Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-233

HAZLETON 138 KV

30 MW Capacity / 50 MW Energy

January 2021

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1 Introduction

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

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 Preston County, West Virginia. The installed facilities will have a total capability of 50 MW with 30 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-233
Project Name	HAZLETON 138 KV
State	West Virginia
County	Preston
Transmission Owner	APS
MFO	50
MWE	50
MWC	30
Fuel	Solar
Basecase Study Year	2024

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

4 Point of Interconnection

AG1-233 will interconnect with the APS system.

4.1 Primary POI

The interconnection of the project at the Primary POI will be accomplished by reconfiguring Hazelton 138 kV substation into a four (4) breaker ring bus substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required. The project will also require Non-Direct Connection upgrades at Lake Lynn Substation, Albright Substation and Finzel Substation.

Attachment 1 shows a one-line diagram of the proposed primary Direct Connection facilities for the AG1-233 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 138 kV three (3) breaker ring bus substation and looping the Albright-Hazelton-Lake Lynn 138 kV line into the new station. The new substation would be located approximately 2.1 miles from Hazelton Substation. A full scope of work or estimated cost is not provided for the proposed Secondary POI.

5 Cost Summary

The AG1-233 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$7,204,000
Total System Network Upgrade Costs	$184,566,480[1]
Total Costs	**$191,770,480**

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

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

6 Transmission Owner Scope of Work

The interconnection of the project at the Primary POI will be accomplished by reconfiguring Hazelton 138 kV substation into a four (4) breaker ring bus substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required. The project will also require Non-Direct Connection upgrades at Lake Lynn Substation, Albright Substation and Finzel Substation.

The total physical interconnection costs are given in the table below:

Description	Total Cost
Install disconnect switch, dead-end structure, and associated facilities for generator lead line exit at interconnection substation.	$360,000
Reconfigure Hazelton 138 kV into a four breaker ring bus substation	$6,808,000
Upgrade relaying at Albright.	$12,000
Upgrade relaying at Lake Lynn.	$12,000
Upgrade relaying at Finzel.	$12,000
Total Physical Interconnection Costs	**$7,204,000**

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

7 Schedule

Based on the scope of work for the Attachment Facilities and the Direct and/or Non-Direct Connection facilities, it is expected to take a minimum of 24 months after the signing of an Interconnection Construction Service Agreement to complete the installation. This includes the requirement for the IC to make a preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the interconnection substation. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined Direct Connection and network upgrades, and that all transmission system outages will be allowed when requested.

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

8 Transmission Owner Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AG1-233 project did not contribute to any overloads on the 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 138 kV circuit breaker to protect the AG1-233 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.

2. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

3. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the FE Transmission System Control Center.

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

5. The execution of a back-up service agreement to serve the customer load supplied from the AG1-233 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) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)

- Wind direction (decimal degrees from true north) - (Accepted, not required)

10.3 Interconnected Transmission Owner Requirements

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

11 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AG1-233 was evaluated as a 50.0 MW (Capacity 30.0 MW) injection at the Hazelton 138 kV substation in the APS area. Project AG1-233 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-233 was studied with a commercial probability of 53%. 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	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
167346156	235471	01GORE	138.0	AP	235512	01STONEW	138.0	AP	1	AP-P2-3-PE-500-014	breaker	191.0	122.49	123.13	DC	2.69
167346157	235471	01GORE	138.0	AP	235512	01STONEW	138.0	AP	1	AP-P2-3-PE-500-016	breaker	191.0	122.39	123.02	DC	2.69
167346298	235479	01JUNCTN	138.0	AP	235467	01FRNCHM	138.0	AP	1	AP-P2-3-PE-500-014	breaker	206.0	103.88	104.45	DC	2.62
167346299	235479	01JUNCTN	138.0	AP	235467	01FRNCHM	138.0	AP	1	AP-P2-3-PE-500-016	breaker	206.0	103.78	104.35	DC	2.62

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
167346304	235484	01MESSCK	138.0	AP	235490	01MORGAN	138.0	AP	1	AP-P2-3-PE-500-014	breaker	268.0	103.62	104.24	DC	3.65
167346305	235484	01MESSCK	138.0	AP	235490	01MORGAN	138.0	AP	1	AP-P2-3-PE-500-016	breaker	268.0	103.51	104.13	DC	3.65
167346328	235490	01MORGAN	138.0	AP	235453	01CHERYR	138.0	AP	1	AP-P2-3-PE-500-014	breaker	229.0	100.69	101.37	DC	3.46
167346329	235490	01MORGAN	138.0	AP	235453	01CHERYR	138.0	AP	1	AP-P2-3-PE-500-016	breaker	229.0	100.6	101.29	DC	3.46
165565383	235504	01RIDGLY	138.0	AP	235593	01HAMPS2	138.0	AP	1	AP-P7-1-PE-138-014	tower	182.0	107.31	108.49	DC	4.74
167346240	235504	01RIDGLY	138.0	AP	235484	01MESSCK	138.0	AP	1	AP-P2-3-PE-500-014	breaker	268.0	109.71	110.32	DC	3.65
167346241	235504	01RIDGLY	138.0	AP	235484	01MESSCK	138.0	AP	1	AP-P2-3-PE-500-016	breaker	268.0	109.59	110.21	DC	3.65
167108137	937190	AD2-157 TAP	138.0	AP	235471	01GORE	138.0	AP	1	AP-P2-3-PE-500-014	breaker	250.0	103.63	104.11	DC	2.69
167108138	937190	AD2-157 TAP	138.0	AP	235471	01GORE	138.0	AP	1	AP-P2-3-PE-500-016	breaker	250.0	103.59	104.07	DC	2.69
165565326	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	FE-P7-1-MP-138-056-B	tower	306.0	118.42	134.75	DC	49.99
167108001	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	FE-P2-3-MP-138-189	breaker	306.0	118.42	134.75	DC	49.99
167108002	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	AP-P2-3-WP-138-233	breaker	306.0	118.42	134.75	DC	49.99

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	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
16789257 8	23529 7	01HAZEL T	138. 0	AP	23530 5	01 106 J	138. 0	AP	1	AP-P1-2-PE-138-100-A	operatio n	311.0	116.48	132.55	DC	49.99
16789252 3	23530 5	01 106 J	138. 0	AP	23512 0	01ALBRIG	138. 0	AP	1	AP-P1-2-PE-138-100-A	operatio n	186.0	130.28	143.9	DC	25.34
16789261 3	23546 8	01FROST B	138. 0	AP	94046 0	AE2-030 TAP	138. 0	AP	1	FE-P1-2-MP-138-040-A	operatio n	306.0	112.54	128.87	DC	49.99
16789261 4	23546 8	01FROST B	138. 0	AP	94046 0	AE2-030 TAP	138. 0	AP	1	Base Case	operatio n	293.0	99.53	102.95	DC	10.0
16789279 2	23548 4	01MESSC K	138. 0	AP	23549 0	01MORGA N	138. 0	AP	1	AP-P1-2-PE-500-001	operatio n	268.0	101.31	101.81	DC	2.99
16789274 6	23550 4	01RIDGLY	138. 0	AP	23548 4	01MESSCK	138. 0	AP	1	AP-P1-2-PE-500-001	operatio n	268.0	107.35	107.86	DC	2.99
16963838 9	94046 0	AE2-030 TAP	138. 0	AP	23550 4	01RIDGLY	138. 0	AP	1	FE-P1-2-MP-138-040-A	operatio n	306.0	118.38	134.72	DC	49.99
16963839 0	94046 0	AE2-030 TAP	138. 0	AP	23550 4	01RIDGLY	138. 0	AP	1	Base Case	operatio n	293.0	104.32	107.73	DC	10.0

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
167346156,167346157	1	01GORE 138.0 kV - 01STONEW 138.0 kV Ckt 1	APS PE-AG1-F-0001 (739) : 1) Replace (1) 5 A thermal relay at Stonewall. 2) Replace (1) 800 A WEST wave trap at Gore. 3) Replace (1) 800 A WEST wave trap at Stonewall. Project Type : FAC Cost : $1,024,800 Time Estimate : 12.0 Months	$1,024,800
167346240,167346241	6	01RIDGLY 138.0 kV - 01MESSCK 138.0 kV Ckt 1	APS PE-AG1-F-0006 (745) : 1) Reconductor 3.49 miles of 556.5 ACSR 26/7 transmission line from Messick Road to Ridgeley with 795 ACSR "Drake" or higher to meet or exceed 295 MVA STE. 2) Replace (1) 8 A thermal relay at Messick Road. 3) Replace (1) 10 A thermal relay at Messick Road. 4) Replace (2) 10 A thermal meters at Messick Road. Project Type : FAC Cost : $9,709,980 Time Estimate : 36.0 Months	$9,709,980
165565383	5	01RIDGLY 138.0 kV - 01HAMPS2 138.0 kV Ckt 1	APS PE-AG1-F-0007 (746) : 1) Reconductor (2) existing sections of 350 CU subconductor circular at Ridgeley with a conductor able to meet or exceed 198 MVA STE or higher. 2) Reconductor 29.76 miles of 336.4 ACSR 26/7 transmission line from Hampshire to Ridgeley with 556.5 ACSR "Dove" or a conductor able to meet or exceed 198 MVA STE. 3) Reconductor (1) existing section of 336.4 ACSR 26/7 transmission line from Hampshire to Ridgeley with 556.5 ACSR "Dove" or a conductor able to meet or exceed 198 MVA STE. Project Type : FAC Cost : $76,501,320 Time Estimate : 60.0 Months	$76,501,320

ID	Idx	Facility	Upgrade Description	Cost
167108002,167108001,165565326	8	AE2-030 TAP 138.0 kV - 01RIDGLY 138.0 kV Ckt 1	**APS** **PE-AG1-F-0011:** **1) Replace (1) 1200 A TRENCH wave trap at Ridgeley.** **2) Reconductor (1) existing section of 1.50 SPS AL subconductor circular at Ridgeley with a conductor able to meet or exceed 413 MVA STE.** **3) Reconductor (1) existing section of 1024.5 ACAR 24/13 subconductor circular at Ridgeley with a conductor able to meet or exceed 413 MVA STE.** **4) Replace (1) 8 A thermal relay at Ridgeley.** **5) Reconductor 8.61 miles of 954 ACSR 45/7 transmission line from Frostburg to Ridgeley with 1590 ACSR 45/7 or equivalent to meet or exceed 413 MVA STE.** **6) Recondcutor existing sections of 954 ACSR 45/7 transmission line at Frostburg and Ridgeley with 1590 ACSR 45/7 or equivalent to meet or exceed 413 MVA STE.** **7) Replace (2) 10 A thermal meters at Ridgeley.** **8) Replace (1) 10 A thermal relay at Ridgeley.** **Project Type : FAC** **Cost : $23,467,920** **Time Estimate : 48.0 Months**	$23,467,920
167346299,167346298	2	01JUNCTN 138.0 kV - 01FRNCHM 138.0 kV Ckt 1	**APS** **PE-AG1-F-0002 (740) : Replace (1) 600 A disconnect switch at Junction.** **Project Type : FAC** **Cost : $256,200** **Time Estimate : 12.0 Months**	$256,200
167346329,167346328	4	01MORGAN 138.0 kV - 01CHERYR 138.0 kV Ckt 1	**APS** **PE-AG1-F-0005 (744) :** **1) Replace (1) 800 A TRENCH wave trap at Morgan (APS).** **2) Replace (2) 8 A thermal relays at Cherry Run.** **3) Replace (1) 8 A thermal relay at Morgan (APS).** **Project Type : FAC** **Cost : $1,665,300** **Time Estimate : 12.0 Months**	$1,665,300
167346305,167346304	3	01MESSCK 138.0 kV - 01MORGAN 138.0 kV Ckt 1	**APS** **PE-AG1-F-0004 (743) :** **1) Replace (1) 800 A GE wave trap at Morgan (APS).** **2) Replace (1) 8 A thermal relay at Messick Road.** **3) Replace (1) 8 A thermal relay at Morgan (APS).** **4) Reconductor 27.23 miles of 556.5 ACSR 26/7 transmission line from Messick Road to Morgan (APS) with 795 ACSR "Drake" or higher to meet or exceed 280 MVA STE.** **5) Reconductor (1) existing section of 556.5 ACSR 26/7 transmission line at Morgan (APS) with 795 ACSR "Drake" or higher to meet or exceed 280 MVA STE.** **Project Type : FAC** **Cost : $71,684,760** **Time Estimate : 60.0 Months**	$71,684,760

ID	Idx	Facility	Upgrade Description	Cost
167108137,167108138	7	AD2-157 TAP 138.0 kV - 01GORE 138.0 kV Ckt 1	**APS** **PE-AG1-F-0010 (749) :** **1) Reconductor (2) existing sections of 556.5 ACSR 26/7 subconductor circular at Gore with 795 ACSR "Drake" or equivalent to meet or exceed 261 MVA STE.** **2) Reconductor (2) existing sections of 556.5 ACSR 26/7 subconductor circular at Hampshire with 795 ACSR "Drake" or equivalent to meet or exceed 261 MVA STE.** **Project Type : FAC** **Cost : $256,200** **Time Estimate : 12.0 Months**	$256,200
			TOTAL COST	**$184,566,480**

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
167346157	235471	01GORE	AP	235512	01STONEW	AP	1	AP-P2-3-PE-500-016	breaker	191.0	122.39	123.02	DC	2.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2295	Adder	0.27
235091	U2-061_E	2.9399	Adder	3.46
235098	U2-073A E	7.4043	Adder	8.71
235099	U2-073B E	3.2462	Adder	3.82
235520	01WVACO_S38	8.3712	50/50	8.3712
235526	01WR_AA1-100	0.7532	Adder	0.89
235627	K19 E	2.6410	Adder	3.11
235854	01KL_K28_T16	0.3850	50/50	0.3850
237084	**AD1-018 E (Suspended)**	**1.2404**	**50/50**	**1.2404**
237089	**AD1-018 C (Suspended)**	**0.7602**	**50/50**	**0.7602**
237507	01CROSSCHOOL	0.2383	50/50	0.2383
290229	S-014 E	3.6914	Adder	4.34
292401	K-028 E	8.2192	50/50	8.2192
885642	T-016 E	3.3662	50/50	3.3662
920072	AA2-103 E	1.3937	Adder	1.64
929522	U2-030 E	3.1787	Adder	3.74
930262	**AB1-065 E (Suspended)**	**0.3807**	**Adder**	**0.45**
934443	AD1-068 C	0.6311	Adder	0.74
934445	AD1-068 E	3.6624	Adder	4.31
934933	AD1-125 C1	2.5596	50/50	2.5596
934934	AD1-125 C2	0.3269	50/50	0.3269
934935	AD1-125 E1	14.8517	50/50	14.8517
934936	AD1-125 E2	1.8978	50/50	1.8978
937191	AD2-157 C O1	23.9908	50/50	23.9908
937192	AD2-157 E O1	33.1302	50/50	33.1302
937361	AD2-180 C O1	2.7423	50/50	2.7423
937362	AD2-180 E O1	17.2612	50/50	17.2612
938341	AE1-052	0.6968	Adder	0.82
938831	AE1-109 C	3.8598	50/50	3.8598
938832	AE1-109 E	5.0134	50/50	5.0134
940461	AE2-030 C	0.4981	Adder	0.59
940462	AE2-030 E	0.6878	Adder	0.81
942731	AE2-289 C	0.7500	Adder	0.88
942732	AE2-289 E	4.3520	Adder	5.12
942901	AE2-309 C	1.7298	50/50	1.7298
942902	AE2-309 E	0.3302	50/50	0.3302
943301	AF1-001 C	0.3415	Adder	0.4
943302	AF1-001 E	0.3809	Adder	0.45
958181	AF2-112 C O1	0.7559	Adder	0.89
958182	AF2-112 E O1	0.3713	Adder	0.44
960191	AF2-310 O1	1.1196	Adder	1.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960651	AF2-356 C	14.3592	50/50	14.3592
960652	AF2-356 E	9.5728	50/50	9.5728
962501	AG1-099	2.8294	50/50	2.8294
962521	AG1-101 C	0.2355	Adder	0.52
962522	AG1-101 E	0.1160	Adder	0.26
962631	AG1-112	0.3693	Adder	0.82
963801	AG1-233 C O1	0.7272	Adder	1.61
963802	AG1-233 E O1	0.4848	Adder	1.08
WEC	WEC	0.0945	Confirmed LTF	0.0945
LGEE	LGEE	0.1803	Confirmed LTF	0.1803
CBM-W2	CBM-W2	1.9174	Confirmed LTF	1.9174
NY	NY	0.0708	Confirmed LTF	0.0708
TVA	TVA	0.2240	Confirmed LTF	0.2240
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0611	Confirmed LTF	0.0611
CBM-S1	CBM-S1	0.0695	Confirmed LTF	0.0695
G-007	G-007	0.3297	Confirmed LTF	0.3297
HAMLET	HAMLET	0.0739	Confirmed LTF	0.0739
MEC	MEC	0.4290	Confirmed LTF	0.4290
LAGN	LAGN	0.2940	Confirmed LTF	0.2940
CATAWBA	CATAWBA	0.0168	Confirmed LTF	0.0168
CBM-W1	CBM-W1	4.3883	Confirmed LTF	4.3883

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
167346299	235479	01JUNCTN	AP	235467	01FRNCHM	AP	1	AP-P2-3-PE-500-016	breaker	206.0	103.78	104.35	DC	2.62

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2239	Adder	0.26
235091	U2-061_E	2.8119	Adder	3.31
235098	U2-073A E	7.2316	Adder	8.51
235099	U2-073B E	3.1705	Adder	3.73
235520	01WVACO_S38	8.1798	50/50	8.1798
235526	01WR_AA1-100	0.7361	Adder	0.87
235627	K19 E	2.5208	Adder	2.97
235854	01KL_K28_T16	0.3759	50/50	0.3759
237084	**AD1-018 E (Suspended)**	**1.0303**	**Adder**	**1.21**
237089	**AD1-018 C (Suspended)**	**0.6315**	**Adder**	**0.74**
237507	01CROSSCHOOL	0.2329	50/50	0.2329
290229	S-014 E	3.6052	Adder	4.24
292401	K-028 E	8.0247	50/50	8.0247
885642	T-016 E	3.2866	50/50	3.2866
920072	AA2-103 E	1.3302	Adder	1.56
929522	U2-030 E	3.1032	Adder	3.65
930262	**AB1-065 E (Suspended)**	**0.3713**	**Adder**	**0.44**
934443	AD1-068 C	0.6139	Adder	0.72
934445	AD1-068 E	3.5620	Adder	4.19
934933	AD1-125 C1	2.3975	50/50	2.3975
934934	AD1-125 C2	0.3062	50/50	0.3062
934935	AD1-125 E1	13.9114	50/50	13.9114
934936	AD1-125 E2	1.7777	50/50	1.7777
937361	AD2-180 C O1	2.6802	50/50	2.6802
937362	AD2-180 E O1	16.8701	50/50	16.8701
938341	AE1-052	0.6651	Adder	0.78
940461	AE2-030 C	0.4865	Adder	0.57
940462	AE2-030 E	0.6719	Adder	0.79
942731	AE2-289 C	0.7325	Adder	0.86
942732	AE2-289 E	4.2505	Adder	5.0
942901	AE2-309 C	1.6905	50/50	1.6905
942902	AE2-309 E	0.3227	50/50	0.3227
943301	AF1-001 C	0.3325	Adder	0.39
943302	AF1-001 E	0.3709	Adder	0.44
958181	AF2-112 C O1	0.7273	Adder	0.86
958182	AF2-112 E O1	0.3573	Adder	0.42
960191	AF2-310 O1	1.0921	Adder	1.28
960651	AF2-356 C	14.0208	50/50	14.0208
960652	AF2-356 E	9.3472	50/50	9.3472
962501	AG1-099	2.7658	50/50	2.7658
962521	AG1-101 C	0.2266	Adder	0.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
962522	AG1-101 E	0.1116	Adder	0.25
962631	AG1-112	0.3525	Adder	0.78
963801	AG1-233 C O1	0.7079	Adder	1.57
963802	AG1-233 E O1	0.4719	Adder	1.05
WEC	WEC	0.0917	Confirmed LTF	0.0917
LGEE	LGEE	0.1747	Confirmed LTF	0.1747
CBM-W2	CBM-W2	1.8547	Confirmed LTF	1.8547
NY	NY	0.0680	Confirmed LTF	0.0680
TVA	TVA	0.2170	Confirmed LTF	0.2170
O-066	O-066	1.9786	Confirmed LTF	1.9786
SIGE	SIGE	0.0592	Confirmed LTF	0.0592
CBM-S1	CBM-S1	0.0673	Confirmed LTF	0.0673
G-007	G-007	0.3192	Confirmed LTF	0.3192
HAMLET	HAMLET	0.0722	Confirmed LTF	0.0722
MEC	MEC	0.4147	Confirmed LTF	0.4147
LAGN	LAGN	0.2835	Confirmed LTF	0.2835
CATAWBA	CATAWBA	0.0164	Confirmed LTF	0.0164
CBM-W1	CBM-W1	4.2481	Confirmed LTF	4.2481

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
167346305	235484	01MESSCK	AP	235490	01MORGAN	AP	1	AP-P2-3-PE-500-016	breaker	268.0	103.51	104.13	DC	3.65

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.5273	50/50	0.5273
235098	U2-073A E	19.8392	50/50	19.8392
235099	U2-073B E	8.6978	50/50	8.6978
235520	01WVACO_S38	6.6150	50/50	6.6150
235526	01WR_AA1-100	2.1601	50/50	2.1601
235530	01TR_U2-073A	0.6983	50/50	0.6983
235531	01TR_U2-073B	0.4044	50/50	0.4044
236001	01WARRIOR RN	5.5766	50/50	5.5766
237084	**AD1-018 E (Suspended)**	**2.0934**	**50/50**	**2.0934**
237089	**AD1-018 C (Suspended)**	**1.2830**	**50/50**	**1.2830**
237312	01DANS_S-014	0.3857	50/50	0.3857
237319	01FMR_U2-030	0.1910	50/50	0.1910
237507	01CROSSCHOOL	0.1882	50/50	0.1882
290229	S-014 E	9.7787	50/50	9.7787
292401	K-028 E	3.2476	Adder	3.82
885642	T-016 E	1.3301	Adder	1.56
913142	Y1-033 E OP1	1.4542	Adder	1.71
929522	U2-030 E	8.1035	50/50	8.1035
930262	**AB1-065 E (Suspended)**	**0.8745**	**50/50**	**0.8745**
934443	AD1-068 C	0.6879	Adder	0.81
934445	AD1-068 E	3.9918	Adder	4.7
934933	AD1-125 C1	0.6399	Adder	0.75
934934	AD1-125 C2	0.0817	Adder	0.1
934935	AD1-125 E1	3.7129	Adder	4.37
934936	AD1-125 E2	0.4744	Adder	0.56
937361	AD2-180 C O1	0.9143	Adder	1.08
937362	AD2-180 E O1	5.7550	Adder	6.77
938801	AE1-106 C	2.8164	Adder	3.31
938802	AE1-106 E	1.9381	Adder	2.28
938831	AE1-109 C	0.4334	Adder	0.51
938832	AE1-109 E	0.5629	Adder	0.66
939591	AE1-188 C	-0.5560	Adder	-0.65
940461	AE2-030 C	1.3780	50/50	1.3780
940462	AE2-030 E	1.9030	50/50	1.9030
942731	AE2-289 C	2.0095	50/50	2.0095
942732	AE2-289 E	11.6609	50/50	11.6609
942901	AE2-309 C	2.7396	50/50	2.7396
942902	AE2-309 E	0.5229	50/50	0.5229
943301	AF1-001 C	0.4906	Adder	0.58
943302	AF1-001 E	0.5472	Adder	0.64
943711	AF1-039 C O1	0.3847	Adder	0.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943712	AF1-039 E O1	0.2565	Adder	0.3
945011	AF1-166 C	-0.4641	Adder	-0.55
945591	AF1-224 C	-0.3486	Adder	-0.41
959241	AF2-215 C	-0.1869	Adder	-0.22
959843	AF2-275 BAT	0.0853	Merchant Transmission	0.0853
959853	AF2-276 BAT	0.0853	Merchant Transmission	0.0853
960191	AF2-310 O1	2.5720	50/50	2.5720
960651	AF2-356 C	9.7512	Adder	11.47
960652	AF2-356 E	6.5008	Adder	7.65
962501	AG1-099	2.7094	50/50	2.7094
963801	AG1-233 C O1	0.9874	Adder	2.19
963802	AG1-233 E O1	0.6583	Adder	1.46
966463	AG1-515 BAT	0.3031	Merchant Transmission	0.3031
WEC	WEC	0.1326	Confirmed LTF	0.1326
LGEE	LGEE	0.2595	Confirmed LTF	0.2595
CPLE	CPLE	0.0212	Confirmed LTF	0.0212
CBM-W2	CBM-W2	3.1718	Confirmed LTF	3.1718
NY	NY	0.2101	Confirmed LTF	0.2101
TVA	TVA	0.4368	Confirmed LTF	0.4368
O-066	O-066	4.0649	Confirmed LTF	4.0649
SIGE	SIGE	0.1059	Confirmed LTF	0.1059
CBM-S2	CBM-S2	1.2841	Confirmed LTF	1.2841
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.6468	Confirmed LTF	0.6468
MEC	MEC	0.6324	Confirmed LTF	0.6324
LAGN	LAGN	0.5547	Confirmed LTF	0.5547
CBM-W1	CBM-W1	6.0006	Confirmed LTF	6.0006

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
167346329	235490	01MORGAN	AP	235453	01CHERYR	AP	1	AP-P2-3-PE-500-016	breaker	229.0	100.6	101.29	DC	3.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.4997	50/50	0.4997
235098	U2-073A E	18.8036	50/50	18.8036
235099	U2-073B E	8.2438	50/50	8.2438
235520	01WVACO_S38	6.2724	50/50	6.2724
235526	01WR_AA1-100	2.0473	50/50	2.0473
235530	01TR_U2-073A	0.6618	50/50	0.6618
235531	01TR_U2-073B	0.3833	50/50	0.3833
236001	01WARRIOR RN	5.2855	50/50	5.2855
237084	**AD1-018 E (Suspended)**	**1.9842**	**50/50**	**1.9842**
237089	**AD1-018 C (Suspended)**	**1.2162**	**50/50**	**1.2162**
237312	01DANS_S-014	0.3656	50/50	0.3656
237319	01FMR_U2-030	0.1811	50/50	0.1811
237507	01CROSSCHOOL	0.1784	50/50	0.1784
290229	S-014 E	9.2686	50/50	9.2686
292401	K-028 E	3.0807	Adder	3.62
885642	T-016 E	1.2617	Adder	1.48
929522	U2-030 E	7.6807	50/50	7.6807
930262	**AB1-065 E (Suspended)**	**0.8289**	**50/50**	**0.8289**
934443	AD1-068 C	0.6522	Adder	0.77
934445	AD1-068 E	3.7848	Adder	4.45
934933	AD1-125 C1	0.6074	Adder	0.71
934934	AD1-125 C2	0.0776	Adder	0.09
934935	AD1-125 E1	3.5246	Adder	4.15
934936	AD1-125 E2	0.4504	Adder	0.53
937361	AD2-180 C O1	0.8675	Adder	1.02
937362	AD2-180 E O1	5.4606	Adder	6.42
938801	AE1-106 C	2.6700	Adder	3.14
938802	AE1-106 E	1.8373	Adder	2.16
938831	AE1-109 C	0.4123	Adder	0.49
938832	AE1-109 E	0.5356	Adder	0.63
940461	AE2-030 C	1.3061	50/50	1.3061
940462	AE2-030 E	1.8036	50/50	1.8036
942731	AE2-289 C	1.9046	50/50	1.9046
942732	AE2-289 E	11.0522	50/50	11.0522
942901	AE2-309 C	2.5970	50/50	2.5970
942902	AE2-309 E	0.4957	50/50	0.4957
943301	AF1-001 C	0.4651	Adder	0.55
943302	AF1-001 E	0.5188	Adder	0.61
945011	AF1-166 C	-0.4265	Adder	-0.5
959241	AF2-215 C	-0.1703	Adder	-0.2
959843	AF2-275 BAT	0.0784	Merchant Transmission	0.0784

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959853	AF2-276 BAT	0.0784	Merchant Transmission	0.0784
960191	AF2-310 O1	2.4378	50/50	2.4378
960651	AF2-356 C	9.2463	Adder	10.88
960652	AF2-356 E	6.1642	Adder	7.25
962501	AG1-099	2.5690	50/50	2.5690
963801	AG1-233 C O1	0.9360	Adder	2.08
963802	AG1-233 E O1	0.6240	Adder	1.39
966463	AG1-515 BAT	0.2785	Merchant Transmission	0.2785
WEC	WEC	0.1257	Confirmed LTF	0.1257
LGEE	LGEE	0.2457	Confirmed LTF	0.2457
CPLE	CPLE	0.0198	Confirmed LTF	0.0198
CBM-W2	CBM-W2	3.0016	Confirmed LTF	3.0016
NY	NY	0.1985	Confirmed LTF	0.1985
TVA	TVA	0.4144	Confirmed LTF	0.4144
O-066	O-066	3.8428	Confirmed LTF	3.8428
SIGE	SIGE	0.1003	Confirmed LTF	0.1003
CBM-S2	CBM-S2	1.2006	Confirmed LTF	1.2006
CBM-S1	CBM-S1	0.1189	Confirmed LTF	0.1189
G-007	G-007	0.6122	Confirmed LTF	0.6122
MEC	MEC	0.5991	Confirmed LTF	0.5991
LAGN	LAGN	0.5268	Confirmed LTF	0.5268
CBM-W1	CBM-W1	5.6921	Confirmed LTF	5.6921

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
165565383	235504	01RIDGLY	AP	235593	01HAMPS2	AP	1	AP-P7-1-PE-138-014	tower	182.0	107.31	108.49	DC	4.74

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200840	26DEEPCRK1	0.1703	50/50	0.1703
200841	26DEEPCRK2	0.1721	50/50	0.1721
235013	01AB1-065 C	0.7827	50/50	0.7827
235098	U2-073A E	30.6585	50/50	30.6585
235099	U2-073B E	13.4412	50/50	13.4412
235526	01WR_AA1-100	3.3899	50/50	3.3899
235530	01TR_U2-073A	1.0790	50/50	1.0790
235531	01TR_U2-073B	0.6249	50/50	0.6249
236001	01WARRIOR RN	8.7516	50/50	8.7516
237084	**AD1-018 E (Suspended)**	**2.8723**	**50/50**	**2.8723**
237089	**AD1-018 C (Suspended)**	**1.7605**	**50/50**	**1.7605**
237312	01DANS_S-014	0.5943	50/50	0.5943
237319	01FMR_U2-030	0.2917	50/50	0.2917
290229	S-014 E	15.0685	50/50	15.0685
913142	Y1-033 E OP1	1.9846	Adder	2.33
929522	U2-030 E	12.3714	50/50	12.3714
930262	**AB1-065 E (Suspended)**	**1.2981**	**50/50**	**1.2981**
934443	AD1-068 C	0.7999	Adder	0.94
934445	AD1-068 E	4.6415	Adder	5.46
938801	AE1-106 C	3.4293	Adder	4.03
938802	AE1-106 E	2.3598	Adder	2.78
940461	AE2-030 C	2.1455	50/50	2.1455
940462	AE2-030 E	2.9628	50/50	2.9628
942731	AE2-289 C	3.1055	50/50	3.1055
942732	AE2-289 E	18.0201	50/50	18.0201
942901	AE2-309 C	3.6812	50/50	3.6812
942902	AE2-309 E	0.7027	50/50	0.7027
943301	AF1-001 C	0.7753	50/50	0.7753
943302	AF1-001 E	0.8647	50/50	0.8647
943711	AF1-039 C O1	0.5250	Adder	0.62
943712	AF1-039 E O1	0.3500	Adder	0.41
960191	AF2-310 O1	3.8180	50/50	3.8180
962501	AG1-099	3.1692	50/50	3.1692
963801	AG1-233 C O1	1.2812	Adder	2.84
963802	AG1-233 E O1	0.8541	Adder	1.9
WEC	WEC	0.0334	Confirmed LTF	0.0334
LGEE	LGEE	0.0553	Confirmed LTF	0.0553
CALDERWOOD	CALDERWOOD	0.0462	Confirmed LTF	0.0462
CBM-W2	CBM-W2	0.1434	Confirmed LTF	0.1434
O-066	O-066	0.4442	Confirmed LTF	0.4442
SIGE	SIGE	0.0154	Confirmed LTF	0.0154

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CHEOAH	CHEOAH	0.0490	Confirmed LTF	0.0490
COTTONWOOD	COTTONWOOD	0.0672	Confirmed LTF	0.0672
G-007	G-007	0.0798	Confirmed LTF	0.0798
HAMLET	HAMLET	0.1848	Confirmed LTF	0.1848
MEC	MEC	0.1176	Confirmed LTF	0.1176
CATAWBA	CATAWBA	0.0864	Confirmed LTF	0.0864
CBM-W1	CBM-W1	1.7385	Confirmed LTF	1.7385

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
167346241	235504	01RIDGLY	AP	235484	01MESSCK	AP	1	AP-P2-3-PE-500-016	breaker	268.0	109.59	110.21	DC	3.65

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.5273	50/50	0.5273
235098	U2-073A E	19.8392	50/50	19.8392
235099	U2-073B E	8.6978	50/50	8.6978
235520	01WVACO_S38	6.6150	50/50	6.6150
235526	01WR_AA1-100	2.1601	50/50	2.1601
235530	01TR_U2-073A	0.6983	50/50	0.6983
235531	01TR_U2-073B	0.4044	50/50	0.4044
236001	01WARRIOR RN	5.5766	50/50	5.5766
237084	**AD1-018 E (Suspended)**	**2.0934**	**50/50**	**2.0934**
237089	**AD1-018 C (Suspended)**	**1.2830**	**50/50**	**1.2830**
237312	01DANS_S-014	0.3857	50/50	0.3857
237319	01FMR_U2-030	0.1910	50/50	0.1910
237507	01CROSSCHOOL	0.1882	50/50	0.1882
290229	S-014 E	9.7787	50/50	9.7787
292401	K-028 E	3.2476	Adder	3.82
885642	T-016 E	1.3301	Adder	1.56
913142	Y1-033 E OP1	1.4542	Adder	1.71
929522	U2-030 E	8.1035	50/50	8.1035
930262	**AB1-065 E (Suspended)**	**0.8745**	**50/50**	**0.8745**
934443	AD1-068 C	0.6879	Adder	0.81
934445	AD1-068 E	3.9918	Adder	4.7
934933	AD1-125 C1	0.6399	Adder	0.75
934934	AD1-125 C2	0.0817	Adder	0.1
934935	AD1-125 E1	3.7129	Adder	4.37
934936	AD1-125 E2	0.4744	Adder	0.56
937361	AD2-180 C O1	0.9143	Adder	1.08
937362	AD2-180 E O1	5.7550	Adder	6.77
938801	AE1-106 C	2.8164	Adder	3.31
938802	AE1-106 E	1.9381	Adder	2.28
938831	AE1-109 C	0.4334	Adder	0.51
938832	AE1-109 E	0.5629	Adder	0.66
939591	AE1-188 C	-0.5560	Adder	-0.65
940461	AE2-030 C	1.3780	50/50	1.3780
940462	AE2-030 E	1.9030	50/50	1.9030
942731	AE2-289 C	2.0095	50/50	2.0095
942732	AE2-289 E	11.6609	50/50	11.6609
942901	AE2-309 C	2.7396	50/50	2.7396
942902	AE2-309 E	0.5229	50/50	0.5229
943301	AF1-001 C	0.4906	Adder	0.58
943302	AF1-001 E	0.5472	Adder	0.64
943711	AF1-039 C O1	0.3847	Adder	0.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943712	AF1-039 E O1	0.2565	Adder	0.3
945011	AF1-166 C	-0.4641	Adder	-0.55
945591	AF1-224 C	-0.3486	Adder	-0.41
959241	AF2-215 C	-0.1869	Adder	-0.22
959843	AF2-275 BAT	0.0853	Merchant Transmission	0.0853
959853	AF2-276 BAT	0.0853	Merchant Transmission	0.0853
960191	AF2-310 O1	2.5720	50/50	2.5720
960651	AF2-356 C	9.7512	Adder	11.47
960652	AF2-356 E	6.5008	Adder	7.65
962501	AG1-099	2.7094	50/50	2.7094
963801	AG1-233 C O1	0.9874	Adder	2.19
963802	AG1-233 E O1	0.6583	Adder	1.46
966463	AG1-515 BAT	0.3031	Merchant Transmission	0.3031
WEC	WEC	0.1326	Confirmed LTF	0.1326
LGEE	LGEE	0.2595	Confirmed LTF	0.2595
CPLE	CPLE	0.0212	Confirmed LTF	0.0212
CBM-W2	CBM-W2	3.1718	Confirmed LTF	3.1718
NY	NY	0.2101	Confirmed LTF	0.2101
TVA	TVA	0.4368	Confirmed LTF	0.4368
O-066	O-066	4.0649	Confirmed LTF	4.0649
SIGE	SIGE	0.1059	Confirmed LTF	0.1059
CBM-S2	CBM-S2	1.2841	Confirmed LTF	1.2841
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.6468	Confirmed LTF	0.6468
MEC	MEC	0.6324	Confirmed LTF	0.6324
LAGN	LAGN	0.5547	Confirmed LTF	0.5547
CBM-W1	CBM-W1	6.0006	Confirmed LTF	6.0006

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
167108138	937190	AD2-157 TAP	AP	235471	01GORE	AP	1	AP-P2-3-PE-500-016	breaker	250.0	103.59	104.07	DC	2.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2295	Adder	0.27
235091	U2-061_E	2.9399	Adder	3.46
235098	U2-073A E	7.4043	Adder	8.71
235099	U2-073B E	3.2462	Adder	3.82
235520	01WVACO_S38	8.3712	50/50	8.3712
235526	01WR_AA1-100	0.7532	Adder	0.89
235627	K19 E	2.6410	Adder	3.11
235854	01KL_K28_T16	0.3850	50/50	0.3850
237084	**AD1-018 E (Suspended)**	**1.2404**	**50/50**	**1.2404**
237089	**AD1-018 C (Suspended)**	**0.7602**	**50/50**	**0.7602**
237507	01CROSSCHOOL	0.2383	50/50	0.2383
290229	S-014 E	3.6914	Adder	4.34
292401	K-028 E	8.2192	50/50	8.2192
885642	T-016 E	3.3662	50/50	3.3662
920072	AA2-103 E	1.3937	Adder	1.64
929522	U2-030 E	3.1787	Adder	3.74
930262	**AB1-065 E (Suspended)**	**0.3807**	**Adder**	**0.45**
934443	AD1-068 C	0.6311	Adder	0.74
934445	AD1-068 E	3.6624	Adder	4.31
934933	AD1-125 C1	2.5596	50/50	2.5596
934934	AD1-125 C2	0.3269	50/50	0.3269
934935	AD1-125 E1	14.8517	50/50	14.8517
934936	AD1-125 E2	1.8978	50/50	1.8978
937191	AD2-157 C O1	23.9908	50/50	23.9908
937192	AD2-157 E O1	33.1302	50/50	33.1302
937361	AD2-180 C O1	2.7423	50/50	2.7423
937362	AD2-180 E O1	17.2612	50/50	17.2612
938341	AE1-052	0.6968	Adder	0.82
938831	AE1-109 C	3.8598	50/50	3.8598
938832	AE1-109 E	5.0134	50/50	5.0134
940461	AE2-030 C	0.4981	Adder	0.59
940462	AE2-030 E	0.6878	Adder	0.81
942731	AE2-289 C	0.7500	Adder	0.88
942732	AE2-289 E	4.3520	Adder	5.12
942901	AE2-309 C	1.7298	50/50	1.7298
942902	AE2-309 E	0.3302	50/50	0.3302
943301	AF1-001 C	0.3415	Adder	0.4
943302	AF1-001 E	0.3809	Adder	0.45
958181	AF2-112 C O1	0.7559	Adder	0.89
958182	AF2-112 E O1	0.3713	Adder	0.44
960191	AF2-310 O1	1.1196	Adder	1.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960651	AF2-356 C	14.3592	50/50	14.3592
960652	AF2-356 E	9.5728	50/50	9.5728
962501	AG1-099	2.8294	50/50	2.8294
962521	AG1-101 C	0.2355	Adder	0.52
962522	AG1-101 E	0.1160	Adder	0.26
962631	AG1-112	0.3693	Adder	0.82
963801	AG1-233 C O1	0.7272	Adder	1.61
963802	AG1-233 E O1	0.4848	Adder	1.08
WEC	WEC	0.0945	Confirmed LTF	0.0945
LGEE	LGEE	0.1803	Confirmed LTF	0.1803
CBM-W2	CBM-W2	1.9174	Confirmed LTF	1.9174
NY	NY	0.0708	Confirmed LTF	0.0708
TVA	TVA	0.2240	Confirmed LTF	0.2240
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0611	Confirmed LTF	0.0611
CBM-S1	CBM-S1	0.0695	Confirmed LTF	0.0695
G-007	G-007	0.3297	Confirmed LTF	0.3297
HAMLET	HAMLET	0.0739	Confirmed LTF	0.0739
MEC	MEC	0.4290	Confirmed LTF	0.4290
LAGN	LAGN	0.2940	Confirmed LTF	0.2940
CATAWBA	CATAWBA	0.0168	Confirmed LTF	0.0168
CBM-W1	CBM-W1	4.3883	Confirmed LTF	4.3883

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
167108002	940460	AE2-030 TAP	AP	235504	01RIDGLY	AP	1	AP-P2-3-WP-138-233	breaker	306.0	118.42	134.75	DC	49.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	4.0989	50/50	4.0989
235098	U2-073A E	116.0698	50/50	116.0698
235099	U2-073B E	50.8868	50/50	50.8868
235530	01TR_U2-073A	4.0852	50/50	4.0852
235531	01TR_U2-073B	2.3659	50/50	2.3659
237319	01FMR_U2-030	1.2303	50/50	1.2303
929522	U2-030 E	52.1864	50/50	52.1864
930262	**AB1-065 E (Suspended)**	**6.7982**	**50/50**	**6.7982**
940461	AE2-030 C	7.5580	50/50	7.5580
940462	AE2-030 E	10.4373	50/50	10.4373
942731	AE2-289 C	11.7569	50/50	11.7569
942732	AE2-289 E	68.2223	50/50	68.2223
960191	AF2-310 O1	19.9948	50/50	19.9948
963801	AG1-233 C O1	29.9922	50/50	29.9922
963802	AG1-233 E O1	19.9948	50/50	19.9948
CALDERWOOD	CALDERWOOD	0.0129	Confirmed LTF	0.0129
NY	NY	0.0144	Confirmed LTF	0.0144
PRAIRIE	PRAIRIE	0.0672	Confirmed LTF	0.0672
O-066	O-066	0.1750	Confirmed LTF	0.1750
CHEOAH	CHEOAH	0.0130	Confirmed LTF	0.0130
COTTONWOOD	COTTONWOOD	0.0546	Confirmed LTF	0.0546
G-007	G-007	0.0273	Confirmed LTF	0.0273
HAMLET	HAMLET	0.0150	Confirmed LTF	0.0150
GIBSON	GIBSON	0.0142	Confirmed LTF	0.0142
BLUEG	BLUEG	0.0451	Confirmed LTF	0.0451
TRIMBLE	TRIMBLE	0.0145	Confirmed LTF	0.0145
CATAWBA	CATAWBA	0.0091	Confirmed LTF	0.0091

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
AA1-100	Warrior Run 138kV	In Service
AA2-103	Backbone Mountain 138kV	Engineering and Procurement
AB1-065	Jennings-Hoyes 34.5kV	Suspended
AD1-018	Carlos Jct - Plaza 34 kV	Suspended
AD1-068	Albright-Garrett 138 kV	Active
AD1-125	Baker 138 kV	Active
AD2-157	Hampshire-Gore 138kV	Active
AD2-180	Elk Garden-Parr Run 138kV	Engineering and Procurement
AE1-052	William 138 kV	Active
AE1-106	Lake Lynn-Hazelton 138 kV	Active
AE1-109	Frenchs Mill 34 kV	Active
AE1-188	Fayetteville 34.5 kV	Engineering and Procurement
AE2-030	Frostburg 138kV	Active
AE2-289	Frostburg 138 kV	Active
AE2-309	Carlos Junction-Lonaconing 34.5 kV	Active
AF1-001	Thayerville 34.5 kV	Engineering and Procurement
AF1-039	Listonburg-Highpoint 24.9 kV	Active
AF1-166	Target-Chambers No.5 34.5 kV	Engineering and Procurement
AF1-224	Fayetteville 34.5 kV	Engineering and Procurement
AF2-112	Oakland-Gorman 69 kV	Active
AF2-215	Saint Thomas-LeMasters Junction 34.5 kV	Engineering and Procurement
AF2-275	Guilford 12.47 kV	Active
AF2-276	Guilford 12.47 kV	Active
AF2-310	Jennings-Hoyes Road 34.5 kV	Active
AF2-356	Albright-Mt. Zion 138 kV	Active
AG1-099	Westernport 34.5 kV	Active
AG1-101	Oakland-Gorman 69 kV	Active
AG1-112	William 138 kV	Active
AG1-233	Hazleton 138 kV	Active
AG1-515	Guilford 138 kV	Active
U2-030	Four Mile Ridge Wind 138kV	In Service
U2-061	Garrett County	In Service
U2-073A	N/A	N/A
U2-073B	N/A	N/A
Y1-033	Penn Mar-Rock Wood 115kV	In Service

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
AP-P7-1-PE-138-014	CONTINGENCY 'AP-P7-1-PE-138-014' /* 111 DISCONNECT BRANCH FROM BUS 235454 TO BUS 235558 CKT 1 /* 01CUMBRL 138 01SHORTG 138 DISCONNECT BRANCH FROM BUS 235484 TO BUS 235504 CKT 1 /* 01MESSCK 138 01RIDGLY 138 END
AP-P2-3-PE-500-016	CONTINGENCY '"AP-P2-3-PE-500-016"' / 183 OPEN BRANCH FROM BUS 235101 TO BUS 235103 CKT 1 / 235101 01BEDNGT 500 235103 01BLACKO 500 1 OPEN BRANCH FROM BUS 235103 TO BUS 235130 CKT 1 / 235103 01BLACKO 500 235130 01BO_SVC 23.0 1 OPEN BRANCH FROM BUS 235446 TO BUS 235103 CKT 3 / 235446 01BLACKO 138 235103 01BLACKO 500 3 DECREASE BUS 235103 SHUNT BY 100.00 PERCENT /* 235103 01BLACKO 500 END
AP-P2-3-PE-500-014	CONTINGENCY '"AP-P2-3-PE-500-014"' / 181 OPEN BRANCH FROM BUS 235103 TO BUS 964990 CKT 1 / 235103 01BLACKO 500 964990 AG1-363 TAP 500 1 OPEN BRANCH FROM BUS 235446 TO BUS 235103 CKT 3 / 235446 01BLACKO 138 235103 01BLACKO 500 3 OPEN BRANCH FROM BUS 235103 TO BUS 235130 CKT 1 / 235103 01BLACKO 500 235130 01BO_SVC 23.0 1 DECREASE BUS 235103 SHUNT BY 100.00 PERCENT /* 235103 01BLACKO 500 END
AP-P1-2-PE-138-100-A	CONTINGENCY 'AP-P1-2-PE-138-100-A' /* RIDGELEY - FINZEL 138KV DISCONNECT BRANCH FROM BUS 235504 TO BUS 940460 CKT 1 /* 01RIDGLY 138 AE2-030 TAP 138 END

Contingency Name	Contingency Definition
AP-P2-3-WP-138-233	CONTINGENCY '"AP-P2-3-WP-138-233"' / 423 OPEN BRANCH FROM BUS 235122 TO BUS 235816 CKT 1 / 235122 01LKLYNN 138 235816 01FT MARTIN 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235386 CKT 1 / 235122 01LKLYNN 138 235386 01PIERPT 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235802 CKT 1 / 235122 01LKLYNN 138 235802 01CHEATL 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235901 CKT 71 / 235122 01LKLYNN 138 235901 01LAKE LYN 25.0 71 OPEN BRANCH FROM BUS 235122 TO BUS 235424 CKT 1 / 235122 01LKLYNN 138 235424 01W RUN 138 1 OPEN BRANCH FROM BUS 235120 TO BUS 235305 CKT 1 / 235120 01ALBRIG 138 235305 01 106 J 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 938800 CKT 1 / 235122 01LKLYNN 138 938800 AE1-106 TAP 138 1 OPEN BRANCH FROM BUS 235297 TO BUS 235305 CKT 1 / 235297 01HAZELT 138 235305 01 106 J 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235570 CKT 1 / 235122 01LKLYNN 138 235570 01LAKEL1 11.0 1 OPEN BRANCH FROM BUS 235122 TO BUS 235571 CKT 1 / 235122 01LKLYNN 138 235571 01LAKEL2 11.0 1 END
Base Case	
FE-P1-2-MP-138-040-A	CONTINGENCY 'FE-P1-2-MP-138-040-A' /* ALBRIGHT-HAZELTON-LAKE LYNN 138KV DISCONNECT BRANCH FROM BUS 235120 TO BUS 235305 CKT 1 /* 01ALBRIG 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 235297 TO BUS 235305 CKT 1 /* 01HAZELT 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 235305 TO BUS 938800 CKT 1 /* 01 106 J 138 AE1-106 TAP 138 END

Contingency Name	Contingency Definition
FE-P2-3-MP-138-189	CONTINGENCY '"FE-P2-3-MP-138-189"' / 155 OPEN BRANCH FROM BUS 235122 TO BUS 235156 CKT 1 / 235122 01LKLYNN 138 235156 01GANS 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235207 CKT 1 / 235122 01LKLYNN 138 235207 01LARDIN 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 938800 CKT 1 / 235122 01LKLYNN 138 938800 AE1-106 TAP 138 1 OPEN BRANCH FROM BUS 235122 TO BUS 235901 CKT 71 / 235122 01LKLYNN 138 235901 01LAKE LYN 25.0 71 OPEN BRANCH FROM BUS 235122 TO BUS 235570 CKT 1 / 235122 01LKLYNN 138 235570 01LAKEL1 11.0 1 OPEN BRANCH FROM BUS 235122 TO BUS 235571 CKT 1 / 235122 01LKLYNN 138 235571 01LAKEL2 11.0 1 OPEN BRANCH FROM BUS 235122 TO BUS 235424 CKT 1 / 235122 01LKLYNN 138 235424 01W RUN 138 1 OPEN BRANCH FROM BUS 235120 TO BUS 235305 CKT 1 / 235120 01ALBRIG 138 235305 01 106 J 138 1 OPEN BRANCH FROM BUS 235297 TO BUS 235305 CKT 1 / 235297 01HAZELT 138 235305 01 106 J 138 1 END
FE-P7-1-MP-138-056-B	CONTINGENCY 'FE-P7-1-MP-138-056-B' /* LL-BVJ-LL-RBL DISCONNECT BRANCH FROM BUS 235122 TO BUS 235802 CKT 1 /* 01LKLYNN 138 01CHEATL 138 DISCONNECT BRANCH FROM BUS 235120 TO BUS 235305 CKT 1 /* 01ALBRIG 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 938800 TO BUS 235305 CKT 1 /* AE1-106 TAP 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 235297 TO BUS 235305 CKT 1 /* 01HAZELT 138 01 106 J 138 END
AP-P1-2-PE-500-001	CONTINGENCY 'AP-P1-2-PE-500-001' /* BEDINGTON - BLACK OAK 500KV DISCONNECT BRANCH FROM BUS 235101 TO BUS 235103 CKT 1 /* 01BEDNGT 500 01BLACKO 500 END

12 Short Circuit Analysis - Primary POI

No breakers were identified as requiring replacement as part of this analysis.

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-233 was evaluated as a 50.0 MW (Capacity 30.0 MW) injection tapping the Hazelton to 106 Junction 138 kV line in the APS area. Project AG1-233 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-233 was studied with a commercial probability of 53%. 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	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165565339	235468	01FROSTB	138.0	AP	940460	AE2-030 TAP	138.0	AP	1	FE-P7-1-MP-138-056-B	tower	306.0	112.54	128.87	DC	49.99
167346156	235471	01GORE	138.0	AP	235512	01STONEW	138.0	AP	1	AP-P2-3-PE-500-014	breaker	191.0	122.49	123.11	DC	2.62
167346298	235479	01JUNCTN	138.0	AP	235467	01FRNCHM	138.0	AP	1	AP-P2-3-PE-500-014	breaker	206.0	103.88	104.44	DC	2.55
167346304	235484	01MESSCK	138.0	AP	235490	01MORGAN	138.0	AP	1	AP-P2-3-PE-500-014	breaker	268.0	103.62	104.18	DC	3.34
167346328	235490	01MORGAN	138.0	AP	235453	01CHERYR	138.0	AP	1	AP-P2-3-PE-500-014	breaker	229.0	100.69	101.31	DC	3.16
165565383	235504	01RIDGLY	138.0	AP	235593	01HAMPS2	138.0	AP	1	AP-P7-1-PE-138-014	tower	182.0	107.31	108.35	DC	4.2
167346240	235504	01RIDGLY	138.0	AP	235484	01MESSCK	138.0	AP	1	AP-P2-3-PE-500-014	breaker	268.0	109.71	110.27	DC	3.34

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
167108137	937190	AD2-157 TAP	138.0	AP	235471	01GORE	138.0	AP	1	AP-P2-3-PE-500-014	breaker	250.0	103.63	104.1	DC	2.62
165565326	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	FE-P7-1-MP-138-056-B	tower	306.0	118.38	134.72	DC	49.99

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	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
167892523	235305	01 106 J	138.0	AP	235120	01ALBRIG	138.0	AP	1	AP-P1-2-PE-138-100-A	operation	186.0	130.28	143.9	DC	25.34
167892614	235468	01FROSTB	138.0	AP	940460	AE2-030 TAP	138.0	AP	1	Base Case	operation	293.0	99.53	102.38	DC	8.33
174845621	235468	01FROSTB	138.0	AP	940460	AE2-030 TAP	138.0	AP	1	AP-P1-2-PE-500-004-A	operation	306.0	108.97	111.67	DC	8.27
167892792	235484	01MESSCK	138.0	AP	235490	01MORGAN	138.0	AP	1	AP-P1-2-PE-500-001	operation	268.0	101.31	101.77	DC	2.72
167892746	235504	01RIDGLY	138.0	AP	235484	01MESSCK	138.0	AP	1	AP-P1-2-PE-500-001	operation	268.0	107.35	107.81	DC	2.72
169638390	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	Base Case	operation	293.0	104.32	107.16	DC	8.33
174845603	940460	AE2-030 TAP	138.0	AP	235504	01RIDGLY	138.0	AP	1	AP-P1-2-PE-500-004-A	operation	306.0	113.52	116.23	DC	8.27
174845531	963800	AG1-233 TAP	138.0	AP	235305	01 106 J	138.0	AP	1	AP-P1-2-PE-138-100-A	operation	311.0	116.48	132.55	DC	49.99

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
165565339	235468	01FROSTB	AP	940460	AE2-030 TAP	AP	1	FE-P7-1-MP-138-056-B	tower	306.0	112.54	128.87	DC	49.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	4.0989	50/50	4.0989
235098	U2-073A E	116.0698	50/50	116.0698
235099	U2-073B E	50.8868	50/50	50.8868
235530	01TR_U2-073A	4.0852	50/50	4.0852
235531	01TR_U2-073B	2.3659	50/50	2.3659
237319	01FMR_U2-030	1.2303	50/50	1.2303
929522	U2-030 E	52.1864	50/50	52.1864
930262	**AB1-065 E (Suspended)**	**6.7982**	**50/50**	**6.7982**
942731	AE2-289 C	11.7569	50/50	11.7569
942732	AE2-289 E	68.2223	50/50	68.2223
960191	AF2-310 O1	19.9948	50/50	19.9948
963801	AG1-233 C O2	29.9922	50/50	29.9922
963802	AG1-233 E O2	19.9948	50/50	19.9948
CALDERWOOD	CALDERWOOD	0.0129	Confirmed LTF	0.0129
NY	NY	0.0144	Confirmed LTF	0.0144
PRAIRIE	PRAIRIE	0.0672	Confirmed LTF	0.0672
O-066	O-066	0.1750	Confirmed LTF	0.1750
CHEOAH	CHEOAH	0.0130	Confirmed LTF	0.0130
COTTONWOOD	COTTONWOOD	0.0546	Confirmed LTF	0.0546
G-007	G-007	0.0273	Confirmed LTF	0.0273
HAMLET	HAMLET	0.0150	Confirmed LTF	0.0150
GIBSON	GIBSON	0.0142	Confirmed LTF	0.0142
BLUEG	BLUEG	0.0451	Confirmed LTF	0.0451
TRIMBLE	TRIMBLE	0.0145	Confirmed LTF	0.0145
CATAWBA	CATAWBA	0.0091	Confirmed LTF	0.0091

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
167346156	235471	01GORE	AP	235512	01STONEW	AP	1	AP-P2-3-PE-500-014	breaker	191.0	122.49	123.11	DC	2.62

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2295	Adder	0.27
235091	U2-061_E	2.9399	Adder	3.46
235098	U2-073A E	7.4043	Adder	8.71
235099	U2-073B E	3.2462	Adder	3.82
235520	01WVACO_S38	8.3712	50/50	8.3712
235526	01WR_AA1-100	0.7532	Adder	0.89
235627	K19 E	2.6410	Adder	3.11
235854	01KL_K28_T16	0.3850	50/50	0.3850
237084	**AD1-018 E (Suspended)**	**1.2404**	**50/50**	**1.2404**
237089	**AD1-018 C (Suspended)**	**0.7602**	**50/50**	**0.7602**
237507	01CROSSCHOOL	0.2383	50/50	0.2383
290229	S-014 E	3.6914	Adder	4.34
292401	K-028 E	8.2192	50/50	8.2192
885642	T-016 E	3.3662	50/50	3.3662
920072	AA2-103 E	1.3937	Adder	1.64
929522	U2-030 E	3.1787	Adder	3.74
930262	**AB1-065 E (Suspended)**	**0.3807**	**Adder**	**0.45**
934443	AD1-068 C	0.6311	Adder	0.74
934445	AD1-068 E	3.6624	Adder	4.31
934933	AD1-125 C1	2.5596	50/50	2.5596
934934	AD1-125 C2	0.3269	50/50	0.3269
934935	AD1-125 E1	14.8517	50/50	14.8517
934936	AD1-125 E2	1.8978	50/50	1.8978
937191	AD2-157 C O1	23.9908	50/50	23.9908
937192	AD2-157 E O1	33.1302	50/50	33.1302
937361	AD2-180 C O1	2.7423	50/50	2.7423
937362	AD2-180 E O1	17.2612	50/50	17.2612
938341	AE1-052	0.6968	Adder	0.82
938831	AE1-109 C	3.8598	50/50	3.8598
938832	AE1-109 E	5.0134	50/50	5.0134
940461	AE2-030 C	0.4981	Adder	0.59
940462	AE2-030 E	0.6878	Adder	0.81
942731	AE2-289 C	0.7500	Adder	0.88
942732	AE2-289 E	4.3520	Adder	5.12
942901	AE2-309 C	1.7298	50/50	1.7298
942902	AE2-309 E	0.3302	50/50	0.3302
943301	AF1-001 C	0.3415	Adder	0.4
943302	AF1-001 E	0.3809	Adder	0.45
958181	AF2-112 C O1	0.7559	Adder	0.89
958182	AF2-112 E O1	0.3713	Adder	0.44
960191	AF2-310 O1	1.1196	Adder	1.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960651	AF2-356 C	14.3592	50/50	14.3592
960652	AF2-356 E	9.5728	50/50	9.5728
962501	AG1-099	2.8294	50/50	2.8294
962521	AG1-101 C	0.2355	Adder	0.52
962522	AG1-101 E	0.1160	Adder	0.26
962631	AG1-112	0.3693	Adder	0.82
963801	AG1-233 C O2	0.7087	Adder	1.57
963802	AG1-233 E O2	0.4725	Adder	1.05
WEC	WEC	0.0945	Confirmed LTF	0.0945
LGEE	LGEE	0.1803	Confirmed LTF	0.1803
CBM-W2	CBM-W2	1.9174	Confirmed LTF	1.9174
NY	NY	0.0708	Confirmed LTF	0.0708
TVA	TVA	0.2240	Confirmed LTF	0.2240
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0611	Confirmed LTF	0.0611
CBM-S1	CBM-S1	0.0695	Confirmed LTF	0.0695
G-007	G-007	0.3297	Confirmed LTF	0.3297
HAMLET	HAMLET	0.0739	Confirmed LTF	0.0739
MEC	MEC	0.4290	Confirmed LTF	0.4290
LAGN	LAGN	0.2940	Confirmed LTF	0.2940
CATAWBA	CATAWBA	0.0168	Confirmed LTF	0.0168
CBM-W1	CBM-W1	4.3883	Confirmed LTF	4.3883

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
167346298	235479	01JUNCTN	AP	235467	01FRNCHM	AP	1	AP-P2-3-PE-500-014	breaker	206.0	103.88	104.44	DC	2.55

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2239	Adder	0.26
235091	U2-061_E	2.8119	Adder	3.31
235098	U2-073A E	7.2316	Adder	8.51
235099	U2-073B E	3.1705	Adder	3.73
235520	01WVACO_S38	8.1798	50/50	8.1798
235526	01WR_AA1-100	0.7361	Adder	0.87
235627	K19 E	2.5208	Adder	2.97
235854	01KL_K28_T16	0.3759	50/50	0.3759
237084	**AD1-018 E (Suspended)**	**1.0303**	**Adder**	**1.21**
237089	**AD1-018 C (Suspended)**	**0.6315**	**Adder**	**0.74**
237507	01CROSSCHOOL	0.2329	50/50	0.2329
290229	S-014 E	3.6052	Adder	4.24
292401	K-028 E	8.0247	50/50	8.0247
885642	T-016 E	3.2866	50/50	3.2866
920072	AA2-103 E	1.3302	Adder	1.56
929522	U2-030 E	3.1032	Adder	3.65
930262	**AB1-065 E (Suspended)**	**0.3713**	**Adder**	**0.44**
934443	AD1-068 C	0.6139	Adder	0.72
934445	AD1-068 E	3.5620	Adder	4.19
934933	AD1-125 C1	2.3975	50/50	2.3975
934934	AD1-125 C2	0.3062	50/50	0.3062
934935	AD1-125 E1	13.9114	50/50	13.9114
934936	AD1-125 E2	1.7777	50/50	1.7777
937361	AD2-180 C O1	2.6802	50/50	2.6802
937362	AD2-180 E O1	16.8701	50/50	16.8701
938341	AE1-052	0.6651	Adder	0.78
940461	AE2-030 C	0.4865	Adder	0.57
940462	AE2-030 E	0.6719	Adder	0.79
942731	AE2-289 C	0.7325	Adder	0.86
942732	AE2-289 E	4.2505	Adder	5.0
942901	AE2-309 C	1.6905	50/50	1.6905
942902	AE2-309 E	0.3227	50/50	0.3227
943301	AF1-001 C	0.3325	Adder	0.39
943302	AF1-001 E	0.3709	Adder	0.44
958181	AF2-112 C O1	0.7273	Adder	0.86
958182	AF2-112 E O1	0.3573	Adder	0.42
960191	AF2-310 O1	1.0921	Adder	1.28
960651	AF2-356 C	14.0208	50/50	14.0208
960652	AF2-356 E	9.3472	50/50	9.3472
962501	AG1-099	2.7658	50/50	2.7658
962521	AG1-101 C	0.2266	Adder	0.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
962522	AG1-101 E	0.1116	Adder	0.25
962631	AG1-112	0.3525	Adder	0.78
963801	AG1-233 C O2	0.6897	Adder	1.53
963802	AG1-233 E O2	0.4598	Adder	1.02
WEC	WEC	0.0917	Confirmed LTF	0.0917
LGEE	LGEE	0.1747	Confirmed LTF	0.1747
CBM-W2	CBM-W2	1.8547	Confirmed LTF	1.8547
NY	NY	0.0680	Confirmed LTF	0.0680
TVA	TVA	0.2170	Confirmed LTF	0.2170
O-066	O-066	1.9786	Confirmed LTF	1.9786
SIGE	SIGE	0.0592	Confirmed LTF	0.0592
CBM-S1	CBM-S1	0.0673	Confirmed LTF	0.0673
G-007	G-007	0.3192	Confirmed LTF	0.3192
HAMLET	HAMLET	0.0722	Confirmed LTF	0.0722
MEC	MEC	0.4147	Confirmed LTF	0.4147
LAGN	LAGN	0.2835	Confirmed LTF	0.2835
CATAWBA	CATAWBA	0.0164	Confirmed LTF	0.0164
CBM-W1	CBM-W1	4.2481	Confirmed LTF	4.2481

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
167346304	235484	01MESSCK	AP	235490	01MORGAN	AP	1	AP-P2-3-PE-500-014	breaker	268.0	103.62	104.18	DC	3.34

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.5273	50/50	0.5273
235098	U2-073A E	19.8392	50/50	19.8392
235099	U2-073B E	8.6978	50/50	8.6978
235520	01WVACO_S38	6.6150	50/50	6.6150
235526	01WR_AA1-100	2.1601	50/50	2.1601
235530	01TR_U2-073A	0.6983	50/50	0.6983
235531	01TR_U2-073B	0.4044	50/50	0.4044
236001	01WARRIOR RN	5.5766	50/50	5.5766
237084	**AD1-018 E (Suspended)**	**2.0934**	**50/50**	**2.0934**
237089	**AD1-018 C (Suspended)**	**1.2830**	**50/50**	**1.2830**
237312	01DANS_S-014	0.3857	50/50	0.3857
237319	01FMR_U2-030	0.1910	50/50	0.1910
237507	01CROSSCHOOL	0.1882	50/50	0.1882
290229	S-014 E	9.7787	50/50	9.7787
292401	K-028 E	3.2476	Adder	3.82
885642	T-016 E	1.3301	Adder	1.56
913142	Y1-033 E OP1	1.4542	Adder	1.71
929522	U2-030 E	8.1035	50/50	8.1035
930262	**AB1-065 E (Suspended)**	**0.8745**	**50/50**	**0.8745**
934443	AD1-068 C	0.6879	Adder	0.81
934445	AD1-068 E	3.9918	Adder	4.7
934933	AD1-125 C1	0.6399	Adder	0.75
934934	AD1-125 C2	0.0817	Adder	0.1
934935	AD1-125 E1	3.7129	Adder	4.37
934936	AD1-125 E2	0.4744	Adder	0.56
937361	AD2-180 C O1	0.9143	Adder	1.08
937362	AD2-180 E O1	5.7550	Adder	6.77
938801	AE1-106 C	2.8164	Adder	3.31
938802	AE1-106 E	1.9381	Adder	2.28
938831	AE1-109 C	0.4334	Adder	0.51
938832	AE1-109 E	0.5629	Adder	0.66
939591	AE1-188 C	-0.5560	Adder	-0.65
940461	AE2-030 C	1.3780	50/50	1.3780
940462	AE2-030 E	1.9030	50/50	1.9030
942731	AE2-289 C	2.0095	50/50	2.0095
942732	AE2-289 E	11.6609	50/50	11.6609
942901	AE2-309 C	2.7396	50/50	2.7396
942902	AE2-309 E	0.5229	50/50	0.5229
943301	AF1-001 C	0.4906	Adder	0.58
943302	AF1-001 E	0.5472	Adder	0.64
943711	AF1-039 C O1	0.3847	Adder	0.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943712	AF1-039 E O1	0.2565	Adder	0.3
945011	AF1-166 C	-0.4641	Adder	-0.55
945591	AF1-224 C	-0.3486	Adder	-0.41
959241	AF2-215 C	-0.1869	Adder	-0.22
959843	AF2-275 BAT	0.0853	Merchant Transmission	0.0853
959853	AF2-276 BAT	0.0853	Merchant Transmission	0.0853
960191	AF2-310 O1	2.5720	50/50	2.5720
960651	AF2-356 C	9.7512	Adder	11.47
960652	AF2-356 E	6.5008	Adder	7.65
962501	AG1-099	2.7094	50/50	2.7094
963801	AG1-233 C O2	0.9023	Adder	2.0
963802	AG1-233 E O2	0.6015	Adder	1.34
966463	AG1-515 BAT	0.3031	Merchant Transmission	0.3031
WEC	WEC	0.1326	Confirmed LTF	0.1326
LGEE	LGEE	0.2595	Confirmed LTF	0.2595
CPLE	CPLE	0.0212	Confirmed LTF	0.0212
CBM-W2	CBM-W2	3.1718	Confirmed LTF	3.1718
NY	NY	0.2101	Confirmed LTF	0.2101
TVA	TVA	0.4368	Confirmed LTF	0.4368
O-066	O-066	4.0649	Confirmed LTF	4.0649
SIGE	SIGE	0.1059	Confirmed LTF	0.1059
CBM-S2	CBM-S2	1.2841	Confirmed LTF	1.2841
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.6468	Confirmed LTF	0.6468
MEC	MEC	0.6324	Confirmed LTF	0.6324
LAGN	LAGN	0.5547	Confirmed LTF	0.5547
CBM-W1	CBM-W1	6.0006	Confirmed LTF	6.0006

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
167346328	235490	01MORGAN	AP	235453	01CHERYR	AP	1	AP-P2-3-PE-500-014	breaker	229.0	100.69	101.31	DC	3.16

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.4997	50/50	0.4997
235098	U2-073A E	18.8036	50/50	18.8036
235099	U2-073B E	8.2438	50/50	8.2438
235520	01WVACO_S38	6.2724	50/50	6.2724
235526	01WR_AA1-100	2.0473	50/50	2.0473
235530	01TR_U2-073A	0.6618	50/50	0.6618
235531	01TR_U2-073B	0.3833	50/50	0.3833
236001	01WARRIOR RN	5.2855	50/50	5.2855
237084	**AD1-018 E (Suspended)**	**1.9842**	**50/50**	**1.9842**
237089	**AD1-018 C (Suspended)**	**1.2162**	**50/50**	**1.2162**
237312	01DANS_S-014	0.3656	50/50	0.3656
237319	01FMR_U2-030	0.1811	50/50	0.1811
237507	01CROSSCHOOL	0.1784	50/50	0.1784
290229	S-014 E	9.2686	50/50	9.2686
292401	K-028 E	3.0807	Adder	3.62
885642	T-016 E	1.2617	Adder	1.48
929522	U2-030 E	7.6807	50/50	7.6807
930262	**AB1-065 E (Suspended)**	**0.8289**	**50/50**	**0.8289**
934443	AD1-068 C	0.6522	Adder	0.77
934445	AD1-068 E	3.7848	Adder	4.45
934933	AD1-125 C1	0.6074	Adder	0.71
934934	AD1-125 C2	0.0776	Adder	0.09
934935	AD1-125 E1	3.5246	Adder	4.15
934936	AD1-125 E2	0.4504	Adder	0.53
937361	AD2-180 C O1	0.8675	Adder	1.02
937362	AD2-180 E O1	5.4606	Adder	6.42
938801	AE1-106 C	2.6700	Adder	3.14
938802	AE1-106 E	1.8373	Adder	2.16
938831	AE1-109 C	0.4123	Adder	0.49
938832	AE1-109 E	0.5356	Adder	0.63
940461	AE2-030 C	1.3061	50/50	1.3061
940462	AE2-030 E	1.8036	50/50	1.8036
942731	AE2-289 C	1.9046	50/50	1.9046
942732	AE2-289 E	11.0522	50/50	11.0522
942901	AE2-309 C	2.5970	50/50	2.5970
942902	AE2-309 E	0.4957	50/50	0.4957
943301	AF1-001 C	0.4651	Adder	0.55
943302	AF1-001 E	0.5188	Adder	0.61
945011	AF1-166 C	-0.4265	Adder	-0.5
959241	AF2-215 C	-0.1703	Adder	-0.2
959843	AF2-275 BAT	0.0784	Merchant Transmission	0.0784

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959853	AF2-276 BAT	0.0784	Merchant Transmission	0.0784
960191	AF2-310 O1	2.4378	50/50	2.4378
960651	AF2-356 C	9.2463	Adder	10.88
960652	AF2-356 E	6.1642	Adder	7.25
962501	AG1-099	2.5690	50/50	2.5690
963801	AG1-233 C O2	0.8552	Adder	1.9
963802	AG1-233 E O2	0.5702	Adder	1.27
966463	AG1-515 BAT	0.2785	Merchant Transmission	0.2785
WEC	WEC	0.1257	Confirmed LTF	0.1257
LGEE	LGEE	0.2457	Confirmed LTF	0.2457
CPLE	CPLE	0.0198	Confirmed LTF	0.0198
CBM-W2	CBM-W2	3.0016	Confirmed LTF	3.0016
NY	NY	0.1985	Confirmed LTF	0.1985
TVA	TVA	0.4144	Confirmed LTF	0.4144
O-066	O-066	3.8428	Confirmed LTF	3.8428
SIGE	SIGE	0.1003	Confirmed LTF	0.1003
CBM-S2	CBM-S2	1.2006	Confirmed LTF	1.2006
CBM-S1	CBM-S1	0.1189	Confirmed LTF	0.1189
G-007	G-007	0.6122	Confirmed LTF	0.6122
MEC	MEC	0.5991	Confirmed LTF	0.5991
LAGN	LAGN	0.5268	Confirmed LTF	0.5268
CBM-W1	CBM-W1	5.6921	Confirmed LTF	5.6921

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
165565383	235504	01RIDGLY	AP	235593	01HAMPS2	AP	1	AP-P7-1-PE-138-014	tower	182.0	107.31	108.35	DC	4.2

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200840	26DEEPCRK1	0.1703	50/50	0.1703
200841	26DEEPCRK2	0.1721	50/50	0.1721
235013	01AB1-065 C	0.7827	50/50	0.7827
235098	U2-073A E	30.6585	50/50	30.6585
235099	U2-073B E	13.4412	50/50	13.4412
235526	01WR_AA1-100	3.3899	50/50	3.3899
235530	01TR_U2-073A	1.0790	50/50	1.0790
235531	01TR_U2-073B	0.6249	50/50	0.6249
236001	01WARRIOR RN	8.7516	50/50	8.7516
237084	**AD1-018 E (Suspended)**	**2.8723**	**50/50**	**2.8723**
237089	**AD1-018 C (Suspended)**	**1.7605**	**50/50**	**1.7605**
237312	01DANS_S-014	0.5943	50/50	0.5943
237319	01FMR_U2-030	0.2917	50/50	0.2917
290229	S-014 E	15.0685	50/50	15.0685
913142	Y1-033 E OP1	1.9846	Adder	2.33
929522	U2-030 E	12.3714	50/50	12.3714
930262	**AB1-065 E (Suspended)**	**1.2981**	**50/50**	**1.2981**
934443	AD1-068 C	0.7999	Adder	0.94
934445	AD1-068 E	4.6415	Adder	5.46
938801	AE1-106 C	3.4293	Adder	4.03
938802	AE1-106 E	2.3598	Adder	2.78
940461	AE2-030 C	2.1455	50/50	2.1455
940462	AE2-030 E	2.9628	50/50	2.9628
942731	AE2-289 C	3.1055	50/50	3.1055
942732	AE2-289 E	18.0201	50/50	18.0201
942901	AE2-309 C	3.6812	50/50	3.6812
942902	AE2-309 E	0.7027	50/50	0.7027
943301	AF1-001 C	0.7753	50/50	0.7753
943302	AF1-001 E	0.8647	50/50	0.8647
943711	AF1-039 C O1	0.5250	Adder	0.62
943712	AF1-039 E O1	0.3500	Adder	0.41
960191	AF2-310 O1	3.8180	50/50	3.8180
962501	AG1-099	3.1692	50/50	3.1692
963801	AG1-233 C O2	1.1339	Adder	2.52
963802	AG1-233 E O2	0.7559	Adder	1.68
WEC	WEC	0.0334	Confirmed LTF	0.0334
LGEE	LGEE	0.0553	Confirmed LTF	0.0553
CALDERWOOD	CALDERWOOD	0.0462	Confirmed LTF	0.0462
CBM-W2	CBM-W2	0.1434	Confirmed LTF	0.1434
O-066	O-066	0.4442	Confirmed LTF	0.4442
SIGE	SIGE	0.0154	Confirmed LTF	0.0154

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CHEOAH	CHEOAH	0.0490	Confirmed LTF	0.0490
COTTONWOOD	COTTONWOOD	0.0672	Confirmed LTF	0.0672
G-007	G-007	0.0798	Confirmed LTF	0.0798
HAMLET	HAMLET	0.1848	Confirmed LTF	0.1848
MEC	MEC	0.1176	Confirmed LTF	0.1176
CATAWBA	CATAWBA	0.0864	Confirmed LTF	0.0864
CBM-W1	CBM-W1	1.7385	Confirmed LTF	1.7385

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
167346240	235504	01RIDGLY	AP	235484	01MESSCK	AP	1	AP-P2-3-PE-500-014	breaker	268.0	109.71	110.27	DC	3.34

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.5273	50/50	0.5273
235098	U2-073A E	19.8392	50/50	19.8392
235099	U2-073B E	8.6978	50/50	8.6978
235520	01WVACO_S38	6.6150	50/50	6.6150
235526	01WR_AA1-100	2.1601	50/50	2.1601
235530	01TR_U2-073A	0.6983	50/50	0.6983
235531	01TR_U2-073B	0.4044	50/50	0.4044
236001	01WARRIOR RN	5.5766	50/50	5.5766
237084	**AD1-018 E (Suspended)**	**2.0934**	**50/50**	**2.0934**
237089	**AD1-018 C (Suspended)**	**1.2830**	**50/50**	**1.2830**
237312	01DANS_S-014	0.3857	50/50	0.3857
237319	01FMR_U2-030	0.1910	50/50	0.1910
237507	01CROSSCHOOL	0.1882	50/50	0.1882
290229	S-014 E	9.7787	50/50	9.7787
292401	K-028 E	3.2476	Adder	3.82
885642	T-016 E	1.3301	Adder	1.56
913142	Y1-033 E OP1	1.4542	Adder	1.71
929522	U2-030 E	8.1035	50/50	8.1035
930262	**AB1-065 E (Suspended)**	**0.8745**	**50/50**	**0.8745**
934443	AD1-068 C	0.6879	Adder	0.81
934445	AD1-068 E	3.9918	Adder	4.7
934933	AD1-125 C1	0.6399	Adder	0.75
934934	AD1-125 C2	0.0817	Adder	0.1
934935	AD1-125 E1	3.7129	Adder	4.37
934936	AD1-125 E2	0.4744	Adder	0.56
937361	AD2-180 C O1	0.9143	Adder	1.08
937362	AD2-180 E O1	5.7550	Adder	6.77
938801	AE1-106 C	2.8164	Adder	3.31
938802	AE1-106 E	1.9381	Adder	2.28
938831	AE1-109 C	0.4334	Adder	0.51
938832	AE1-109 E	0.5629	Adder	0.66
939591	AE1-188 C	-0.5560	Adder	-0.65
940461	AE2-030 C	1.3780	50/50	1.3780
940462	AE2-030 E	1.9030	50/50	1.9030
942731	AE2-289 C	2.0095	50/50	2.0095
942732	AE2-289 E	11.6609	50/50	11.6609
942901	AE2-309 C	2.7396	50/50	2.7396
942902	AE2-309 E	0.5229	50/50	0.5229
943301	AF1-001 C	0.4906	Adder	0.58
943302	AF1-001 E	0.5472	Adder	0.64
943711	AF1-039 C O1	0.3847	Adder	0.45

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943712	AF1-039 E O1	0.2565	Adder	0.3
945011	AF1-166 C	-0.4641	Adder	-0.55
945591	AF1-224 C	-0.3486	Adder	-0.41
959241	AF2-215 C	-0.1869	Adder	-0.22
959843	AF2-275 BAT	0.0853	Merchant Transmission	0.0853
959853	AF2-276 BAT	0.0853	Merchant Transmission	0.0853
960191	AF2-310 O1	2.5720	50/50	2.5720
960651	AF2-356 C	9.7512	Adder	11.47
960652	AF2-356 E	6.5008	Adder	7.65
962501	AG1-099	2.7094	50/50	2.7094
963801	AG1-233 C O2	0.9023	Adder	2.0
963802	AG1-233 E O2	0.6015	Adder	1.34
966463	AG1-515 BAT	0.3031	Merchant Transmission	0.3031
WEC	WEC	0.1326	Confirmed LTF	0.1326
LGEE	LGEE	0.2595	Confirmed LTF	0.2595
CPLE	CPLE	0.0212	Confirmed LTF	0.0212
CBM-W2	CBM-W2	3.1718	Confirmed LTF	3.1718
NY	NY	0.2101	Confirmed LTF	0.2101
TVA	TVA	0.4368	Confirmed LTF	0.4368
O-066	O-066	4.0649	Confirmed LTF	4.0649
SIGE	SIGE	0.1059	Confirmed LTF	0.1059
CBM-S2	CBM-S2	1.2841	Confirmed LTF	1.2841
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.6468	Confirmed LTF	0.6468
MEC	MEC	0.6324	Confirmed LTF	0.6324
LAGN	LAGN	0.5547	Confirmed LTF	0.5547
CBM-W1	CBM-W1	6.0006	Confirmed LTF	6.0006

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
167108137	937190	AD2-157 TAP	AP	235471	01GORE	AP	1	AP-P2-3-PE-500-014	breaker	250.0	103.63	104.1	DC	2.62

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	0.2295	Adder	0.27
235091	U2-061_E	2.9399	Adder	3.46
235098	U2-073A E	7.4043	Adder	8.71
235099	U2-073B E	3.2462	Adder	3.82
235520	01WVACO_S38	8.3712	50/50	8.3712
235526	01WR_AA1-100	0.7532	Adder	0.89
235627	K19 E	2.6410	Adder	3.11
235854	01KL_K28_T16	0.3850	50/50	0.3850
237084	**AD1-018 E (Suspended)**	**1.2404**	**50/50**	**1.2404**
237089	**AD1-018 C (Suspended)**	**0.7602**	**50/50**	**0.7602**
237507	01CROSSCHOOL	0.2383	50/50	0.2383
290229	S-014 E	3.6914	Adder	4.34
292401	K-028 E	8.2192	50/50	8.2192
885642	T-016 E	3.3662	50/50	3.3662
920072	AA2-103 E	1.3937	Adder	1.64
929522	U2-030 E	3.1787	Adder	3.74
930262	**AB1-065 E (Suspended)**	**0.3807**	**Adder**	**0.45**
934443	AD1-068 C	0.6311	Adder	0.74
934445	AD1-068 E	3.6624	Adder	4.31
934933	AD1-125 C1	2.5596	50/50	2.5596
934934	AD1-125 C2	0.3269	50/50	0.3269
934935	AD1-125 E1	14.8517	50/50	14.8517
934936	AD1-125 E2	1.8978	50/50	1.8978
937191	AD2-157 C O1	23.9908	50/50	23.9908
937192	AD2-157 E O1	33.1302	50/50	33.1302
937361	AD2-180 C O1	2.7423	50/50	2.7423
937362	AD2-180 E O1	17.2612	50/50	17.2612
938341	AE1-052	0.6968	Adder	0.82
938831	AE1-109 C	3.8598	50/50	3.8598
938832	AE1-109 E	5.0134	50/50	5.0134
940461	AE2-030 C	0.4981	Adder	0.59
940462	AE2-030 E	0.6878	Adder	0.81
942731	AE2-289 C	0.7500	Adder	0.88
942732	AE2-289 E	4.3520	Adder	5.12
942901	AE2-309 C	1.7298	50/50	1.7298
942902	AE2-309 E	0.3302	50/50	0.3302
943301	AF1-001 C	0.3415	Adder	0.4
943302	AF1-001 E	0.3809	Adder	0.45
958181	AF2-112 C O1	0.7559	Adder	0.89
958182	AF2-112 E O1	0.3713	Adder	0.44
960191	AF2-310 O1	1.1196	Adder	1.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960651	AF2-356 C	14.3592	50/50	14.3592
960652	AF2-356 E	9.5728	50/50	9.5728
962501	AG1-099	2.8294	50/50	2.8294
962521	AG1-101 C	0.2355	Adder	0.52
962522	AG1-101 E	0.1160	Adder	0.26
962631	AG1-112	0.3693	Adder	0.82
963801	AG1-233 C O2	0.7087	Adder	1.57
963802	AG1-233 E O2	0.4725	Adder	1.05
WEC	WEC	0.0945	Confirmed LTF	0.0945
LGEE	LGEE	0.1803	Confirmed LTF	0.1803
CBM-W2	CBM-W2	1.9174	Confirmed LTF	1.9174
NY	NY	0.0708	Confirmed LTF	0.0708
TVA	TVA	0.2240	Confirmed LTF	0.2240
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0611	Confirmed LTF	0.0611
CBM-S1	CBM-S1	0.0695	Confirmed LTF	0.0695
G-007	G-007	0.3297	Confirmed LTF	0.3297
HAMLET	HAMLET	0.0739	Confirmed LTF	0.0739
MEC	MEC	0.4290	Confirmed LTF	0.4290
LAGN	LAGN	0.2940	Confirmed LTF	0.2940
CATAWBA	CATAWBA	0.0168	Confirmed LTF	0.0168
CBM-W1	CBM-W1	4.3883	Confirmed LTF	4.3883

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
165565326	940460	AE2-030 TAP	AP	235504	01RIDGLY	AP	1	FE-P7-1-MP-138-056-B	tower	306.0	118.38	134.72	DC	49.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
235013	01AB1-065 C	4.0989	50/50	4.0989
235098	U2-073A E	116.0698	50/50	116.0698
235099	U2-073B E	50.8868	50/50	50.8868
235530	01TR_U2-073A	4.0852	50/50	4.0852
235531	01TR_U2-073B	2.3659	50/50	2.3659
237319	01FMR_U2-030	1.2303	50/50	1.2303
929522	U2-030 E	52.1864	50/50	52.1864
930262	**AB1-065 E (Suspended)**	**6.7982**	**50/50**	**6.7982**
940461	AE2-030 C	7.5580	50/50	7.5580
940462	AE2-030 E	10.4373	50/50	10.4373
942731	AE2-289 C	11.7569	50/50	11.7569
942732	AE2-289 E	68.2223	50/50	68.2223
960191	AF2-310 O1	19.9948	50/50	19.9948
963801	AG1-233 C O2	29.9922	50/50	29.9922
963802	AG1-233 E O2	19.9948	50/50	19.9948
CALDERWOOD	CALDERWOOD	0.0129	Confirmed LTF	0.0129
NY	NY	0.0144	Confirmed LTF	0.0144
PRAIRIE	PRAIRIE	0.0672	Confirmed LTF	0.0672
O-066	O-066	0.1750	Confirmed LTF	0.1750
CHEOAH	CHEOAH	0.0130	Confirmed LTF	0.0130
COTTONWOOD	COTTONWOOD	0.0546	Confirmed LTF	0.0546
G-007	G-007	0.0273	Confirmed LTF	0.0273
HAMLET	HAMLET	0.0150	Confirmed LTF	0.0150
GIBSON	GIBSON	0.0142	Confirmed LTF	0.0142
BLUEG	BLUEG	0.0451	Confirmed LTF	0.0451
TRIMBLE	TRIMBLE	0.0145	Confirmed LTF	0.0145
CATAWBA	CATAWBA	0.0091	Confirmed LTF	0.0091

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
AP-P7-1-PE-138-014	CONTINGENCY 'AP-P7-1-PE-138-014' /* 111 DISCONNECT BRANCH FROM BUS 235454 TO BUS 235558 CKT 1 /* 01CUMBRL 138 01SHORTG 138 DISCONNECT BRANCH FROM BUS 235484 TO BUS 235504 CKT 1 /* 01MESSCK 138 01RIDGLY 138 END
AP-P2-3-PE-500-014	CONTINGENCY 'AP-P2-3-PE-500-014' / 2626 OPEN BRANCH FROM BUS 235103 TO BUS 964990 CKT 1 / 235103 01BLACKO 500 964990 AG1-363 TAP 500 1 OPEN BRANCH FROM BUS 235446 TO BUS 235103 CKT 3 / 235446 01BLACKO 138 235103 01BLACKO 500 3 OPEN BRANCH FROM BUS 235103 TO BUS 235130 CKT 1 / 235103 01BLACKO 500 235130 01BO_SVC 23.0 1 DECREASE BUS 235103 SHUNT BY 100.00 PERCENT /* 235103 01BLACKO 500 END
AP-P1-2-PE-138-100-A	CONTINGENCY 'AP-P1-2-PE-138-100-A' / 322 OPEN BRANCH FROM BUS 235504 TO BUS 940460 CKT 1 / 235504 01RIDGLY 138 940460 AE2-030 TAP 138 1 END
AP-P1-2-PE-500-004-A	CONTINGENCY 'AP-P1-2-PE-500-004-A' / 120 OPEN BRANCH FROM BUS 235108 TO BUS 964990 CKT 1 / 235108 01HATFLD 500 964990 AG1-363 TAP 500 1 END
Base Case	
FE-P7-1-MP-138-056-B	CONTINGENCY 'FE-P7-1-MP-138-056-B' /* LL-BVJ-LL-RBL DISCONNECT BRANCH FROM BUS 235122 TO BUS 235802 CKT 1 /* 01LKLYNN 138 01CHEATL 138 DISCONNECT BRANCH FROM BUS 235120 TO BUS 235305 CKT 1 /* 01ALBRIG 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 938800 TO BUS 235305 CKT 1 /* AE1-106 TAP 138 01 106 J 138 DISCONNECT BRANCH FROM BUS 963800 TO BUS 235305 CKT 1 /* AG1-233 TAP 138 01 106 J 138 END
AP-P1-2-PE-500-001	CONTINGENCY 'AP-P1-2-PE-500-001' / 345 OPEN BRANCH FROM BUS 235101 TO BUS 235103 CKT 1 / 235101 01BEDNGT 500 235103 01BLACKO 500 1 END

14 Affected Systems

14.1 NYISO

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

Attachment 1: One Line Diagram