



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF2-143
“POWERTON-NEVADA 345 KV”**

July 2020

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 ComEd.

2 Preface

The intent of the Feasibility Study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

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

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 LaSalle County, Illinois. Queue Position AF2-143 proposes to add 150 MW solar generation to Osagrove Flats Wind Farm to be built under PJM queue AD2-038. The installed facilities will have a combined total capability of 300 MWs Energy with 109.5 MWs 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	AF2-143
Project Name	POWERTON-NEVADA 345 KV
State	Illinois
County	LaSalle
Transmission Owner	ComEd
MFO	150
MWE	150
MWC	90
Fuel	Solar
Basecase Study Year	2023

A new service customer with a generating facility that could be commercially operable prior to June 1st of the basecase study year is required to request an interim deliverability analysis from PJM.

4 Point of Interconnection

AF2-143 will interconnect with the ComEd transmission system at the AD2-038 substation which taps the Powerton to Goodings Grove 345 kV line.

5 Cost Summary

The AF2-143 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$200,000
Total System Network Upgrade Costs	\$59,862,440
Total Costs	\$60,062,440

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.

6 Transmission Owner Scope of Work

Attachment Facilities

To accommodate interconnection of AF2-143; the relaying, SCADA, communication, and metering between Osagrove Flats Wind Farm and TSS 920 Dana would be reviewed and upgraded if needed.

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

Description	Total Cost
The relaying, SCADA, communication, and metering between Osagrove Flats Wind Farm and TSS 920 Dana would be reviewed and upgraded if needed.	\$200,000
Total Physical Interconnection Costs	\$200,000

7 Schedule

ComEd would take approximately 18-months to review and possibly upgrade the relaying, SCADA, Communication and metering after the ISA / ICSA are signed. See Section 11.5 for System Upgrades schedule.

8 Transmission Owner Analysis

See Section 6.

9 Interconnection Customer Requirements

The Interconnection Customer is responsible for all design and construction related activities on the Interconnection Customer's side of the Point of Interconnection.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

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

10.2 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

ComEd interconnection requirements can be found at <https://www.pjm.com/planning/design-engineering/to-tech-standards/private-comed.aspx>

To the extent that these Applicable Technical Requirements and Standards may conflict with the terms and conditions of the Tariff, the Tariff shall control.

11 Summer Peak - Load Flow Analysis

The Queue Project AF2-143 was evaluated as a 150.0 MW (Capacity 90.0 MW) injection at the AD2-038 substation which taps the Powerton to Goodings Grove 345 kV line in the ComEd area. Project AF2-143 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-143 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	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADING %	POST PROJE CT LOADING %	AC DC	MW IMPACT
96263945	270855	POWER TON ; R	345.0	CE	349662	7TAZE W ELL	345.0	AMI L	1	COMED_P4_012-45-BT4-5__	break er	1489.0	134.51	139.2	DC	69.86
96265327	270855	POWER TON ; R	345.0	CE	349662	7TAZE W ELL	345.0	AMI L	1	COMED_P7_345-L19601_B-S_+_345-L9801__R-S_FSA	tower	1489.0	158.53	165.96	DC	110.74
96265328	270855	POWER TON ; R	345.0	CE	349662	7TAZE W ELL	345.0	AMI L	1	COMED_P7_345-L0301__B-S_+_345-L9801__R-S_FSA-B	tower	1489.0	143.92	151.36	DC	110.77
96264042	270926	WILTON ; B	345.0	CE	275232	WILTON ;3M	345.0	CE	1	COMED_P4_112-65-BT5-6__	break er	1379.0	121.85	121.9	DC	21.99
96264030	270927	WILTON ; R	345.0	CE	275233	WILTON ;4M	345.0	CE	1	COMED_P4_112-65-BT2-3__	break er	1379.0	124.4	124.45	DC	22.47
96264041	275232	WILTON ;3M	345.0	CE	270644	WILTON ;	765.0	CE	1	COMED_P4_112-65-BT5-6__	break er	1379.0	121.85	121.9	DC	21.99
96264029	275233	WILTON ;4M	345.0	CE	270644	WILTON ;	765.0	CE	1	COMED_P4_112-65-BT2-3__	break er	1379.0	124.4	124.45	DC	22.47
96265342	930740	AB1-122 TAP	345.0	CE	270717	DRESDE N ; R	345.0	CE	1	COMED_P7_345-L19601_B-S_+_345-L9801__R-S_FSA	tower	1195.0	135.95	138.64	DC	32.13
96265343	930740	AB1-122 TAP	345.0	CE	270717	DRESDE N ; R	345.0	CE	1	COMED_P7_345-L0301__B-S_+_345-L9801__R-S_FSA-B	tower	1195.0	130.56	133.26	DC	32.15
95294071	960680	AF2-359 TAP	345.0	CE	243229	OSOLIVE	345.0	AEP	1	AEP_P4_#2978_05DUMONT_NON_FSA	break er	971.0	109.28	109.61	DC	15.21
95294072	960680	AF2-359 TAP	345.0	CE	243229	OSOLIVE	345.0	AEP	1	AEP_P4_#2978_05DUMONT_FSA	break er	971.0	109.28	109.61	DC	15.21
95294073	960680	AF2-359 TAP	345.0	CE	243229	OSOLIVE	345.0	AEP	1	COMED_P4_023-65-BT2-3__	break er	971.0	108.95	109.28	DC	15.31

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95294074	960680	AF2-359 TAP	345.0	CE	243229	05OLIVE	345.0	AEP	1	COMED_P4_112-65-BT4-5__	breaker	971.0	108.87	109.2	DC	15.32
95294075	960680	AF2-359 TAP	345.0	CE	243229	05OLIVE	345.0	AEP	1	COMED_P4_112-65-BT3-4__	breaker	971.0	108.87	109.2	DC	15.32

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	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
96264466	270855	POWER TON; R	345.0	CE	349662	7TAZEWEL L	345.0	AMIL	1	COMED_P1-2_345-L1202__B-S-A	operation	1489.0	134.23	138.93	DC	69.98
96264416	274750	CRETE EC; BP	345.0	CE	255112	17STJOHN	345.0	NIPS	1	Base Case	operation	1091.0	153.47	153.53	DC	11.86
96264672	274804	UNIV PK N; RP	345.0	CE	960680	AF2-359 TAP	345.0	CE	1	COMED_P1-2_695_B2	operation	971.0	106.25	106.31	DC	15.31
96264684	918050	AA1-018 TAP	345.0	CE	270769	GOODING S; 2R	345.0	CE	1	COMED_P1-2_345-L0304__R-S	operation	1195.0	98.67	104.8	DC	73.15
96264548	930740	AB1-122 TAP	345.0	CE	270717	DRESDEN ; R	345.0	CE	1	COMED_P1-2_345-L1202__B-S-A	operation	1195.0	120.43	122.0	DC	18.74
96264542	930750	AB1-122 TAP	345.0	CE	270716	DRESDEN ; B	345.0	CE	1	COMED_P1-2_345-L0304__R-S	operation	1479.0	119.38	122.1	DC	40.23
96264543	930750	AB1-122 TAP	345.0	CE	270716	DRESDEN ; B	345.0	CE	1	Base Case	operation	1201.0	113.82	115.31	DC	17.83
95294358	960680	AF2-359 TAP	345.0	CE	243229	05OLIVE	345.0	AEP	1	COMED_P1-2_695_B2	operation	971.0	108.83	109.16	DC	15.31

11.5 System Reinforcements - Summer Peak Load Flow

ID	Idx	Facility	Upgrade Description	Cost
96265343,96265342	6	AB1-122 TAP 345.0 kV - DRESDEN ; R 345.0 kV Ckt 1	<p><u>ComEd</u> ce-024 (898) : ComEd 345kV L1227 SLD and ALDR ratings are 1284 MVA & 1477 MVA. The post contingency flow for this event exceeds the ratings therefore an upgrade is required. The upgrade will be to mitigate the sag on a portion of the line, re-conductor another segment of the line and upgrade the station conductor at a terminal. A preliminary estimate for the upgrades is \$34.2 with an estimated construction timeline of 30-36 months. Upon completion of the upgrades the rating limits will be 1334/1726/1837/2084/2397 MVA (SN/SLTE/SSTE/SLD/ALDR). Project Type : FAC Cost : \$34,200,000 Time Estimate : 30-36 Months</p>	\$34,200,000
96264041	4	WILTON ;3M 345.0 kV - WILTON ; 765.0 kV Ckt 1	<p><u>ComEd</u> n5145 (884) : PJM Network Upgrade (n5145): Reconfigure Wilton 765kV bus thereby allowing for 765kV L11216 (currently on Bus 6) to be relocated to Bus 8. Along with this line relocation, installation of 2-765kV BT CBs (6-8 & 8-2). Project Type : CON Cost : \$11,000,000 Time Estimate : 36-40 Months</p>	\$11,000,000
96264042	2	WILTON ; B 345.0 kV - WILTON ;3M 345.0 kV Ckt 1		
96264029	5	WILTON ;4M 345.0 kV - WILTON ; 765.0 kV Ckt 1		
96264030	3	WILTON ; R 345.0 kV - WILTON ;4M 345.0 kV Ckt 1		
96263945,96265328,96265327	1	POWERTON ; R 345.0 kV - 7TAZEWELL 345.0 kV Ckt 1	<p><u>ComEd</u> CE_NUN_0304 (915) : ComEd 345kV L0304 SSTE rating is 1512 MVA. The post contingency flow for this event exceeds the rating therefore an upgrade is required. The upgrade will be to mitigate the sag on the line and replace a 345kV disconnect switch. A preliminary estimate for this work is \$9.7M with an estimated construction timeline of 30 months. Upon completion of this upgrade the new ratings will be 1679/2058/2107/2280/2622 MVA (SN/SLTE/SSTE/SLD/ALDR). Project Type : FAC Cost : \$9,700,000 Time Estimate : 30.0 Months</p> <p><u>AMIL</u> NonPJMArea: The external (i.e. Non-PJM) Transmission Owner, AMIL, will not evaluate this violation until the impact study phase.</p>	\$9,700,000

ID	Idx	Facility	Upgrade Description	Cost
95294071,95294072,95294073,95294074,95294075	7	AF2-359 TAP 345.0 kV - 05OLIVE 345.0 kV Ckt 1	<p><u>AEP</u> n4057 (502) : A Sag Study will be required on the 40.64 miles of ACSR/PE 1414 62/19 conductor to mitigate the overload. The new ratings after sag study will be: S/N: 971 MVA, S/E: 1419 MVA, Depending on the sag study results, the cost for this upgrade is expected to be between \$162,560 (no remediation required, just sag study) and \$81.28 million (complete line Re-conductor/rebuild). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. Project Type : FAC Cost : \$162,440 Time Estimate : 6-12 Months</p> <p><u>ComEd</u> CE_NUN_L97008 (912) : Sag mitigation on a portion of the line. A preliminary estimate for this work is \$M with an estimated construction timeline of 30 months. Upon completion of the upgrade the rating will be 1334/1334/1391/1523 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : \$4,800,000 Time Estimate : 30.0 Months</p>	\$4,962,440
Total System Network Upgrade Costs				\$59,862,440

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

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gauge 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
96265327	270855	POWERTON ;R	CE	349662	7TAZEWELL	AMIL	1	COMED_P7_345-L19601_B-S+_345-L9801_R-S_FSA	tower	1489.0	158.53	165.96	DC	110.74

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274677	POWERTON ;5U	97.6817	50/50	97.6817
274678	POWERTON ;6U	97.9218	50/50	97.9218
274861	TOP CROP ;1U	2.5917	50/50	2.5917
274862	TOP CROP ;2U	5.0309	50/50	5.0309
274879	MINONK ;1U	3.0743	50/50	3.0743
290021	O50 E	71.2896	50/50	71.2896
293644	O22 E1	60.0992	50/50	60.0992
293645	O22 E2	116.6632	50/50	116.6632
918051	AA1-018 C OP	2.4835	50/50	2.4835
918052	AA1-018 E OP	96.3521	50/50	96.3521
934871	AD1-116 C	5.6113	50/50	5.6113
934872	AD1-116 E	9.1553	50/50	9.1553
936291	AD2-038 C O1	14.3963	50/50	14.3963
936292	AD2-038 E O1	96.3442	50/50	96.3442
938851	AE1-113 C	29.4070	50/50	29.4070
938852	AE1-113 E	104.2610	50/50	104.2610
939321	AE1-163 C O1	36.1752	50/50	36.1752
939322	AE1-163 E O1	222.2193	50/50	222.2193
942421	AE2-255 C O1	11.1390	50/50	11.1390
942422	AE2-255 E O1	33.4170	50/50	33.4170
942651	AE2-281 C O1	5.1679	50/50	5.1679
942652	AE2-281 E O1	31.7456	50/50	31.7456
957021	AF2-003 C O1	39.2745	50/50	39.2745
957022	AF2-003 E O1	183.8759	50/50	183.8759
958481	AF2-142 C	66.4497	50/50	66.4497
958482	AF2-142 E	44.2998	50/50	44.2998
958491	AF2-143 C	66.4443	50/50	66.4443
958492	AF2-143 E	44.2962	50/50	44.2962
959351	AF2-226 C	14.7302	50/50	14.7302
959352	AF2-226 E	22.0953	50/50	22.0953
960281	AF2-319 C	14.7302	50/50	14.7302
960282	AF2-319 E	22.0953	50/50	22.0953
WEC	WEC	0.0564	Confirmed LTF	0.0564
NEWTON	NEWTON	2.5745	Confirmed LTF	2.5745
FARMERCITY	FARMERCITY	0.2126	Confirmed LTF	0.2126
CALDERWOOD	CALDERWOOD	0.7758	Confirmed LTF	0.7758
NY	NY	0.4612	Confirmed LTF	0.4612
PRAIRIE	PRAIRIE	8.2733	Confirmed LTF	8.2733
O-066	O-066	5.6314	Confirmed LTF	5.6314
CHEOAH	CHEOAH	0.7773	Confirmed LTF	0.7773
EDWARDS	EDWARDS	5.4649	Confirmed LTF	5.4649

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
TILTON	TILTON	1.2203	Confirmed LTF	1.2203
G-007	G-007	0.8726	Confirmed LTF	0.8726
GIBSON	GIBSON	0.7868	Confirmed LTF	0.7868
BLUEG	BLUEG	1.9530	Confirmed LTF	1.9530
TRIMBLE	TRIMBLE	0.6110	Confirmed LTF	0.6110
CATAWBA	CATAWBA	0.4522	Confirmed LTF	0.4522

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
96264042	270926	WILTON ; B	CE	275232	WILTON ;3M	CE	1	COMED_P4_112-65-BT5-6__	breaker	1379.0	121.85	121.9	DC	21.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274771	LINCOLN ;2U	3.7664	50/50	3.7664
274772	LINCOLN ;3U	3.7664	50/50	3.7664
274773	LINCOLN ;4U	3.7664	50/50	3.7664
274774	LINCOLN ;5U	3.7664	50/50	3.7664
274775	LINCOLN ;6U	3.7664	50/50	3.7664
274776	LINCOLN ;7U	3.7664	50/50	3.7664
274777	LINCOLN ;8U	3.7664	50/50	3.7664
274830	U3-021 1	6.3035	Adder	7.42
274831	U3-021 2	6.3035	Adder	7.42
274881	PILOT HIL;1E	19.9396	Adder	23.46
274890	CAYUG;1U E	17.0054	Adder	20.01
274891	CAYUG;2U E	17.0054	Adder	20.01
275149	KELLYCK ;1E	19.9396	Adder	23.46
276167	Z1-106 E2	1.3063	Adder	1.54
276168	Z1-106 E1	1.3062	Adder	1.54
276169	Z1-107 E	2.6738	Adder	3.15
276170	Z1-108 E	2.5704	Adder	3.02
290021	O50 E	20.0260	Adder	23.56
290051	GSG-6; E	10.8913	Adder	12.81
290108	LEEDK;1U E	25.1940	Adder	29.64
293061	N-015 E	16.4434	Adder	19.35
293644	O22 E1	10.5913	Adder	12.46
293645	O22 E2	20.5595	Adder	24.19
294392	P-010 E	20.8831	Adder	24.57
910542	X3-005 E	0.7562	Adder	0.89
915011	Y3-013 1	3.8635	Adder	4.55
915021	Y3-013 2	3.8635	Adder	4.55
915031	Y3-013 3	3.8635	Adder	4.55
918052	AA1-018 E OP	16.9837	Adder	19.98
920272	AA2-123 E	2.5262	Adder	2.97
924471	AB2-096	43.7741	Adder	51.5
926311	AC1-109 1	1.9765	Adder	2.33
926321	AC1-109 2	1.9765	Adder	2.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
926331	AC1-110 1	1.9634	Adder	2.31
926341	AC1-110 2	1.9634	Adder	2.31
926351	AC1-111 1	0.7894	Adder	0.93
926361	AC1-111 2	0.7894	Adder	0.93
926371	AC1-111 3	0.7894	Adder	0.93
926381	AC1-111 4	0.7894	Adder	0.93
926391	AC1-111 5	0.7894	Adder	0.93
926401	AC1-111 6	0.7894	Adder	0.93
927451	AC1-142A 1	4.3256	Adder	5.09
927461	AC1-142A 2	4.3256	Adder	5.09
930501	AB1-091 O1	79.3394	Adder	93.34
930741	AB1-122 1O1	75.3017	Adder	88.59
930751	AB1-122 2O1	76.2303	Adder	89.68
933411	AC2-154 C	2.7061	Adder	3.18
933412	AC2-154 E	4.4152	Adder	5.19
933431	AC2-156 C O1	0.9893	Adder	1.16
933432	AC2-156 E O1	1.6142	Adder	1.9
933911	AD1-013 C	1.9232	Adder	2.26
933912	AD1-013 E	3.0721	Adder	3.61
933931	AD1-016 C	0.9600	Adder	1.13
933932	AD1-016 E	1.5662	Adder	1.84
934101	AD1-039 1	7.3796	Adder	8.68
934111	AD1-039 2	7.4706	Adder	8.79
934431	AD1-067 C	0.1368	Adder	0.16
934432	AD1-067 E	0.5750	Adder	0.68
934701	AD1-098 C O1	7.1661	Adder	8.43
934702	AD1-098 E O1	5.2320	Adder	6.16
934721	AD1-100 C	24.8523	Adder	29.24
934722	AD1-100 E	115.9774	Adder	136.44
934871	AD1-116 C	0.9891	Adder	1.16
934872	AD1-116 E	1.6138	Adder	1.9
934971	AD1-129 C	0.9344	Adder	1.1
934972	AD1-129 E	0.6230	Adder	0.73
935001	AD1-133 C O1	23.0234	Adder	27.09
935002	AD1-133 E O1	15.3490	Adder	18.06
936291	AD2-038 C O1	2.4301	Adder	2.86
936292	AD2-038 E O1	16.2627	Adder	19.13
936371	AD2-047 C O1	4.8425	Adder	5.7
936372	AD2-047 E O1	23.6427	Adder	27.81
936461	AD2-060	2.8485	Adder	3.35
936511	AD2-066 C O1	8.7640	Adder	10.31
936512	AD2-066 E O1	5.8426	Adder	6.87
937001	AD2-134 C	2.8471	Adder	3.35
937002	AD2-134 E	11.7616	Adder	13.84
937401	AD2-194 1	8.0697	Adder	9.49
937411	AD2-194 2	8.0692	Adder	9.49
938511	AE1-070 1	9.4819	Adder	11.16
938521	AE1-070 2	8.6744	Adder	10.21
938851	AE1-113 C	8.2607	Adder	9.72
938852	AE1-113 E	29.2880	Adder	34.46
939321	AE1-163 C O1	6.1063	Adder	7.18
939322	AE1-163 E O1	37.5102	Adder	44.13

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939351	AE1-166 C O1	12.2622	Adder	14.43
939352	AE1-166 E O1	11.3189	Adder	13.32
939401	AE1-172 C O1	6.7946	Adder	7.99
939402	AE1-172 E O1	31.8801	Adder	37.51
940101	AE1-252 C O1	13.6499	Adder	16.06
940102	AE1-252 E O1	9.0999	Adder	10.71
940752	AE2-062 E	0.1351	Adder	0.16
941131	AE2-107 C	7.5761	Adder	8.91
941132	AE2-107 E	5.0507	Adder	5.94
941551	AE2-152 C O1	14.1487	Adder	16.65
941552	AE2-152 E O1	9.4325	Adder	11.1
941561	AE2-153 C O1	5.1247	Adder	6.03
941562	AE2-153 E O1	23.9929	Adder	28.23
941731	AE2-173 O1	3.2665	Adder	3.84
942111	AE2-223 C	2.4140	Adder	2.84
942112	AE2-223 E	16.1551	Adder	19.01
942421	AE2-255 C O1	3.1291	Adder	3.68
942422	AE2-255 E O1	9.3872	Adder	11.04
942651	AE2-281 C O1	0.8723	Adder	1.03
942652	AE2-281 E O1	5.3586	Adder	6.3
942991	AE2-321 C	8.4508	Adder	9.94
942992	AE2-321 E	4.1623	Adder	4.9
943121	AE2-341 C	13.2079	Adder	15.54
943122	AE2-341 E	6.4858	Adder	7.63
943381	AF1-009 C	0.6199	Adder	0.73
943382	AF1-009 E	2.4796	Adder	2.92
943591	AF1-030 C O1	8.7834	Adder	10.33
943592	AF1-030 E O1	4.3457	Adder	5.11
943801	AF1-048 C	3.9504	Adder	4.65
943802	AF1-048 E	2.6336	Adder	3.1
944041	AF1-072	2.2259	Adder	2.62
944911	AF1-156 C	13.1029	Adder	15.42
944912	AF1-156 E	8.7353	Adder	10.28
945351	AF1-200 FTIR	322.6289	Merchant Transmission	322.6289
946661	AF1-330 C	2.0715	Adder	2.44
946662	AF1-330 E	0.4547	Adder	0.53
946671	AF1-331	2.4976	Adder	2.94
957021	AF2-003 C O1	3.5751	Adder	7.94
957022	AF2-003 E O1	16.7377	Adder	37.15
957331	AF2-027 C	1.3651	Adder	3.03
957332	AF2-027 E	2.0477	Adder	4.55
958011	AF2-095 C O1	10.2661	Adder	22.79
958012	AF2-095 E O1	4.8311	Adder	10.72
958021	AF2-096 C O1	19.7578	Adder	43.86
958022	AF2-096 E O1	9.3434	Adder	20.74
958481	AF2-142 C	6.2078	Adder	13.78
958482	AF2-142 E	4.1386	Adder	9.19
958491	AF2-143 C	5.9443	Adder	13.19
958492	AF2-143 E	3.9629	Adder	8.8
959341	AF2-225 C	4.1335	Adder	9.18
959342	AF2-225 E	5.7081	Adder	12.67
959351	AF2-226 C	1.3758	Adder	3.05

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959352	AF2-226 E	2.0637	Adder	4.58
960281	AF2-319 C	1.3758	Adder	3.05
960282	AF2-319 E	2.0637	Adder	4.58
960381	AF2-329	3.6323	Adder	8.06
960581	AF2-349 C	11.9583	Adder	26.54
960582	AF2-349 E	7.9722	Adder	17.7
960591	AF2-350 C O1	4.5291	Adder	10.05
960592	AF2-350 E O1	3.0194	Adder	6.7
960601	AF2-351 C O1	0.6039	Adder	1.34
960602	AF2-351 E O1	0.9058	Adder	2.01
960721	AF2-363 C O1	3.2702	Adder	7.26
960722	AF2-363 E O1	2.1801	Adder	4.84
960731	AF2-364 C O1	3.3662	Adder	7.47
960732	AF2-364 E O1	2.2441	Adder	4.98
960751	AF2-366 C O1	3.8221	Adder	8.48
960752	AF2-366 E O1	2.5480	Adder	5.66
961501	AF2-441 C O1	5.4914	Adder	12.19
961502	AF2-441 E O1	8.2371	Adder	18.28
WEC	WEC	4.5603	Confirmed LTF	4.5603
CALDERWOOD	CALDERWOOD	0.0631	Confirmed LTF	0.0631
CBM-W2	CBM-W2	25.0942	Confirmed LTF	25.0942
NY	NY	1.4306	Confirmed LTF	1.4306
CBM-W1	CBM-W1	78.1875	Confirmed LTF	78.1875
TVA	TVA	1.6184	Confirmed LTF	1.6184
O-066	O-066	16.9546	Confirmed LTF	16.9546
CHEOAH	CHEOAH	0.0771	Confirmed LTF	0.0771
CBM-S1	CBM-S1	6.0407	Confirmed LTF	6.0407
G-007	G-007	2.6218	Confirmed LTF	2.6218
MADISON	MADISON	24.3210	Confirmed LTF	24.3210
MEC	MEC	16.0171	Confirmed LTF	16.0171
BLUEG	BLUEG	2.3071	Confirmed LTF	2.3071
TRIMBLE	TRIMBLE	0.7969	Confirmed LTF	0.7969
CATAWBA	CATAWBA	0.3619	Confirmed LTF	0.3619

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
96264030	270927	WILTON	CE	275233	WILTON	CE	1	COMED_P4_112-65-BT2-3__	breaker	1379.0	124.4	124.45	DC	22.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274771	LINCOLN ;2U	3.8683	50/50	3.8683
274772	LINCOLN ;3U	3.8683	50/50	3.8683
274773	LINCOLN ;4U	3.8683	50/50	3.8683
274774	LINCOLN ;5U	3.8683	50/50	3.8683
274775	LINCOLN ;6U	3.8683	50/50	3.8683
274776	LINCOLN ;7U	3.8683	50/50	3.8683

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274777	LINCOLN ;8U	3.8683	50/50	3.8683
274830	U3-021 1	6.4380	Adder	7.57
274831	U3-021 2	6.4380	Adder	7.57
274881	PILOT HIL;1E	20.3561	Adder	23.95
274890	CAYUG;1U E	17.3451	Adder	20.41
274891	CAYUG;2U E	17.3451	Adder	20.41
275149	KELLYCK ;1E	20.3561	Adder	23.95
276167	Z1-106 E2	1.3342	Adder	1.57
276168	Z1-106 E1	1.3341	Adder	1.57
276169	Z1-107 E	2.7309	Adder	3.21
276170	Z1-108 E	2.6251	Adder	3.09
290021	O50 E	20.4530	Adder	24.06
290051	GSG-6; E	11.1236	Adder	13.09
290108	LEEDK;1U E	25.7295	Adder	30.27
293061	N-015 E	16.7861	Adder	19.75
293644	O22 E1	10.8153	Adder	12.72
293645	O22 E2	20.9944	Adder	24.7
294392	P-010 E	21.3184	Adder	25.08
910542	X3-005 E	0.7727	Adder	0.91
915011	Y3-013 1	3.9461	Adder	4.64
915021	Y3-013 2	3.9461	Adder	4.64
915031	Y3-013 3	3.9461	Adder	4.64
918052	AA1-018 E OP	17.3542	Adder	20.42
920272	AA2-123 E	2.5799	Adder	3.04
924471	AB2-096	44.7083	Adder	52.6
926311	AC1-109 1	2.0186	Adder	2.37
926321	AC1-109 2	2.0186	Adder	2.37
926331	AC1-110 1	2.0052	Adder	2.36
926341	AC1-110 2	2.0052	Adder	2.36
926351	AC1-111 1	0.8063	Adder	0.95
926361	AC1-111 2	0.8063	Adder	0.95
926371	AC1-111 3	0.8063	Adder	0.95
926381	AC1-111 4	0.8063	Adder	0.95
926391	AC1-111 5	0.8063	Adder	0.95
926401	AC1-111 6	0.8063	Adder	0.95
927451	AC1-142A 1	4.4186	Adder	5.2
927461	AC1-142A 2	4.4186	Adder	5.2
930501	AB1-091 O1	80.9897	Adder	95.28
930741	AB1-122 1O1	76.8999	Adder	90.47
930751	AB1-122 2O1	77.8579	Adder	91.6
933411	AC2-154 C	2.7626	Adder	3.25
933412	AC2-154 E	4.5074	Adder	5.3
933431	AC2-156 C O1	1.0103	Adder	1.19
933432	AC2-156 E O1	1.6485	Adder	1.94
933911	AD1-013 C	1.9642	Adder	2.31
933912	AD1-013 E	3.1375	Adder	3.69
933931	AD1-016 C	0.9804	Adder	1.15
933932	AD1-016 E	1.5996	Adder	1.88
934101	AD1-039 1	7.5362	Adder	8.87
934111	AD1-039 2	7.6301	Adder	8.98
934431	AD1-067 C	0.1397	Adder	0.16
934432	AD1-067 E	0.5873	Adder	0.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
934701	AD1-098 C O1	7.3184	Adder	8.61
934702	AD1-098 E O1	5.3432	Adder	6.29
934721	AD1-100 C	25.3457	Adder	29.82
934722	AD1-100 E	118.2800	Adder	139.15
934871	AD1-116 C	1.0107	Adder	1.19
934872	AD1-116 E	1.6490	Adder	1.94
934971	AD1-129 C	0.9544	Adder	1.12
934972	AD1-129 E	0.6363	Adder	0.75
935001	AD1-133 C O1	23.5023	Adder	27.65
935002	AD1-133 E O1	15.6682	Adder	18.43
936291	AD2-038 C O1	2.4826	Adder	2.92
936292	AD2-038 E O1	16.6143	Adder	19.55
936371	AD2-047 C O1	4.9436	Adder	5.82
936372	AD2-047 E O1	24.1366	Adder	28.4
936461	AD2-060	2.9080	Adder	3.42
936511	AD2-066 C O1	8.9497	Adder	10.53
936512	AD2-066 E O1	5.9665	Adder	7.02
937001	AD2-134 C	2.9079	Adder	3.42
937002	AD2-134 E	12.0124	Adder	14.13
937401	AD2-194 1	8.2426	Adder	9.7
937411	AD2-194 2	8.2421	Adder	9.7
938511	AE1-070 1	9.6851	Adder	11.39
938521	AE1-070 2	8.8603	Adder	10.42
938851	AE1-113 C	8.4369	Adder	9.93
938852	AE1-113 E	29.9126	Adder	35.19
939321	AE1-163 C O1	6.2383	Adder	7.34
939322	AE1-163 E O1	38.3212	Adder	45.08
939351	AE1-166 C O1	12.5095	Adder	14.72
939352	AE1-166 E O1	11.5472	Adder	13.58
939401	AE1-172 C O1	6.9294	Adder	8.15
939402	AE1-172 E O1	32.5126	Adder	38.25
940101	AE1-252 C O1	13.9207	Adder	16.38
940102	AE1-252 E O1	9.2805	Adder	10.92
940752	AE2-062 E	0.1379	Adder	0.16
941131	AE2-107 C	7.7372	Adder	9.1
941132	AE2-107 E	5.1581	Adder	6.07
941551	AE2-152 C O1	14.4340	Adder	16.98
941552	AE2-152 E O1	9.6227	Adder	11.32
941561	AE2-153 C O1	5.2303	Adder	6.15
941562	AE2-153 E O1	24.4874	Adder	28.81
941731	AE2-173 O1	3.3326	Adder	3.92
942111	AE2-223 C	2.4629	Adder	2.9
942112	AE2-223 E	16.4823	Adder	19.39
942421	AE2-255 C O1	3.1958	Adder	3.76
942422	AE2-255 E O1	9.5874	Adder	11.28
942651	AE2-281 C O1	0.8912	Adder	1.05
942652	AE2-281 E O1	5.4745	Adder	6.44
942991	AE2-321 C	8.6313	Adder	10.15
942992	AE2-321 E	4.2513	Adder	5.0
943121	AE2-341 C	13.4892	Adder	15.87
943122	AE2-341 E	6.6239	Adder	7.79
943381	AF1-009 C	0.6331	Adder	0.74

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943382	AF1-009 E	2.5323	Adder	2.98
943591	AF1-030 C O1	8.9705	Adder	10.55
943592	AF1-030 E O1	4.4383	Adder	5.22
943801	AF1-048 C	4.0348	Adder	4.75
943802	AF1-048 E	2.6899	Adder	3.16
944041	AF1-072	2.2734	Adder	2.67
944911	AF1-156 C	13.3730	Adder	15.73
944912	AF1-156 E	8.9153	Adder	10.49
945351	AF1-200 FTIR	329.4462	Merchant Transmission	329.4462
946661	AF1-330 C	2.1155	Adder	2.49
946662	AF1-330 E	0.4644	Adder	0.55
946671	AF1-331	2.5508	Adder	3.0
957021	AF2-003 C O1	3.6510	Adder	8.1
957022	AF2-003 E O1	17.0932	Adder	37.94
957331	AF2-027 C	1.3943	Adder	3.1
957332	AF2-027 E	2.0914	Adder	4.64
958011	AF2-095 C O1	10.4805	Adder	23.26
958012	AF2-095 E O1	4.9320	Adder	10.95
958021	AF2-096 C O1	20.1649	Adder	44.76
958022	AF2-096 E O1	9.5360	Adder	21.17
958481	AF2-142 C	6.3433	Adder	14.08
958482	AF2-142 E	4.2288	Adder	9.39
958491	AF2-143 C	6.0728	Adder	13.48
958492	AF2-143 E	4.0486	Adder	8.99
959341	AF2-225 C	4.2172	Adder	9.36
959342	AF2-225 E	5.8238	Adder	12.93
959351	AF2-226 C	1.4049	Adder	3.12
959352	AF2-226 E	2.1074	Adder	4.68
960281	AF2-319 C	1.4049	Adder	3.12
960282	AF2-319 E	2.1074	Adder	4.68
960381	AF2-329	3.7097	Adder	8.23
960581	AF2-349 C	12.2138	Adder	27.11
960582	AF2-349 E	8.1425	Adder	18.07
960591	AF2-350 C O1	4.6238	Adder	10.26
960592	AF2-350 E O1	3.0825	Adder	6.84
960601	AF2-351 C O1	0.6165	Adder	1.37
960602	AF2-351 E O1	0.9248	Adder	2.05
960721	AF2-363 C O1	3.3397	Adder	7.41
960722	AF2-363 E O1	2.2265	Adder	4.94
960731	AF2-364 C O1	3.4379	Adder	7.63
960732	AF2-364 E O1	2.2919	Adder	5.09
960751	AF2-366 C O1	3.9034	Adder	8.66
960752	AF2-366 E O1	2.6023	Adder	5.78
961501	AF2-441 C O1	5.6075	Adder	12.45
961502	AF2-441 E O1	8.4112	Adder	18.67
WEC	WEC	4.6573	Confirmed LTF	4.6573
CALDERWOOD	CALDERWOOD	0.0656	Confirmed LTF	0.0656
CBM-W2	CBM-W2	25.6101	Confirmed LTF	25.6101
NY	NY	1.4616	Confirmed LTF	1.4616
CBM-W1	CBM-W1	79.8388	Confirmed LTF	79.8388
TVA	TVA	1.6492	Confirmed LTF	1.6492
O-066	O-066	17.3242	Confirmed LTF	17.3242

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CHEOAH	CHEOAH	0.0801	Confirmed LTF	0.0801
CBM-S1	CBM-S1	6.1514	Confirmed LTF	6.1514
G-007	G-007	2.6780	Confirmed LTF	2.6780
MADISON	MADISON	24.8371	Confirmed LTF	24.8371
MEC	MEC	16.3540	Confirmed LTF	16.3540
BLUEG	BLUEG	2.3592	Confirmed LTF	2.3592
TRIMBLE	TRIMBLE	0.8147	Confirmed LTF	0.8147
CATAWBA	CATAWBA	0.3703	Confirmed LTF	0.3703

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
96264041	275232	WILTON ;3M	CE	270644	WILTON ;	CE	1	COMED_P4_112-65-BT5-6__	breaker	1379.0	121.85	121.9	DC	21.99

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274771	LINCOLN ;2U	3.7664	50/50	3.7664
274772	LINCOLN ;3U	3.7664	50/50	3.7664
274773	LINCOLN ;4U	3.7664	50/50	3.7664
274774	LINCOLN ;5U	3.7664	50/50	3.7664
274775	LINCOLN ;6U	3.7664	50/50	3.7664
274776	LINCOLN ;7U	3.7664	50/50	3.7664
274777	LINCOLN ;8U	3.7664	50/50	3.7664
274830	U3-021 1	6.3035	Adder	7.42
274831	U3-021 2	6.3035	Adder	7.42
274881	PILOT HIL;1E	19.9396	Adder	23.46
274890	CAYUG;1U E	17.0054	Adder	20.01
274891	CAYUG;2U E	17.0054	Adder	20.01
275149	KELLYCK ;1E	19.9396	Adder	23.46
276167	Z1-106 E2	1.3063	Adder	1.54
276168	Z1-106 E1	1.3062	Adder	1.54
276169	Z1-107 E	2.6738	Adder	3.15
276170	Z1-108 E	2.5704	Adder	3.02
290021	O50 E	20.0260	Adder	23.56
290051	GSG-6; E	10.8913	Adder	12.81
290108	LEEDK;1U E	25.1940	Adder	29.64
293061	N-015 E	16.4434	Adder	19.35
293644	O22 E1	10.5913	Adder	12.46
293645	O22 E2	20.5595	Adder	24.19
294392	P-010 E	20.8831	Adder	24.57
910542	X3-005 E	0.7562	Adder	0.89
915011	Y3-013 1	3.8635	Adder	4.55
915021	Y3-013 2	3.8635	Adder	4.55
915031	Y3-013 3	3.8635	Adder	4.55
918052	AA1-018 E OP	16.9837	Adder	19.98
920272	AA2-123 E	2.5262	Adder	2.97
924471	AB2-096	43.7741	Adder	51.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
926311	AC1-109 1	1.9765	Adder	2.33
926321	AC1-109 2	1.9765	Adder	2.33
926331	AC1-110 1	1.9634	Adder	2.31
926341	AC1-110 2	1.9634	Adder	2.31
926351	AC1-111 1	0.7894	Adder	0.93
926361	AC1-111 2	0.7894	Adder	0.93
926371	AC1-111 3	0.7894	Adder	0.93
926381	AC1-111 4	0.7894	Adder	0.93
926391	AC1-111 5	0.7894	Adder	0.93
926401	AC1-111 6	0.7894	Adder	0.93
927451	AC1-142A 1	4.3256	Adder	5.09
927461	AC1-142A 2	4.3256	Adder	5.09
930501	AB1-091 O1	79.3394	Adder	93.34
930741	AB1-122 1O1	75.3017	Adder	88.59
930751	AB1-122 2O1	76.2303	Adder	89.68
933411	AC2-154 C	2.7061	Adder	3.18
933412	AC2-154 E	4.4152	Adder	5.19
933431	AC2-156 C O1	0.9893	Adder	1.16
933432	AC2-156 E O1	1.6142	Adder	1.9
933911	AD1-013 C	1.9232	Adder	2.26
933912	AD1-013 E	3.0721	Adder	3.61
933931	AD1-016 C	0.9600	Adder	1.13
933932	AD1-016 E	1.5662	Adder	1.84
934101	AD1-039 1	7.3796	Adder	8.68
934111	AD1-039 2	7.4706	Adder	8.79
934431	AD1-067 C	0.1368	Adder	0.16
934432	AD1-067 E	0.5750	Adder	0.68
934701	AD1-098 C O1	7.1661	Adder	8.43
934702	AD1-098 E O1	5.2320	Adder	6.16
934721	AD1-100 C	24.8523	Adder	29.24
934722	AD1-100 E	115.9774	Adder	136.44
934871	AD1-116 C	0.9891	Adder	1.16
934872	AD1-116 E	1.6138	Adder	1.9
934971	AD1-129 C	0.9344	Adder	1.1
934972	AD1-129 E	0.6230	Adder	0.73
935001	AD1-133 C O1	23.0234	Adder	27.09
935002	AD1-133 E O1	15.3490	Adder	18.06
936291	AD2-038 C O1	2.4301	Adder	2.86
936292	AD2-038 E O1	16.2627	Adder	19.13
936371	AD2-047 C O1	4.8425	Adder	5.7
936372	AD2-047 E O1	23.6427	Adder	27.81
936461	AD2-060	2.8485	Adder	3.35
936511	AD2-066 C O1	8.7640	Adder	10.31
936512	AD2-066 E O1	5.8426	Adder	6.87
937001	AD2-134 C	2.8471	Adder	3.35
937002	AD2-134 E	11.7616	Adder	13.84
937401	AD2-194 1	8.0697	Adder	9.49
937411	AD2-194 2	8.0692	Adder	9.49
938511	AE1-070 1	9.4819	Adder	11.16
938521	AE1-070 2	8.6744	Adder	10.21
938851	AE1-113 C	8.2607	Adder	9.72
938852	AE1-113 E	29.2880	Adder	34.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939321	AE1-163 C O1	6.1063	Adder	7.18
939322	AE1-163 E O1	37.5102	Adder	44.13
939351	AE1-166 C O1	12.2622	Adder	14.43
939352	AE1-166 E O1	11.3189	Adder	13.32
939401	AE1-172 C O1	6.7946	Adder	7.99
939402	AE1-172 E O1	31.8801	Adder	37.51
940101	AE1-252 C O1	13.6499	Adder	16.06
940102	AE1-252 E O1	9.0999	Adder	10.71
940752	AE2-062 E	0.1351	Adder	0.16
941131	AE2-107 C	7.5761	Adder	8.91
941132	AE2-107 E	5.0507	Adder	5.94
941551	AE2-152 C O1	14.1487	Adder	16.65
941552	AE2-152 E O1	9.4325	Adder	11.1
941561	AE2-153 C O1	5.1247	Adder	6.03
941562	AE2-153 E O1	23.9929	Adder	28.23
941731	AE2-173 O1	3.2665	Adder	3.84
942111	AE2-223 C	2.4140	Adder	2.84
942112	AE2-223 E	16.1551	Adder	19.01
942421	AE2-255 C O1	3.1291	Adder	3.68
942422	AE2-255 E O1	9.3872	Adder	11.04
942651	AE2-281 C O1	0.8723	Adder	1.03
942652	AE2-281 E O1	5.3586	Adder	6.3
942991	AE2-321 C	8.4508	Adder	9.94
942992	AE2-321 E	4.1623	Adder	4.9
943121	AE2-341 C	13.2079	Adder	15.54
943122	AE2-341 E	6.4858	Adder	7.63
943381	AF1-009 C	0.6199	Adder	0.73
943382	AF1-009 E	2.4796	Adder	2.92
943591	AF1-030 C O1	8.7834	Adder	10.33
943592	AF1-030 E O1	4.3457	Adder	5.11
943801	AF1-048 C	3.9504	Adder	4.65
943802	AF1-048 E	2.6336	Adder	3.1
944041	AF1-072	2.2259	Adder	2.62
944911	AF1-156 C	13.1029	Adder	15.42
944912	AF1-156 E	8.7353	Adder	10.28
945351	AF1-200 FTIR	322.6289	Merchant Transmission	322.6289
946661	AF1-330 C	2.0715	Adder	2.44
946662	AF1-330 E	0.4547	Adder	0.53
946671	AF1-331	2.4976	Adder	2.94
957021	AF2-003 C O1	3.5751	Adder	7.94
957022	AF2-003 E O1	16.7377	Adder	37.15
957331	AF2-027 C	1.3651	Adder	3.03
957332	AF2-027 E	2.0477	Adder	4.55
958011	AF2-095 C O1	10.2661	Adder	22.79
958012	AF2-095 E O1	4.8311	Adder	10.72
958021	AF2-096 C O1	19.7578	Adder	43.86
958022	AF2-096 E O1	9.3434	Adder	20.74
958481	AF2-142 C	6.2078	Adder	13.78
958482	AF2-142 E	4.1386	Adder	9.19
958491	AF2-143 C	5.9443	Adder	13.19
958492	AF2-143 E	3.9629	Adder	8.8
959341	AF2-225 C	4.1335	Adder	9.18

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959342	AF2-225 E	5.7081	Adder	12.67
959351	AF2-226 C	1.3758	Adder	3.05
959352	AF2-226 E	2.0637	Adder	4.58
960281	AF2-319 C	1.3758	Adder	3.05
960282	AF2-319 E	2.0637	Adder	4.58
960381	AF2-329	3.6323	Adder	8.06
960581	AF2-349 C	11.9583	Adder	26.54
960582	AF2-349 E	7.9722	Adder	17.7
960591	AF2-350 C O1	4.5291	Adder	10.05
960592	AF2-350 E O1	3.0194	Adder	6.7
960601	AF2-351 C O1	0.6039	Adder	1.34
960602	AF2-351 E O1	0.9058	Adder	2.01
960721	AF2-363 C O1	3.2702	Adder	7.26
960722	AF2-363 E O1	2.1801	Adder	4.84
960731	AF2-364 C O1	3.3662	Adder	7.47
960732	AF2-364 E O1	2.2441	Adder	4.98
960751	AF2-366 C O1	3.8221	Adder	8.48
960752	AF2-366 E O1	2.5480	Adder	5.66
961501	AF2-441 C O1	5.4914	Adder	12.19
961502	AF2-441 E O1	8.2371	Adder	18.28
WEC	WEC	4.5603	Confirmed LTF	4.5603
CALDERWOOD	CALDERWOOD	0.0631	Confirmed LTF	0.0631
CBM-W2	CBM-W2	25.0942	Confirmed LTF	25.0942
NY	NY	1.4306	Confirmed LTF	1.4306
CBM-W1	CBM-W1	78.1875	Confirmed LTF	78.1875
TVA	TVA	1.6184	Confirmed LTF	1.6184
O-066	O-066	16.9546	Confirmed LTF	16.9546
CHEOAH	CHEOAH	0.0771	Confirmed LTF	0.0771
CBM-S1	CBM-S1	6.0407	Confirmed LTF	6.0407
G-007	G-007	2.6218	Confirmed LTF	2.6218
MADISON	MADISON	24.3210	Confirmed LTF	24.3210
MEC	MEC	16.0171	Confirmed LTF	16.0171
BLUEG	BLUEG	2.3071	Confirmed LTF	2.3071
TRIMBLE	TRIMBLE	0.7969	Confirmed LTF	0.7969
CATAWBA	CATAWBA	0.3619	Confirmed LTF	0.3619

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
96264029	275233	WILTON ;4M	CE	270644	WILTON ;	CE	1	COMED_P4_112-65-BT2-3__	breaker	1379.0	124.4	124.45	DC	22.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274771	LINCOLN ;2U	3.8683	50/50	3.8683
274772	LINCOLN ;3U	3.8683	50/50	3.8683
274773	LINCOLN ;4U	3.8683	50/50	3.8683
274774	LINCOLN ;5U	3.8683	50/50	3.8683

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274775	LINCOLN ;6U	3.8683	50/50	3.8683
274776	LINCOLN ;7U	3.8683	50/50	3.8683
274777	LINCOLN ;8U	3.8683	50/50	3.8683
274830	U3-021 1	6.4380	Adder	7.57
274831	U3-021 2	6.4380	Adder	7.57
274881	PILOT HIL;1E	20.3561	Adder	23.95
274890	CAYUG;1U E	17.3451	Adder	20.41
274891	CAYUG;2U E	17.3451	Adder	20.41
275149	KELLYCK ;1E	20.3561	Adder	23.95
276167	Z1-106 E2	1.3342	Adder	1.57
276168	Z1-106 E1	1.3341	Adder	1.57
276169	Z1-107 E	2.7309	Adder	3.21
276170	Z1-108 E	2.6251	Adder	3.09
290021	O50 E	20.4530	Adder	24.06
290051	GSG-6; E	11.1236	Adder	13.09
290108	LEEDK;1U E	25.7295	Adder	30.27
293061	N-015 E	16.7861	Adder	19.75
293644	O22 E1	10.8153	Adder	12.72
293645	O22 E2	20.9944	Adder	24.7
294392	P-010 E	21.3184	Adder	25.08
910542	X3-005 E	0.7727	Adder	0.91
915011	Y3-013 1	3.9461	Adder	4.64
915021	Y3-013 2	3.9461	Adder	4.64
915031	Y3-013 3	3.9461	Adder	4.64
918052	AA1-018 E OP	17.3542	Adder	20.42
920272	AA2-123 E	2.5799	Adder	3.04
924471	AB2-096	44.7083	Adder	52.6
926311	AC1-109 1	2.0186	Adder	2.37
926321	AC1-109 2	2.0186	Adder	2.37
926331	AC1-110 1	2.0052	Adder	2.36
926341	AC1-110 2	2.0052	Adder	2.36
926351	AC1-111 1	0.8063	Adder	0.95
926361	AC1-111 2	0.8063	Adder	0.95
926371	AC1-111 3	0.8063	Adder	0.95
926381	AC1-111 4	0.8063	Adder	0.95
926391	AC1-111 5	0.8063	Adder	0.95
926401	AC1-111 6	0.8063	Adder	0.95
927451	AC1-142A 1	4.4186	Adder	5.2
927461	AC1-142A 2	4.4186	Adder	5.2
930501	AB1-091 O1	80.9897	Adder	95.28
930741	AB1-122 1O1	76.8999	Adder	90.47
930751	AB1-122 2O1	77.8579	Adder	91.6
933411	AC2-154 C	2.7626	Adder	3.25
933412	AC2-154 E	4.5074	Adder	5.3
933431	AC2-156 C O1	1.0103	Adder	1.19
933432	AC2-156 E O1	1.6485	Adder	1.94
933911	AD1-013 C	1.9642	Adder	2.31
933912	AD1-013 E	3.1375	Adder	3.69
933931	AD1-016 C	0.9804	Adder	1.15
933932	AD1-016 E	1.5996	Adder	1.88
934101	AD1-039 1	7.5362	Adder	8.87
934111	AD1-039 2	7.6301	Adder	8.98

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
934431	AD1-067 C	0.1397	Adder	0.16
934432	AD1-067 E	0.5873	Adder	0.69
934701	AD1-098 C O1	7.3184	Adder	8.61
934702	AD1-098 E O1	5.3432	Adder	6.29
934721	AD1-100 C	25.3457	Adder	29.82
934722	AD1-100 E	118.2800	Adder	139.15
934871	AD1-116 C	1.0107	Adder	1.19
934872	AD1-116 E	1.6490	Adder	1.94
934971	AD1-129 C	0.9544	Adder	1.12
934972	AD1-129 E	0.6363	Adder	0.75
935001	AD1-133 C O1	23.5023	Adder	27.65
935002	AD1-133 E O1	15.6682	Adder	18.43
936291	AD2-038 C O1	2.4826	Adder	2.92
936292	AD2-038 E O1	16.6143	Adder	19.55
936371	AD2-047 C O1	4.9436	Adder	5.82
936372	AD2-047 E O1	24.1366	Adder	28.4
936461	AD2-060	2.9080	Adder	3.42
936511	AD2-066 C O1	8.9497	Adder	10.53
936512	AD2-066 E O1	5.9665	Adder	7.02
937001	AD2-134 C	2.9079	Adder	3.42
937002	AD2-134 E	12.0124	Adder	14.13
937401	AD2-194 1	8.2426	Adder	9.7
937411	AD2-194 2	8.2421	Adder	9.7
938511	AE1-070 1	9.6851	Adder	11.39
938521	AE1-070 2	8.8603	Adder	10.42
938851	AE1-113 C	8.4369	Adder	9.93
938852	AE1-113 E	29.9126	Adder	35.19
939321	AE1-163 C O1	6.2383	Adder	7.34
939322	AE1-163 E O1	38.3212	Adder	45.08
939351	AE1-166 C O1	12.5095	Adder	14.72
939352	AE1-166 E O1	11.5472	Adder	13.58
939401	AE1-172 C O1	6.9294	Adder	8.15
939402	AE1-172 E O1	32.5126	Adder	38.25
940101	AE1-252 C O1	13.9207	Adder	16.38
940102	AE1-252 E O1	9.2805	Adder	10.92
940752	AE2-062 E	0.1379	Adder	0.16
941131	AE2-107 C	7.7372	Adder	9.1
941132	AE2-107 E	5.1581	Adder	6.07
941551	AE2-152 C O1	14.4340	Adder	16.98
941552	AE2-152 E O1	9.6227	Adder	11.32
941561	AE2-153 C O1	5.2303	Adder	6.15
941562	AE2-153 E O1	24.4874	Adder	28.81
941731	AE2-173 O1	3.3326	Adder	3.92
942111	AE2-223 C	2.4629	Adder	2.9
942112	AE2-223 E	16.4823	Adder	19.39
942421	AE2-255 C O1	3.1958	Adder	3.76
942422	AE2-255 E O1	9.5874	Adder	11.28
942651	AE2-281 C O1	0.8912	Adder	1.05
942652	AE2-281 E O1	5.4745	Adder	6.44
942991	AE2-321 C	8.6313	Adder	10.15
942992	AE2-321 E	4.2513	Adder	5.0
943121	AE2-341 C	13.4892	Adder	15.87

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943122	AE2-341 E	6.6239	Adder	7.79
943381	AF1-009 C	0.6331	Adder	0.74
943382	AF1-009 E	2.5323	Adder	2.98
943591	AF1-030 C O1	8.9705	Adder	10.55
943592	AF1-030 E O1	4.4383	Adder	5.22
943801	AF1-048 C	4.0348	Adder	4.75
943802	AF1-048 E	2.6899	Adder	3.16
944041	AF1-072	2.2734	Adder	2.67
944911	AF1-156 C	13.3730	Adder	15.73
944912	AF1-156 E	8.9153	Adder	10.49
945351	AF1-200 FTIR	329.4462	Merchant Transmission	329.4462
946661	AF1-330 C	2.1155	Adder	2.49
946662	AF1-330 E	0.4644	Adder	0.55
946671	AF1-331	2.5508	Adder	3.0
957021	AF2-003 C O1	3.6510	Adder	8.1
957022	AF2-003 E O1	17.0932	Adder	37.94
957331	AF2-027 C	1.3943	Adder	3.1
957332	AF2-027 E	2.0914	Adder	4.64
958011	AF2-095 C O1	10.4805	Adder	23.26
958012	AF2-095 E O1	4.9320	Adder	10.95
958021	AF2-096 C O1	20.1649	Adder	44.76
958022	AF2-096 E O1	9.5360	Adder	21.17
958481	AF2-142 C	6.3433	Adder	14.08
958482	AF2-142 E	4.2288	Adder	9.39
958491	AF2-143 C	6.0728	Adder	13.48
958492	AF2-143 E	4.0486	Adder	8.99
959341	AF2-225 C	4.2172	Adder	9.36
959342	AF2-225 E	5.8238	Adder	12.93
959351	AF2-226 C	1.4049	Adder	3.12
959352	AF2-226 E	2.1074	Adder	4.68
960281	AF2-319 C	1.4049	Adder	3.12
960282	AF2-319 E	2.1074	Adder	4.68
960381	AF2-329	3.7097	Adder	8.23
960581	AF2-349 C	12.2138	Adder	27.11
960582	AF2-349 E	8.1425	Adder	18.07
960591	AF2-350 C O1	4.6238	Adder	10.26
960592	AF2-350 E O1	3.0825	Adder	6.84
960601	AF2-351 C O1	0.6165	Adder	1.37
960602	AF2-351 E O1	0.9248	Adder	2.05
960721	AF2-363 C O1	3.3397	Adder	7.41
960722	AF2-363 E O1	2.2265	Adder	4.94
960731	AF2-364 C O1	3.4379	Adder	7.63
960732	AF2-364 E O1	2.2919	Adder	5.09
960751	AF2-366 C O1	3.9034	Adder	8.66
960752	AF2-366 E O1	2.6023	Adder	5.78
961501	AF2-441 C O1	5.6075	Adder	12.45
961502	AF2-441 E O1	8.4112	Adder	18.67
WEC	WEC	4.6573	Confirmed LTF	4.6573
CALDERWOOD	CALDERWOOD	0.0656	Confirmed LTF	0.0656
CBM-W2	CBM-W2	25.6101	Confirmed LTF	25.6101
NY	NY	1.4616	Confirmed LTF	1.4616
CBM-W1	CBM-W1	79.8388	Confirmed LTF	79.8388

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
TVA	TVA	1.6492	Confirmed LTF	1.6492
O-066	O-066	17.3242	Confirmed LTF	17.3242
CHEOAH	CHEOAH	0.0801	Confirmed LTF	0.0801
CBM-S1	CBM-S1	6.1514	Confirmed LTF	6.1514
G-007	G-007	2.6780	Confirmed LTF	2.6780
MADISON	MADISON	24.8371	Confirmed LTF	24.8371
MEC	MEC	16.3540	Confirmed LTF	16.3540
BLUEG	BLUEG	2.3592	Confirmed LTF	2.3592
TRIMBLE	TRIMBLE	0.8147	Confirmed LTF	0.8147
CATAWBA	CATAWBA	0.3703	Confirmed LTF	0.3703

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
96265342	930740	AB1-122 TAP	CE	270717	DRESDEN ; R	CE	1	COMED_P7_345-L19601_B-S+_345-L9801_R-S_FSA	tower	1195.0	135.95	138.64	DC	32.13

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274677	POWERTON ;5U	28.3468	50/50	28.3468
274678	POWERTON ;6U	28.4277	50/50	28.4277
274861	TOP CROP ;1U	0.7514	50/50	0.7514
274862	TOP CROP ;2U	1.4586	50/50	1.4586
274879	MINONK ;1U	0.8015	50/50	0.8015
290021	O50 E	18.5856	50/50	18.5856
293644	O22 E1	17.4249	50/50	17.4249
293645	O22 E2	33.8247	50/50	33.8247
293771	O-035 E	3.9436	Adder	4.64
294401	BSHIL;1U E	5.9160	Adder	6.96
294410	BSHIL;2U E	5.9160	Adder	6.96
918051	AA1-018 C OP	0.7203	50/50	0.7203
918052	AA1-018 E OP	27.9466	50/50	27.9466
925581	AC1-033 C	0.9687	Adder	1.14
925582	AC1-033 E	6.4854	Adder	7.63
926821	AC1-168 C O1	0.5478	Adder	0.64
926822	AC1-168 E O1	3.6760	Adder	4.32
926841	AC1-171 C O1	1.3961	50/50	1.3961
926842	AC1-171 E O1	9.3252	50/50	9.3252
927201	AC1-214 C O1	1.2657	Adder	1.49
927202	AC1-214 E O1	4.0235	Adder	4.73
930741	AB1-122 1O1	524.6358	50/50	524.6358
934051	AD1-031 C O1	1.9659	Adder	2.31
934052	AD1-031 E O1	3.2076	Adder	3.77
934101	AD1-039 1	51.4143	50/50	51.4143
934871	AD1-116 C	1.6275	50/50	1.6275
934872	AD1-116 E	2.6555	50/50	2.6555

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
936291	AD2-038 C O1	4.1775	50/50	4.1775
936292	AD2-038 E O1	27.9570	50/50	27.9570
938851	AE1-113 C	7.6666	50/50	7.6666
938852	AE1-113 E	27.1814	50/50	27.1814
939321	AE1-163 C O1	10.4973	50/50	10.4973
939322	AE1-163 E O1	64.4832	50/50	64.4832
942421	AE2-255 C O1	2.9040	50/50	2.9040
942422	AE2-255 E O1	8.7120	50/50	8.7120
942651	AE2-281 C O1	1.4996	50/50	1.4996
942652	AE2-281 E O1	9.2119	50/50	9.2119
946541	AF1-318 C O1	2.9781	Adder	3.5
946542	AF1-318 E O1	13.9445	Adder	16.41
951631	J456 C	1.9539	PJM External (MISO)	1.9539
951632	J456 E	10.5711	PJM External (MISO)	10.5711
953951	J859	10.7522	PJM External (MISO)	10.7522
954702	J844 E	13.2756	PJM External (MISO)	13.2756
954981	J974 C	7.1109	PJM External (MISO)	7.1109
954982	J974 E	38.4716	PJM External (MISO)	38.4716
955711	J1055 C	2.0719	PJM External (MISO)	2.0719
955712	J1055 E	11.2093	PJM External (MISO)	11.2093
957021	AF2-003 C O1	11.3903	50/50	11.3903
957022	AF2-003 E O1	53.3274	50/50	53.3274
957751	AF2-069 C	0.0777	Adder	0.17
957752	AF2-069 E	0.2507	Adder	0.56
957761	AF2-070 C	0.1094	Adder	0.24
957762	AF2-070 E	0.5314	Adder	1.18
958341	AF2-128 C O1	0.4028	Adder	0.89
958342	AF2-128 E O1	1.8858	Adder	4.19
958481	AF2-142 C	19.2735	50/50	19.2735
958482	AF2-142 E	12.8490	50/50	12.8490
958491	AF2-143 C	19.2807	50/50	19.2807
958492	AF2-143 E	12.8538	50/50	12.8538
959351	AF2-226 C	4.2708	50/50	4.2708
959352	AF2-226 E	6.4062	50/50	6.4062
960281	AF2-319 C	4.2708	50/50	4.2708
960282	AF2-319 E	6.4062	50/50	6.4062
990901	L-005 E	9.9164	Adder	11.67
LGEE	LGEE	0.1506	Confirmed LTF	0.1506
CPL	CPL	0.2381	Confirmed LTF	0.2381
CBM-W2	CBM-W2	16.4619	Confirmed LTF	16.4619
NY	NY	0.0415	Confirmed LTF	0.0415
CBM-W1	CBM-W1	15.1371	Confirmed LTF	15.1371
TVA	TVA	1.7472	Confirmed LTF	1.7472
O-066	O-066	0.3965	Confirmed LTF	0.3965
CBM-S2	CBM-S2	2.8149	Confirmed LTF	2.8149
CBM-S1	CBM-S1	9.0738	Confirmed LTF	9.0738
G-007	G-007	0.0603	Confirmed LTF	0.0603
MADISON	MADISON	6.4411	Confirmed LTF	6.4411
MEC	MEC	6.8851	Confirmed LTF	6.8851

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
95294075	960680	AF2-359 TAP	CE	243229	05OLIVE	AEP	1	COMED_P4_112-65-BT3-4__	breaker	971.0	108.87	109.2	DC	15.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274806	UNIV PK N;2U	1.8438	50/50	1.8438
274808	UNIV PK N;4U	1.8438	50/50	1.8438
274809	UNIV PK N;5U	1.8438	50/50	1.8438
274811	UNIV PK N;7U	1.8438	50/50	1.8438
274812	UNIV PK N;8U	1.8438	50/50	1.8438
274814	UNIV PK N;0U	1.8438	50/50	1.8438
274815	UNIV PK N;XU	1.8438	50/50	1.8438
274830	U3-021 1	4.2437	Adder	4.99
274831	U3-021 2	4.2437	Adder	4.99
274881	PILOT HIL;1E	12.8008	Adder	15.06
275149	KELLYCK ;1E	12.8008	Adder	15.06
276167	Z1-106 E2	0.8815	Adder	1.04
276168	Z1-106 E1	0.8815	Adder	1.04
276169	Z1-107 E	1.8726	Adder	2.2
276170	Z1-108 E	1.7357	Adder	2.04
290021	O50 E	13.4014	Adder	15.77
290051	GSG-6; E	7.3075	Adder	8.6
290108	LEEDK;1U E	16.9235	Adder	19.91
293061	N-015 E	10.8589	Adder	12.78
293644	O22 E1	6.7411	Adder	7.93
293645	O22 E2	13.0857	Adder	15.39
294392	P-010 E	13.7908	Adder	16.22
915011	Y3-013 1	2.6176	Adder	3.08
915021	Y3-013 2	2.6176	Adder	3.08
915031	Y3-013 3	2.6176	Adder	3.08
918052	AA1-018 E OP	12.3182	Adder	14.49
920272	AA2-123 E	1.7022	Adder	2.0
924471	AB2-096	29.4703	Adder	34.67
926311	AC1-109 1	1.3324	Adder	1.57
926321	AC1-109 2	1.3324	Adder	1.57
926331	AC1-110 1	1.3249	Adder	1.56
926341	AC1-110 2	1.3249	Adder	1.56
926351	AC1-111 1	0.5330	Adder	0.63
926361	AC1-111 2	0.5330	Adder	0.63
926371	AC1-111 3	0.5330	Adder	0.63
926381	AC1-111 4	0.5330	Adder	0.63
926391	AC1-111 5	0.5330	Adder	0.63
926401	AC1-111 6	0.5330	Adder	0.63
926431	AC1-114	1.6527	Adder	1.94
927451	AC1-142A 1	2.9727	Adder	3.5
927461	AC1-142A 2	2.9713	Adder	3.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
927511	AC1-113 1	0.8264	Adder	0.97
927521	AC1-113 2	0.8264	Adder	0.97
930481	AB1-089	45.6841	Adder	53.75
930501	AB1-091 O1	49.2044	Adder	57.89
930741	AB1-122 1O1	49.9503	Adder	58.77
930751	AB1-122 2O1	51.4018	Adder	60.47
932881	AC2-115 1	1.6527	Adder	1.94
932891	AC2-115 2	1.6527	Adder	1.94
932921	AC2-116	0.5785	Adder	0.68
932931	AC2-117	8.9559	Adder	10.54
933411	AC2-154 C	1.7374	Adder	2.04
933412	AC2-154 E	2.8347	Adder	3.33
933431	AC2-156 C O1	0.6658	Adder	0.78
933432	AC2-156 E O1	1.0864	Adder	1.28
933911	AD1-013 C	1.2909	Adder	1.52
933912	AD1-013 E	2.0621	Adder	2.43
933931	AD1-016 C	0.6468	Adder	0.76
933932	AD1-016 E	1.0554	Adder	1.24
934101	AD1-039 1	4.8951	Adder	5.76
934111	AD1-039 2	5.0374	Adder	5.93
934431	AD1-067 C	0.0918	Adder	0.11
934432	AD1-067 E	0.3858	Adder	0.45
934651	AD1-096 C	0.6185	Adder	0.73
934652	AD1-096 E	1.0091	Adder	1.19
934701	AD1-098 C O1	4.8064	Adder	5.65
934702	AD1-098 E O1	3.5092	Adder	4.13
934721	AD1-100 C	13.3811	Adder	15.74
934722	AD1-100 E	62.4453	Adder	73.47
934871	AD1-116 C	0.7174	Adder	0.84
934872	AD1-116 E	1.1705	Adder	1.38
934971	AD1-129 C	0.6287	Adder	0.74
934972	AD1-129 E	0.4191	Adder	0.49
936291	AD2-038 C O1	1.6923	Adder	1.99
936292	AD2-038 E O1	11.3254	Adder	13.32
936371	AD2-047 C O1	3.1091	Adder	3.66
936372	AD2-047 E O1	15.1795	Adder	17.86
936461	AD2-060	1.8289	Adder	2.15
936511	AD2-066 C O1	5.8799	Adder	6.92
936512	AD2-066 E O1	3.9199	Adder	4.61
936791	AD2-102 C	9.8165	Adder	11.55
936792	AD2-102 E	6.5443	Adder	7.7
937001	AD2-134 C	1.9103	Adder	2.25
937002	AD2-134 E	7.8914	Adder	9.28
937401	AD2-194 1	5.4743	Adder	6.44
937411	AD2-194 2	5.4784	Adder	6.45
938511	AE1-070 1	6.4323	Adder	7.57
938521	AE1-070 2	5.8893	Adder	6.93
938851	AE1-113 C	5.5281	Adder	6.5
938852	AE1-113 E	19.5996	Adder	23.06
939321	AE1-163 C O1	4.2525	Adder	5.0
939322	AE1-163 E O1	26.1223	Adder	30.73
939351	AE1-166 C O1	7.1186	Adder	8.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939352	AE1-166 E O1	6.5710	Adder	7.73
940752	AE2-062 E	0.0901	Adder	0.11
941131	AE2-107 C	5.0908	Adder	5.99
941132	AE2-107 E	3.3939	Adder	3.99
941551	AE2-152 C O1	8.2138	Adder	9.66
941552	AE2-152 E O1	5.4759	Adder	6.44
941561	AE2-153 C O1	3.2939	Adder	3.88
941562	AE2-153 E O1	15.4214	Adder	18.14
942421	AE2-255 C O1	2.0940	Adder	2.46
942422	AE2-255 E O1	6.2819	Adder	7.39
942651	AE2-281 C O1	0.6075	Adder	0.71
942652	AE2-281 E O1	3.7318	Adder	4.39
942991	AE2-321 C	5.6939	Adder	6.7
942992	AE2-321 E	2.8044	Adder	3.3
943121	AE2-341 C	8.8930	Adder	10.46
943122	AE2-341 E	4.3670	Adder	5.14
943381	AF1-009 C	0.4158	Adder	0.49
943382	AF1-009 E	1.6631	Adder	1.96
943591	AF1-030 C O1	5.9140	Adder	6.96
943592	AF1-030 E O1	2.9260	Adder	3.44
943801	AF1-048 C	2.6617	Adder	3.13
943802	AF1-048 E	1.7744	Adder	2.09
944041	AF1-072	1.5025	Adder	1.77
944911	AF1-156 C	8.4219	Adder	9.91
944912	AF1-156 E	5.6146	Adder	6.61
945351	AF1-200 FTIR	215.3640	Merchant Transmission	215.3640
946661	AF1-330 C	1.3958	Adder	1.64
946662	AF1-330 E	0.3064	Adder	0.36
946671	AF1-331	1.6765	Adder	1.97
957021	AF2-003 C O1	2.3049	Adder	5.12
957022	AF2-003 E O1	10.7911	Adder	23.95
957331	AF2-027 C	0.9249	Adder	2.05
957332	AF2-027 E	1.3873	Adder	3.08
957471	AF2-041 C	7.8455	Adder	17.42
957472	AF2-041 E	5.2303	Adder	11.61
958011	AF2-095 C O1	6.5900	Adder	14.63
958012	AF2-095 E O1	3.1012	Adder	6.88
958021	AF2-096 C O1	12.8794	Adder	28.59
958022	AF2-096 E O1	6.0906	Adder	13.52
958481	AF2-142 C	4.5025	Adder	9.99
958482	AF2-142 E	3.0017	Adder	6.66
958491	AF2-143 C	4.1396	Adder	9.19
958492	AF2-143 E	2.7598	Adder	6.13
959081	AF2-199 C	2.6152	Adder	5.81
959082	AF2-199 E	1.7434	Adder	3.87
959091	AF2-200 C	5.2303	Adder	11.61
959092	AF2-200 E	3.4869	Adder	7.74
959101	AF2-201 C O1	0.0380	Adder	0.08
959102	AF2-201 E O1	0.1091	Adder	0.24
959351	AF2-226 C	0.8757	Adder	1.94
959352	AF2-226 E	1.3135	Adder	2.92
960281	AF2-319 C	0.8757	Adder	1.94

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960282	AF2-319 E	1.3135	Adder	2.92
960381	AF2-329	2.4457	Adder	5.43
960581	AF2-349 C	8.0530	Adder	17.88
960582	AF2-349 E	5.3687	Adder	11.92
960591	AF2-350 C O1	2.9076	Adder	6.45
960592	AF2-350 E O1	1.9384	Adder	4.3
960601	AF2-351 C O1	0.3877	Adder	0.86
960602	AF2-351 E O1	0.5815	Adder	1.29
960681	AF2-359 C	65.7540	50/50	65.7540
960682	AF2-359 E	43.8360	50/50	43.8360
960721	AF2-363 C O1	2.1980	Adder	4.88
960722	AF2-363 E O1	1.4654	Adder	3.25
960731	AF2-364 C O1	2.2713	Adder	5.04
960732	AF2-364 E O1	1.5142	Adder	3.36
960751	AF2-366 C O1	2.5693	Adder	5.7
960752	AF2-366 E O1	1.7128	Adder	3.8
WEC	WEC	3.0757	Confirmed LTF	3.0757
CALDERWOOD	CALDERWOOD	0.0691	Confirmed LTF	0.0691
CBM-W2	CBM-W2	14.5536	Confirmed LTF	14.5536
NY	NY	0.9241	Confirmed LTF	0.9241
CBM-W1	CBM-W1	47.1877	Confirmed LTF	47.1877
TVA	TVA	0.9016	Confirmed LTF	0.9016
O-066	O-066	10.9133	Confirmed LTF	10.9133
CHEOAH	CHEOAH	0.0776	Confirmed LTF	0.0776
CBM-S1	CBM-S1	3.0246	Confirmed LTF	3.0246
G-007	G-007	1.6869	Confirmed LTF	1.6869
MADISON	MADISON	15.8659	Confirmed LTF	15.8659
MEC	MEC	10.4429	Confirmed LTF	10.4429
GIBSON	GIBSON	0.1338	Confirmed LTF	0.1338
BLUEG	BLUEG	1.6666	Confirmed LTF	1.6666
TRIMBLE	TRIMBLE	0.5654	Confirmed LTF	0.5654
CATAWBA	CATAWBA	0.2394	Confirmed LTF	0.2394

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
AA1-018	Powerton-Goodings Grove	In Service
AA2-123	Marengo 34kV	In Service
AB1-089	Byron-Wayne 345kV #1	Active
AB1-091	Davis Creek 345kV	Active
AB1-122	Kendall-Tazewell & Dresden-Mole Creek	Active
AB2-096	Silver Lake-Cherry Valley	Active
AC1-033	Kewanee	Active
AC1-109	Aurora 345kV	Active
AC1-110	Aurora 138kV	Active
AC1-111	Aurora 138kV	Active
AC1-113	Rockford	Active
AC1-114	Rockford II	Active
AC1-142A	Joliet	Active
AC1-168	Kewanee-Streator	Active
AC1-171	Powerton	Active
AC1-214	Crescent Ridge	Engineering and Procurement
AC2-115	Rockford	Active
AC2-116	Rockford II	Active
AC2-117	University Park North	Engineering and Procurement
AC2-154	Davis Creek 138kV	Active
AC2-156	Sandwich 34.5kV	Active
AD1-013	Twombly Road 138kV	Active
AD1-016	Marengo	Active
AD1-031	Kewanee 138 kV	Active
AD1-039	Kendall-Tazewell & Dresden-Mole Creek	Active
AD1-067	Mendota Hills	Active
AD1-096	Stillman Valley 34 kV	Active
AD1-098	Dixon-McGirr	Active
AD1-100	Loretto-Wilton & Braidwood-Davis Creek	Active
AD1-116	Nevada 345 kV	Active
AD1-129	Belvidere 34 kV	Active
AD1-133	Pontiac MidPoint-Dresden	Active
AD2-038	Powerton	Active
AD2-047	Davis Creek 138 kV	Active
AD2-060	Davis Creek 138kV	Active
AD2-066	Mazon-Crescent Ridge	Active
AD2-102	Wempletown 345 kV	Active
AD2-134	Shady Oaks	Active
AD2-194	Elwood	Active

Queue Number	Project Name	Status
AE1-070	Elwood 345 kV	Active
AE1-113	Mole Creek 345 kV	Active
AE1-163	Powerton-Nevada 345 kV	Active
AE1-166	Loretto-Wilton & Braidwood-Davis Creek	Active
AE1-172	Loretto-Wilton Center	Active
AE1-252	Loretto-Wilton Center	Active
AE2-062	Normantown	Active
AE2-107	Haumesser Road 138 kV	Active
AE2-152	Loretto-Wilton & Braidwood-Davis Creek	Active
AE2-153	Braidwood-Davis Creek	Active
AE2-173	McLean 345 kV	Active
AE2-223	McLean 345 kV	Active
AE2-255	Molecreek 345 kV	Active
AE2-281	Powerton-Nevada 345 kV	Active
AE2-321	Belvidere-Marengo 138 kV	Active
AE2-341	Sandwich-Plano	Active
AF1-009	Dixon-McGirr	Active
AF1-030	Plano-R 138 kV	Active
AF1-048	Belvidere-Marengo	Active
AF1-072	Rocky Road	Active
AF1-156	Braidwood-Davis Creek	Active
AF1-200	Plano 345 kV	Active
AF1-318	Crescent Ridge-Corbin	Active
AF1-330	Marengo	Active
AF1-331	Twombly Road	Active
AF2-003	Powerton-Mole Creek	Active
AF2-027	Zion Energy Center 345 kV	Active
AF2-041	Nelson-Electric Junction 345 kV	Active
AF2-069	Crescent Ridge 138 kV	Active
AF2-070	Crescent Ridge 138 kV	Active
AF2-095	Wilmington-Davis Creek	Active
AF2-096	Braidwood-East Frankfort 345 kV	Active
AF2-128	Crescent Ridge-Corbin 138 kV	Active
AF2-142	Nevada 345 kV	Active
AF2-143	Powerton-Nevada 345 kV	Active
AF2-199	Nelson-Electric Junction 345 kV	Active
AF2-200	Nelson-Electric Junction 345 kV	Active
AF2-201	Lena-Ecogrove 138 kV	Active
AF2-225	McLean 345 kV	Active
AF2-226	Katydid Road 345 kV	Active
AF2-319	Katydid Road 345 kV	Active
AF2-329	Sandwich-Plano 138 kV	Active
AF2-349	Garden Prairie-Silver Lake 345 kV	Active
AF2-350	Kensington 138 kV	Active
AF2-351	Kensington 138 kV	Active
AF2-359	Olive-University Park 345 kV	Active
AF2-363	Glidden 138 kV	Active
AF2-364	Wayne Red 138 kV	Active
AF2-366	Glidden-Waterman 345 kV	Active
AF2-441	Burnham 138kV	Active
U3-021	Silver Lake-Cherry Valley	Active
X3-005	Wildwood 12kV	In Service

Queue Number	Project Name	Status
Y3-013	Zion Energy Center	Active
Z1-106	West Chicago 34kV	In Service
Z1-107	Joliet 34kV	In Service
Z1-108	McHenry 34kV	In Service
J1055	MISO	MISO
J456	MISO	MISO
J844	MISO	MISO
J859	MISO	MISO
J974	MISO	MISO

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
COMED_P4_112-65-BT5-6__	CONTINGENCY 'COMED_P4_112-65-BT5-6__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33 END
AEP_P4_#2978_05DUMONT_FSA	CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA' OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1 END
COMED_P7_345-L19601_B-S+_345-L9801__R-S_FSA	CONTINGENCY 'COMED_P7_345-L19601_B-S+_345-L9801__R-S_FSA' TRIP BRANCH FROM BUS 270790 TO BUS 270770 CKT 1 / KATYD; B 345 GOODI;4B 345 TRIP BRANCH FROM BUS 918050 TO BUS 270769 CKT 1 / AA1-018 GOODINGS ;2R 345 END
COMED_P7_345-L0301__B-S+_345-L9801__R-S_FSA-B	CONTINGENCY 'COMED_P7_345-L0301__B-S+_345-L9801__R-S_FSA-B' TRIP BRANCH FROM BUS 957020 TO BUS 270790 CKT 1 / AF2-003 TAP 345 KATYDID TRIP BRANCH FROM BUS 918050 TO BUS 270769 CKT 1 / AA1-018 GOODINGS ;2R 345 END

Contingency Name	Contingency Definition
COMED_P4_012-45-BT4-5__	CONTINGENCY 'COMED_P4_012-45-BT4-5__' TRIP BRANCH FROM BUS 270716 TO BUS 930750 CKT 1 / DRESDEN ; B 345 AB1-122 TAP 345 TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1 / DRESD; B 345 ELWOO; B 345 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1 / ELWOO; B 345 ELWOO; R 345 END
COMED_P1-2_695_B2	CONTINGENCY 'COMED_P1-2_695_B2' OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1 END
COMED_P4_112-65-BT2-3__	CONTINGENCY 'COMED_P4_112-65-BT2-3__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33 END
COMED_P4_112-65-BT3-4__	CONTINGENCY 'COMED_P4_112-65-BT3-4__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33 END
Base Case	
COMED_P4_023-65-BT2-3__	CONTINGENCY 'COMED_P4_023-65-BT2-3__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765 END
AEP_P4_#2978_05DUMONT_NON_FSA	CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA' OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020 OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1 END

Contingency Name	Contingency Definition
COMED_P1-2_345-L1202__B-S-A	CONTINGENCY 'COMED_P1-2_345-L1202__B-S-A' TRIP BRANCH FROM BUS 270716 TO BUS 930750 CKT 1 / DRESDEN ; B 345 AB1-122 TAP 345 END
COMED_P4_112-65-BT4-5__	CONTINGENCY 'COMED_P4_112-65-BT4-5__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33 END
COMED_P1-2_345-L0304__R-S	CONTINGENCY 'COMED_P1-2_345-L0304__R-S' TRIP BRANCH FROM BUS 270855 TO BUS 349662 CKT 1 / POWER; R 345 7TAZEWELL 345 END

12 Short Circuit Analysis

The following breakers are overdutied

None

12.1 System Reinforcements - Short Circuit

None

13 Affected Systems

13.1 MISO

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