUEG	BLUEG	0.7291	Confirmed LTF	0.7291
TRIMBLE	TRIMBLE	0.2337	Confirmed LTF	0.2337
CATAWBA	CATAWBA	0.1165	Confirmed LTF	0.1165

11.6.6 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
167448484	235152	01BUTLER	AP	235197	01KARNSC	AP	1	ATSI-P2-3-CEI-345-004D	breaker	179.0	102.16	103.18	DC	3.19

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
236828	01GRAYMONT	-0.1716	Adder	-0.2
915952	Y3-092 NFTWR	95.0500	Merchant Transmission	95.0500
923062	AB1-105 OP (Suspended)	9.0529	Adder	10.65
923821	AB2-019 FTWR	2.6614	Merchant Transmission	2.6614
926252	AC1-103 GEN1	4.2902	Adder	5.05
926253	AC1-103 GEN2	4.2902	Adder	5.05
938951	AE1-123	-2.3724	Adder	-2.79
939171	AE1-147 C	-0.5172	Adder	-0.61
941351	AE2-131 C (Suspended)	-0.5598	Adder	-0.66
942813	AE2-299 BAT	12.1504	Merchant Transmission	12.1504
944382	AF1-103 BAT	1.4572	Merchant Transmission	1.4572
944392	AF1-104 BAT	1.8444	Merchant Transmission	1.8444
944901	AF1-155 C	-0.9096	Adder	-1.07
945351	AF1-200 FTIR	1.2130	Merchant Transmission	1.2130
945451	AF1-210 C	-1.4502	Adder	-1.71
946061	AF1-271 C O1	1.9153	Adder	2.25
946062	AF1-271 E O1	1.2768	Adder	1.5
946403	AF1-304 BAT	12.7040	50/50	12.7040
946423	AF1-306 BAT	18.2533	Merchant Transmission	18.2533
959823	AF2-273 BAT	0.2721	50/50	0.2721
960023	AF2-293 BAT	0.0592	Merchant Transmission	0.0592
961202	AF2-411 BAT (Withdrawn : 12/08/2020)	15.0180	Merchant Transmission	15.0180
965203	AG1-385 BAT	0.4012	Merchant Transmission	0.4012
965303	AG1-395 BAT	0.2493	Merchant Transmission	0.2493
965862	AG1-455 BAT	1.6908	Merchant Transmission	1.6908
966122	AG1-481 BAT	0.5908	Merchant Transmission	0.5908
966773	AG1-548 BAT	1.2338	Merchant Transmission	1.2338
WEC	WEC	0.2142	Confirmed LTF	0.2142
LGEE	LGEE	0.4172	Confirmed LTF	0.4172
CPL	CPL	0.2826	Confirmed LTF	0.2826
CBM-W2	CBM-W2	5.6090	Confirmed LTF	5.6090
NY	NY	1.2232	Confirmed LTF	1.2232
TVA	TVA	0.8288	Confirmed LTF	0.8288
O-066	O-066	5.4850	Confirmed LTF	5.4850
SIGE	SIGE	0.1550	Confirmed LTF	0.1550
CBM-S2	CBM-S2	4.8859	Confirmed LTF	4.8859
CBM-S1	CBM-S1	0.2299	Confirmed LTF	0.2299
G-007	G-007	0.8242	Confirmed LTF	0.8242

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
MEC	MEC	1.0503	Confirmed LTF	1.0503
LAGN	LAGN	1.0482	Confirmed LTF	1.0482
CBM-W1	CBM-W1	9.8140	Confirmed LTF	9.8140

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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
167448187	235197	01KARNSC	AP	235152	01BUTLER	AP	1	ATSI-P2-3-CEI-345-004D	breaker	179.0	238.94	239.74	DC	3.19

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200608	26PINEY #1	0.7388	50/50	0.7388
200662	26SCRUB GR	1.6803	50/50	1.6803
235030	01MHNG-T155	0.1596	50/50	0.1596
236828	01GRAYMONT	0.1716	Adder	0.2
290086	Q-036 E	1.7010	Adder	2.0
293393	V3-030E	1.2402	Adder	1.46
915951	Y3-092 FTIR	95.0500	Merchant Transmission	95.0500
916202	Z1-069 E	2.6874	Adder	3.16
921642	AA2-000	21.5351	Adder	25.34
930511	AB2-092	0.7907	Adder	0.93
931092	AB1-160 E	0.7678	Adder	0.9
935191	AD1-154	2.3032	50/50	2.3032
936421	AD2-055	1.6279	Adder	1.92
936991	AD2-133 C	0.7655	Adder	0.9
936992	AD2-133 E	3.5011	Adder	4.12
938951	AE1-123	2.7911	50/50	2.7911
939171	AE1-147 C	0.5172	Adder	0.61
939172	AE1-147 E	0.3448	Adder	0.41
939291	AE1-160 C	1.4995	50/50	1.4995
939292	AE1-160 E	0.8619	50/50	0.8619
940201	AE2-001 C	0.5159	Adder	0.61
940202	AE2-001 E	0.3439	Adder	0.4
940861	AE2-074 C	0.7659	Adder	0.9
940862	AE2-074 E	1.0081	Adder	1.19
941191	AE2-113 C	3.5353	Adder	4.16
941192	AE2-113 E	3.8063	Adder	4.48
941261	AE2-120 C	0.5152	Adder	0.61
941262	AE2-120 E	0.3435	Adder	0.4
941271	AE2-121 C	0.2762	Adder	0.32
941272	AE2-121 E	0.1844	Adder	0.22
941321	AE2-126 C	0.6680	Adder	0.79
941322	AE2-126 E	0.4453	Adder	0.52
941331	AE2-129 C	0.5598	Adder	0.66
941332	AE2-129 E	0.3732	Adder	0.44
941351	AE2-131 C (Suspended)	0.5598	Adder	0.66
941352	AE2-131 E (Suspended)	0.3732	Adder	0.44
942491	AE2-262 C	2.4259	Adder	2.85
942492	AE2-262 E	1.6302	Adder	1.92
942501	AE2-263 C	2.2803	Adder	2.68
942502	AE2-263 E	1.5225	Adder	1.79

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942811	AE2-299 C	2.0656	Adder	2.43
942812	AE2-299 E	8.2623	Adder	9.72
942961	AE2-316 C	4.3499	50/50	4.3499
942962	AE2-316 E	6.2031	50/50	6.2031
943151	AE2-344 C	5.2796	Adder	6.21
943152	AE2-344 E	3.5197	Adder	4.14
943351	AF1-006 C	0.9302	Adder	1.09
943352	AF1-006 E	0.5233	Adder	0.62
943751	AF1-043	4.8838	Adder	5.75
944181	AF1-086 C O1	1.0729	Adder	1.26
944182	AF1-086 E O1	4.6675	Adder	5.49
944261	AF1-094 C	0.9660	Adder	1.14
944262	AF1-094 E	0.6440	Adder	0.76
944281	AF1-096 C	1.4168	50/50	1.4168
944282	AF1-096 E	0.9446	50/50	0.9446
944301	AF1-098 C	3.2077	Adder	3.77
944302	AF1-098 E	2.1385	Adder	2.52
944311	AF1-099 C	3.6825	Adder	4.33
944312	AF1-099 E	2.4550	Adder	2.89
944321	AF1-100 C	7.9114	Adder	9.31
944322	AF1-100 E	5.2742	Adder	6.2
944381	AF1-103 O1	1.2386	Adder	1.46
944391	AF1-104 O1	1.5677	Adder	1.84
944691	AF1-134 C	0.6241	Adder	0.73
944692	AF1-134 E	0.4161	Adder	0.49
944771	AF1-142 C	5.8920	Adder	6.93
944772	AF1-142 E	3.9280	Adder	4.62
944881	AF1-153 C O1	0.9010	Adder	1.06
944882	AF1-153 E O1	0.6006	Adder	0.71
944901	AF1-155 C	0.9096	Adder	1.07
944902	AF1-155 E	0.6064	Adder	0.71
945021	AF1-167 C	1.5046	50/50	1.5046
945022	AF1-167 E	1.0049	50/50	1.0049
945051	AF1-170 C	3.6027	Adder	4.24
945052	AF1-170 E	2.4018	Adder	2.83
945451	AF1-210 C	1.7061	50/50	1.7061
945452	AF1-210 E	1.1374	50/50	1.1374
945491	AF1-214 C (Withdrawn : 12/03/2020)	0.5153	Adder	0.61
945492	AF1-214 E (Withdrawn : 12/03/2020)	0.3435	Adder	0.4
945751	AF1-240 C O1	1.3819	50/50	1.3819
945752	AF1-240 E O1	0.9213	50/50	0.9213
946111	AF1-276 C	3.7393	Adder	4.4
946112	AF1-276 E	1.8418	Adder	2.17
946121	AF1-277 C	3.7393	Adder	4.4
946122	AF1-277 E	1.8418	Adder	2.17
946131	AF1-278 C	2.9825	Adder	3.51
946132	AF1-278 E	1.4823	Adder	1.74
946221	AF1-287 C	0.9076	Adder	1.07
946222	AF1-287 E	0.6051	Adder	0.71
946381	AF1-302 C	1.8995	50/50	1.8995
946382	AF1-302 E	2.5327	50/50	2.5327

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946401	AF1-304 C	7.6224	50/50	7.6224
946402	AF1-304 E	5.0816	50/50	5.0816
946421	AF1-306 C	3.1031	Adder	3.65
946422	AF1-306 E	12.4123	Adder	14.6
946771	AF1-217 C	0.9076	Adder	1.07
946772	AF1-217 E	0.6051	Adder	0.71
957161	AF2-010 C	3.7466	Adder	4.41
957162	AF2-010 E	2.5249	Adder	2.97
957451	AF2-039 C	0.4190	Adder	0.49
957452	AF2-039 E	0.2793	Adder	0.33
957571	AF2-051 C	2.7680	Adder	3.26
957572	AF2-051 E	1.4259	Adder	1.68
957941	AF2-088 C	0.2017	Adder	0.24
957942	AF2-088 E	0.1345	Adder	0.16
958271	AF2-121 C	0.5598	Adder	0.66
958272	AF2-121 E	0.3732	Adder	0.44
958361	AF2-130 C	1.7143	50/50	1.7143
958362	AF2-130 E	1.1429	50/50	1.1429
958731	AF2-164 C O1	3.9772	Adder	4.68
958732	AF2-164 E O1	2.6515	Adder	3.12
958741	AF2-165 C	1.5448	50/50	1.5448
958742	AF2-165 E	1.0298	50/50	1.0298
958751	AF2-166 C	1.7143	50/50	1.7143
958752	AF2-166 E	1.1429	50/50	1.1429
959441	AF2-235 C	0.7084	50/50	0.7084
959442	AF2-235 E	0.4723	50/50	0.4723
959521	AF2-243 C	1.1586	50/50	1.1586
959522	AF2-243 E	0.7724	50/50	0.7724
959822	AF2-273 E	0.6750	50/50	0.6750
960022	AF2-293 E	0.0503	Adder	0.06
960041	AF2-295 C	0.9096	Adder	1.07
960042	AF2-295 E	0.6064	Adder	0.71
960051	AF2-296 C	0.6241	Adder	0.73
960052	AF2-296 E	0.4161	Adder	0.49
960891	AF2-380 C	3.6836	50/50	3.6836
960892	AF2-380 E	2.4557	50/50	2.4557
961201	AF2-411 O1 (Withdrawn : 12/08/2020)	12.7653	Adder	15.02
961971	AG1-040 C	0.5056	Adder	1.12
961972	AG1-040 E	0.3370	Adder	0.75
962411	AG1-090 C O1	1.4834	Adder	3.29
962412	AG1-090 E O1	0.9889	Adder	2.2
962511	AG1-100 C	0.4897	Adder	1.09
962512	AG1-100 E	0.3265	Adder	0.72
962891	AG1-138 C	0.6786	50/50	0.6786
962892	AG1-138 E	0.0357	50/50	0.0357
962901	AG1-139 C	0.6115	50/50	0.6115
962902	AG1-139 E	0.0322	50/50	0.0322
962911	AG1-140 C	0.0616	Adder	0.14
962912	AG1-140 E	0.0281	Adder	0.06
962951	AG1-144 C	0.2967	Adder	0.66
962952	AG1-144 E	0.1978	Adder	0.44
963281	AG1-177 C O1	0.5120	Adder	1.14

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
963282	AG1-177 E O1	0.3413	Adder	0.76
963441	AG1-193 C	1.3675	50/50	1.3675
963442	AG1-193 E	0.9117	50/50	0.9117
963481	AG1-197 C	0.3834	Adder	0.85
963482	AG1-197 E	0.2556	Adder	0.57
963491	AG1-198 C	0.3072	Adder	0.68
963492	AG1-198 E	0.2048	Adder	0.45
963531	AG1-202 C	0.2719	Adder	0.6
963532	AG1-202 E	0.1401	Adder	0.31
963571	AG1-206 C	0.1952	Adder	0.43
963572	AG1-206 E	0.1051	Adder	0.23
963891	AG1-242 C	0.1792	Adder	0.4
963892	AG1-242 E	0.0965	Adder	0.21
963991	AG1-253 C	0.0924	Adder	0.21
963992	AG1-253 E	0.0445	Adder	0.1
964341	AG1-296 C	0.7284	50/50	0.7284
964342	AG1-296 E	0.3922	50/50	0.3922
964411	AG1-303 C O1	1.1736	Adder	2.61
964412	AG1-303 E O1	0.7824	Adder	1.74
964451	AG1-308 C O1	0.2120	Adder	0.47
964452	AG1-308 E O1	0.2963	Adder	0.66
965121	AG1-377 C O1	0.2967	Adder	0.66
965122	AG1-377 E O1	0.1978	Adder	0.44
965131	AG1-378 C O1	0.2967	Adder	0.66
965132	AG1-378 E O1	0.1978	Adder	0.44
965201	AG1-385 C	0.6140	Adder	1.36
965202	AG1-385 E	0.1819	Adder	0.4
965241	AG1-389 C O1	0.3064	Adder	0.68
965242	AG1-389 E O1	0.2043	Adder	0.45
965251	AG1-390 C O1	0.3064	Adder	0.68
965252	AG1-390 E O1	0.2043	Adder	0.45
965261	AG1-391 C O1	0.3064	Adder	0.68
965262	AG1-391 E O1	0.2043	Adder	0.45
965271	AG1-392 C O1	0.6128	Adder	1.36
965272	AG1-392 E O1	0.4085	Adder	0.91
965301	AG1-395 C	0.3812	Adder	0.85
965302	AG1-395 E	0.1132	Adder	0.25
965861	AG1-455	1.4372	Adder	3.19
966121	AG1-481	0.5097	Adder	1.13
966771	AG1-548 C	4.8243	Adder	10.71
966772	AG1-548 E	1.4683	Adder	3.26
G-007A	G-007A	1.8820	Confirmed LTF	1.8820
VFT	VFT	5.1923	Confirmed LTF	5.1923
CALDERWOOD	CALDERWOOD	0.2798	Confirmed LTF	0.2798
PRAIRIE	PRAIRIE	1.6660	Confirmed LTF	1.6660
CHEOAH	CHEOAH	0.2803	Confirmed LTF	0.2803
CBM-N	CBM-N	1.0296	Confirmed LTF	1.0296
COTTONWOOD	COTTONWOOD	1.2579	Confirmed LTF	1.2579
HAMLET	HAMLET	0.2535	Confirmed LTF	0.2535
GIBSON	GIBSON	0.3647	Confirmed LTF	0.3647
BLUEG	BLUEG	1.1562	Confirmed LTF	1.1562
TRIMBLE	TRIMBLE	0.3712	Confirmed LTF	0.3712

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CATAWBA	CATAWBA	0.1677	Confirmed LTF	0.1677

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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
168003628	235203	01KISSNG	AP	235197	01KARNSC	AP	1	ATSI-P1-2-CEI-345-700T	single	268.0	144.19	145.43	DC	3.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200608	26PINEY #1	0.7758	80/20	0.7758
200642	26SENECA#1	2.8936	80/20	2.8936
200643	26SENECA#2	2.7329	80/20	2.7329
200644	26SENECA#3	0.2986	80/20	0.2986
200649	26PENNTech	0.5029	80/20	0.5029
200662	26SCRUB GR	1.7506	80/20	1.7506
200665	26SHAWVL 3	1.8285	80/20	1.8285
200666	26SHAWVL 4	1.7954	80/20	1.7954
200805	26COLVER13 (Deactivation : 01/09/2020)	1.1511	80/20	1.1511
200828	26HNSMLK 1	0.8374	80/20	0.8374
200829	26HNSMLK 2	0.8374	80/20	0.8374
200830	26HNSMLK 3	0.8374	80/20	0.8374
200831	26HNSMLK 4	0.8374	80/20	0.8374
200832	26HNSMLK 5	0.8374	80/20	0.8374
200849	26LAKVU GN	0.0712	80/20	0.0712
201201	26WRREN CT	0.7342	80/20	0.7342
235030	01MHNG-T155	0.0751	80/20	0.0751
235134	01AL&D6	0.0844	80/20	0.0844
915951	Y3-092 FTIR	92.3700	80/20	92.3700
921642	AA2-000	23.1250	Adder	27.21
930511	AB2-092	0.8491	Adder	1.0
935191	AD1-154	2.4200	80/20	2.4200
936421	AD2-055	1.7481	Adder	2.06
936991	AD2-133 C	0.8153	Adder	0.96
938951	AE1-123	2.9308	80/20	2.9308
939171	AE1-147 C	0.5544	Adder	0.65
939291	AE1-160 C	1.5949	80/20	1.5949
940201	AE2-001 C	0.5529	Adder	0.65
940681	AE2-055 C (Suspended)	0.5319	Adder	0.63
940861	AE2-074 C	0.8292	Adder	0.98
941191	AE2-113 C	4.4991	80/20	4.4991
941261	AE2-120 C	0.5522	Adder	0.65
941271	AE2-121 C	0.2960	Adder	0.35
941321	AE2-126 C	0.8448	80/20	0.8448
941331	AE2-129 C	0.5975	Adder	0.7
941351	AE2-131 C (Suspended)	0.5975	Adder	0.7
942351	AE2-248 C	0.4326	Adder	0.51
942491	AE2-262 C	2.6006	Adder	3.06

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942501	AE2-263 C	2.4445	Adder	2.88
942811	AE2-299 C	2.8198	80/20	2.8198
942961	AE2-316 C	4.5989	80/20	4.5989
943151	AE2-344 C	6.6468	80/20	6.6468
943351	AF1-006 C	1.1808	80/20	1.1808
943751	AF1-043	5.2443	Adder	6.17
944001	AF1-068 C O1 (Withdrawn : 12/15/2020)	0.5739	Adder	0.68
944181	AF1-086 C O1	1.1348	Adder	1.34
944261	AF1-094 C	1.2530	80/20	1.2530
944281	AF1-096 C	1.5070	80/20	1.5070
944301	AF1-098 C	4.2893	80/20	4.2893
944311	AF1-099 C	3.9477	Adder	4.64
944321	AF1-100 C	9.9765	80/20	9.9765
944381	AF1-103 O1	1.6328	80/20	1.6328
944391	AF1-104 O1	1.8556	80/20	1.8556
944471	AF1-112 C	0.5429	Adder	0.64
944671	AF1-132 C O1 (Withdrawn : 12/15/2020)	0.5365	Adder	0.63
944691	AF1-134 C	0.6635	Adder	0.78
944771	AF1-142 C	6.3163	Adder	7.43
944881	AF1-153 C O1	1.1297	80/20	1.1297
944901	AF1-155 C	1.1402	80/20	1.1402
945021	AF1-167 C	1.4331	80/20	1.4331
945051	AF1-170 C	4.4040	80/20	4.4040
945121	AF1-177	0.0644	80/20	0.0644
945161	AF1-181	0.0084	80/20	0.0084
945171	AF1-182	0.0420	80/20	0.0420
945451	AF1-210 C	1.2796	80/20	1.2796
945491	AF1-214 C (Withdrawn : 12/03/2020)	0.5522	Adder	0.65
945751	AF1-240 C O1	1.4520	80/20	1.4520
946111	AF1-276 C	4.8046	80/20	4.8046
946121	AF1-277 C	4.8046	80/20	4.8046
946131	AF1-278 C	3.8322	80/20	3.8322
946221	AF1-287 C	1.1434	80/20	1.1434
946381	AF1-302 C	2.0083	80/20	2.0083
946401	AF1-304 C	8.0226	80/20	8.0226
946421	AF1-306 C	3.9208	80/20	3.9208
946771	AF1-217 C	1.1434	80/20	1.1434
957161	AF2-010 C	4.8493	80/20	4.8493
957451	AF2-039 C	0.4483	Adder	0.53
957571	AF2-051 C	3.3653	80/20	3.3653
957941	AF2-088 C	0.2158	Adder	0.25
958271	AF2-121 C	0.5975	Adder	0.7
958361	AF2-130 C	1.7996	80/20	1.7996
958731	AF2-164 C O1	4.7621	80/20	4.7621
958741	AF2-165 C	1.6175	80/20	1.6175
958751	AF2-166 C	1.7996	80/20	1.7996
959441	AF2-235 C	0.7535	80/20	0.7535
959521	AF2-243 C	1.2131	80/20	1.2131

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960041	AF2-295 C	1.1402	80/20	1.1402
960051	AF2-296 C	0.6635	Adder	0.78
961201	AF2-411 O1 (Withdrawn : 12/08/2020)	13.7037	Adder	16.12
961211	AF2-412	5.8311	Adder	6.86
961971	AG1-040 C	1.1778	80/20	1.1778
962411	AG1-090 C O1	1.5834	Adder	3.51
962511	AG1-100 C	1.1488	80/20	1.1488
962891	AG1-138 C	0.7124	80/20	0.7124
962901	AG1-139 C	0.6403	80/20	0.6403
962911	AG1-140 C	0.1586	80/20	0.1586
962951	AG1-144 C	0.3167	Adder	0.7
963281	AG1-177 C O1	1.2530	80/20	1.2530
963441	AG1-193 C	1.4104	80/20	1.4104
963481	AG1-197 C	0.8893	80/20	0.8893
963491	AG1-198 C	0.7518	80/20	0.7518
963531	AG1-202 C	0.6215	80/20	0.6215
963571	AG1-206 C	0.4663	80/20	0.4663
963891	AG1-242 C	0.1905	Adder	0.42
963991	AG1-253 C	0.2379	80/20	0.2379
964031	AG1-257 C	0.1997	Adder	0.44
964041	AG1-258 C	0.1997	Adder	0.44
964341	AG1-296 C	0.7684	80/20	0.7684
964411	AG1-303 C O1	2.6923	80/20	2.6923
964451	AG1-308 C O1	0.2264	Adder	0.5
965121	AG1-377 C O1	0.3167	Adder	0.7
965131	AG1-378 C O1	0.3167	Adder	0.7
965201	AG1-385 C	1.4526	80/20	1.4526
965241	AG1-389 C O1	0.3312	Adder	0.74
965251	AG1-390 C O1	0.3312	Adder	0.74
965261	AG1-391 C O1	0.3312	Adder	0.74
965271	AG1-392 C O1	0.6623	Adder	1.47
965301	AG1-395 C	0.4069	Adder	0.9
965861	AG1-455	3.3148	80/20	3.3148
966121	AG1-481	1.2679	80/20	1.2679
966771	AG1-548 C	11.8415	80/20	11.8415
G-007A	G-007A	2.0547	Confirmed LTF	2.0547
VFT	VFT	5.6696	Confirmed LTF	5.6696
CALDERWOOD	CALDERWOOD	0.3012	Confirmed LTF	0.3012
PRAIRIE	PRAIRIE	1.8004	Confirmed LTF	1.8004
CHEOAH	CHEOAH	0.3018	Confirmed LTF	0.3018
CBM-N	CBM-N	1.1232	Confirmed LTF	1.1232
COTTONWOOD	COTTONWOOD	1.3566	Confirmed LTF	1.3566
HAMLET	HAMLET	0.2720	Confirmed LTF	0.2720
GIBSON	GIBSON	0.3937	Confirmed LTF	0.3937
BLUEG	BLUEG	1.2499	Confirmed LTF	1.2499
TRIMBLE	TRIMBLE	0.4012	Confirmed LTF	0.4012
CATAWBA	CATAWBA	0.1803	Confirmed LTF	0.1803

11.6.9 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
167448328	235204	01KITTAN	AP	235139	01AL&D6T	AP	1	ATSI-P2-3-CEI-345-004D	breaker	151.0	120.38	121.04	DC	2.22

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235030	01MHNG-T155	0.1500	50/50	0.1500
915951	Y3-092 FTIR	68.2300	Merchant Transmission	68.2300
935191	AD1-154	0.9926	Adder	1.17
936881	AD2-112 C	-4.2587	Adder	-5.01
936882	AD2-112 E	-1.6900	Adder	-1.99
938951	AE1-123	1.1755	Adder	1.38
939291	AE1-160 C	0.7334	Adder	0.86
939292	AE1-160 E	0.4216	Adder	0.5
942811	AE2-299 C	1.3984	Adder	1.65
942812	AE2-299 E	5.5934	Adder	6.58
942961	AE2-316 C	2.8226	Adder	3.32
942962	AE2-316 E	4.0250	Adder	4.74
943151	AE2-344 C	3.6184	Adder	4.26
943152	AE2-344 E	2.4122	Adder	2.84
943351	AF1-006 C	0.6405	Adder	0.75
943352	AF1-006 E	0.3603	Adder	0.42
944261	AF1-094 C	0.6071	Adder	0.71
944262	AF1-094 E	0.4047	Adder	0.48
944281	AF1-096 C	0.6930	Adder	0.82
944282	AF1-096 E	0.4620	Adder	0.54
944301	AF1-098 C	2.1665	Adder	2.55
944302	AF1-098 E	1.4443	Adder	1.7
944391	AF1-104 O1	1.1094	Adder	1.31
944881	AF1-153 C O1	0.5589	Adder	0.66
944882	AF1-153 E O1	0.3726	Adder	0.44
944901	AF1-155 C	0.5629	Adder	0.66
944902	AF1-155 E	0.3753	Adder	0.44
945021	AF1-167 C	0.6635	Adder	0.78
945022	AF1-167 E	0.4432	Adder	0.52
945051	AF1-170 C	2.5035	Adder	2.95
945052	AF1-170 E	1.6690	Adder	1.96
945451	AF1-210 C	1.0356	50/50	1.0356
945452	AF1-210 E	0.6904	50/50	0.6904
945751	AF1-240 C O1	0.5956	Adder	0.7
945752	AF1-240 E O1	0.3971	Adder	0.47
946221	AF1-287 C	0.6215	Adder	0.73
946222	AF1-287 E	0.4143	Adder	0.49
946381	AF1-302 C	1.2326	Adder	1.45
946382	AF1-302 E	1.6434	Adder	1.93
946401	AF1-304 C	3.6297	Adder	4.27

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946402	AF1-304 E	2.4198	Adder	2.85
946771	AF1-217 C	0.6215	Adder	0.73
946772	AF1-217 E	0.4143	Adder	0.49
957161	AF2-010 C	2.3429	Adder	2.76
957162	AF2-010 E	1.5789	Adder	1.86
957571	AF2-051 C	1.8937	Adder	2.23
957572	AF2-051 E	0.9755	Adder	1.15
958361	AF2-130 C	0.7607	Adder	0.89
958362	AF2-130 E	0.5071	Adder	0.6
958731	AF2-164 C O1	2.9935	Adder	3.52
958732	AF2-164 E O1	1.9957	Adder	2.35
958741	AF2-165 C	0.7375	Adder	0.87
958742	AF2-165 E	0.4916	Adder	0.58
958751	AF2-166 C	0.7607	Adder	0.89
958752	AF2-166 E	0.5071	Adder	0.6
959441	AF2-235 C	0.3465	Adder	0.41
959442	AF2-235 E	0.2310	Adder	0.27
959521	AF2-243 C	0.5531	Adder	0.65
959522	AF2-243 E	0.3687	Adder	0.43
959822	AF2-273 E	0.3872	50/50	0.3872
960041	AF2-295 C	0.5629	Adder	0.66
960042	AF2-295 E	0.3753	Adder	0.44
960891	AF2-380 C	0.4212	Adder	0.5
960892	AF2-380 E	0.2808	Adder	0.33
961971	AG1-040 C	0.3467	Adder	0.77
961972	AG1-040 E	0.2311	Adder	0.51
962511	AG1-100 C	0.3370	Adder	0.75
962512	AG1-100 E	0.2246	Adder	0.5
962891	AG1-138 C	0.1596	Adder	0.35
962892	AG1-138 E	0.0084	Adder	0.02
962901	AG1-139 C	0.1547	Adder	0.34
962902	AG1-139 E	0.0081	Adder	0.02
962911	AG1-140 C	0.0417	Adder	0.09
962912	AG1-140 E	0.0190	Adder	0.04
963281	AG1-177 C O1	0.3218	Adder	0.71
963282	AG1-177 E O1	0.2145	Adder	0.48
963441	AG1-193 C	0.3871	Adder	0.86
963442	AG1-193 E	0.2581	Adder	0.57
963481	AG1-197 C	0.2630	Adder	0.58
963482	AG1-197 E	0.1753	Adder	0.39
963491	AG1-198 C	0.1931	Adder	0.43
963492	AG1-198 E	0.1287	Adder	0.29
963531	AG1-202 C	0.1899	Adder	0.42
963532	AG1-202 E	0.0978	Adder	0.22
963991	AG1-253 C	0.0625	Adder	0.14
963992	AG1-253 E	0.0301	Adder	0.07
964341	AG1-296 C	0.2576	Adder	0.57
964342	AG1-296 E	0.1387	Adder	0.31
964411	AG1-303 C O1	0.8029	Adder	1.78
964412	AG1-303 E O1	0.5353	Adder	1.19
965201	AG1-385 C	0.3809	Adder	0.85
965202	AG1-385 E	0.1128	Adder	0.25

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965861	AG1-455	0.9987	Adder	2.22
966453	AG1-514 BAT	0.5298	Merchant Transmission	0.5298
966771	AG1-548 C	3.0541	Adder	6.78
966772	AG1-548 E	0.9295	Adder	2.06
G-007A	G-007A	1.4025	Confirmed LTF	1.4025
VFT	VFT	3.8700	Confirmed LTF	3.8700
CALDERWOOD	CALDERWOOD	0.1834	Confirmed LTF	0.1834
PRAIRIE	PRAIRIE	1.0435	Confirmed LTF	1.0435
CHEOAH	CHEOAH	0.1842	Confirmed LTF	0.1842
CBM-N	CBM-N	0.7656	Confirmed LTF	0.7656
COTTONWOOD	COTTONWOOD	0.8064	Confirmed LTF	0.8064
HAMLET	HAMLET	0.1784	Confirmed LTF	0.1784
GIBSON	GIBSON	0.2266	Confirmed LTF	0.2266
BLUEG	BLUEG	0.7222	Confirmed LTF	0.7222
TRIMBLE	TRIMBLE	0.2315	Confirmed LTF	0.2315
CATAWBA	CATAWBA	0.1151	Confirmed LTF	0.1151

11.6.10 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
167448199	235240	01COLMBGPN	AP	235202	01KISKIV	AP	1	ATSI-P2-3-CEI-345-004D	breaker	151.0	178.75	179.55	DC	2.66

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235030	01MHNG-T155	0.1762	50/50	0.1762
235134	01AL&D6	0.1825	50/50	0.1825
915951	Y3-092 FTIR	82.2700	Merchant Transmission	82.2700
935191	AD1-154	1.1432	Adder	1.34
936881	AD2-112 C	-2.1694	Adder	-2.55
936882	AD2-112 E	-0.8609	Adder	-1.01
938951	AE1-123	1.4097	Adder	1.66
939291	AE1-160 C	0.8797	Adder	1.03
939292	AE1-160 E	0.5056	Adder	0.59
941191	AE2-113 C	2.8350	Adder	3.34
941192	AE2-113 E	3.0524	Adder	3.59
942811	AE2-299 C	1.6660	Adder	1.96
942812	AE2-299 E	6.6640	Adder	7.84
942961	AE2-316 C	3.4396	Adder	4.05
942962	AE2-316 E	4.9049	Adder	5.77
943151	AE2-344 C	4.3415	Adder	5.11
943152	AE2-344 E	2.8943	Adder	3.41
943351	AF1-006 C	0.7677	Adder	0.9
943352	AF1-006 E	0.4318	Adder	0.51
944261	AF1-094 C	0.7265	Adder	0.85
944262	AF1-094 E	0.4844	Adder	0.57
944281	AF1-096 C	0.8312	Adder	0.98
944282	AF1-096 E	0.5541	Adder	0.65
944301	AF1-098 C	2.5835	Adder	3.04
944302	AF1-098 E	1.7223	Adder	2.03
944381	AF1-103 O1	0.9957	Adder	1.17
944391	AF1-104 O1	1.3352	Adder	1.57
944881	AF1-153 C O1	0.6661	Adder	0.78
944882	AF1-153 E O1	0.4440	Adder	0.52
944901	AF1-155 C	0.6712	Adder	0.79
944902	AF1-155 E	0.4474	Adder	0.53
945021	AF1-167 C	0.9419	50/50	0.9419
945022	AF1-167 E	0.6291	50/50	0.6291
945051	AF1-170 C	3.0090	Adder	3.54
945052	AF1-170 E	2.0060	Adder	2.36
945451	AF1-210 C	1.2366	50/50	1.2366
945452	AF1-210 E	0.8244	50/50	0.8244
945751	AF1-240 C O1	0.6859	Adder	0.81
945752	AF1-240 E O1	0.4573	Adder	0.54
946111	AF1-276 C	3.0650	Adder	3.61

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946112	AF1-276 E	1.5097	Adder	1.78
946121	AF1-277 C	3.0650	Adder	3.61
946122	AF1-277 E	1.5097	Adder	1.78
946131	AF1-278 C	2.4447	Adder	2.88
946132	AF1-278 E	1.2150	Adder	1.43
946221	AF1-287 C	0.7457	Adder	0.88
946222	AF1-287 E	0.4971	Adder	0.58
946381	AF1-302 C	1.5020	Adder	1.77
946382	AF1-302 E	2.0027	Adder	2.36
946401	AF1-304 C	4.3569	Adder	5.13
946402	AF1-304 E	2.9046	Adder	3.42
946421	AF1-306 C	2.4158	Adder	2.84
946422	AF1-306 E	9.6633	Adder	11.37
946771	AF1-217 C	0.7457	Adder	0.88
946772	AF1-217 E	0.4971	Adder	0.58
957161	AF2-010 C	2.8043	Adder	3.3
957162	AF2-010 E	1.8898	Adder	2.22
957571	AF2-051 C	2.2793	Adder	2.68
957572	AF2-051 E	1.1742	Adder	1.38
958361	AF2-130 C	0.9128	Adder	1.07
958362	AF2-130 E	0.6085	Adder	0.72
958731	AF2-164 C O1	3.6169	Adder	4.26
958732	AF2-164 E O1	2.4113	Adder	2.84
958741	AF2-165 C	0.8858	Adder	1.04
958742	AF2-165 E	0.5905	Adder	0.69
958751	AF2-166 C	0.9128	Adder	1.07
958752	AF2-166 E	0.6085	Adder	0.72
959441	AF2-235 C	0.4156	Adder	0.49
959442	AF2-235 E	0.2771	Adder	0.33
959521	AF2-243 C	0.6643	Adder	0.78
959522	AF2-243 E	0.4429	Adder	0.52
959822	AF2-273 E	0.4640	50/50	0.4640
960041	AF2-295 C	0.6712	Adder	0.79
960042	AF2-295 E	0.4474	Adder	0.53
960891	AF2-380 C	0.4951	Adder	0.58
960892	AF2-380 E	0.3301	Adder	0.39
961971	AG1-040 C	0.4167	Adder	0.92
961972	AG1-040 E	0.2778	Adder	0.62
962511	AG1-100 C	0.4046	Adder	0.9
962512	AG1-100 E	0.2698	Adder	0.6
962891	AG1-138 C	0.1915	Adder	0.43
962892	AG1-138 E	0.0101	Adder	0.02
962901	AG1-139 C	0.1858	Adder	0.41
962902	AG1-139 E	0.0098	Adder	0.02
962911	AG1-140 C	0.0497	Adder	0.11
962912	AG1-140 E	0.0226	Adder	0.05
963281	AG1-177 C O1	0.3851	Adder	0.85
963282	AG1-177 E O1	0.2567	Adder	0.57
963441	AG1-193 C	0.4659	Adder	1.03
963442	AG1-193 E	0.3106	Adder	0.69
963481	AG1-197 C	0.3162	Adder	0.7
963482	AG1-197 E	0.2108	Adder	0.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
963491	AG1-198 C	0.2310	Adder	0.51
963492	AG1-198 E	0.1540	Adder	0.34
963531	AG1-202 C	0.2284	Adder	0.51
963532	AG1-202 E	0.1176	Adder	0.26
963571	AG1-206 C	0.1499	Adder	0.33
963572	AG1-206 E	0.0807	Adder	0.18
963991	AG1-253 C	0.0745	Adder	0.17
963992	AG1-253 E	0.0359	Adder	0.08
964341	AG1-296 C	0.6993	50/50	0.6993
964342	AG1-296 E	0.3765	50/50	0.3765
964411	AG1-303 C O1	0.9664	Adder	2.15
964412	AG1-303 E O1	0.6443	Adder	1.43
965201	AG1-385 C	0.4539	Adder	1.01
965202	AG1-385 E	0.1344	Adder	0.3
965861	AG1-455	1.2004	Adder	2.66
966121	AG1-481	0.4098	Adder	0.91
966453	AG1-514 BAT	0.2684	Merchant Transmission	0.2684
966771	AG1-548 C	3.6540	Adder	8.11
966772	AG1-548 E	1.1121	Adder	2.47
G-007A	G-007A	1.4505	Confirmed LTF	1.4505
VFT	VFT	4.0119	Confirmed LTF	4.0119
CALDERWOOD	CALDERWOOD	0.2112	Confirmed LTF	0.2112
PRAIRIE	PRAIRIE	1.2063	Confirmed LTF	1.2063
CHEOAH	CHEOAH	0.2122	Confirmed LTF	0.2122
CBM-N	CBM-N	0.8004	Confirmed LTF	0.8004
COTTONWOOD	COTTONWOOD	0.9303	Confirmed LTF	0.9303
HAMLET	HAMLET	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.2621	Confirmed LTF	0.2621
BLUEG	BLUEG	0.8333	Confirmed LTF	0.8333
TRIMBLE	TRIMBLE	0.2677	Confirmed LTF	0.2677
CATAWBA	CATAWBA	0.1326	Confirmed LTF	0.1326

11.6.11 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
167448197	235282	01GAR RN	AP	235240	01COLMBGPN	AP	1	ATSI-P2-3-CEI-345-004D	breaker	151.0	181.07	181.87	DC	2.66

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235030	01MHNG-T155	0.1762	50/50	0.1762
235134	01AL&D6	0.1825	50/50	0.1825
915951	Y3-092 FTIR	82.2700	Merchant Transmission	82.2700
935191	AD1-154	1.1432	Adder	1.34
936881	AD2-112 C	-2.1694	Adder	-2.55
936882	AD2-112 E	-0.8609	Adder	-1.01
938951	AE1-123	1.4097	Adder	1.66
939291	AE1-160 C	0.8797	Adder	1.03
939292	AE1-160 E	0.5056	Adder	0.59
941191	AE2-113 C	2.8350	Adder	3.34
941192	AE2-113 E	3.0524	Adder	3.59
942811	AE2-299 C	1.6660	Adder	1.96
942812	AE2-299 E	6.6640	Adder	7.84
942961	AE2-316 C	3.4396	Adder	4.05
942962	AE2-316 E	4.9049	Adder	5.77
943151	AE2-344 C	4.3415	Adder	5.11
943152	AE2-344 E	2.8943	Adder	3.41
943351	AF1-006 C	0.7677	Adder	0.9
943352	AF1-006 E	0.4318	Adder	0.51
944261	AF1-094 C	0.7265	Adder	0.85
944262	AF1-094 E	0.4844	Adder	0.57
944281	AF1-096 C	0.8312	Adder	0.98
944282	AF1-096 E	0.5541	Adder	0.65
944301	AF1-098 C	2.5835	Adder	3.04
944302	AF1-098 E	1.7223	Adder	2.03
944381	AF1-103 O1	0.9957	Adder	1.17
944391	AF1-104 O1	1.3352	Adder	1.57
944881	AF1-153 C O1	0.6661	Adder	0.78
944882	AF1-153 E O1	0.4440	Adder	0.52
944901	AF1-155 C	0.6712	Adder	0.79
944902	AF1-155 E	0.4474	Adder	0.53
945021	AF1-167 C	0.9419	50/50	0.9419
945022	AF1-167 E	0.6291	50/50	0.6291
945051	AF1-170 C	3.0090	Adder	3.54
945052	AF1-170 E	2.0060	Adder	2.36
945451	AF1-210 C	1.2366	50/50	1.2366
945452	AF1-210 E	0.8244	50/50	0.8244
945751	AF1-240 C O1	0.6859	Adder	0.81
945752	AF1-240 E O1	0.4573	Adder	0.54
946111	AF1-276 C	3.0650	Adder	3.61

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946112	AF1-276 E	1.5097	Adder	1.78
946121	AF1-277 C	3.0650	Adder	3.61
946122	AF1-277 E	1.5097	Adder	1.78
946131	AF1-278 C	2.4447	Adder	2.88
946132	AF1-278 E	1.2150	Adder	1.43
946221	AF1-287 C	0.7457	Adder	0.88
946222	AF1-287 E	0.4971	Adder	0.58
946381	AF1-302 C	1.5020	Adder	1.77
946382	AF1-302 E	2.0027	Adder	2.36
946401	AF1-304 C	4.3569	Adder	5.13
946402	AF1-304 E	2.9046	Adder	3.42
946421	AF1-306 C	2.4158	Adder	2.84
946422	AF1-306 E	9.6633	Adder	11.37
946771	AF1-217 C	0.7457	Adder	0.88
946772	AF1-217 E	0.4971	Adder	0.58
957161	AF2-010 C	2.8043	Adder	3.3
957162	AF2-010 E	1.8898	Adder	2.22
957571	AF2-051 C	2.2793	Adder	2.68
957572	AF2-051 E	1.1742	Adder	1.38
958361	AF2-130 C	0.9128	Adder	1.07
958362	AF2-130 E	0.6085	Adder	0.72
958731	AF2-164 C O1	3.6169	Adder	4.26
958732	AF2-164 E O1	2.4113	Adder	2.84
958741	AF2-165 C	0.8858	Adder	1.04
958742	AF2-165 E	0.5905	Adder	0.69
958751	AF2-166 C	0.9128	Adder	1.07
958752	AF2-166 E	0.6085	Adder	0.72
959441	AF2-235 C	0.4156	Adder	0.49
959442	AF2-235 E	0.2771	Adder	0.33
959521	AF2-243 C	0.6643	Adder	0.78
959522	AF2-243 E	0.4429	Adder	0.52
959822	AF2-273 E	0.4640	50/50	0.4640
960041	AF2-295 C	0.6712	Adder	0.79
960042	AF2-295 E	0.4474	Adder	0.53
960891	AF2-380 C	0.4951	Adder	0.58
960892	AF2-380 E	0.3301	Adder	0.39
961971	AG1-040 C	0.4167	Adder	0.92
961972	AG1-040 E	0.2778	Adder	0.62
962511	AG1-100 C	0.4046	Adder	0.9
962512	AG1-100 E	0.2698	Adder	0.6
962891	AG1-138 C	0.1915	Adder	0.43
962892	AG1-138 E	0.0101	Adder	0.02
962901	AG1-139 C	0.1858	Adder	0.41
962902	AG1-139 E	0.0098	Adder	0.02
962911	AG1-140 C	0.0497	Adder	0.11
962912	AG1-140 E	0.0226	Adder	0.05
963281	AG1-177 C O1	0.3851	Adder	0.85
963282	AG1-177 E O1	0.2567	Adder	0.57
963441	AG1-193 C	0.4659	Adder	1.03
963442	AG1-193 E	0.3106	Adder	0.69
963481	AG1-197 C	0.3162	Adder	0.7
963482	AG1-197 E	0.2108	Adder	0.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
963491	AG1-198 C	0.2310	Adder	0.51
963492	AG1-198 E	0.1540	Adder	0.34
963531	AG1-202 C	0.2284	Adder	0.51
963532	AG1-202 E	0.1176	Adder	0.26
963571	AG1-206 C	0.1499	Adder	0.33
963572	AG1-206 E	0.0807	Adder	0.18
963991	AG1-253 C	0.0745	Adder	0.17
963992	AG1-253 E	0.0359	Adder	0.08
964341	AG1-296 C	0.6993	50/50	0.6993
964342	AG1-296 E	0.3765	50/50	0.3765
964411	AG1-303 C O1	0.9664	Adder	2.15
964412	AG1-303 E O1	0.6443	Adder	1.43
965201	AG1-385 C	0.4539	Adder	1.01
965202	AG1-385 E	0.1344	Adder	0.3
965861	AG1-455	1.2004	Adder	2.66
966121	AG1-481	0.4098	Adder	0.91
966453	AG1-514 BAT	0.2684	Merchant Transmission	0.2684
966771	AG1-548 C	3.6540	Adder	8.11
966772	AG1-548 E	1.1121	Adder	2.47
G-007A	G-007A	1.4505	Confirmed LTF	1.4505
VFT	VFT	4.0119	Confirmed LTF	4.0119
CALDERWOOD	CALDERWOOD	0.2112	Confirmed LTF	0.2112
PRAIRIE	PRAIRIE	1.2063	Confirmed LTF	1.2063
CHEOAH	CHEOAH	0.2122	Confirmed LTF	0.2122
CBM-N	CBM-N	0.8004	Confirmed LTF	0.8004
COTTONWOOD	COTTONWOOD	0.9303	Confirmed LTF	0.9303
HAMLET	HAMLET	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.2621	Confirmed LTF	0.2621
BLUEG	BLUEG	0.8333	Confirmed LTF	0.8333
TRIMBLE	TRIMBLE	0.2677	Confirmed LTF	0.2677
CATAWBA	CATAWBA	0.1326	Confirmed LTF	0.1326

11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA2-000	N/A	N/A
AA2-132	Thompson 34.5kV	Withdrawn
AB1-105	Highland-Hanna 345kV	Suspended
AB1-160	Gold-Sabinsville 115kV	In Service
AB2-019	Erie West 345kV	Engineering and Procurement
AB2-092	Bergen 138kV	Partially in Service - Under Construction
AC1-103	Nottingham 138kV	Active
AD1-154	Timblin 34.5 kV	Active
AD2-055	Moshannon-East Towanda 230 kV	Active
AD2-112	Springdale CC II 138kV	Engineering and Procurement
AD2-133	Eagle Valley 115kV	Active
AE1-123	Emlenton 34.5 kV	Engineering and Procurement
AE1-147	Bellefonte 46 kV	Engineering and Procurement
AE1-160	Venango 34.5 kV	Engineering and Procurement
AE2-001	Nittany-Zion 46 kV	Active
AE2-055	Shingletown-Boalsburg 46 kV	Suspended
AE2-074	Potter 46 kV	Active
AE2-113	Farmers Valley-Ridgeway 115 kV	Active
AE2-120	Graymont-Zion 46 kV	Active
AE2-121	Milesburg-Tanney Junction 46 kV	Active
AE2-126	Dubois-Curwensville 34.5 kV	Engineering and Procurement
AE2-129	Philipsburg-Clarence 34.5 kV	Engineering and Procurement
AE2-131	Philipsburg-Karthus 34.5	Suspended
AE2-248	Fillmore-Thompson Farm 46 kV	Active
AE2-262	Moshannon-Milesburg 230 kV	Active
AE2-263	Moshannon-Milesburg 230 kV	Active
AE2-299	Erie East 230 kV	Active
AE2-316	Brookville-Squab Hollow 138 kV	Active
AE2-344	Edinboro South-Venango Junction 115 kV	Active
AF1-006	Fairview East 34.5 kV	Active
AF1-043	Moshannon-East Towanda 230 kV	Active
AF1-068	Boalsburg-Centre Hall 46 kV	Withdrawn
AF1-086	Madera-Westover South 115 kV	Active
AF1-094	Union City-Cambridge Springs 34.5 kV	Active
AF1-096	Titusville-Oil Creek 34.5 kV	Active
AF1-098	Four Mile Jct-Corry East 115 kV	Active
AF1-099	Moshannon-Milesburg 230 kV	Active
AF1-100	Shawville-Moshannon 230 kV	Active
AF1-103	Warren 34.5 kV	Active

Queue Number	Project Name	Status
AF1-104	Erie West 34.5 kV	Active
AF1-106	East Sayre 34.5 kV	Active
AF1-112	Centre Hall-Boalsburg 46 kV	Active
AF1-132	Shingletown-Boalsburg 46 kV	Withdrawn
AF1-134	Philipsburg-Madera 34.5 kV	Active
AF1-142	Moshannon-Milesburg 230 kV	Active
AF1-153	Motion-Ridgeway 46 kV	Active
AF1-155	Paper City-Wilcox 46 kV	Engineering and Procurement
AF1-167	West Freedom-C&K Coal 25 kV	Active
AF1-170	Springboro-Venango Junction 115 kV	Active
AF1-177	Warren 115 kV	Partially in Service - Under Construction
AF1-181	Shawville 3 230 kV	Partially in Service - Under Construction
AF1-182	Shawville 4 230 kV	Partially in Service - Under Construction
AF1-200	Plano 345 kV	Active
AF1-210	Burma 23 kV	Engineering and Procurement
AF1-214	Nittany-Zion 46 kV	Withdrawn
AF1-217	Edinboro -Cambridge Springs 34.5 kV	Active
AF1-240	Timblin 34.5 kV	Active
AF1-271	Keisters-Krendale 138 kV	Active
AF1-272	Lucerne 115 kV	Active
AF1-276	Lewis Run-Pierce Brook 230 kV	Active
AF1-277	Lewis Run-Pierce Brook 2 230 kV	Active
AF1-278	Lewis Run-Pierce Brook 3 230 kV	Active
AF1-286	East Sayre 34.5 kV II	Active
AF1-287	Edinboro South 34.5 kV II	Active
AF1-302	Brookville-Squab Hollow 138 kV	Active
AF1-304	Titusville-Grandview 115 kV	Active
AF1-306	Squab Hollow 230 kV	Active
AF2-010	Union City-Titusville 115 kV	Active
AF2-039	Shawville-Clearfield 34.5 kV	Active
AF2-051	Geneva 115 kV	Active
AF2-088	Shawville-Clearfield 34.5 kV II	Active
AF2-121	Philipsburg-Shawville 34.5 kV	Active
AF2-130	Wolfs Corners 34.5 kV	Active
AF2-164	Handsome Lake 345 kV	Active
AF2-165	Clark Summit-Emlenton 34.5 kV	Active
AF2-166	Clark Summit-Emlenton 34 kV	Active
AF2-235	Titusville-Oil Creek 34.5 kV	Active
AF2-238	Mansfield-South Troy 34.5 kV	Active
AF2-240	North Orwell 12.47 kV	Active
AF2-241	Athens-Milan 34.5 kV	Active
AF2-243	Clark Summit 34.5 kV	Active
AF2-265	South Troy-Athens 34.5 kV	Active
AF2-273	Sligo 25 kV	Engineering and Procurement
AF2-293	Beech Creek 12.47 kV	Active
AF2-294	Thompson 34.5 kV	Active
AF2-295	Wilcox-Paper City 46 kV	Active
AF2-296	Madera 34.5 kV	Active
AF2-380	Karns City-Bear Creek 25 kV	Active
AF2-405	East Sayre 34.5 kV III	Active
AF2-406	Sayre 115 kV	Active
AF2-411	Mainesburg 345 kV	Withdrawn

Queue Number	Project Name	Status
AF2-412	Mainesburg 115 kV	Active
AG1-040	Morgan Street-Mount Hope 34.5 kV	Active
AG1-090	Philipsburg 115 kV	Active
AG1-100	Venango-Saegertown 34.5 kV	Active
AG1-138	Wolfs Corners 34.5 kV	Active
AG1-139	Clark Summit-Emlenton 34.5 kV	Active
AG1-140	Union City 34.5 kV	Active
AG1-144	Phillipsburg 34.5 kV	Active
AG1-177	Union City 34.5 kV	Active
AG1-193	Utica Junction 34.5 kV	Active
AG1-197	Morgan Street-Cochranton 34.5 kV	Active
AG1-198	Union City 34.5 kV	Active
AG1-202	Springboro 12.47 kV	Active
AG1-206	Snyder Twp 34.5 kV	Active
AG1-242	Beccaria 34.5 kV	Active
AG1-247	North Orwell 12.47 kV	Active
AG1-253	Erie East-Union City 34.5 kV	Active
AG1-257	Madisonburg Jct-Millheim 46 kV	Active
AG1-258	Madisonburg Jct-Millheim 46 kV	Active
AG1-296	Snyder Township 34.5 kV	Active
AG1-303	Geneva 115 kV	Active
AG1-308	Shawville-Philipsburg 115 kV	Active
AG1-333	Lake Como-Pine Mills 12.47 kV	Active
AG1-377	Philipsburg 115 kV	Active
AG1-378	Philipsburg 115 kV	Active
AG1-385	Motion-Ridgeway 46 kV	Active
AG1-389	Gold 115 kV I	Active
AG1-390	Gold 115 kV II	Active
AG1-391	Gold 115 kV III	Active
AG1-392	Gold 115 kV IV	Active
AG1-395	Philipsburg-Karthaus 34.5 kV 2	Active
AG1-455	Springboro-Venango Junction 115 kV	Active
AG1-481	Warren 34.5 kV	Active
AG1-514	Springdale CT III 138 kV	Active
AG1-548	Erie South-Union City 115 kV	Active
V3-030	St. Benedict-Patton 46kV	In Service
Y3-092	Erie West 345kV	Engineering and Procurement
Z1-069	Gold-Sabinsville 115kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
ATSI-P2-3-CEI-345-004D	CONTINGENCY 'ATSI-P2-3-CEI-345-004D' /* ERIE WEST 345KV BKR 8 DISCONNECT BRANCH FROM BUS 200599 TO BUS 200600 CKT 1 /* 26ERIE W 345 26ERIE SO 345 DISCONNECT BRANCH FROM BUS 200599 TO BUS 238547 CKT 1 /* 26ERIE W 345 02AT 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239036 CKT 1 /* 02AT 345 02PERRY 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239082 CKT 1 /* 02AT 345 02S8-ATT 345 DISCONNECT BUS 200600 /* 26ERIE SO 345 DISCONNECT BUS 238547 /* 02AT 345 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
PN-P1-2-PN-345-001	CONTINGENCY 'PN-P1-2-PN-345-001' /* ERIE WEST - WAYNE 345KV DISCONNECT BRANCH FROM BUS 200599 TO BUS 200595 CKT 1 /* 26ERIE W 345 26WAYNE 345 END
ATSI-P1-2-CEI-345-700T	CONTINGENCY 'ATSI-P1-2-CEI-345-700T' /* PN/ATSI ERIE WEST - ASHTABULA - PERRY 345KV DISCONNECT BRANCH FROM BUS 239036 TO BUS 238547 CKT 1 /* 02PERRY 345 02AT 345 DISCONNECT BRANCH FROM BUS 238547 TO BUS 239082 CKT 1 /* 02AT 345 02S8-ATT 345 DISCONNECT BRANCH FROM BUS 239082 TO BUS 238544 CKT 8 /* 02S8-ATT 345 02ASH_3 138 DISCONNECT BRANCH FROM BUS 238547 TO BUS 200599 CKT 1 /* 02AT 345 26ERIE W 345 END
PJM_GEN_P1-1: UNIT02PERRG1	CONTINGENCY 'PJM_GEN_P1-1: UNIT02PERRG1' REMOVE MACHINE 1 FROM BUS 239035 END
Base Case	

Contingency Name	Contingency Definition
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-230-6G	CONTINGENCY 'PN-P2-3-PN-230-6G' /* ERIE SOUTH 230KV SB 35 OPEN BUS 200819 /*ERIE SOUTH 1 230KV BUS OPEN BUS 200918 /*ERIE SOUTH 230 KV BUS TIE END

12 Short Circuit Analysis

The following Breakers are overdutied:

None.

12.1 System Reinforcements - Short Circuit

No short circuit impacts were identified for this project.

13 Affected Systems

13.1 NYISO

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

14 Attachment 1: One Line Diagram