



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF2-338
SNAKE SPRING 115 KV III
12 MW Capacity / 20 MW Energy**

July 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, LLC (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.

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 generating facility located in Bedford County, Pennsylvania. The installed facilities will have a total capability of 20 MW with 12 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-338
Project Name	SNAKE SPRING 115 KV III
State	Pennsylvania
County	Bedford
Transmission Owner	MAIT-PENELEC Zone
MFO	20
MWE	20
MWC	12
Fuel	Solar
Basecase Study Year	2023

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

4.1 Primary POI

The AF2-338 project is an uprate to the proposed AF2-336 and AF2-337 projects and the Point of Interconnection will remain unchanged. The IC will not incur any connection facility upgrade costs for this project as long as AF2-336 and/or AF2-337 is constructed before or concurrently with AF2-338.

Attachment 1 shows a one-line diagram of the proposed primary Direct Connection facilities for the AF2-338 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 Direct Connection facilities.

4.2 Secondary POI

The interconnection of the project at a Secondary POI can be accomplished by constructing a new 115 kV three (3) breaker ring bus substation and looping the Bedford North Snake Spring 115 kV line into the new station. The new substation would be located approximately 0.6 miles from Snake Spring Substation. A full scope of work or estimated cost is not provided for the proposed Secondary POI.

5 Cost Summary

The AF2-338 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$0
Total System Network Upgrade Costs	\$80,266,140
Total Costs	\$80,266,140

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 88-129. 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.

6 Transmission Owner Scope of Work

The AF2-338 project is an uprate to the proposed AF2-336 and AF2-337 projects and the Point of Interconnection will remain unchanged. The IC will not incur any connection facility upgrade costs for this project as long as AF2-336 and/or AF2-337 is constructed before or concurrently with AF2-338.

7 Schedule

The project is an uprate to the proposed AF2-336 and AF2-337 projects and point of interconnection will remain unchanged. There is no Attachment Facilities or Direct and/or Non-Direct Connection facilities scope of work.

The schedule for the required Network Impact Reinforcements will be more clearly identified in future study phases. The estimated time to complete each of the required reinforcements is identified in the “System Reinforcements” section of the report.

8 Transmission Owner Analysis

8.1 Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AF2-338 project did not contribute to any overloads on the <100 kV FE transmission 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.

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 AF2-336/AF2-337/AF2-338 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 AF2-338 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 Meteorological Data Reporting Requirements

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

- Back Panel temperature (Fahrenheit)
- Irradiance (Watts/meter²)
- Ambient air temperature (Fahrenheit) – (Accepted, not required)
- Wind speed (meters/second) – (Accepted, not required)
- Wind direction (decimal degrees from true north) – (Accepted, not required)

1.1 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>.

11 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AF2-338 was evaluated as a 20.0 MW (Capacity 12.0 MW) uprate to the AF2-337 which is a direct connection at the Snake Spring 115 kV substation in the APS area. Project AF2-338 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-338 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)

None.

11.2 Multiple Facility Contingency

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

None.

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	CON T NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPAC T
101345667	200734	26SCALP L.	115.0	PENELE C	200749	26RACHEL H	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	190.0	111.27	113.57	DC	4.37
101345678	200743	26HOOVERS V	115.0	PENELE C	200734	26SCALP L.	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	190.0	110.97	113.27	DC	4.37
101344559	200746	26ROCKWOOD	115.0	PENELE C	202650	26HIGHPOINT	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	179.0	155.9	157.4	DC	2.7
101345652	200746	26ROCKWOOD	115.0	PENELE C	202650	26HIGHPOINT	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	179.0	138.94	140.74	DC	3.23
101344522	200747	26PENN-MAR	115.0	PENELE C	200762	26GARRETT	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	167.0	185.3	186.92	DC	2.7
101345684	200751	26HILLCLAY	115.0	PENELE C	200752	26HILLTOP	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	237.0	106.21	109.35	DC	7.45
98888867	200762	26GARRETT	115.0	PENELE C	235470	01GARRET	115.0	AP	1	PN-P2-3-PN-115-35E	breaker	160.0	203.75	205.43	DC	2.69
101344527	202650	26HIGHPOINT	115.0	PENELE C	200747	26PENN-MAR	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	174.0	174.58	176.13	DC	2.7
101345647	202650	26HIGHPOINT	115.0	PENELE C	200747	26PENN-MAR	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	174.0	154.09	155.95	DC	3.23

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
100765338	235470	01GARRET	115.0	AP	235469	01GARRET	138.0	AP	1	PN-P2-3-PN-115-35E	breaker	196.0	166.33	167.7	DC	2.69
101345685	960390	AF2-330 TAP	115.0	PENELEC	200525	26SUMMIT	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	237.0	108.36	111.69	DC	7.91

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	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
101345006	200523	26SNAKE SP	115.0	PENELEC	200521	26SAXTON	115.0	PENELEC	1	PN-P1-2-PN-115-080	operation	120.0	106.97	113.73	DC	8.12
101344969	200742	26TOWER 51	115.0	PENELEC	200741	26SEWARD	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	185.0	123.51	125.83	DC	4.29
101344974	200742	26TOWER 51	115.0	PENELEC	200741	26SEWARD	115.0	PENELEC	1	Base Case	operation	147.0	101.86	104.35	DC	3.65
101344922	200743	26HOOVERS V	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	AP-P1-3-PN-115-010	operation	172.0	146.42	148.93	DC	4.32
101344927	200743	26HOOVERS V	115.0	PENELEC	200742	26TOWER 51	115.0	PENELEC	1	Base Case	operation	137.0	125.71	128.39	DC	3.67
101344995	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	PN-P1-3-PN-115-029	operation	179.0	131.18	132.47	DC	2.31
101344996	200746	26ROCKWOOD	115.0	PENELEC	202650	26HIGHPOINT	115.0	PENELEC	1	Base Case	operation	148.0	136.18	136.75	DC	1.88
101344912	200747	26PENN-MAR	115.0	PENELEC	200762	26GARRETT	115.0	PENELEC	1	Base Case	operation	137.0	163.1	163.72	DC	1.88
98889084	200762	26GARRETT	115.0	PENELEC	235470	01GARRET	115.0	AP	1	Base Case	operation	133.0	180.13	180.77	DC	1.88

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Rating MVA	PRE PROJE T LOADIN G %	POST PROJE T LOADIN G %	AC D C	MW IMPAC T
1013449 64	20083 6	26STATHILL	115.0	PENELE C	20074 3	26HOOVER SV	115.0	PENELE C	1	PN-P1-2-PN-115-074B-A	operati on	201.0	100.19	104.36	DC	8.38
1013449 55	20263 7	26PRIDE	115.0	PENELE C	20074 4	26SOMERS T	115.0	PENELE C	1	Base Case	operati on	133.0	158.06	160.64	DC	3.43
1013449 52	20264 7	26KIMRUN TAP	115.0	PENELE C	20263 7	26PRIDE	115.0	PENELE C	1	Base Case	operati on	133.0	160.47	163.04	DC	3.43
1013449 58	20265 0	26HIGHPOIN T	115.0	PENELE C	20074 7	26PENN-MAR	115.0	PENELE C	1	Base Case	operati on	137.0	159.56	160.18	DC	1.88
1007656 61	23547 0	01GARRET	115.0	AP	23546 9	01GARRET	138.0	AP	1	Base Case	operati on	169.0	141.76	142.26	DC	1.88
1013449 49	94567 0	AF1-232 TAP	115.0	PENELE C	20264 7	26KIMRUN TAP	115.0	PENELE C	1	Base Case	operati on	133.0	160.47	163.04	DC	3.43
1013450 44	96039 0	AF2-330 TAP	115.0	PENELE C	20052 5	26SUMMIT	115.0	PENELE C	1	Base Case	operati on	175.0	110.05	113.51	DC	6.05
1013450 45	96039 0	AF2-330 TAP	115.0	PENELE C	20052 5	26SUMMIT	115.0	PENELE C	1	PN-P1-2-PN-115-082	operati on	237.0	108.97	112.38	DC	8.09

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
101345684	5	26HILLCLAY 115.0 kV - 26HILLTOP 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0041A (1785) : Reconductor 4.5 miles of transmission line Project Type : FAC Cost : \$13,756,500 Time Estimate : 36.0 Months	\$13,756,500
101345678	2	26HOOVERSV 115.0 kV - 26SCALP L. 115.0 kV Ckt 1	<u>PENELEC</u> s2046_s2046.1_s2046.2 (1894) : Hooversville115 kV Substation Replace line relaying and line trap (s2046.1) Scalp Level 115 kV Substation Replace substation conductor (s2046.2) Rachel Hill 115 kV Substation Replace line relaying, line trap, and substation conductor (s2046.3)	\$0
101345667	1	26SCALP L. 115.0 kV - 26RACHEL H 115.0 kV Ckt 1	Project Type : FAC Cost : \$0 Time Estimate : N/A Months	
100765338	8	01GARRET 115.0 kV - 01GARRET 138.0 kV Ckt 1	<u>APS / PENELEC</u> PN-AF2-F-0065A (728) : Replace transformer. Project Type : FAC Cost : \$5,502,600 Time Estimate : 24.0 Months PN-AF2-F-0065B (729) : Replace metering. Project Type : FAC Cost : \$489,120 Time Estimate : 12.0 Months PN-AF2-F-0065C (730) : Replace bus conductor. Project Type : FAC Cost : \$152,850 Time Estimate : 12.0 Months	\$6,144,570
101344522	4	26PENN-MAR 115.0 kV - 26GARRETT 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0038A (1777) : Reconductor 1.76 miles of transmission line Project Type : FAC Cost : \$5,380,320 Time Estimate : 30.0 Months PN-AF2-F-0038B (1778) : Replace bus conductor at Penn Mar substation. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months PN-AF2-F-0038C (1779) : Replace line drops at Penn Mar substation. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months	\$5,624,880

ID	Idx	Facility	Upgrade Description	Cost
101344559,101345652	3	26ROCKWOOD 115.0 kV - 26HIGHPOINT 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0037 (1776) : Rebuild 10.1 miles of transmission line Project Type : FAC Cost : \$30,875,700 Time Estimate : 36.0 Months	\$30,875,700
101345685	9	AF2-330 TAP 115.0 kV - 26SUMMIT 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0025A (1749) : Replace line trap at Summit Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months PN-AF2-F-0025B (1750) : Replace bus conductor at Summit. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months PN-AF2-F-0025C (1751) : Adjust CT taps at Summit. Project Type : FAC Cost : \$733,680 Time Estimate : 12.0 Months PN-AF2-F-0025D (1752) : Rebuild 1.22 miles of transmission line Project Type : FAC Cost : \$3,729,540 Time Estimate : 24.0 Months	\$4,707,780
98888867	6	26GARRETT 115.0 kV - 01GARRET 115.0 kV Ckt 1	<u>APS</u> WP-AF1-F-0003 (636) : Reconductor Garrett Tap - Garrett (~2.0 miles) Project Type : FAC Cost : \$3,780,000 Time Estimate : 6.0 Months <u>PENELEC</u> PN-AF2-F-0042A (1788) : Replace line trap at Garrett. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months PN-AF2-F-0042B (1789) : Replace bus conductor at Garrett. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months	\$4,024,560

ID	Idx	Facility	Upgrade Description	Cost
101345647,101 344527	7	26HIGHPOINT 115.0 kV - 26PENN-MAR 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0039A (1780) : Replace circuit breaker at Penn Mar Project Type : FAC Cost : \$733,680 Time Estimate : 12.0 Months PN-AF2-F-0039B (1781) : Rebuild 4.67 miles of transmission line Project Type : FAC Cost : \$14,276,190 Time Estimate : 36.0 Months PN-AF2-F-0039C (1782) : Replace bus conductor at Penn Mar. Project Type : FAC Cost : \$122,280 Time Estimate : 12.0 Months	\$15,132,150
			TOTAL COST	\$80,266,140

11.6 Flow Gate Details - Primary POI

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
101345667	200734	26SCALP L.	PENELEC	200749	26RACHEL H	PENELEC	1	PN-P7-1-PN-230-001	tower	190.0	111.27	113.57	DC	4.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2537	50/50	0.2537
200834	26SW_E13_K22	0.1303	50/50	0.1303
200835	26DSGENWIN	0.6414	50/50	0.6414
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4573	50/50	0.4573
200864	K-013 E	10.6047	50/50	10.6047
200889	26STNY CRK	0.6356	50/50	0.6356
200890	26BF_G21_K23	0.3146	50/50	0.3146
200891	26CSLMN_L13	0.4934	50/50	0.4934
200892	26LOOKOUT	0.4687	50/50	0.4687
202225	26SCI_S29B	0.2027	50/50	0.2027
202652	26RGH_Y1-033	0.2408	50/50	0.2408
292350	K-023	11.7637	50/50	11.7637
292542	L-013 1	11.4419	50/50	11.4419
293432	R-040 E	0.6436	50/50	0.6436
293902	O-048 E	10.2977	50/50	10.2977
294903	P-060 E	14.7386	50/50	14.7386
913142	Y1-033 E OP1	9.5361	50/50	9.5361
917672	Z2-108 E	6.4361	50/50	6.4361
930262	AB1-065 E (Suspended)	0.4692	Adder	0.55
938351	AE1-053	3.5756	50/50	3.5756
938881	AE1-116	1.8885	50/50	1.8885
938991	AE1-128 C	19.0411	50/50	19.0411
938992	AE1-128 E	12.6941	50/50	12.6941
943301	AF1-001 C	0.4485	Adder	0.53
943302	AF1-001 E	0.5002	Adder	0.59
943711	AF1-039 C O1	2.5228	50/50	2.5228
943712	AF1-039 E O1	1.6819	50/50	1.6819
944781	AF1-143 C	21.4536	50/50	21.4536
944782	AF1-143 E	11.4419	50/50	11.4419
945671	AF1-232 C O2	39.0010	50/50	39.0010
945672	AF1-232 E O2	21.0006	50/50	21.0006
946081	AF1-273 C O1	18.7389	50/50	18.7389
946082	AF1-273 E O1	12.4926	50/50	12.4926
946571	AF1-321 C O1	6.0611	50/50	6.0611
946572	AF1-321 E O1	4.0407	50/50	4.0407
957001	AF2-001 C O1	6.0611	50/50	6.0611
957002	AF2-001 E O1	4.0407	50/50	4.0407
957011	AF2-002 C O1	3.0305	50/50	3.0305
957012	AF2-002 E O1	2.0204	50/50	2.0204

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957981	AF2-092 C	1.5727	50/50	1.5727
957982	AF2-092 E	1.0485	50/50	1.0485
958101	AF2-104 C	1.0072	50/50	1.0072
958102	AF2-104 E	0.6715	50/50	0.6715
958411	AF2-135 C	1.0727	50/50	1.0727
958412	AF2-135 E	0.7151	50/50	0.7151
958471	AF2-141	2.8605	50/50	2.8605
959301	AF2-221 C	4.3160	50/50	4.3160
959302	AF2-221 E	5.9602	50/50	5.9602
959792	AF2-270 E	0.9841	50/50	0.9841
960451	AF2-336 C O1	2.6212	50/50	2.6212
960452	AF2-336 E O1	1.7474	50/50	1.7474
960461	AF2-337 C O1	2.6212	50/50	2.6212
960462	AF2-337 E O1	1.7474	50/50	1.7474
960471	AF2-338 C O1	2.6212	50/50	2.6212
960472	AF2-338 E O1	1.7474	50/50	1.7474
960481	AF2-339 C O1	2.6212	50/50	2.6212
960482	AF2-339 E O1	1.7474	50/50	1.7474
960901	AF2-381 C	32.3898	50/50	32.3898
960902	AF2-381 E	17.0452	50/50	17.0452
WEC	WEC	0.0410	Confirmed LTF	0.0410
LGEE	LGEE	0.0787	Confirmed LTF	0.0787
CPL	CPL	0.1131	Confirmed LTF	0.1131
CBM-W2	CBM-W2	1.1630	Confirmed LTF	1.1630
NY	NY	0.2300	Confirmed LTF	0.2300
CBM-W1	CBM-W1	1.4887	Confirmed LTF	1.4887
TVA	TVA	0.2086	Confirmed LTF	0.2086
O-066	O-066	1.5994	Confirmed LTF	1.5994
CBM-S2	CBM-S2	0.9595	Confirmed LTF	0.9595
CBM-S1	CBM-S1	1.2524	Confirmed LTF	1.2524
G-007	G-007	0.2392	Confirmed LTF	0.2392
MEC	MEC	0.2129	Confirmed LTF	0.2129

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
101345678	200743	26HOOVERSV	PENELEC	200734	26SCALP L	PENELEC	1	PN-P7-1-PN-230-001	tower	190.0	110.97	113.27	DC	4.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2537	50/50	0.2537
200834	26SW_E13_K22	0.1303	50/50	0.1303
200835	26DSGENWIN	0.6414	50/50	0.6414
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4573	50/50	0.4573
200864	K-013 E	10.6047	50/50	10.6047
200889	26STNY CRK	0.6356	50/50	0.6356
200890	26BF_G21_K23	0.3146	50/50	0.3146
200891	26CSLMN_L13	0.4934	50/50	0.4934
200892	26LOOKOUT	0.4687	50/50	0.4687
202225	26SCI_S29B	0.2027	50/50	0.2027
202652	26RGH_Y1-033	0.2408	50/50	0.2408
292350	K-023	11.7637	50/50	11.7637
292542	L-013 1	11.4419	50/50	11.4419
293432	R-040 E	0.6436	50/50	0.6436
293902	O-048 E	10.2977	50/50	10.2977
294903	P-060 E	14.7386	50/50	14.7386
913142	Y1-033 E OP1	9.5361	50/50	9.5361
917672	Z2-108 E	6.4361	50/50	6.4361
930262	AB1-065 E (Suspended)	0.4692	Adder	0.55
938351	AE1-053	3.5756	50/50	3.5756
938881	AE1-116	1.8885	50/50	1.8885
938991	AE1-128 C	19.0411	50/50	19.0411
938992	AE1-128 E	12.6941	50/50	12.6941
943301	AF1-001 C	0.4485	Adder	0.53
943302	AF1-001 E	0.5002	Adder	0.59
943711	AF1-039 C O1	2.5228	50/50	2.5228
943712	AF1-039 E O1	1.6819	50/50	1.6819
944781	AF1-143 C	21.4536	50/50	21.4536
944782	AF1-143 E	11.4419	50/50	11.4419
945671	AF1-232 C O2	39.0010	50/50	39.0010
945672	AF1-232 E O2	21.0006	50/50	21.0006
946081	AF1-273 C O1	18.7389	50/50	18.7389
946082	AF1-273 E O1	12.4926	50/50	12.4926
946571	AF1-321 C O1	6.0611	50/50	6.0611
946572	AF1-321 E O1	4.0407	50/50	4.0407
957001	AF2-001 C O1	6.0611	50/50	6.0611
957002	AF2-001 E O1	4.0407	50/50	4.0407
957011	AF2-002 C O1	3.0305	50/50	3.0305
957012	AF2-002 E O1	2.0204	50/50	2.0204

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957981	AF2-092 C	1.5727	50/50	1.5727
957982	AF2-092 E	1.0485	50/50	1.0485
958101	AF2-104 C	1.0072	50/50	1.0072
958102	AF2-104 E	0.6715	50/50	0.6715
958411	AF2-135 C	1.0727	50/50	1.0727
958412	AF2-135 E	0.7151	50/50	0.7151
958471	AF2-141	2.8605	50/50	2.8605
959792	AF2-270 E	0.9841	50/50	0.9841
960451	AF2-336 C O1	2.6212	50/50	2.6212
960452	AF2-336 E O1	1.7474	50/50	1.7474
960461	AF2-337 C O1	2.6212	50/50	2.6212
960462	AF2-337 E O1	1.7474	50/50	1.7474
960471	AF2-338 C O1	2.6212	50/50	2.6212
960472	AF2-338 E O1	1.7474	50/50	1.7474
960481	AF2-339 C O1	2.6212	50/50	2.6212
960482	AF2-339 E O1	1.7474	50/50	1.7474
960901	AF2-381 C	32.3898	50/50	32.3898
960902	AF2-381 E	17.0452	50/50	17.0452
WEC	WEC	0.0410	Confirmed LTF	0.0410
LGEE	LGEE	0.0787	Confirmed LTF	0.0787
CPL	CPL	0.1131	Confirmed LTF	0.1131
CBM-W2	CBM-W2	1.1630	Confirmed LTF	1.1630
NY	NY	0.2300	Confirmed LTF	0.2300
CBM-W1	CBM-W1	1.4887	Confirmed LTF	1.4887
TVA	TVA	0.2086	Confirmed LTF	0.2086
O-066	O-066	1.5994	Confirmed LTF	1.5994
CBM-S2	CBM-S2	0.9595	Confirmed LTF	0.9595
CBM-S1	CBM-S1	1.2524	Confirmed LTF	1.2524
G-007	G-007	0.2392	Confirmed LTF	0.2392
MEC	MEC	0.2129	Confirmed LTF	0.2129

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
101344559	200746	26ROCKWOOD	PENELEC	202650	26HIGHPOINT	PENELEC	1	PN-P2-3- PN-115-35E	breaker	179.0	155.9	157.4	DC	2.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9850	50/50	0.9850
200864	K-013 E	1.7949	Adder	2.11
200889	26STNY CRK	0.5957	50/50	0.5957
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7577	50/50	0.7577
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
292350	K-023	18.0647	50/50	18.0647
292542	L-013 1	17.5706	50/50	17.5706
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8135	50/50	15.8135
294903	P-060 E	13.8130	50/50	13.8130
917672	Z2-108 E	9.8834	50/50	9.8834
938351	AE1-053	5.4908	50/50	5.4908
938881	AE1-116	2.1188	50/50	2.1188
938991	AE1-128 C	10.8245	50/50	10.8245
938992	AE1-128 E	7.2163	50/50	7.2163
944751	AF1-140 C	0.6698	Adder	0.79
944752	AF1-140 E	0.4465	Adder	0.53
944781	AF1-143 C	32.9448	50/50	32.9448
944782	AF1-143 E	17.5706	50/50	17.5706
945671	AF1-232 C O2	39.3744	50/50	39.3744
945672	AF1-232 E O2	21.2016	50/50	21.2016
946081	AF1-273 C O1	18.5115	50/50	18.5115
946082	AF1-273 E O1	12.3410	50/50	12.3410
957981	AF2-092 C	0.9707	50/50	0.9707
957982	AF2-092 E	0.6471	50/50	0.6471
958101	AF2-104 C	1.1300	50/50	1.1300
958102	AF2-104 E	0.7533	50/50	0.7533
958411	AF2-135 C	1.6472	50/50	1.6472
958412	AF2-135 E	1.0982	50/50	1.0982
958471	AF2-141	4.3926	50/50	4.3926
959792	AF2-270 E	0.5594	50/50	0.5594
960451	AF2-336 C O1	1.6178	50/50	1.6178
960452	AF2-336 E O1	1.0786	50/50	1.0786
960461	AF2-337 C O1	1.6178	50/50	1.6178
960462	AF2-337 E O1	1.0786	50/50	1.0786
960471	AF2-338 C O1	1.6178	50/50	1.6178
960472	AF2-338 E O1	1.0786	50/50	1.0786

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960481	AF2-339 C O1	1.6178	50/50	1.6178
960482	AF2-339 E O1	1.0786	50/50	1.0786
960901	AF2-381 C	9.0082	50/50	9.0082
960902	AF2-381 E	4.7406	50/50	4.7406
NEWTON	NEWTON	0.2278	Confirmed LTF	0.2278
FARMERCITY	FARMERCITY	0.0119	Confirmed LTF	0.0119
G-007A	G-007A	0.7121	Confirmed LTF	0.7121
VFT	VFT	1.9672	Confirmed LTF	1.9672
CALDERWOOD	CALDERWOOD	0.1173	Confirmed LTF	0.1173
PRAIRIE	PRAIRIE	0.5553	Confirmed LTF	0.5553
CHEOAH	CHEOAH	0.1186	Confirmed LTF	0.1186
EDWARDS	EDWARDS	0.0721	Confirmed LTF	0.0721
TILTON	TILTON	0.1310	Confirmed LTF	0.1310
GIBSON	GIBSON	0.1158	Confirmed LTF	0.1158
BLUEG	BLUEG	0.3732	Confirmed LTF	0.3732
TRIMBLE	TRIMBLE	0.1191	Confirmed LTF	0.1191
CATAWBA	CATAWBA	0.0872	Confirmed LTF	0.0872

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
101344522	200747	26PENN-MAR	PENELEC	200762	26GARRETT	PENELEC	1	PN-P2-3-PN-115-35E	breaker	167.0	185.3	186.92	DC	2.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7148	50/50	0.7148
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9849	50/50	0.9849
200864	K-013 E	1.7937	Adder	2.11
200889	26STNY CRK	0.5956	50/50	0.5956
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7576	50/50	0.7576
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
202652	26RGH_Y1-033	0.5552	50/50	0.5552
292350	K-023	18.0631	50/50	18.0631
292542	L-013 1	17.5690	50/50	17.5690
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8121	50/50	15.8121
294903	P-060 E	13.8104	50/50	13.8104
913142	Y1-033 E OP1	21.9885	50/50	21.9885
917672	Z2-108 E	9.8825	50/50	9.8825
938351	AE1-053	5.4903	50/50	5.4903
938881	AE1-116	2.1185	50/50	2.1185
938991	AE1-128 C	10.8202	50/50	10.8202
938992	AE1-128 E	7.2134	50/50	7.2134
943711	AF1-039 C O1	5.8171	50/50	5.8171
943712	AF1-039 E O1	3.8780	50/50	3.8780
944781	AF1-143 C	32.9418	50/50	32.9418
944782	AF1-143 E	17.5690	50/50	17.5690
945671	AF1-232 C O2	39.3692	50/50	39.3692
945672	AF1-232 E O2	21.1988	50/50	21.1988
946081	AF1-273 C O1	18.5084	50/50	18.5084
946082	AF1-273 E O1	12.3389	50/50	12.3389
957981	AF2-092 C	0.9703	50/50	0.9703
957982	AF2-092 E	0.6468	50/50	0.6468
958101	AF2-104 C	1.1299	50/50	1.1299
958102	AF2-104 E	0.7532	50/50	0.7532
958411	AF2-135 C	1.6471	50/50	1.6471
958412	AF2-135 E	1.0981	50/50	1.0981
958471	AF2-141	4.3922	50/50	4.3922
959792	AF2-270 E	0.5592	50/50	0.5592
960451	AF2-336 C O1	1.6171	50/50	1.6171
960452	AF2-336 E O1	1.0781	50/50	1.0781
960461	AF2-337 C O1	1.6171	50/50	1.6171
960462	AF2-337 E O1	1.0781	50/50	1.0781

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960471	AF2-338 C O1	1.6171	50/50	1.6171
960472	AF2-338 E O1	1.0781	50/50	1.0781
960481	AF2-339 C O1	1.6171	50/50	1.6171
960482	AF2-339 E O1	1.0781	50/50	1.0781
960901	AF2-381 C	9.0041	50/50	9.0041
960902	AF2-381 E	4.7384	50/50	4.7384
NEWTON	NEWTON	0.2342	Confirmed LTF	0.2342
FARMERCITY	FARMERCITY	0.0123	Confirmed LTF	0.0123
G-007A	G-007A	0.6977	Confirmed LTF	0.6977
VFT	VFT	1.9285	Confirmed LTF	1.9285
CALDERWOOD	CALDERWOOD	0.1203	Confirmed LTF	0.1203
PRAIRIE	PRAIRIE	0.5708	Confirmed LTF	0.5708
CHEOAH	CHEOAH	0.1216	Confirmed LTF	0.1216
EDWARDS	EDWARDS	0.0742	Confirmed LTF	0.0742
TILTON	TILTON	0.1348	Confirmed LTF	0.1348
GIBSON	GIBSON	0.1190	Confirmed LTF	0.1190
BLUEG	BLUEG	0.3837	Confirmed LTF	0.3837
TRIMBLE	TRIMBLE	0.1224	Confirmed LTF	0.1224
CATAWBA	CATAWBA	0.0893	Confirmed LTF	0.0893

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
101345684	200751	26HILLCLAY	PENELEC	200752	26HILLTOP	PENELEC	1	PN-P7-1-PN-230-001	tower	237.0	106.21	109.35	DC	7.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2541	50/50	0.2541
200834	26SW_E13_K22	0.1306	50/50	0.1306
200835	26DSGENWIN	0.6428	50/50	0.6428
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4624	50/50	0.4624
200864	K-013 E	10.7233	50/50	10.7233
200883	Q-053 E	7.7242	50/50	7.7242
200888	26HIGHLAND	1.2344	50/50	1.2344
200889	26STNY CRK	0.7356	50/50	0.7356
200890	26BF_G21_K23	0.3152	50/50	0.3152
200891	26CSLMN_L13	0.4945	50/50	0.4945
200892	26LOOKOUT	0.4698	50/50	0.4698
200915	26CHSTN_FL	0.2110	50/50	0.2110
200925	26R32	1.4243	50/50	1.4243
202225	26SCI_S29B	0.2032	50/50	0.2032
202652	26RGH_Y1-033	0.2412	50/50	0.2412
292350	K-023	11.7891	50/50	11.7891
292542	L-013 1	11.4666	50/50	11.4666
293432	R-040 E	0.6450	50/50	0.6450
293603	O-018 E	28.6239	50/50	28.6239
293902	O-048 E	10.3199	50/50	10.3199
294903	P-060 E	17.0591	50/50	17.0591
296332	R-032 E	33.0276	50/50	33.0276
913142	Y1-033 E OP1	9.5532	50/50	9.5532
917672	Z2-108 E	6.4499	50/50	6.4499
938351	AE1-053	3.5833	50/50	3.5833
938881	AE1-116	1.8930	50/50	1.8930
938991	AE1-128 C	27.9324	50/50	27.9324
938992	AE1-128 E	18.6216	50/50	18.6216
943711	AF1-039 C O1	2.5273	50/50	2.5273
943712	AF1-039 E O1	1.6849	50/50	1.6849
944751	AF1-140 C	3.1099	50/50	3.1099
944752	AF1-140 E	2.0733	50/50	2.0733
944781	AF1-143 C	21.4998	50/50	21.4998
944782	AF1-143 E	11.4666	50/50	11.4666
945671	AF1-232 C O2	42.7700	50/50	42.7700
945672	AF1-232 E O2	23.0300	50/50	23.0300
946081	AF1-273 C O1	20.8921	50/50	20.8921
946082	AF1-273 E O1	13.9281	50/50	13.9281
946571	AF1-321 C O1	5.7685	50/50	5.7685

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946572	AF1-321 E O1	3.8457	50/50	3.8457
957001	AF2-001 C O1	5.7685	50/50	5.7685
957002	AF2-001 E O1	3.8457	50/50	3.8457
957011	AF2-002 C O1	2.8843	50/50	2.8843
957012	AF2-002 E O1	1.9228	50/50	1.9228
957931	AF2-087 C	0.1261	Adder	0.28
957932	AF2-087 E	0.1737	Adder	0.39
957981	AF2-092 C	2.6812	50/50	2.6812
957982	AF2-092 E	1.7875	50/50	1.7875
958101	AF2-104 C	1.0096	50/50	1.0096
958102	AF2-104 E	0.6731	50/50	0.6731
958411	AF2-135 C	1.0750	50/50	1.0750
958412	AF2-135 E	0.7167	50/50	0.7167
958471	AF2-141	2.8666	50/50	2.8666
959301	AF2-221 C	3.6886	50/50	3.6886
959302	AF2-221 E	5.0938	50/50	5.0938
959792	AF2-270 E	1.4436	50/50	1.4436
959802	AF2-271 E	0.3133	50/50	0.3133
960391	AF2-330 C	9.6134	50/50	9.6134
960392	AF2-330 E	4.2046	50/50	4.2046
960451	AF2-336 C O1	4.4687	50/50	4.4687
960452	AF2-336 E O1	2.9791	50/50	2.9791
960461	AF2-337 C O1	4.4687	50/50	4.4687
960462	AF2-337 E O1	2.9791	50/50	2.9791
960471	AF2-338 C O1	4.4687	50/50	4.4687
960472	AF2-338 E O1	2.9791	50/50	2.9791
960481	AF2-339 C O1	4.4687	50/50	4.4687
960482	AF2-339 E O1	2.9791	50/50	2.9791
960901	AF2-381 C	35.9099	50/50	35.9099
960902	AF2-381 E	18.8976	50/50	18.8976
WEC	WEC	0.0268	Confirmed LTF	0.0268
LGEE	LGEE	0.0531	Confirmed LTF	0.0531
CPL	CPL	0.0900	Confirmed LTF	0.0900
CBM-W2	CBM-W2	0.8026	Confirmed LTF	0.8026
NY	NY	0.1825	Confirmed LTF	0.1825
CBM-W1	CBM-W1	0.9257	Confirmed LTF	0.9257
TVA	TVA	0.1498	Confirmed LTF	0.1498
O-066	O-066	1.2029	Confirmed LTF	1.2029
CBM-S2	CBM-S2	0.7456	Confirmed LTF	0.7456
CBM-S1	CBM-S1	0.8946	Confirmed LTF	0.8946
G-007	G-007	0.1810	Confirmed LTF	0.1810
MADISON	MADISON	0.0040	Confirmed LTF	0.0040
MEC	MEC	0.1430	Confirmed LTF	0.1430

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
9888867	200762	26GARRETT	PENELEC	235470	01GARRET	AP	1	PN-P2-3-PN-115-35E	breaker	160.0	203.75	205.43	DC	2.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7147	50/50	0.7147
200834	26SW_E13_K22	0.1461	50/50	0.1461
200835	26DSGENWIN	0.9847	50/50	0.9847
200840	26DEEPCRK1	1.4114	50/50	1.4114
200841	26DEEPCRK2	1.4114	50/50	1.4114
200889	26STNY CRK	0.5954	50/50	0.5954
200890	26BF_G21_K23	0.4829	50/50	0.4829
200891	26CSLMN_L13	0.7575	50/50	0.7575
200892	26LOOKOUT	0.7196	50/50	0.7196
202225	26SCI_S29B	0.2273	50/50	0.2273
202652	26RGH_Y1-033	0.5551	50/50	0.5551
292350	K-023	18.0595	50/50	18.0595
292542	L-013 1	17.5654	50/50	17.5654
293432	R-040 E	0.9881	50/50	0.9881
293902	O-048 E	15.8089	50/50	15.8089
294903	P-060 E	13.8062	50/50	13.8062
913142	Y1-033 E OP1	21.9847	50/50	21.9847
917672	Z2-108 E	9.8806	50/50	9.8806
938351	AE1-053	5.4892	50/50	5.4892
938881	AE1-116	2.1181	50/50	2.1181
938991	AE1-128 C	10.8130	50/50	10.8130
938992	AE1-128 E	7.2086	50/50	7.2086
943711	AF1-039 C O1	5.8161	50/50	5.8161
943712	AF1-039 E O1	3.8774	50/50	3.8774
944781	AF1-143 C	32.9352	50/50	32.9352
944782	AF1-143 E	17.5654	50/50	17.5654
945671	AF1-232 C O2	39.3588	50/50	39.3588
945672	AF1-232 E O2	21.1932	50/50	21.1932
946081	AF1-273 C O1	18.5033	50/50	18.5033
946082	AF1-273 E O1	12.3355	50/50	12.3355
957981	AF2-092 C	0.9696	50/50	0.9696
957982	AF2-092 E	0.6464	50/50	0.6464
958101	AF2-104 C	1.1296	50/50	1.1296
958102	AF2-104 E	0.7531	50/50	0.7531
958411	AF2-135 C	1.6468	50/50	1.6468
958412	AF2-135 E	1.0978	50/50	1.0978
958471	AF2-141	4.3914	50/50	4.3914
959792	AF2-270 E	0.5588	50/50	0.5588
960451	AF2-336 C O1	1.6159	50/50	1.6159
960452	AF2-336 E O1	1.0773	50/50	1.0773
960461	AF2-337 C O1	1.6159	50/50	1.6159

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960462	AF2-337 E O1	1.0773	50/50	1.0773
960471	AF2-338 C O1	1.6159	50/50	1.6159
960472	AF2-338 E O1	1.0773	50/50	1.0773
960481	AF2-339 C O1	1.6159	50/50	1.6159
960482	AF2-339 E O1	1.0773	50/50	1.0773
960901	AF2-381 C	8.9959	50/50	8.9959
960902	AF2-381 E	4.7341	50/50	4.7341
NEWTON	NEWTON	0.2450	Confirmed LTF	0.2450
FARMERCITY	FARMERCITY	0.0128	Confirmed LTF	0.0128
G-007A	G-007A	0.6737	Confirmed LTF	0.6737
VFT	VFT	1.8640	Confirmed LTF	1.8640
CALDERWOOD	CALDERWOOD	0.1252	Confirmed LTF	0.1252
PRAIRIE	PRAIRIE	0.5967	Confirmed LTF	0.5967
CHEOAH	CHEOAH	0.1266	Confirmed LTF	0.1266
EDWARDS	EDWARDS	0.0777	Confirmed LTF	0.0777
TILTON	TILTON	0.1411	Confirmed LTF	0.1411
GIBSON	GIBSON	0.1245	Confirmed LTF	0.1245
BLUEG	BLUEG	0.4010	Confirmed LTF	0.4010
TRIMBLE	TRIMBLE	0.1280	Confirmed LTF	0.1280
CATAWBA	CATAWBA	0.0927	Confirmed LTF	0.0927

11.6.7 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
101344527	202650	26HIGHPOINT	PENELEC	200747	26PENN-MAR	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	174.58	176.13	DC	2.7

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9850	50/50	0.9850
200864	K-013 E	1.7945	Adder	2.11
200889	26STNY CRK	0.5956	50/50	0.5956
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7577	50/50	0.7577
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
202652	26RGH_Y1-033	0.5552	50/50	0.5552
292350	K-023	18.0641	50/50	18.0641
292542	L-013 1	17.5699	50/50	17.5699
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8129	50/50	15.8129
294903	P-060 E	13.8117	50/50	13.8117
913142	Y1-033 E OP1	21.9895	50/50	21.9895
917672	Z2-108 E	9.8831	50/50	9.8831
938351	AE1-053	5.4906	50/50	5.4906
938881	AE1-116	2.1186	50/50	2.1186
938991	AE1-128 C	10.8223	50/50	10.8223
938992	AE1-128 E	7.2149	50/50	7.2149
943711	AF1-039 C O1	5.8173	50/50	5.8173
943712	AF1-039 E O1	3.8782	50/50	3.8782
944781	AF1-143 C	32.9436	50/50	32.9436
944782	AF1-143 E	17.5699	50/50	17.5699
945671	AF1-232 C O2	39.3723	50/50	39.3723
945672	AF1-232 E O2	21.2005	50/50	21.2005
946081	AF1-273 C O1	18.5099	50/50	18.5099
946082	AF1-273 E O1	12.3400	50/50	12.3400
957981	AF2-092 C	0.9706	50/50	0.9706
957982	AF2-092 E	0.6470	50/50	0.6470
958101	AF2-104 C	1.1299	50/50	1.1299
958102	AF2-104 E	0.7533	50/50	0.7533
958411	AF2-135 C	1.6472	50/50	1.6472
958412	AF2-135 E	1.0981	50/50	1.0981
958471	AF2-141	4.3925	50/50	4.3925
959792	AF2-270 E	0.5593	50/50	0.5593
960451	AF2-336 C O1	1.6176	50/50	1.6176
960452	AF2-336 E O1	1.0784	50/50	1.0784
960461	AF2-337 C O1	1.6176	50/50	1.6176
960462	AF2-337 E O1	1.0784	50/50	1.0784
960471	AF2-338 C O1	1.6176	50/50	1.6176

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960472	AF2-338 E O1	1.0784	50/50	1.0784
960481	AF2-339 C O1	1.6176	50/50	1.6176
960482	AF2-339 E O1	1.0784	50/50	1.0784
960901	AF2-381 C	9.0065	50/50	9.0065
960902	AF2-381 E	4.7397	50/50	4.7397
NEWTON	NEWTON	0.2310	Confirmed LTF	0.2310
FARMERCITY	FARMERCITY	0.0121	Confirmed LTF	0.0121
G-007A	G-007A	0.7049	Confirmed LTF	0.7049
VFT	VFT	1.9479	Confirmed LTF	1.9479
CALDERWOOD	CALDERWOOD	0.1188	Confirmed LTF	0.1188
PRAIRIE	PRAIRIE	0.5631	Confirmed LTF	0.5631
CHEOAH	CHEOAH	0.1201	Confirmed LTF	0.1201
EDWARDS	EDWARDS	0.0732	Confirmed LTF	0.0732
TILTON	TILTON	0.1329	Confirmed LTF	0.1329
GIBSON	GIBSON	0.1174	Confirmed LTF	0.1174
BLUEG	BLUEG	0.3784	Confirmed LTF	0.3784
TRIMBLE	TRIMBLE	0.1208	Confirmed LTF	0.1208
CATAWBA	CATAWBA	0.0882	Confirmed LTF	0.0882

11.6.8 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
100765338	235470	01GARRET	AP	235469	01GARRET	AP	1	PN-P2-3-PN-115-35E	breaker	196.0	166.33	167.7	DC	2.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7147	50/50	0.7147
200834	26SW_E13_K22	0.1461	50/50	0.1461
200835	26DSGENWIN	0.9847	50/50	0.9847
200840	26DEEPCRK1	1.4114	50/50	1.4114
200841	26DEEPCRK2	1.4114	50/50	1.4114
200889	26STNY CRK	0.5954	50/50	0.5954
200890	26BF_G21_K23	0.4829	50/50	0.4829
200891	26CSLMN_L13	0.7575	50/50	0.7575
200892	26LOOKOUT	0.7196	50/50	0.7196
202225	26SCI_S29B	0.2273	50/50	0.2273
202652	26RGH_Y1-033	0.5551	50/50	0.5551
292350	K-023	18.0595	50/50	18.0595
292542	L-013 1	17.5654	50/50	17.5654
293432	R-040 E	0.9881	50/50	0.9881
293902	O-048 E	15.8089	50/50	15.8089
294903	P-060 E	13.8062	50/50	13.8062
913142	Y1-033 E OP1	21.9847	50/50	21.9847
917672	Z2-108 E	9.8806	50/50	9.8806
938351	AE1-053	5.4892	50/50	5.4892
938881	AE1-116	2.1181	50/50	2.1181
938991	AE1-128 C	10.8130	50/50	10.8130
938992	AE1-128 E	7.2086	50/50	7.2086
943711	AF1-039 C O1	5.8161	50/50	5.8161
943712	AF1-039 E O1	3.8774	50/50	3.8774
944781	AF1-143 C	32.9352	50/50	32.9352
944782	AF1-143 E	17.5654	50/50	17.5654
945671	AF1-232 C O2	39.3588	50/50	39.3588
945672	AF1-232 E O2	21.1932	50/50	21.1932
946081	AF1-273 C O1	18.5033	50/50	18.5033
946082	AF1-273 E O1	12.3355	50/50	12.3355
957981	AF2-092 C	0.9696	50/50	0.9696
957982	AF2-092 E	0.6464	50/50	0.6464
958101	AF2-104 C	1.1296	50/50	1.1296
958102	AF2-104 E	0.7531	50/50	0.7531
958411	AF2-135 C	1.6468	50/50	1.6468
958412	AF2-135 E	1.0978	50/50	1.0978
958471	AF2-141	4.3914	50/50	4.3914
959792	AF2-270 E	0.5588	50/50	0.5588
960451	AF2-336 C O1	1.6159	50/50	1.6159
960452	AF2-336 E O1	1.0773	50/50	1.0773
960461	AF2-337 C O1	1.6159	50/50	1.6159

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960462	AF2-337 E O1	1.0773	50/50	1.0773
960471	AF2-338 C O1	1.6159	50/50	1.6159
960472	AF2-338 E O1	1.0773	50/50	1.0773
960481	AF2-339 C O1	1.6159	50/50	1.6159
960482	AF2-339 E O1	1.0773	50/50	1.0773
960901	AF2-381 C	8.9959	50/50	8.9959
960902	AF2-381 E	4.7341	50/50	4.7341
NEWTON	NEWTON	0.2450	Confirmed LTF	0.2450
FARMERCITY	FARMERCITY	0.0128	Confirmed LTF	0.0128
G-007A	G-007A	0.6737	Confirmed LTF	0.6737
VFT	VFT	1.8640	Confirmed LTF	1.8640
CALDERWOOD	CALDERWOOD	0.1252	Confirmed LTF	0.1252
PRAIRIE	PRAIRIE	0.5967	Confirmed LTF	0.5967
CHEOAH	CHEOAH	0.1266	Confirmed LTF	0.1266
EDWARDS	EDWARDS	0.0777	Confirmed LTF	0.0777
TILTON	TILTON	0.1411	Confirmed LTF	0.1411
GIBSON	GIBSON	0.1245	Confirmed LTF	0.1245
BLUEG	BLUEG	0.4010	Confirmed LTF	0.4010
TRIMBLE	TRIMBLE	0.1280	Confirmed LTF	0.1280
CATAWBA	CATAWBA	0.0927	Confirmed LTF	0.0927

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
101345685	960390	AF2-330 TAP	PENELEC	200525	26SUMMIT	PENELEC	1	PN-P7-1-PN-230-001	tower	237.0	108.36	111.69	DC	7.91

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.1441	50/50	0.1441
200834	26SW_E13_K22	0.0739	50/50	0.0739
200835	26DSGENWIN	0.3639	50/50	0.3639
200846	26FORWARD	0.2664	50/50	0.2664
200864	K-013 E	6.1772	50/50	6.1772
200888	26HIGHLAND	0.6407	50/50	0.6407
200889	26STNY CRK	0.5348	50/50	0.5348
200890	26BF_G21_K23	0.1785	50/50	0.1785
200891	26CSLMN_L13	0.2800	50/50	0.2800
200892	26LOOKOUT	0.2660	50/50	0.2660
200925	26R32	0.7393	50/50	0.7393
202225	26SCI_S29B	0.1150	50/50	0.1150
202652	26RGH_Y1-033	0.1367	50/50	0.1367
292350	K-023	6.6744	50/50	6.6744
292542	L-013 1	6.4918	50/50	6.4918
293432	R-040 E	0.3652	50/50	0.3652
293603	O-018 E	14.8585	50/50	14.8585
293902	O-048 E	5.8427	50/50	5.8427
294903	P-060 E	12.4022	50/50	12.4022
296332	R-032 E	17.1444	50/50	17.1444
913142	Y1-033 E OP1	5.4139	50/50	5.4139
917672	Z2-108 E	3.6517	50/50	3.6517
938351	AE1-053	2.0287	50/50	2.0287
938881	AE1-116	1.0712	50/50	1.0712
938991	AE1-128 C	26.4449	50/50	26.4449
938992	AE1-128 E	17.6299	50/50	17.6299
943711	AF1-039 C O1	1.4323	50/50	1.4323
943712	AF1-039 E O1	0.9548	50/50	0.9548
944751	AF1-140 C	4.8234	50/50	4.8234
944752	AF1-140 E	3.2156	50/50	3.2156
944781	AF1-143 C	12.1722	50/50	12.1722
944782	AF1-143 E	6.4918	50/50	6.4918
945671	AF1-232 C O2	28.6250	50/50	28.6250
945672	AF1-232 E O2	15.4134	50/50	15.4134
946081	AF1-273 C O1	14.3585	50/50	14.3585
946082	AF1-273 E O1	9.5724	50/50	9.5724
946571	AF1-321 C O1	2.8931	50/50	2.8931
946572	AF1-321 E O1	1.9287	50/50	1.9287
957001	AF2-001 C O1	2.8931	50/50	2.8931
957002	AF2-001 E O1	1.9287	50/50	1.9287
957011	AF2-002 C O1	1.4465	50/50	1.4465

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957012	AF2-002 E O1	0.9644	50/50	0.9644
957513	AF2-045 BAT	2.6820	50/50	2.6820
957981	AF2-092 C	2.8461	50/50	2.8461
957982	AF2-092 E	1.8974	50/50	1.8974
958101	AF2-104 C	0.5713	50/50	0.5713
958102	AF2-104 E	0.3809	50/50	0.3809
958411	AF2-135 C	0.6086	50/50	0.6086
958412	AF2-135 E	0.4057	50/50	0.4057
958471	AF2-141	1.6230	50/50	1.6230
959301	AF2-221 C	1.2907	50/50	1.2907
959302	AF2-221 E	1.7824	50/50	1.7824
959792	AF2-270 E	1.3667	50/50	1.3667
959803	AF2-271 BAT	0.2573	50/50	0.2573
960391	AF2-330 C	32.6533	50/50	32.6533
960392	AF2-330 E	14.2816	50/50	14.2816
960451	AF2-336 C O1	4.7435	50/50	4.7435
960452	AF2-336 E O1	3.1623	50/50	3.1623
960461	AF2-337 C O1	4.7435	50/50	4.7435
960462	AF2-337 E O1	3.1623	50/50	3.1623
960471	AF2-338 C O1	4.7435	50/50	4.7435
960472	AF2-338 E O1	3.1623	50/50	3.1623
960481	AF2-339 C O1	4.7435	50/50	4.7435
960482	AF2-339 E O1	3.1623	50/50	3.1623
960901	AF2-381 C	24.4529	50/50	24.4529
960902	AF2-381 E	12.8684	50/50	12.8684
WEC	WEC	0.0321	Confirmed LTF	0.0321
LGEE	LGEE	0.0616	Confirmed LTF	0.0616
CPL	CPL	0.0820	Confirmed LTF	0.0820
CBM-W2	CBM-W2	0.8927	Confirmed LTF	0.8927
NY	NY	0.2085	Confirmed LTF	0.2085
CBM-W1	CBM-W1	1.1885	Confirmed LTF	1.1885
TVA	TVA	0.1596	Confirmed LTF	0.1596
O-066	O-066	1.2970	Confirmed LTF	1.2970
CBM-S2	CBM-S2	0.7052	Confirmed LTF	0.7052
CBM-S1	CBM-S1	0.9628	Confirmed LTF	0.9628
G-007	G-007	0.1914	Confirmed LTF	0.1914
MEC	MEC	0.1668	Confirmed LTF	0.1668

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
AB1-065	Jennings-Hoyes 34.5kV	Suspended
AE1-053	Meyersdale North	Active
AE1-116	Somerset Windpower 23 kV	Active
AE1-128	Bedford North-Wills Mounain 115 kV	Active
AF1-001	Thayerville 34.5 kV	Engineering and Procurement
AF1-039	Listonburg-Highpoint 24.9 kV	Active
AF1-140	Claysburg 23 kV	Engineering and Procurement
AF1-143	Lick Run 115 kV	Active
AF1-232	Allegheny-Somerset 115 kV	Active
AF1-273	Allegheny 115 kV	Active
AF1-321	Hooversville 115 kV I	Active
AF2-001	Hooversville 115 kV II	Active
AF2-002	Hooversville 115 kV III	Active
AF2-045	Cambria Nug 115 kV	Active
AF2-087	East Altoona-Pinecroft 12.47 kV	Active
AF2-092	Snake Spring-Bedford Area 23 kV	Active
AF2-104	Somerset 23 kV	Active
AF2-135	Rockwood-Confluence 23 kV	Active
AF2-141	Lick Run 115 kV	Active
AF2-221	Scalp Level 22.9 kV	Active
AF2-270	Bedford South RCB-Bedford Area 23 kV	Active
AF2-271	Pemberton-Sinking Valley 12.47 kV	Active
AF2-330	Claysburg-Summit 115 kV	Active
AF2-336	Snake Spring 115 kV	Active
AF2-337	Snake Spring 115 kV	Active
AF2-338	Snake Spring-Saxton 115 kV	Active
AF2-339	Snake Spring-Saxton 115 kV	Active
AF2-381	Bedford North-Central City West 115 kV	Active
Y1-033	Penn Mar-Rock Wood 115kV	In Service
Z2-108	Meyersdale North 115kV	In Service

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
PN-P1-3-PN-115-029	CONTINGENCY 'PN-P1-3-PN-115-029' /* HOOVERSVILLE #2 XFMR FAULT DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200742 CKT 1 /* 26HOOVERSV 115 26TOWER 51 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 END
PN-P1-2-PN-115-074B-A	CONTINGENCY 'PN-P1-2-PN-115-074B-A' /* ALLEGHENY - KIMRUN 115KV DISCONNECT BRANCH FROM BUS 202647 TO BUS 945670 CKT 1 /* 26KIMRUN TAP 115 AF1-232 TAP 115 END
AP-P1-3-PN-115-010	CONTINGENCY 'AP-P1-3-PN-115-010' /* GARRETT 138/115KV XFMR FAULT OPEN BRANCH FROM BUS 235469 TO BUS 235470 CKT 1 /* 01GARRET 138.00 01GARRET 115.00 END
PN-P1-2-PN-115-082	CONTINGENCY 'PN-P1-2-PN-115-082' /* HILLTOP - KRAYN - RACHEL HILL 115KV DISCONNECT BRANCH FROM BUS 200878 TO BUS 200790 CKT 1 /* 26KRAYN 115 26SALIX 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200751 CKT 1 /* 26SALIX 115 26HILLCLAY 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200752 CKT 1 /* 26HILLCLAY 115 26HILLTOP 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200749 CKT 1 /* 26HILLCLAY 115 26RACHEL H 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200785 CKT 1 /* 26SALIX 115 26SALIX 23 DISCONNECT BRANCH FROM BUS 200749 TO BUS 200784 CKT 1 /* 26RACHEL H 115 26RACHEL#1 23 DISCONNECT BUS 200790 /* 26SALIX 115 DISCONNECT BUS 200751 /* 26HILLCLAY 115 END
PN-P1-2-PN-115-080	CONTINGENCY 'PN-P1-2-PN-115-080' /* BEDFORD NORTH - CLAYSBURG 115KV DISCONNECT BRANCH FROM BUS 200505 TO BUS 200516 CKT 1 /* 26CLYSBURG 115 26OSTRBURG 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200501 CKT 1 /* 26OSTRBURG 115 26BDFORD N 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200564 CKT 1 /* 26OSTRBURG 115 26OSTRE SB 23 DISCONNECT BUS 200516 /* 26OSTRBURG 115 END

Contingency Name	Contingency Definition
PN-P2-3-PN-115-35E	CONTINGENCY 'PN-P2-3-PN-115-35E' /* #14 STUCK TIE BREAKER BETWEEN BUSES 1 AND 2 DISCONNECT BRANCH FROM BUS 200734 TO BUS 200743 CKT 1 /* 26SCALP L. 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200802 CKT 1 /* 26HOOVERSV 115 26RALPHTON 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200776 CKT 1 /* 26HOOVERSV 115 26HOOVER#1 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200744 CKT 1 /* 26HOOVERSV 115 26SOMERST 115 DISCONNECT BRANCH FROM BUS 200742 TO BUS 200743 CKT 1 /* 26TOWER 51 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 END
Base Case	
PN-P7-1-PN-230-001	CONTINGENCY 'PN-P7-1-PN-230-001' /* HOMER CITY - HOOVERSVILLE 230KV & SEWARD - TOWER 51 115KV DISCONNECT BRANCH FROM BUS 200767 TO BUS 200768 CKT 1 /* 26HOMER CT 230 26QUEMAHON 230 DISCONNECT BRANCH FROM BUS 200768 TO BUS 200796 CKT 1 /* 26QUEMAHON 230 26HOOVERSVL 230 DISCONNECT BRANCH FROM BUS 200796 TO BUS 200743 CKT 3 /* 26HOOVERSVL 230 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200741 TO BUS 200742 CKT 1 /* 26SEWARD 115 26TOWER 51 115 END

12 Short Circuit Analysis - Primary POI

To be performed in System Impact phase.

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AF2-338 was evaluated as a 20.0 MW (Capacity 12.0 MW) injection as an uprate to the AF2-337 which is tapping the Snake Spring to Bedford 115 kV line in the APS area. Project AF2-338 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-338 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

13.1 Generation Deliverability

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

None.

13.2 Multiple Facility Contingency

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

None.

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	CON T NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPAC T
101345667	200734	26SCALP L.	115.0	PENELE C	200749	26RACHEL H	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	190.0	111.2	113.54	DC	4.45
101345678	200743	26HOOVERS V	115.0	PENELE C	200734	26SCALP L.	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	190.0	110.9	113.24	DC	4.45
101344559	200746	26ROCKWOOD	115.0	PENELE C	202650	26HIGHPOINT	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	179.0	163.74	165.26	DC	2.72
101345652	200746	26ROCKWOOD	115.0	PENELE C	202650	26HIGHPOINT	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	179.0	140.5	142.32	DC	3.25
101344522	200747	26PENN-MAR	115.0	PENELE C	200762	26GARRETT	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	167.0	193.3	194.93	DC	2.72
101345684	200751	26HILLCLAY	115.0	PENELE C	200752	26HILLTOP	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	237.0	106.14	109.3	DC	7.47
9888867	200762	26GARRETT	115.0	PENELE C	235470	01GARRET	115.0	AP	1	PN-P2-3-PN-115-35E	breaker	160.0	212.61	214.31	DC	2.72
101344527	202650	26HIGHPOINT	115.0	PENELE C	200747	26PENN-MAR	115.0	PENELE C	1	PN-P2-3-PN-115-35E	breaker	174.0	183.29	184.85	DC	2.72
101345647	202650	26HIGHPOINT	115.0	PENELE C	200747	26PENN-MAR	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	174.0	155.7	157.57	DC	3.25

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
100765338	235470	01GARRET	115.0	AP	235469	01GARRET	138.0	AP	1	PN-P2-3-PN-115-35E	break er	196.0	173.56	174.95	DC	2.72
101345685	960390	AF2-330 TAP	115.0	PENELE C	200525	26SUMMIT	115.0	PENELE C	1	PN-P7-1-PN-230-001	tower	237.0	108.31	111.63	DC	7.86
152412775	960450	AF2-336 TAP	115.0	PENELE C	200523	26SNAKE SP	115.0	PENELE C	1	PN-P2-3-PN-115-11F	break er	152.0	107.16	111.98	DC	7.31

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	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
101345006	200523	26SNAKE SP	115.0	PENELE C	200521	26SAXTON	115.0	PENELE C	1	PN-P1-2-PN-115-080	operati on	120.0	106.65	113.24	DC	7.91
101344969	200742	26TOWER 51	115.0	PENELE C	200741	26SEWARD	115.0	PENELE C	1	AP-P1-3-PN-115-010	operati on	185.0	123.52	125.86	DC	4.33
101344974	200742	26TOWER 51	115.0	PENELE C	200741	26SEWARD	115.0	PENELE C	1	Base Case	operati on	147.0	101.8	104.31	DC	3.69
101344922	200743	26HOOVERS V	115.0	PENELE C	200742	26TOWER 51	115.0	PENELE C	1	AP-P1-3-PN-115-010	operati on	172.0	146.43	148.96	DC	4.36
101344927	200743	26HOOVERS V	115.0	PENELE C	200742	26TOWER 51	115.0	PENELE C	1	Base Case	operati on	137.0	125.64	128.35	DC	3.71
101344996	200746	26ROCKWO OD	115.0	PENELE C	202650	26HIGHPOI NT	115.0	PENELE C	1	Base Case	operati on	148.0	139.41	139.99	DC	1.89
152658492	200746	26ROCKWO OD	115.0	PENELE C	202650	26HIGHPOI NT	115.0	PENELE C	1	PN-P1-3-PN-115-029-A	operati on	179.0	135.04	136.34	DC	2.33

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
1013449 12	20074 7	26PENN-MAR	115.0	PENELE C	20076 2	26GARRETT	115.0	PENELE C	1	Base Case	operati on	137.0	166.59	167.22	DC	1.89
9888908 4	20076 2	26GARRETT	115.0	PENELE C	23547 0	01GARRET	115.0	AP	1	Base Case	operati on	133.0	183.73	184.37	DC	1.89
1013449 64	20083 6	26STATHILL	115.0	PENELE C	20074 3	26HOOVER SV	115.0	PENELE C	1	PN-P1-2-PN-115-074B -A	operati on	201.0	100.29	104.51	DC	8.48
1013449 55	20263 7	26PRIDE	115.0	PENELE C	20074 4	26SOMERS T	115.0	PENELE C	1	Base Case	operati on	133.0	158.12	160.73	DC	3.47
1013449 52	20264 7	26KIMRUN TAP	115.0	PENELE C	20263 7	26PRIDE	115.0	PENELE C	1	Base Case	operati on	133.0	160.53	163.14	DC	3.47
1013449 58	20265 0	26HIGHPOIN T	115.0	PENELE C	20074 7	26PENN-MAR	115.0	PENELE C	1	Base Case	operati on	137.0	163.05	163.67	DC	1.89
1007656 61	23547 0	01GARRET	115.0	AP	23546 9	01GARRET	138.0	AP	1	Base Case	operati on	169.0	144.59	145.1	DC	1.89
1013449 49	94567 0	AF1-232 TAP	115.0	PENELE C	20264 7	26KIMRUN TAP	115.0	PENELE C	1	Base Case	operati on	133.0	160.53	163.14	DC	3.47
1013450 44	96039 0	AF2-330 TAP	115.0	PENELE C	20052 5	26SUMMIT	115.0	PENELE C	1	Base Case	operati on	175.0	109.99	113.42	DC	5.99
1013450 45	96039 0	AF2-330 TAP	115.0	PENELE C	20052 5	26SUMMIT	115.0	PENELE C	1	PN-P1-2-PN-115-082	operati on	237.0	108.94	112.31	DC	8.0
1526586 49	96045 0	AF2-336 TAP	115.0	PENELE C	20052 3	26SNAKE SP	115.0	PENELE C	1	PN-P1-2-PN-115-080	operati on	152.0	97.97	103.17	DC	7.91

13.5 Flow Gate Details - Secondary POI

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".

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
101345667	200734	26SCALP L.	PENELEC	200749	26RACHEL H	PENELEC	1	PN-P7-1-PN-230-001	tower	190.0	111.2	113.54	DC	4.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2537	50/50	0.2537
200834	26SW_E13_K22	0.1303	50/50	0.1303
200835	26DSGENWIN	0.6414	50/50	0.6414
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4573	50/50	0.4573
200864	K-013 E	10.6047	50/50	10.6047
200889	26STNY CRK	0.6356	50/50	0.6356
200890	26BF_G21_K23	0.3146	50/50	0.3146
200891	26CSLMN_L13	0.4934	50/50	0.4934
200892	26LOOKOUT	0.4687	50/50	0.4687
202225	26SCI_S29B	0.2027	50/50	0.2027
202652	26RGH_Y1-033	0.2408	50/50	0.2408
292350	K-023	11.7637	50/50	11.7637
292542	L-013 1	11.4419	50/50	11.4419
293432	R-040 E	0.6436	50/50	0.6436
293902	O-048 E	10.2977	50/50	10.2977
294903	P-060 E	14.7386	50/50	14.7386
913142	Y1-033 E OP1	9.5361	50/50	9.5361
917672	Z2-108 E	6.4361	50/50	6.4361
930262	AB1-065 E (Suspended)	0.4692	Adder	0.55
938351	AE1-053	3.5756	50/50	3.5756
938881	AE1-116	1.8885	50/50	1.8885
938991	AE1-128 C	19.0411	50/50	19.0411
938992	AE1-128 E	12.6941	50/50	12.6941
943301	AF1-001 C	0.4485	Adder	0.53
943302	AF1-001 E	0.5002	Adder	0.59
943711	AF1-039 C O1	2.5228	50/50	2.5228
943712	AF1-039 E O1	1.6819	50/50	1.6819
944781	AF1-143 C	21.4536	50/50	21.4536
944782	AF1-143 E	11.4419	50/50	11.4419
945671	AF1-232 C O2	39.0010	50/50	39.0010
945672	AF1-232 E O2	21.0006	50/50	21.0006
946081	AF1-273 C O1	18.7389	50/50	18.7389
946082	AF1-273 E O1	12.4926	50/50	12.4926
946571	AF1-321 C O1	6.0611	50/50	6.0611
946572	AF1-321 E O1	4.0407	50/50	4.0407
957001	AF2-001 C O2	5.9447	50/50	5.9447
957002	AF2-001 E O2	3.9631	50/50	3.9631
957011	AF2-002 C O2	2.9723	50/50	2.9723
957012	AF2-002 E O2	1.9816	50/50	1.9816

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957981	AF2-092 C	1.5727	50/50	1.5727
957982	AF2-092 E	1.0485	50/50	1.0485
958101	AF2-104 C	1.0072	50/50	1.0072
958102	AF2-104 E	0.6715	50/50	0.6715
958411	AF2-135 C	1.0727	50/50	1.0727
958412	AF2-135 E	0.7151	50/50	0.7151
958471	AF2-141	2.8605	50/50	2.8605
959301	AF2-221 C	4.3160	50/50	4.3160
959302	AF2-221 E	5.9602	50/50	5.9602
959792	AF2-270 E	0.9841	50/50	0.9841
960451	AF2-336 C O2	2.6678	50/50	2.6678
960452	AF2-336 E O2	1.7786	50/50	1.7786
960461	AF2-337 C O2	2.6678	50/50	2.6678
960462	AF2-337 E O2	1.7786	50/50	1.7786
960471	AF2-338 C O2	2.6678	50/50	2.6678
960472	AF2-338 E O2	1.7786	50/50	1.7786
960481	AF2-339 C O2	2.6678	50/50	2.6678
960482	AF2-339 E O2	1.7786	50/50	1.7786
960901	AF2-381 C	32.3898	50/50	32.3898
960902	AF2-381 E	17.0452	50/50	17.0452
WEC	WEC	0.0410	Confirmed LTF	0.0410
LGEE	LGEE	0.0787	Confirmed LTF	0.0787
CPL	CPL	0.1131	Confirmed LTF	0.1131
CBM-W2	CBM-W2	1.1630	Confirmed LTF	1.1630
NY	NY	0.2300	Confirmed LTF	0.2300
CBM-W1	CBM-W1	1.4887	Confirmed LTF	1.4887
TVA	TVA	0.2086	Confirmed LTF	0.2086
O-066	O-066	1.5994	Confirmed LTF	1.5994
CBM-S2	CBM-S2	0.9595	Confirmed LTF	0.9595
CBM-S1	CBM-S1	1.2524	Confirmed LTF	1.2524
G-007	G-007	0.2392	Confirmed LTF	0.2392
MEC	MEC	0.2129	Confirmed LTF	0.2129

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
101345678	200743	26HOOVERSV	PENELEC	200734	26SCALP L	PENELEC	1	PN-P7-1-PN-230-001	tower	190.0	110.9	113.24	DC	4.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2537	50/50	0.2537
200834	26SW_E13_K22	0.1303	50/50	0.1303
200835	26DSGENWIN	0.6414	50/50	0.6414
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4573	50/50	0.4573
200864	K-013 E	10.6047	50/50	10.6047
200889	26STNY CRK	0.6356	50/50	0.6356
200890	26BF_G21_K23	0.3146	50/50	0.3146
200891	26CSLMN_L13	0.4934	50/50	0.4934
200892	26LOOKOUT	0.4687	50/50	0.4687
202225	26SCI_S29B	0.2027	50/50	0.2027
202652	26RGH_Y1-033	0.2408	50/50	0.2408
292350	K-023	11.7637	50/50	11.7637
292542	L-013 1	11.4419	50/50	11.4419
293432	R-040 E	0.6436	50/50	0.6436
293902	O-048 E	10.2977	50/50	10.2977
294903	P-060 E	14.7386	50/50	14.7386
913142	Y1-033 E OP1	9.5361	50/50	9.5361
917672	Z2-108 E	6.4361	50/50	6.4361
930262	AB1-065 E (Suspended)	0.4692	Adder	0.55
938351	AE1-053	3.5756	50/50	3.5756
938881	AE1-116	1.8885	50/50	1.8885
938991	AE1-128 C	19.0411	50/50	19.0411
938992	AE1-128 E	12.6941	50/50	12.6941
943301	AF1-001 C	0.4485	Adder	0.53
943302	AF1-001 E	0.5002	Adder	0.59
943711	AF1-039 C O1	2.5228	50/50	2.5228
943712	AF1-039 E O1	1.6819	50/50	1.6819
944781	AF1-143 C	21.4536	50/50	21.4536
944782	AF1-143 E	11.4419	50/50	11.4419
945671	AF1-232 C O2	39.0010	50/50	39.0010
945672	AF1-232 E O2	21.0006	50/50	21.0006
946081	AF1-273 C O1	18.7389	50/50	18.7389
946082	AF1-273 E O1	12.4926	50/50	12.4926
946571	AF1-321 C O1	6.0611	50/50	6.0611
946572	AF1-321 E O1	4.0407	50/50	4.0407
957001	AF2-001 C O2	5.9447	50/50	5.9447
957002	AF2-001 E O2	3.9631	50/50	3.9631
957011	AF2-002 C O2	2.9723	50/50	2.9723
957012	AF2-002 E O2	1.9816	50/50	1.9816

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957981	AF2-092 C	1.5727	50/50	1.5727
957982	AF2-092 E	1.0485	50/50	1.0485
958101	AF2-104 C	1.0072	50/50	1.0072
958102	AF2-104 E	0.6715	50/50	0.6715
958411	AF2-135 C	1.0727	50/50	1.0727
958412	AF2-135 E	0.7151	50/50	0.7151
958471	AF2-141	2.8605	50/50	2.8605
959792	AF2-270 E	0.9841	50/50	0.9841
960451	AF2-336 C O2	2.6678	50/50	2.6678
960452	AF2-336 E O2	1.7786	50/50	1.7786
960461	AF2-337 C O2	2.6678	50/50	2.6678
960462	AF2-337 E O2	1.7786	50/50	1.7786
960471	AF2-338 C O2	2.6678	50/50	2.6678
960472	AF2-338 E O2	1.7786	50/50	1.7786
960481	AF2-339 C O2	2.6678	50/50	2.6678
960482	AF2-339 E O2	1.7786	50/50	1.7786
960901	AF2-381 C	32.3898	50/50	32.3898
960902	AF2-381 E	17.0452	50/50	17.0452
WEC	WEC	0.0410	Confirmed LTF	0.0410
LGEE	LGEE	0.0787	Confirmed LTF	0.0787
CPL	CPL	0.1131	Confirmed LTF	0.1131
CBM-W2	CBM-W2	1.1630	Confirmed LTF	1.1630
NY	NY	0.2300	Confirmed LTF	0.2300
CBM-W1	CBM-W1	1.4887	Confirmed LTF	1.4887
TVA	TVA	0.2086	Confirmed LTF	0.2086
O-066	O-066	1.5994	Confirmed LTF	1.5994
CBM-S2	CBM-S2	0.9595	Confirmed LTF	0.9595
CBM-S1	CBM-S1	1.2524	Confirmed LTF	1.2524
G-007	G-007	0.2392	Confirmed LTF	0.2392
MEC	MEC	0.2129	Confirmed LTF	0.2129

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
101344559	200746	26ROCKWOOD	PENELEC	202650	26HIGHPOINT	PENELEC	1	PN-P2-3- PN-115-35E	breaker	179.0	163.74	165.26	DC	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9850	50/50	0.9850
200864	K-013 E	1.7949	Adder	2.11
200889	26STNY CRK	0.5957	50/50	0.5957
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7577	50/50	0.7577
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
292350	K-023	18.0647	50/50	18.0647
292542	L-013 1	17.5706	50/50	17.5706
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8135	50/50	15.8135
294903	P-060 E	13.8130	50/50	13.8130
917672	Z2-108 E	9.8834	50/50	9.8834
938351	AE1-053	5.4908	50/50	5.4908
938881	AE1-116	2.1188	50/50	2.1188
938991	AE1-128 C	10.8245	50/50	10.8245
938992	AE1-128 E	7.2163	50/50	7.2163
944781	AF1-143 C	32.9448	50/50	32.9448
944782	AF1-143 E	17.5706	50/50	17.5706
945671	AF1-232 C O2	39.3744	50/50	39.3744
945672	AF1-232 E O2	21.2016	50/50	21.2016
946081	AF1-273 C O1	18.5115	50/50	18.5115
946082	AF1-273 E O1	12.3410	50/50	12.3410
957001	AF2-001 C O2	5.6510	50/50	5.6510
957002	AF2-001 E O2	3.7674	50/50	3.7674
957011	AF2-002 C O2	2.8255	50/50	2.8255
957012	AF2-002 E O2	1.8837	50/50	1.8837
957981	AF2-092 C	0.9707	50/50	0.9707
957982	AF2-092 E	0.6471	50/50	0.6471
958101	AF2-104 C	1.1300	50/50	1.1300
958102	AF2-104 E	0.7533	50/50	0.7533
958411	AF2-135 C	1.6472	50/50	1.6472
958412	AF2-135 E	1.0982	50/50	1.0982
958471	AF2-141	4.3926	50/50	4.3926
959792	AF2-270 E	0.5594	50/50	0.5594
960192	AF2-310 BAT	0.9817	Merchant Transmission	0.9817
960451	AF2-336 C O2	1.6336	50/50	1.6336
960452	AF2-336 E O2	1.0890	50/50	1.0890
960461	AF2-337 C O2	1.6336	50/50	1.6336

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960462	AF2-337 E O2	1.0890	50/50	1.0890
960471	AF2-338 C O2	1.6336	50/50	1.6336
960472	AF2-338 E O2	1.0890	50/50	1.0890
960481	AF2-339 C O2	1.6336	50/50	1.6336
960482	AF2-339 E O2	1.0890	50/50	1.0890
960901	AF2-381 C	9.0082	50/50	9.0082
960902	AF2-381 E	4.7406	50/50	4.7406
NEWTON	NEWTON	0.2278	Confirmed LTF	0.2278
FARMERCITY	FARMERCITY	0.0119	Confirmed LTF	0.0119
G-007A	G-007A	0.7121	Confirmed LTF	0.7121
VFT	VFT	1.9672	Confirmed LTF	1.9672
CALDERWOOD	CALDERWOOD	0.1173	Confirmed LTF	0.1173
PRAIRIE	PRAIRIE	0.5553	Confirmed LTF	0.5553
CHEOAH	CHEOAH	0.1186	Confirmed LTF	0.1186
EDWARDS	EDWARDS	0.0721	Confirmed LTF	0.0721
TILTON	TILTON	0.1310	Confirmed LTF	0.1310
GIBSON	GIBSON	0.1158	Confirmed LTF	0.1158
BLUEG	BLUEG	0.3732	Confirmed LTF	0.3732
TRIMBLE	TRIMBLE	0.1191	Confirmed LTF	0.1191
CATAWBA	CATAWBA	0.0872	Confirmed LTF	0.0872

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
101344522	200747	26PENN-MAR	PENELEC	200762	26GARRETT	PENELEC	1	PN-P2-3-PN-115-35E	breaker	167.0	193.3	194.93	DC	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7148	50/50	0.7148
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9849	50/50	0.9849
200889	26STNY CRK	0.5956	50/50	0.5956
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7576	50/50	0.7576
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
202652	26RGH_Y1-033	0.5552	50/50	0.5552
292350	K-023	18.0631	50/50	18.0631
292542	L-013 1	17.5690	50/50	17.5690
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8121	50/50	15.8121
294903	P-060 E	13.8104	50/50	13.8104
913142	Y1-033 E OP1	21.9885	50/50	21.9885
917672	Z2-108 E	9.8825	50/50	9.8825
938351	AE1-053	5.4903	50/50	5.4903
938881	AE1-116	2.1185	50/50	2.1185
938991	AE1-128 C	10.8202	50/50	10.8202
938992	AE1-128 E	7.2134	50/50	7.2134
943711	AF1-039 C O1	5.8171	50/50	5.8171
943712	AF1-039 E O1	3.8780	50/50	3.8780
944781	AF1-143 C	32.9418	50/50	32.9418
944782	AF1-143 E	17.5690	50/50	17.5690
945671	AF1-232 C O2	39.3692	50/50	39.3692
945672	AF1-232 E O2	21.1988	50/50	21.1988
946081	AF1-273 C O1	18.5084	50/50	18.5084
946082	AF1-273 E O1	12.3389	50/50	12.3389
957001	AF2-001 C O2	5.6503	50/50	5.6503
957002	AF2-001 E O2	3.7669	50/50	3.7669
957011	AF2-002 C O2	2.8252	50/50	2.8252
957012	AF2-002 E O2	1.8834	50/50	1.8834
957981	AF2-092 C	0.9703	50/50	0.9703
957982	AF2-092 E	0.6468	50/50	0.6468
958101	AF2-104 C	1.1299	50/50	1.1299
958102	AF2-104 E	0.7532	50/50	0.7532
958411	AF2-135 C	1.6471	50/50	1.6471
958412	AF2-135 E	1.0981	50/50	1.0981
958471	AF2-141	4.3922	50/50	4.3922
959792	AF2-270 E	0.5592	50/50	0.5592
960192	AF2-310 BAT	0.9823	Merchant Transmission	0.9823

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960451	AF2-336 C O2	1.6330	50/50	1.6330
960452	AF2-336 E O2	1.0886	50/50	1.0886
960461	AF2-337 C O2	1.6330	50/50	1.6330
960462	AF2-337 E O2	1.0886	50/50	1.0886
960471	AF2-338 C O2	1.6330	50/50	1.6330
960472	AF2-338 E O2	1.0886	50/50	1.0886
960481	AF2-339 C O2	1.6330	50/50	1.6330
960482	AF2-339 E O2	1.0886	50/50	1.0886
960901	AF2-381 C	9.0041	50/50	9.0041
960902	AF2-381 E	4.7384	50/50	4.7384
NEWTON	NEWTON	0.2342	Confirmed LTF	0.2342
FARMERCITY	FARMERCITY	0.0123	Confirmed LTF	0.0123
G-007A	G-007A	0.6977	Confirmed LTF	0.6977
VFT	VFT	1.9285	Confirmed LTF	1.9285
CALDERWOOD	CALDERWOOD	0.1203	Confirmed LTF	0.1203
PRAIRIE	PRAIRIE	0.5708	Confirmed LTF	0.5708
CHEOAH	CHEOAH	0.1216	Confirmed LTF	0.1216
EDWARDS	EDWARDS	0.0742	Confirmed LTF	0.0742
TILTON	TILTON	0.1348	Confirmed LTF	0.1348
GIBSON	GIBSON	0.1190	Confirmed LTF	0.1190
BLUEG	BLUEG	0.3837	Confirmed LTF	0.3837
TRIMBLE	TRIMBLE	0.1224	Confirmed LTF	0.1224
CATAWBA	CATAWBA	0.0893	Confirmed LTF	0.0893

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
101345684	200751	26HILLCLAY	PENELEC	200752	26HILLTOP	PENELEC	1	PN-P7-1-PN-230-001	tower	237.0	106.14	109.3	DC	7.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.2541	50/50	0.2541
200834	26SW_E13_K22	0.1306	50/50	0.1306
200835	26DSGENWIN	0.6428	50/50	0.6428
200840	26DEEPCRK1	0.2343	50/50	0.2343
200841	26DEEPCRK2	0.2343	50/50	0.2343
200846	26FORWARD	0.4624	50/50	0.4624
200864	K-013 E	10.7233	50/50	10.7233
200883	Q-053 E	7.7242	50/50	7.7242
200888	26HIGHLAND	1.2344	50/50	1.2344
200889	26STNY CRK	0.7356	50/50	0.7356
200890	26BF_G21_K23	0.3152	50/50	0.3152
200891	26CSLMN_L13	0.4945	50/50	0.4945
200892	26LOOKOUT	0.4698	50/50	0.4698
200915	26CHSTN_FL	0.2110	50/50	0.2110
200925	26R32	1.4243	50/50	1.4243
202225	26SCI_S29B	0.2032	50/50	0.2032
202652	26RGH_Y1-033	0.2412	50/50	0.2412
292350	K-023	11.7891	50/50	11.7891
292542	L-013 1	11.4666	50/50	11.4666
293432	R-040 E	0.6450	50/50	0.6450
293603	O-018 E	28.6239	50/50	28.6239
293902	O-048 E	10.3199	50/50	10.3199
294903	P-060 E	17.0591	50/50	17.0591
296332	R-032 E	33.0276	50/50	33.0276
913142	Y1-033 E OP1	9.5532	50/50	9.5532
917672	Z2-108 E	6.4499	50/50	6.4499
938351	AE1-053	3.5833	50/50	3.5833
938881	AE1-116	1.8930	50/50	1.8930
938991	AE1-128 C	27.9324	50/50	27.9324
938992	AE1-128 E	18.6216	50/50	18.6216
943711	AF1-039 C O1	2.5273	50/50	2.5273
943712	AF1-039 E O1	1.6849	50/50	1.6849
944751	AF1-140 C	3.1099	50/50	3.1099
944752	AF1-140 E	2.0733	50/50	2.0733
944781	AF1-143 C	21.4998	50/50	21.4998
944782	AF1-143 E	11.4666	50/50	11.4666
945671	AF1-232 C O2	42.7700	50/50	42.7700
945672	AF1-232 E O2	23.0300	50/50	23.0300
946081	AF1-273 C O1	20.8921	50/50	20.8921
946082	AF1-273 E O1	13.9281	50/50	13.9281
946571	AF1-321 C O1	5.7685	50/50	5.7685

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946572	AF1-321 E O1	3.8457	50/50	3.8457
957001	AF2-001 C O2	5.6867	50/50	5.6867
957002	AF2-001 E O2	3.7911	50/50	3.7911
957011	AF2-002 C O2	2.8433	50/50	2.8433
957012	AF2-002 E O2	1.8956	50/50	1.8956
957931	AF2-087 C	0.1261	Adder	0.28
957932	AF2-087 E	0.1737	Adder	0.39
957981	AF2-092 C	2.6812	50/50	2.6812
957982	AF2-092 E	1.7875	50/50	1.7875
958101	AF2-104 C	1.0096	50/50	1.0096
958102	AF2-104 E	0.6731	50/50	0.6731
958411	AF2-135 C	1.0750	50/50	1.0750
958412	AF2-135 E	0.7167	50/50	0.7167
958471	AF2-141	2.8666	50/50	2.8666
959301	AF2-221 C	3.6886	50/50	3.6886
959302	AF2-221 E	5.0938	50/50	5.0938
959792	AF2-270 E	1.4436	50/50	1.4436
959802	AF2-271 E	0.3133	50/50	0.3133
960391	AF2-330 C	9.6134	50/50	9.6134
960392	AF2-330 E	4.2046	50/50	4.2046
960451	AF2-336 C O2	4.4844	50/50	4.4844
960452	AF2-336 E O2	2.9896	50/50	2.9896
960461	AF2-337 C O2	4.4844	50/50	4.4844
960462	AF2-337 E O2	2.9896	50/50	2.9896
960471	AF2-338 C O2	4.4844	50/50	4.4844
960472	AF2-338 E O2	2.9896	50/50	2.9896
960481	AF2-339 C O2	4.4844	50/50	4.4844
960482	AF2-339 E O2	2.9896	50/50	2.9896
960901	AF2-381 C	35.9099	50/50	35.9099
960902	AF2-381 E	18.8976	50/50	18.8976
WEC	WEC	0.0268	Confirmed LTF	0.0268
LGEE	LGEE	0.0531	Confirmed LTF	0.0531
CPL	CPL	0.0900	Confirmed LTF	0.0900
CBM-W2	CBM-W2	0.8026	Confirmed LTF	0.8026
NY	NY	0.1825	Confirmed LTF	0.1825
CBM-W1	CBM-W1	0.9257	Confirmed LTF	0.9257
TVA	TVA	0.1498	Confirmed LTF	0.1498
O-066	O-066	1.2029	Confirmed LTF	1.2029
CBM-S2	CBM-S2	0.7456	Confirmed LTF	0.7456
CBM-S1	CBM-S1	0.8946	Confirmed LTF	0.8946
G-007	G-007	0.1810	Confirmed LTF	0.1810
MADISON	MADISON	0.0040	Confirmed LTF	0.0040
MEC	MEC	0.1430	Confirmed LTF	0.1430

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
9888867	200762	26GARRETT	PENELEC	235470	01GARRET	AP	1	PN-P2-3-PN-115-35E	breaker	160.0	212.61	214.31	DC	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7147	50/50	0.7147
200834	26SW_E13_K22	0.1461	50/50	0.1461
200835	26DSGENWIN	0.9847	50/50	0.9847
200840	26DEEPCRK1	1.4114	50/50	1.4114
200841	26DEEPCRK2	1.4114	50/50	1.4114
200889	26STNY CRK	0.5954	50/50	0.5954
200890	26BF_G21_K23	0.4829	50/50	0.4829
200891	26CSLMN_L13	0.7575	50/50	0.7575
200892	26LOOKOUT	0.7196	50/50	0.7196
202225	26SCI_S29B	0.2273	50/50	0.2273
202652	26RGH_Y1-033	0.5551	50/50	0.5551
292350	K-023	18.0595	50/50	18.0595
292542	L-013 1	17.5654	50/50	17.5654
293432	R-040 E	0.9881	50/50	0.9881
293902	O-048 E	15.8089	50/50	15.8089
294903	P-060 E	13.8062	50/50	13.8062
913142	Y1-033 E OP1	21.9847	50/50	21.9847
917672	Z2-108 E	9.8806	50/50	9.8806
938351	AE1-053	5.4892	50/50	5.4892
938881	AE1-116	2.1181	50/50	2.1181
938991	AE1-128 C	10.8130	50/50	10.8130
938992	AE1-128 E	7.2086	50/50	7.2086
943711	AF1-039 C O1	5.8161	50/50	5.8161
943712	AF1-039 E O1	3.8774	50/50	3.8774
944781	AF1-143 C	32.9352	50/50	32.9352
944782	AF1-143 E	17.5654	50/50	17.5654
945671	AF1-232 C O2	39.3588	50/50	39.3588
945672	AF1-232 E O2	21.1932	50/50	21.1932
946081	AF1-273 C O1	18.5033	50/50	18.5033
946082	AF1-273 E O1	12.3355	50/50	12.3355
957001	AF2-001 C O2	5.6491	50/50	5.6491
957002	AF2-001 E O2	3.7661	50/50	3.7661
957011	AF2-002 C O2	2.8246	50/50	2.8246
957012	AF2-002 E O2	1.8830	50/50	1.8830
957981	AF2-092 C	0.9696	50/50	0.9696
957982	AF2-092 E	0.6464	50/50	0.6464
958101	AF2-104 C	1.1296	50/50	1.1296
958102	AF2-104 E	0.7531	50/50	0.7531
958411	AF2-135 C	1.6468	50/50	1.6468
958412	AF2-135 E	1.0978	50/50	1.0978
958471	AF2-141	4.3914	50/50	4.3914

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959792	AF2-270 E	0.5588	50/50	0.5588
960451	AF2-336 C O2	1.6316	50/50	1.6316
960452	AF2-336 E O2	1.0878	50/50	1.0878
960461	AF2-337 C O2	1.6316	50/50	1.6316
960462	AF2-337 E O2	1.0878	50/50	1.0878
960471	AF2-338 C O2	1.6316	50/50	1.6316
960472	AF2-338 E O2	1.0878	50/50	1.0878
960481	AF2-339 C O2	1.6316	50/50	1.6316
960482	AF2-339 E O2	1.0878	50/50	1.0878
960901	AF2-381 C	8.9959	50/50	8.9959
960902	AF2-381 E	4.7341	50/50	4.7341
NEWTON	NEWTON	0.2450	Confirmed LTF	0.2450
FARMERCITY	FARMERCITY	0.0128	Confirmed LTF	0.0128
G-007A	G-007A	0.6737	Confirmed LTF	0.6737
VFT	VFT	1.8640	Confirmed LTF	1.8640
CALDERWOOD	CALDERWOOD	0.1252	Confirmed LTF	0.1252
PRAIRIE	PRAIRIE	0.5967	Confirmed LTF	0.5967
CHEOAH	CHEOAH	0.1266	Confirmed LTF	0.1266
EDWARDS	EDWARDS	0.0777	Confirmed LTF	0.0777
TILTON	TILTON	0.1411	Confirmed LTF	0.1411
GIBSON	GIBSON	0.1245	Confirmed LTF	0.1245
BLUEG	BLUEG	0.4010	Confirmed LTF	0.4010
TRIMBLE	TRIMBLE	0.1280	Confirmed LTF	0.1280
CATAWBA	CATAWBA	0.0927	Confirmed LTF	0.0927

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
101344527	202650	26HIGHPOINT	PENELEC	200747	26PENN-MAR	PENELEC	1	PN-P2-3-PN-115-35E	breaker	174.0	183.29	184.85	DC	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.1462	50/50	0.1462
200835	26DSGENWIN	0.9850	50/50	0.9850
200864	K-013 E	1.7945	Adder	2.11
200889	26STNY CRK	0.5956	50/50	0.5956
200890	26BF_G21_K23	0.4830	50/50	0.4830
200891	26CSLMN_L13	0.7577	50/50	0.7577
200892	26LOOKOUT	0.7198	50/50	0.7198
202225	26SCI_S29B	0.2274	50/50	0.2274
202652	26RGH_Y1-033	0.5552	50/50	0.5552
292350	K-023	18.0641	50/50	18.0641
292542	L-013 1	17.5699	50/50	17.5699
293432	R-040 E	0.9883	50/50	0.9883
293902	O-048 E	15.8129	50/50	15.8129
294903	P-060 E	13.8117	50/50	13.8117
913142	Y1-033 E OP1	21.9895	50/50	21.9895
917672	Z2-108 E	9.8831	50/50	9.8831
938351	AE1-053	5.4906	50/50	5.4906
938881	AE1-116	2.1186	50/50	2.1186
938991	AE1-128 C	10.8223	50/50	10.8223
938992	AE1-128 E	7.2149	50/50	7.2149
943711	AF1-039 C O1	5.8173	50/50	5.8173
943712	AF1-039 E O1	3.8782	50/50	3.8782
944781	AF1-143 C	32.9436	50/50	32.9436
944782	AF1-143 E	17.5699	50/50	17.5699
945671	AF1-232 C O2	39.3723	50/50	39.3723
945672	AF1-232 E O2	21.2005	50/50	21.2005
946081	AF1-273 C O1	18.5099	50/50	18.5099
946082	AF1-273 E O1	12.3400	50/50	12.3400
957001	AF2-001 C O2	5.6508	50/50	5.6508
957002	AF2-001 E O2	3.7672	50/50	3.7672
957011	AF2-002 C O2	2.8254	50/50	2.8254
957012	AF2-002 E O2	1.8836	50/50	1.8836
957981	AF2-092 C	0.9706	50/50	0.9706
957982	AF2-092 E	0.6470	50/50	0.6470
958101	AF2-104 C	1.1299	50/50	1.1299
958102	AF2-104 E	0.7533	50/50	0.7533
958411	AF2-135 C	1.6472	50/50	1.6472
958412	AF2-135 E	1.0981	50/50	1.0981
958471	AF2-141	4.3925	50/50	4.3925
959792	AF2-270 E	0.5593	50/50	0.5593
960192	AF2-310 BAT	0.9820	Merchant Transmission	0.9820

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960451	AF2-336 C O2	1.6333	50/50	1.6333
960452	AF2-336 E O2	1.0889	50/50	1.0889
960461	AF2-337 C O2	1.6333	50/50	1.6333
960462	AF2-337 E O2	1.0889	50/50	1.0889
960471	AF2-338 C O2	1.6333	50/50	1.6333
960472	AF2-338 E O2	1.0889	50/50	1.0889
960481	AF2-339 C O2	1.6333	50/50	1.6333
960482	AF2-339 E O2	1.0889	50/50	1.0889
960901	AF2-381 C	9.0065	50/50	9.0065
960902	AF2-381 E	4.7397	50/50	4.7397
NEWTON	NEWTON	0.2310	Confirmed LTF	0.2310
FARMERCITY	FARMERCITY	0.0121	Confirmed LTF	0.0121
G-007A	G-007A	0.7049	Confirmed LTF	0.7049
VFT	VFT	1.9479	Confirmed LTF	1.9479
CALDERWOOD	CALDERWOOD	0.1188	Confirmed LTF	0.1188
PRAIRIE	PRAIRIE	0.5631	Confirmed LTF	0.5631
CHEOAH	CHEOAH	0.1201	Confirmed LTF	0.1201
EDWARDS	EDWARDS	0.0732	Confirmed LTF	0.0732
TILTON	TILTON	0.1329	Confirmed LTF	0.1329
GIBSON	GIBSON	0.1174	Confirmed LTF	0.1174
BLUEG	BLUEG	0.3784	Confirmed LTF	0.3784
TRIMBLE	TRIMBLE	0.1208	Confirmed LTF	0.1208
CATAWBA	CATAWBA	0.0882	Confirmed LTF	0.0882

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
100765338	235470	01GARRET	AP	235469	01GARRET	AP	1	PN-P2-3-PN-115-35E	breaker	196.0	173.56	174.95	DC	2.72

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.7147	50/50	0.7147
200834	26SW_E13_K22	0.1461	50/50	0.1461
200835	26DSGENWIN	0.9847	50/50	0.9847
200840	26DEEPCRK1	1.4114	50/50	1.4114
200841	26DEEPCRK2	1.4114	50/50	1.4114
200889	26STNY CRK	0.5954	50/50	0.5954
200890	26BF_G21_K23	0.4829	50/50	0.4829
200891	26CSLMN_L13	0.7575	50/50	0.7575
200892	26LOOKOUT	0.7196	50/50	0.7196
202225	26SCI_S29B	0.2273	50/50	0.2273
202652	26RGH_Y1-033	0.5551	50/50	0.5551
292350	K-023	18.0595	50/50	18.0595
292542	L-013 1	17.5654	50/50	17.5654
293432	R-040 E	0.9881	50/50	0.9881
293902	O-048 E	15.8089	50/50	15.8089
294903	P-060 E	13.8062	50/50	13.8062
913142	Y1-033 E OP1	21.9847	50/50	21.9847
917672	Z2-108 E	9.8806	50/50	9.8806
938351	AE1-053	5.4892	50/50	5.4892
938881	AE1-116	2.1181	50/50	2.1181
938991	AE1-128 C	10.8130	50/50	10.8130
938992	AE1-128 E	7.2086	50/50	7.2086
943711	AF1-039 C O1	5.8161	50/50	5.8161
943712	AF1-039 E O1	3.8774	50/50	3.8774
944781	AF1-143 C	32.9352	50/50	32.9352
944782	AF1-143 E	17.5654	50/50	17.5654
945671	AF1-232 C O2	39.3588	50/50	39.3588
945672	AF1-232 E O2	21.1932	50/50	21.1932
946081	AF1-273 C O1	18.5033	50/50	18.5033
946082	AF1-273 E O1	12.3355	50/50	12.3355
957001	AF2-001 C O2	5.6491	50/50	5.6491
957002	AF2-001 E O2	3.7661	50/50	3.7661
957011	AF2-002 C O2	2.8246	50/50	2.8246
957012	AF2-002 E O2	1.8830	50/50	1.8830
957981	AF2-092 C	0.9696	50/50	0.9696
957982	AF2-092 E	0.6464	50/50	0.6464
958101	AF2-104 C	1.1296	50/50	1.1296
958102	AF2-104 E	0.7531	50/50	0.7531
958411	AF2-135 C	1.6468	50/50	1.6468
958412	AF2-135 E	1.0978	50/50	1.0978
958471	AF2-141	4.3914	50/50	4.3914

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959792	AF2-270 E	0.5588	50/50	0.5588
960451	AF2-336 C O2	1.6316	50/50	1.6316
960452	AF2-336 E O2	1.0878	50/50	1.0878
960461	AF2-337 C O2	1.6316	50/50	1.6316
960462	AF2-337 E O2	1.0878	50/50	1.0878
960471	AF2-338 C O2	1.6316	50/50	1.6316
960472	AF2-338 E O2	1.0878	50/50	1.0878
960481	AF2-339 C O2	1.6316	50/50	1.6316
960482	AF2-339 E O2	1.0878	50/50	1.0878
960901	AF2-381 C	8.9959	50/50	8.9959
960902	AF2-381 E	4.7341	50/50	4.7341
NEWTON	NEWTON	0.2450	Confirmed LTF	0.2450
FARMERCITY	FARMERCITY	0.0128	Confirmed LTF	0.0128
G-007A	G-007A	0.6737	Confirmed LTF	0.6737
VFT	VFT	1.8640	Confirmed LTF	1.8640
CALDERWOOD	CALDERWOOD	0.1252	Confirmed LTF	0.1252
PRAIRIE	PRAIRIE	0.5967	Confirmed LTF	0.5967
CHEOAH	CHEOAH	0.1266	Confirmed LTF	0.1266
EDWARDS	EDWARDS	0.0777	Confirmed LTF	0.0777
TILTON	TILTON	0.1411	Confirmed LTF	0.1411
GIBSON	GIBSON	0.1245	Confirmed LTF	0.1245
BLUEG	BLUEG	0.4010	Confirmed LTF	0.4010
TRIMBLE	TRIMBLE	0.1280	Confirmed LTF	0.1280
CATAWBA	CATAWBA	0.0927	Confirmed LTF	0.0927

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
101345685	960390	AF2-330 TAP	PENELEC	200525	26SUMMIT	PENELEC	1	PN-P7-1-PN-230-001	tower	237.0	108.31	111.63	DC	7.86

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUGH	0.1441	50/50	0.1441
200834	26SW_E13_K22	0.0739	50/50	0.0739
200835	26DSGENWIN	0.3639	50/50	0.3639
200846	26FORWARD	0.2664	50/50	0.2664
200864	K-013 E	6.1772	50/50	6.1772
200888	26HIGHLAND	0.6407	50/50	0.6407
200889	26STNY CRK	0.5348	50/50	0.5348
200890	26BF_G21_K23	0.1785	50/50	0.1785
200891	26CSLMN_L13	0.2800	50/50	0.2800
200892	26LOOKOUT	0.2660	50/50	0.2660
200925	26R32	0.7393	50/50	0.7393
202225	26SCI_S29B	0.1150	50/50	0.1150
202652	26RGH_Y1-033	0.1367	50/50	0.1367
292350	K-023	6.6744	50/50	6.6744
292542	L-013 1	6.4918	50/50	6.4918
293432	R-040 E	0.3652	50/50	0.3652
293603	O-018 E	14.8585	50/50	14.8585
293902	O-048 E	5.8427	50/50	5.8427
294903	P-060 E	12.4022	50/50	12.4022
296332	R-032 E	17.1444	50/50	17.1444
913142	Y1-033 E OP1	5.4139	50/50	5.4139
917672	Z2-108 E	3.6517	50/50	3.6517
938351	AE1-053	2.0287	50/50	2.0287
938881	AE1-116	1.0712	50/50	1.0712
938991	AE1-128 C	26.4449	50/50	26.4449
938992	AE1-128 E	17.6299	50/50	17.6299
943711	AF1-039 C O1	1.4323	50/50	1.4323
943712	AF1-039 E O1	0.9548	50/50	0.9548
944751	AF1-140 C	4.8234	50/50	4.8234
944752	AF1-140 E	3.2156	50/50	3.2156
944781	AF1-143 C	12.1722	50/50	12.1722
944782	AF1-143 E	6.4918	50/50	6.4918
945671	AF1-232 C O2	28.6250	50/50	28.6250
945672	AF1-232 E O2	15.4134	50/50	15.4134
946081	AF1-273 C O1	14.3585	50/50	14.3585
946082	AF1-273 E O1	9.5724	50/50	9.5724
946571	AF1-321 C O1	2.8931	50/50	2.8931
946572	AF1-321 E O1	1.9287	50/50	1.9287
957001	AF2-001 C O2	2.8889	50/50	2.8889
957002	AF2-001 E O2	1.9259	50/50	1.9259
957011	AF2-002 C O2	1.4444	50/50	1.4444

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957012	AF2-002 E O2	0.9630	50/50	0.9630
957513	AF2-045 BAT	2.6820	50/50	2.6820
957981	AF2-092 C	2.8461	50/50	2.8461
957982	AF2-092 E	1.8974	50/50	1.8974
958101	AF2-104 C	0.5713	50/50	0.5713
958102	AF2-104 E	0.3809	50/50	0.3809
958411	AF2-135 C	0.6086	50/50	0.6086
958412	AF2-135 E	0.4057	50/50	0.4057
958471	AF2-141	1.6230	50/50	1.6230
959301	AF2-221 C	1.2907	50/50	1.2907
959302	AF2-221 E	1.7824	50/50	1.7824
959792	AF2-270 E	1.3667	50/50	1.3667
959803	AF2-271 BAT	0.2573	50/50	0.2573
960391	AF2-330 C	32.6533	50/50	32.6533
960392	AF2-330 E	14.2816	50/50	14.2816
960451	AF2-336 C O2	4.7150	50/50	4.7150
960452	AF2-336 E O2	3.1434	50/50	3.1434
960461	AF2-337 C O2	4.7150	50/50	4.7150
960462	AF2-337 E O2	3.1434	50/50	3.1434
960471	AF2-338 C O2	4.7150	50/50	4.7150
960472	AF2-338 E O2	3.1434	50/50	3.1434
960481	AF2-339 C O2	4.7150	50/50	4.7150
960482	AF2-339 E O2	3.1434	50/50	3.1434
960901	AF2-381 C	24.4529	50/50	24.4529
960902	AF2-381 E	12.8684	50/50	12.8684
WEC	WEC	0.0321	Confirmed LTF	0.0321
LGEE	LGEE	0.0616	Confirmed LTF	0.0616
CPL	CPL	0.0820	Confirmed LTF	0.0820
CBM-W2	CBM-W2	0.8927	Confirmed LTF	0.8927
NY	NY	0.2085	Confirmed LTF	0.2085
CBM-W1	CBM-W1	1.1885	Confirmed LTF	1.1885
TVA	TVA	0.1596	Confirmed LTF	0.1596
O-066	O-066	1.2970	Confirmed LTF	1.2970
CBM-S2	CBM-S2	0.7052	Confirmed LTF	0.7052
CBM-S1	CBM-S1	0.9628	Confirmed LTF	0.9628
G-007	G-007	0.1914	Confirmed LTF	0.1914
MEC	MEC	0.1668	Confirmed LTF	0.1668

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
152412775	960450	AF2-336 TAP	PENELEC	200523	26SNAKE SP	PENELEC	1	PN-P2-3-PN-115-11F	breaker	152.0	107.16	111.98	DC	7.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200846	26FORWARD	0.1053	50/50	0.1053
200864	K-013 E	2.4411	50/50	2.4411
200889	26STNY CRK	0.3031	50/50	0.3031
292350	K-023	2.1578	Adder	2.54
292542	L-013 1	2.0988	Adder	2.47
293432	R-040 E	0.1181	Adder	0.14
293902	O-048 E	1.8889	Adder	2.22
294903	P-060 E	7.0287	50/50	7.0287
913142	Y1-033 E OP1	1.7518	Adder	2.06
917672	Z2-108 E	1.1805	Adder	1.39
938351	AE1-053	0.6559	Adder	0.77
938881	AE1-116	0.3462	Adder	0.41
938991	AE1-128 C	19.0073	50/50	19.0073
938992	AE1-128 E	12.6715	50/50	12.6715
943711	AF1-039 C O1	0.4634	Adder	0.55
943712	AF1-039 E O1	0.3090	Adder	0.36
944781	AF1-143 C	3.9352	Adder	4.63
944782	AF1-143 E	2.0988	Adder	2.47
945671	AF1-232 C O2	14.6047	50/50	14.6047
945672	AF1-232 E O2	7.8641	50/50	7.8641
946081	AF1-273 C O1	7.5934	50/50	7.5934
946082	AF1-273 E O1	5.0623	50/50	5.0623
946571	AF1-321 C O1	0.6698	Adder	0.79
946572	AF1-321 E O1	0.4466	Adder	0.53
957001	AF2-001 C O2	0.3703	Adder	0.82
957002	AF2-001 E O2	0.2468	Adder	0.55
957011	AF2-002 C O2	0.1851	Adder	0.41
957012	AF2-002 E O2	0.1234	Adder	0.27
957513	AF2-045 BAT	0.7421	Merchant Transmission	0.7421
958101	AF2-104 C	0.0978	Adder	0.22
958102	AF2-104 E	0.0652	Adder	0.14
958411	AF2-135 C	0.1043	Adder	0.23
958412	AF2-135 E	0.0695	Adder	0.15
958471	AF2-141	0.2781	Adder	0.62
959792	AF2-270 E	0.9823	50/50	0.9823
959803	AF2-271 BAT	0.0725	Merchant Transmission	0.0725
960451	AF2-336 C O2	4.3878	50/50	4.3878
960452	AF2-336 E O2	2.9252	50/50	2.9252
960461	AF2-337 C O2	4.3878	50/50	4.3878
960462	AF2-337 E O2	2.9252	50/50	2.9252
960471	AF2-338 C O2	4.3878	50/50	4.3878

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960472	AF2-338 E O2	2.9252	50/50	2.9252
960481	AF2-339 C O2	4.3878	50/50	4.3878
960482	AF2-339 E O2	2.9252	50/50	2.9252
960901	AF2-381 C	12.7772	50/50	12.7772
960902	AF2-381 E	6.7240	50/50	6.7240
WEC	WEC	0.0214	Confirmed LTF	0.0214
LGEE	LGEE	0.0399	Confirmed LTF	0.0399
CPL	CPL	0.0417	Confirmed LTF	0.0417
CBM-W2	CBM-W2	0.5569	Confirmed LTF	0.5569
NY	NY	0.0951	Confirmed LTF	0.0951
CBM-W1	CBM-W1	0.8257	Confirmed LTF	0.8257
TVA	TVA	0.0952	Confirmed LTF	0.0952
O-066	O-066	0.9072	Confirmed LTF	0.9072
CBM-S2	CBM-S2	0.3757	Confirmed LTF	0.3757
CBM-S1	CBM-S1	0.5794	Confirmed LTF	0.5794
G-007	G-007	0.1362	Confirmed LTF	0.1362
MEC	MEC	0.1081	Confirmed LTF	0.1081

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
PN-P1-2-PN-115-074B-A	CONTINGENCY 'PN-P1-2-PN-115-074B-A' /* ALLEGHENY - KIMRUN 115KV DISCONNECT BRANCH FROM BUS 202647 TO BUS 945670 CKT 1 /* 26KIMRUN TAP 115 AF1-232 TAP 115 END
AP-P1-3-PN-115-010	CONTINGENCY 'AP-P1-3-PN-115-010' /* GARRETT 138/115KV XFMR FAULT OPEN BRANCH FROM BUS 235469 TO BUS 235470 CKT 1 /* 01GARRET 138.00 01GARRET 115.00 END
PN-P1-2-PN-115-082	CONTINGENCY 'PN-P1-2-PN-115-082' /* HILLTOP - KRAYN - RACHEL HILL 115KV DISCONNECT BRANCH FROM BUS 200878 TO BUS 200790 CKT 1 /* 26KRAYN 115 26SALIX 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200751 CKT 1 /* 26SALIX 115 26HILLCLAY 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200752 CKT 1 /* 26HILLCLAY 115 26HILLTOP 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200749 CKT 1 /* 26HILLCLAY 115 26RACHEL H 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200785 CKT 1 /* 26SALIX 115 26SALIX 23 DISCONNECT BRANCH FROM BUS 200749 TO BUS 200784 CKT 1 /* 26RACHEL H 115 26RACHEL#1 23 DISCONNECT BUS 200790 /* 26SALIX 115 DISCONNECT BUS 200751 /* 26HILLCLAY 115 END
PN-P1-2-PN-115-080	CONTINGENCY 'PN-P1-2-PN-115-080' /* BEDFORD NORTH - CLAYSBURG 115KV DISCONNECT BRANCH FROM BUS 200505 TO BUS 200516 CKT 1 /* 26CLYSBURG 115 26OSTRBURG 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200501 CKT 1 /* 26OSTRBURG 115 26BDFORD N 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200564 CKT 1 /* 26OSTRBURG 115 26OSTRE SB 23 DISCONNECT BUS 200516 /* 26OSTRBURG 115 END

Contingency Name	Contingency Definition
PN-P2-3-PN-115-35E	CONTINGENCY 'PN-P2-3-PN-115-35E' /* #14 STUCK TIE BREAKER BETWEEN BUSES 1 AND 2 DISCONNECT BRANCH FROM BUS 200734 TO BUS 200743 CKT 1 /* 26SCALP L. 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200802 CKT 1 /* 26HOOVERSV 115 26RALPHTON 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200776 CKT 1 /* 26HOOVERSV 115 26HOOVER#1 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 957000 CKT 1 /* 26HOOVERSV 115 AF2-001 TAP 115 DISCONNECT BRANCH FROM BUS 200742 TO BUS 200743 CKT 1 /* 26TOWER 51 115 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 END
PN-P2-3-PN-115-11F	CONTINGENCY 'PN-P2-3-PN-115-11F' /* FUTURE CLAYSBURG 115KV SB (BEDFORD NORTH/KRAYN) DISCONNECT BUS 200516 /* 26OSTRBURG 115 DISCONNECT BUS 200564 /* 26OSTRE SB 23 DISCONNECT BRANCH FROM BUS 200505 TO BUS 200878 CKT 1 /* 26CLYSBURG 115 26KRAYN 115 END
PN-P1-3-PN-115-029-A	CONTINGENCY 'PN-P1-3-PN-115-029-A' /* HOOVERSVILLE #2 XFMR FAULT DISCONNECT BRANCH FROM BUS 200743 TO BUS 200789 CKT 2 /* 26HOOVERSV 115 26HOOVER#2 23 DISCONNECT BRANCH FROM BUS 200743 TO BUS 200742 CKT 1 /* 26HOOVERSV 115 26TOWER 51 115 DISCONNECT BRANCH FROM BUS 200743 TO BUS 957000 CKT 1 /* 26HOOVERSV 115 AF2-001 TAP 115 END
Base Case	
PN-P7-1-PN-230-001	CONTINGENCY 'PN-P7-1-PN-230-001' /* HOMER CITY - HOOVERSVILLE 230KV & SEWARD - TOWER 51 115KV DISCONNECT BRANCH FROM BUS 200767 TO BUS 200768 CKT 1 /* 26HOMER CT 230 26QUEMAHON 230 DISCONNECT BRANCH FROM BUS 200768 TO BUS 200796 CKT 1 /* 26QUEMAHON 230 26HOOVERSVL 230 DISCONNECT BRANCH FROM BUS 200796 TO BUS 200743 CKT 3 /* 26HOOVERSVL 230 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200741 TO BUS 200742 CKT 1 /* 26SEWARD 115 26TOWER 51 115 END

14 Affected Systems

14.1 NYISO

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