



**Generation Interconnection
System Impact Study Report
for**

Queue Project AF2-041

NELSON-ELECTRIC JUNCTION 345 KV

180 MW Capacity / 300 MW Energy

February 2021

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact 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 System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. 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 System Impact Study is performed.

The System Impact 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.

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.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Lee County, Illinois. The installed facilities will have a total capability of 300 MW with 180 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is November 01, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-041
Project Name	NELSON-ELECTRIC JUNCTION 345 KV
State	Illinois
County	Lee
Transmission Owner	ComEd
MFO	300
MWE	300
MWC	180
Fuel	Solar
Basecase Study Year	2023

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

4 Point of Interconnection

AF2-041 will interconnect with the ComEd on transmission system tapping the Nelson to Electric Junction 345 kV line.

5 Cost Summary

The AF2-041 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ 26,000,000
Allocation towards System Network Upgrade Costs*	\$ 37,637,000
Total Costs	\$ 63,637,000

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

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.

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

The total physical interconnection work scope and costs are given below:

6.1 Attachment Facilities

The AF2-041 generator lead would interconnect to a new 345kV Interconnection Substation. The required Attachment Facilities are one 345kV line MOD, a dead-end structure and revenue metering as shown in the one-line diagram.

Scope of Work	Cost Estimate
Installation of one 345kV line MOD, one dead-end structure and one set of revenue metering (see notes below on cost estimate)	\$1,000,000

6.2 Direct Connection Network Upgrades

In order to accommodate interconnection of AF1-041, a new 345kV Interconnection Substation would need to be built close to the Nelson-Electric Junction 345kV line 15502, approximately 32.5 miles from Nelson TSS 155.

The scope of work includes the installation of three 345kV circuit breakers in a “breaker-and-a-half” bus configuration and cutting in the Interconnection Substation to the Nelson-Electric Junction 345kV line 15502, as shown in the one-line diagram below.

The Interconnection Customer (“IC”) is responsible for constructing all of the facilities on the IC side of the Point of Interconnection (“POI”) outside of the substation. It is assumed for the purposes of this report that the IC will obtain the site for the Interconnection Substation and right-of-way between the Interconnection Substation and the 345kV transmission line.

In the event that the IC exercises the option to build the interconnecting substation, the IC will be required to construct all interconnection facilities that will be turned over to ComEd in accordance with ComEd published standards and the PJM Tariff.

ComEd would design, engineer and construct the tie-in of the Interconnection Substation to the Nelson-Electric Junction 345kV line 15502.

The preliminary cost estimate for Direct Connection Network Upgrade is given in the following tables.

For Option to Build Direct Connection cost estimates:

Scope of Work	Cost Estimate
Installation of a new 345kV substation as described above	N/A
Transmission line tie in work (foundations, structures, conductors)	\$3,000,000
ComEd oversight and testing	\$1,500,000
Total Cost Estimate (see notes below on cost estimate)	\$4,500,000

For ComEd building the interconnecting substation cost estimates:

Scope of Work	Cost Estimate
Installation of a new 345kV substation as described above	\$20,000,000
Transmission line tie in work (foundations, structures, conductors)	\$3,000,000
Total Cost Estimate (see notes below on cost estimate)	\$23,000,000

ComEd would take approximately 24-months to construct the substation and transmission line work after the ISA / ICSA are signed.

6.3 Non-Direct Connection Network Upgrades

The integration of the new 345kV Interconnection Substation would require relay/communications/SCADA upgrades at Nelson TSS 155 and Electric Junction TSS 111 substation. The ComEd cost is given below:

Scope of Work	Cost Estimate
Relay/communications/SCADA upgrades at the Nelson TSS 155 substation	\$1,000,000
Relay/communications/SCADA upgrades at the Electric Junction TSS 111 Substation	\$1,000,000
Total Cost Estimate (see notes below on cost estimate)	\$2,000,000

6.4 Notes on Cost Estimate:

- 1) These estimates are Order-of-Magnitude estimates of the costs that ComEd would bill to the customer for this interconnection. These estimates are based on a one-line electrical diagram of the project and the information provided by the IC.
- 2) There were no site visits performed for these estimates. There may be costs related to specific site related issues that are not identified in these estimates. The site reviews will be performed during the Facilities Study or during detailed engineering.
- 3) These estimates are not a guarantee of the maximum amount payable by the IC and the actual costs of ComEd's work may differ significantly from these estimates. The IC will be responsible for paying actual costs of ComEd's work in accordance with Sections 212.1 and 217 of the PJM Open Access Transmission Tariff.
- 4) The IC is responsible for all engineering, procurement, testing and construction of all equipment on the IC's side of the POI.
- 5) These cost estimates do not include cost of acquiring right-of-way for the transmission line and purchasing any additional land, if needed, for the line terminations. The need and cost of acquiring property and associated legal costs will be investigated during Facilities Study for this project.

7 Schedule

See Sections 6 and 11.

8 Transmission Owner Analysis

See Sections 6 and 11.

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 Meteorological Data Reporting Requirements

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

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance
- Forced outage data

10.3 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 Analysis

The Queue Project AF2-041 was evaluated as a 300.0 MW (Capacity 180.0 MW) injection tapping the Nelson to Electric Junction 345 kV line (specifically the AF1-012 Tap – Electric Junction 345 kV line segment) in the ComEd area. Project AF2-041 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-041 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
96084446	270730	ELECT JCT; B	345.0	CE	270812	LOMBARD ; B	345.0	CE	1	Base Case	single	1201.0	99.61	101.68	AC	25.85

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 PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
96083904	270678	BYRON ; B	345.0	CE	270694	CHERRY VA; B	345.0	CE	1	COMED_P4_006-45-BT7-8	breaker	1441.0	115.51	117.43	AC	30.08
96083616	270730	ELECT JCT; B	345.0	CE	270812	LOMBARD ; B	345.0	CE	1	COMED_P2-2_111_EJ-345R_3	bus	1479.0	104.13	107.08	AC	44.34
96083591	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P2-2_116_GG-345R_2	bus	1802.0	112.01	112.81	AC	24.96
96083880	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P4_116-45-L11614	breaker	1802.0	116.74	117.53	AC	24.93
96083881	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P4_116-45-L9801_FSA	breaker	1802.0	112.01	112.81	AC	24.96
96083882	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P4_116-45-TR82	breaker	1802.0	112.01	112.81	AC	24.96
96083883	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P4_112-45-BT4-5	breaker	1802.0	106.96	107.5	AC	30.77
157163503	270770	GOODIN GS;4B	345.0	CE	270766	GOODIN GS;3B	345.0	CE	1	COMED_P4_020-45-BT1-3_-A	breaker	1802.0	101.15	101.94	AC	23.96
96084289	274750	CRETE EC;BP	345.0	CE	255112	17STJOHN	345.0	NIPS	1	COMED_P1-2_695_B2	single	1399.0	102.19	102.23	AC	22.31
95197381	956820	J1180 TAP	345.0	AMIL	247712	05SULLIVAN	345.0	AEP	1	AEP_P4_#3128_05EU GENE 345_A2	breaker	1466.0	136.94	136.95	AC	20.07
95197382	956820	J1180 TAP	345.0	AMIL	247712	05SULLIVAN	345.0	AEP	1	COMED_P4_080-45-BT4-5	breaker	1466.0	130.3	130.31	AC	16.19
95197383	956820	J1180 TAP	345.0	AMIL	247712	05SULLIVAN	345.0	AEP	1	COMED_P4_080-45-BT7-8	breaker	1466.0	130.04	130.05	AC	15.83
96083832	957470	AF2-041 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	COMED_P4_006-45-BT3-4	breaker	1656.0	109.37	120.05	AC	178.25

11.4 Steady-State Voltage Requirements

None

11.5 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 LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
96084441	270730	ELECT JCT; B	345.0	CE	270812	LOMBARD ; B	345.0	CE	1	Base Case	operation	1201.0	107.93	111.46	AC	43.09
96084442	270730	ELECT JCT; B	345.0	CE	270812	LOMBARD ; B	345.0	CE	1	COMED_P 2-1_111-L11120	operation	1479.0	104.01	106.96	AC	44.44
147794612	270770	GOODINGS ;4B	345.0	CE	270766	GOODINGS ;3B	345.0	CE	1	COMED_P 1-2_345-L2001__B-S-A	operation	1802.0	100.9	101.69	AC	23.84
157163391	274768	LEE CO EC;BP	345.0	CE	270678	BYRON ; B	345.0	CE	1	COMED_P 1-2_345-L15502__B-R-C	operation	1726.0	102.1	107.95	AC	116.59
157163516	946160	AF1-281 TAP	345.0	CE	274768	LEE CO EC;BP	345.0	CE	1	COMED_P 1-2_345-L15502__B-R-C	operation	1479.0	94.52	101.0	AC	117.72
95197660	956820	J1180 TAP	345.0	AMIL	247712	O5SULLIVAN	345.0	AEP	1	AEP_P1-2_#286	operation	1466.0	127.91	127.92	AC	20.59
95197664	956820	J1180 TAP	345.0	AMIL	247712	O5SULLIVAN	345.0	AEP	1	Base Case	operation	1334.0	126.57	126.58	AC	16.95
96084327	957470	AF2-041 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	Base Case	operation	1334.0	106.83	118.7	AC	162.69
96084328	957470	AF2-041 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	COMED_P 1-2_345-L0627__B-R	operation	1656.0	108.49	119.1	AC	178.25

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-041	Upgrade Number
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95197382,95197383,95197381	9	J1180 TAP 345.0 kV - 05SULLIVAN 345.0 kV Ckt 1	AEP End: AEP can eliminate the Eugene stuck breaker contingency by requiring a new string, expanding the 345 kV buses, add two (2) additional 345 kV circuit breakers, and repositioning the Bunsonville 345 kV line between the two new breakers on the new string. Estimated cost is \$5M. PJM Network Upgrade N5808.	\$5 M \$78 M	\$109 K \$4.628 M	N5808 N7204																																																																																												
			The cost allocation is:																																																																																															
			<table><tr><th>Queue</th><th>MW Contribution</th><th>Percentage of cost</th><th>Cost (\$5 M)</th></tr><tr><td>AD1-100</td><td>49.3</td><td>5.36%</td><td>\$0.268</td></tr><tr><td>AD1-133</td><td>23.9</td><td>2.60%</td><td>\$0.130</td></tr><tr><td>AD2-100</td><td>37.7</td><td>4.10%</td><td>\$0.205</td></tr><tr><td>AD2-159</td><td>26.2</td><td>2.85%</td><td>\$0.142</td></tr><tr><td>AE1-113</td><td>20.2</td><td>2.19%</td><td>\$0.110</td></tr><tr><td>AE1-163</td><td>24.1</td><td>2.62%</td><td>\$0.131</td></tr><tr><td>AE1-172</td><td>19.4</td><td>2.11%</td><td>\$0.105</td></tr><tr><td>AE1-205</td><td>19.8</td><td>2.15%</td><td>\$0.108</td></tr><tr><td>J955</td><td>109.2</td><td>11.86%</td><td>\$0.593</td></tr><tr><td>J979</td><td>22.6</td><td>2.46%</td><td>\$0.123</td></tr><tr><td>J991</td><td>30.7</td><td>3.34%</td><td>\$0.167</td></tr><tr><td>J1022</td><td>15.6</td><td>1.69%</td><td>\$0.085</td></tr><tr><td>J1115</td><td>18.4</td><td>2.00%</td><td>\$0.100</td></tr><tr><td>J1139</td><td>22.2</td><td>2.41%</td><td>\$0.121</td></tr><tr><td>AE2-130</td><td>31.6</td><td>3.43%</td><td>\$0.172</td></tr><tr><td>AE2-223</td><td>14.9</td><td>1.62%</td><td>\$0.081</td></tr><tr><td>AE2-261</td><td>52.2</td><td>5.67%</td><td>\$0.284</td></tr><tr><td>AF1-088</td><td>280.2</td><td>30.44%</td><td>\$1.522</td></tr><tr><td>AF1-090</td><td>38.7</td><td>4.20%</td><td>\$0.210</td></tr><tr><td>AF1-296</td><td>17.5</td><td>1.90%</td><td>\$0.095</td></tr><tr><td>AF1-318</td><td>26.0</td><td>2.82%</td><td>\$0.141</td></tr><tr><td>AF2-041</td><td>20.1</td><td>2.18%</td><td>\$0.109</td></tr></table>				Queue	MW Contribution	Percentage of cost	Cost (\$5 M)	AD1-100	49.3	5.36%	\$0.268	AD1-133	23.9	2.60%	\$0.130	AD2-100	37.7	4.10%	\$0.205	AD2-159	26.2	2.85%	\$0.142	AE1-113	20.2	2.19%	\$0.110	AE1-163	24.1	2.62%	\$0.131	AE1-172	19.4	2.11%	\$0.105	AE1-205	19.8	2.15%	\$0.108	J955	109.2	11.86%	\$0.593	J979	22.6	2.46%	\$0.123	J991	30.7	3.34%	\$0.167	J1022	15.6	1.69%	\$0.085	J1115	18.4	2.00%	\$0.100	J1139	22.2	2.41%	\$0.121	AE2-130	31.6	3.43%	\$0.172	AE2-223	14.9	1.62%	\$0.081	AE2-261	52.2	5.67%	\$0.284	AF1-088	280.2	30.44%	\$1.522	AF1-090	38.7	4.20%	\$0.210	AF1-296	17.5	1.90%	\$0.095	AF1-318	26.0	2.82%	\$0.141	AF2-041	20.1	2.18%	\$0.109
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			AE1-205				19.8	2.15%	\$0.108																																																																																									
			J955				109.2	11.86%	\$0.593																																																																																									
			J979				22.6	2.46%	\$0.123																																																																																									
			J991				30.7	3.34%	\$0.167																																																																																									
			J1022				15.6	1.69%	\$0.085																																																																																									
			J1115				18.4	2.00%	\$0.100																																																																																									
			J1139				22.2	2.41%	\$0.121																																																																																									
			AE2-130				31.6	3.43%	\$0.172																																																																																									
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			AF1-088				280.2	30.44%	\$1.522																																																																																									
			AF1-090				38.7	4.20%	\$0.210																																																																																									
			AF1-296				17.5	1.90%	\$0.095																																																																																									
			AF1-318				26.0	2.82%	\$0.141																																																																																									
			AF2-041				20.1	2.18%	\$0.109																																																																																									
			Ameren: Upgrade is to build a second parallel Sullivan – Casey 345 kV line. \$60-74M (AMIL owns ~97% of the line, estimate for entire line of about 28 miles). Time estimate is 5 years for obtaining permits and line construction.																																																																																															

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-041	Upgrade Number												
			AEP end cost estimate for about 0.9 miles of the line and adding two breakers to accommodate the new line is \$4M. The cost allocation is: <table><tr><th>Queue</th><th>MW Contribution</th><th>Percent age of cost</th><th>Cost (\$78 M)</th></tr><tr><td>AF1-088</td><td>256.85</td><td>94.07%</td><td>\$73.372</td></tr><tr><td>AF2-041</td><td>16.2</td><td>5.93%</td><td>\$4.628</td></tr></table>	Queue	MW Contribution	Percent age of cost	Cost (\$78 M)	AF1-088	256.85	94.07%	\$73.372	AF2-041	16.2	5.93%	\$4.628			
Queue	MW Contribution	Percent age of cost	Cost (\$78 M)															
AF1-088	256.85	94.07%	\$73.372															
AF2-041	16.2	5.93%	\$4.628															
96084289	8	CRETE EC ;BP 345.0 kV - 17STJOHN 345.0 kV Ckt 1	ComEd End: The applicable rating to apply is the SSTE. ComEd L94507 SSTE rating is 1483 MVA. No upgrade required. NIPSCO-End: SE rating is 1508 MVA. No upgrade required.	\$0	\$0	N/A												
96083880,96083881,96083882,96083883,157163503,96083591	7	GOODINGS ;4B 345.0 kV - GOODINGS ;3B 345.0 kV Ckt 1	The applicable rating to apply is the SSTE. ComEd TSS 116 345 kV BT 3-4 SSTE rating is 2083 MVA. The upgrade will be a 345kV BT 3-4 circuit breaker replacement and station conductor. A preliminary estimate for this upgrade is \$3.2 M with a preliminary construction timeline of 24 months. Upon completion of the upgrade the new ratings are expected to be 1793/2008/2425/2918 MVA (SN/SLTE/SSTE/SLD). This upgrade is presently driven by a prior queue cycle.	\$3.2 M	\$0	N6279												

ID	Idx	Facility	Upgrade Description		Cost	Cost Allocated to AF2-041	Upgrade Number		
96083904	6	BYRON ; B 345.0 kV - CHERRY VA; B 345.0 kV Ckt 1	The upgrade will be to mitigate sag on the line and replace a 345kV circuit breaker at Cherry Valley. Cost: \$12,200,000. Time Estimate: 24 Months. Upon completion of the upgrade the ratings will be 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD).		\$12.2 M	\$3.3 M	N6824		
			The cost allocation is:						
			Queue	MW contribution				Percentage of Cost	\$ cost (\$ 12.2 M)
			AF1-280	55.12				49.57%	\$6.05
			AF1-296	25.97				23.36%	\$2.85
			AF2-041	30.1				27.07%	\$3.30
It should be evaluated during the Facilities Study whether a circuit breaker can be added to the Byron Blue ring bus to eliminate this stuck breaker contingency causing the overload.									
96084333,96084332,96083832	4	AF2-041 TAP 345.0 kV - ELECT JCT; B 345.0 kV Ckt 1	Install BT 2-3 345 kV CB at Station 6 Byron. The addition of this CB is proposed to eliminate the overload of L15502 due to the loss of the Byron-Lee County 345 kv line as a result of the stuck BT 3-4 CB at Byron. Preliminary estimate is \$8M with an estimated construction timeline of 24 months pending outage coordination with Byron station.		\$8 M	\$8 M	N6693.3		
96083616,96085329,96084447,96084446	1	ELECT JCT; B 345.0 kV - LOMBARD ; B 345.0 kV Ckt 1	The upgrade will be to reconductor the line. A preliminary estimate is \$14.6M with an estimated construction timeline of 30 months. In addition, to increase the normal rating, the upgrade will be to replace 2-345kV Circuit Breakers and station conductor. A preliminary estimate is \$7M with an estimated construction timeline of 30 months. Upon completion of the upgrades the ratings will be 1461/1656/1837/1912 MVA (SN/SLTE/SSTE/SLD).		\$14.6 M + \$7 M	\$14.6 M + \$7 M	N7023.1 N7023.2		
			Total Costs		\$128,000,000	\$37,637,000			

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates \$0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently \$0, your project may need this system reinforcement

completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

11.7 Flow Gate Details

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

11.7.1 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
96083616	270730	ELECT JCT; B	CE	270812	LOMBARD ; B	CE	1	COMED_P2-2_111_EJ-345R_3	bus	1479.0	104.13	107.08	AC	44.34

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274738	AURORA EC;3P	4.3071	50/50	4.3071
274740	AURORA EC;4P	4.3071	50/50	4.3071
274859	EASYR;U1 E	5.9127	Adder	6.96
274860	EASYR;U2 E	5.9127	Adder	6.96
274872	LEE DEKAL;1U	0.8160	50/50	0.8160
276167	Z1-106 E2	1.1111	50/50	1.1111
276168	Z1-106 E1	1.1176	50/50	1.1176
290051	GSG-6; E	7.0908	Adder	8.34
290108	LEEDK;1U E	20.2340	50/50	20.2340
292543	L-013 2	0.5415	50/50	0.5415
293516	O-009 E1	4.5934	Adder	5.4
293517	O-009 E2	2.3331	Adder	2.74
293518	O-009 E3	2.5694	Adder	3.02
293715	O-029 E	4.9108	Adder	5.78
293716	O-029 E	2.6925	Adder	3.17
293717	O-029 E	2.4747	Adder	2.91
294763	P-046 E	3.8284	Adder	4.5
295109	WESTBROOK E	3.7963	Adder	4.47
295111	SUBLETTE E	1.8456	Adder	2.17
916221	Z1-073 E	3.6587	Adder	4.3
919581	AA2-030	10.8215	Adder	12.73
925302	AB2-191 E	0.9390	Adder	1.1
926311	AC1-109 1	0.9249	Adder	1.09
926321	AC1-109 2	0.9249	Adder	1.09
926331	AC1-110 1	2.5295	50/50	2.5295
926341	AC1-110 2	2.5295	50/50	2.5295
926351	AC1-111 1	0.4956	Adder	0.58
926361	AC1-111 2	0.4956	Adder	0.58
926371	AC1-111 3	0.4956	Adder	0.58
926381	AC1-111 4	0.4956	Adder	0.58
926391	AC1-111 5	0.4956	Adder	0.58
926401	AC1-111 6	0.4956	Adder	0.58
926431	AC1-114	0.8701	Adder	1.02
927511	AC1-113 1	0.4349	Adder	0.51
927521	AC1-113 2	0.4349	Adder	0.51
930481	AB1-089	30.3361	Adder	35.69
932881	AC2-115 1	0.8697	Adder	1.02
932891	AC2-115 2	0.8697	Adder	1.02
932921	AC2-116	0.3045	Adder	0.36
933431	AC2-156 C O1	0.8020	50/50	0.8020
933432	AC2-156 E O1	1.3086	50/50	1.3086

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
933911	AD1-013 C	1.2634	Adder	1.49
933912	AD1-013 E	2.0182	Adder	2.37
934431	AD1-067 C	0.0890	Adder	0.1
934432	AD1-067 E	0.3744	Adder	0.44
934701	AD1-098 C O1	4.6241	Adder	5.44
934702	AD1-098 E O1	3.3761	Adder	3.97
937001	AD2-134 C	1.8537	Adder	2.18
937002	AD2-134 E	7.6574	Adder	9.01
937311	AD2-172 C	1.0050	Adder	1.18
937312	AD2-172 E	1.3878	Adder	1.63
937531	AD2-214 C	2.2750	Adder	2.68
937532	AD2-214 E	1.5167	Adder	1.78
938861	AE1-114 C O1	1.8531	Adder	2.18
938862	AE1-114 E O1	6.3222	Adder	7.44
939051	AE1-134 1	0.8409	Adder	0.99
939061	AE1-134 2	0.8409	Adder	0.99
940501	AE2-035 C	1.0050	Adder	1.18
940502	AE2-035 E	1.3878	Adder	1.63
941131	AE2-107 C	5.4632	50/50	5.4632
941132	AE2-107 E	3.6421	50/50	3.6421
943121	AE2-341 C	10.6374	50/50	10.6374
943122	AE2-341 E	5.2236	50/50	5.2236
943411	AF1-012 C	10.9053	50/50	10.9053
943412	AF1-012 E	7.2702	50/50	7.2702
943591	AF1-030 C O1	7.0740	50/50	7.0740
943592	AF1-030 E O1	3.5000	50/50	3.5000
943921	AF1-060	0.4948	Adder	0.58
944041	AF1-072	0.8968	Adder	1.06
945351	AF1-200 FTIR	174.7048	Merchant Transmission	174.7048
946151	AF1-280 C O1	8.7419	Adder	10.28
946152	AF1-280 E O1	4.0200	Adder	4.73
946161	AF1-281 C	0.1914	Adder	0.23
946162	AF1-281 E	1.0848	Adder	1.28
946321	AF1-296 C O1	1.8826	Adder	2.21
946322	AF1-296 E O1	8.8137	Adder	10.37
946501	AF1-314 C	1.7856	Adder	2.1
946502	AF1-314 E	8.3597	Adder	9.83
946671	AF1-331	1.6408	Adder	1.93
955971	J1084	8.1360	PJM External (MISO)	8.1360
957333	AF2-027 BAT	3.1460	Merchant Transmission	3.1460
957471	AF2-041 C	26.6040	50/50	26.6040
957472	AF2-041 E	17.7360	50/50	17.7360
958911	AF2-182 C	11.4857	Adder	13.51
958912	AF2-182 E	7.6571	Adder	9.01
958921	AF2-183 C	2.0419	Adder	2.4
958922	AF2-183 E	3.0629	Adder	3.6
959081	AF2-199 C	8.8680	50/50	8.8680
959082	AF2-199 E	5.9120	50/50	5.9120
959091	AF2-200 C O1	17.7360	50/50	17.7360
959092	AF2-200 E O1	11.8240	50/50	11.8240
959101	AF2-201 C O1	2.4597	Adder	2.89
959102	AF2-201 E O1	7.0634	Adder	8.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960381	AF2-329	5.5196	50/50	5.5196
960551	AF2-346 C	4.6737	50/50	4.6737
960552	AF2-346 E	3.1158	50/50	3.1158
960721	AF2-363 C O1	3.4444	Adder	4.05
960722	AF2-363 E O1	2.2963	Adder	2.7
960731	AF2-364 C O1	3.4814	Adder	4.1
960732	AF2-364 E O1	2.3209	Adder	2.73
960751	AF2-366 C	5.8312	50/50	5.8312
960752	AF2-366 E	3.8875	50/50	3.8875
961011	AF2-392 C O1	2.2763	Adder	2.68
961012	AF2-392 E O1	10.6573	Adder	12.54
961021	AF2-393 O1	3.8801	Adder	4.56
961031	AF2-394 O1	2.5867	Adder	3.04
BLUEG	BLUEG	0.1944	Confirmed LTF	0.1944
CBM-W2	CBM-W2	4.0868	Confirmed LTF	4.0868
NY	NY	0.1040	Confirmed LTF	0.1040
TVA	TVA	0.4312	Confirmed LTF	0.4312
O-066	O-066	1.2096	Confirmed LTF	1.2096
CBM-S2	CBM-S2	0.1618	Confirmed LTF	0.1618
CBM-S1	CBM-S1	1.9766	Confirmed LTF	1.9766
TILTON	TILTON	0.0076	Confirmed LTF	0.0076
G-007	G-007	0.1872	Confirmed LTF	0.1872
MADISON	MADISON	3.0119	Confirmed LTF	3.0119
MEC	MEC	3.9804	Confirmed LTF	3.9804
GIBSON	GIBSON	0.0235	Confirmed LTF	0.0235
TRIMBLE	TRIMBLE	0.0673	Confirmed LTF	0.0673
CBM-W1	CBM-W1	2.4520	Confirmed LTF	2.4520

11.7.2 Index 2

None

11.7.3 Index 3

Nome

11.7.4 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
96083832	957470	AF2-041 TAP	CE	270730	ELECT JCT; B	CE	1	COMED_P4_006-45-BT3-4__	breaker	1656.0	109.37	120.05	AC	178.25

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274715	NELSON EC;1C	9.6789	50/50	9.6789
274716	NELSON EC;1S	7.0622	50/50	7.0622
274717	NELSON EC;2C	9.7536	50/50	9.7536
274718	NELSON EC;2S	7.1254	50/50	7.1254
274761	LEE CO EC;2U	4.5359	50/50	4.5359
274764	LEE CO EC;5U	4.5474	50/50	4.5474
274765	LEE CO EC;6U	4.5474	50/50	4.5474
274859	EASYR;U1 E	27.9170	Adder	32.84
274860	EASYR;U2 E	27.9170	Adder	32.84
293516	O-009 E1	17.2864	Adder	20.34
293517	O-009 E2	8.7801	Adder	10.33
293518	O-009 E3	9.6693	Adder	11.38
293715	O-029 E	18.4811	Adder	21.74
293716	O-029 E	10.1329	Adder	11.92
293717	O-029 E	9.3132	Adder	10.96
293771	O-035 E	4.9354	Adder	5.81
294401	BSHIL;1U E	8.0866	Adder	9.51
294410	BSHIL;2U E	8.0866	Adder	9.51
916211	Z1-072 E	3.7349	Adder	4.39
919221	AA1-146	9.0290	50/50	9.0290
919581	AA2-030	53.7317	50/50	53.7317
925581	AC1-033 C	1.3245	Adder	1.56
925582	AC1-033 E	8.8671	Adder	10.43
927201	AC1-214 C O1	1.5840	Adder	1.86
927202	AC1-214 E O1	5.0354	Adder	5.92
934051	AD1-031 C O1	2.6901	Adder	3.16
934052	AD1-031 E O1	4.3892	Adder	5.16
937531	AD2-214 C	9.0882	Adder	10.69
937532	AD2-214 E	6.0588	Adder	7.13
938861	AE1-114 C O1	4.1862	Adder	4.92
938862	AE1-114 E O1	14.2822	Adder	16.8
939051	AE1-134 1	4.1753	50/50	4.1753
939061	AE1-134 2	4.1753	50/50	4.1753
943411	AF1-012 C	44.9662	50/50	44.9662
943412	AF1-012 E	29.9775	50/50	29.9775
946151	AF1-280 C O1	46.8759	50/50	46.8759
946152	AF1-280 E O1	21.5561	50/50	21.5561
946161	AF1-281 C	1.0265	50/50	1.0265
946162	AF1-281 E	5.8167	50/50	5.8167
946321	AF1-296 C O1	7.6870	Adder	9.04
946322	AF1-296 E O1	35.9888	Adder	42.34

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
950471	J438 C	3.3717	PJM External (MISO)	3.3717
950472	J438 E	13.4869	PJM External (MISO)	13.4869
951381	J504	5.7865	PJM External (MISO)	5.7865
951421	J514	3.4599	PJM External (MISO)	3.4599
951511	J530 C	5.5045	PJM External (MISO)	5.5045
951512	J530 E	22.0180	PJM External (MISO)	22.0180
954091	J873 C	3.3038	PJM External (MISO)	3.3038
954092	J873 E	17.8742	PJM External (MISO)	17.8742
954702	J844 E	14.1620	PJM External (MISO)	14.1620
954792	J952 E	6.7954	PJM External (MISO)	6.7954
954861	J959 C	2.2974	PJM External (MISO)	2.2974
954862	J959 E	12.4296	PJM External (MISO)	12.4296
954901	J963	1.4067	PJM External (MISO)	1.4067
955051	J981 C	3.8638	PJM External (MISO)	3.8638
955052	J981 E	20.9042	PJM External (MISO)	20.9042
955971	J1084	31.5210	PJM External (MISO)	31.5210
956411	J1131	16.9080	PJM External (MISO)	16.9080
956831	J1181 C	3.0077	PJM External (MISO)	3.0077
956832	J1181 E	16.2723	PJM External (MISO)	16.2723
957471	AF2-041 C	106.9488	50/50	106.9488
957472	AF2-041 E	71.2992	50/50	71.2992
957751	AF2-069 C	0.1834	Adder	0.22
957752	AF2-069 E	0.5919	Adder	0.7
957761	AF2-070 C	0.2584	Adder	0.3
957762	AF2-070 E	1.2547	Adder	1.48
958911	AF2-182 C	61.5888	50/50	61.5888
958912	AF2-182 E	41.0592	50/50	41.0592
958921	AF2-183 C	10.9491	50/50	10.9491
958922	AF2-183 E	16.4237	50/50	16.4237
959081	AF2-199 C	35.6496	50/50	35.6496
959082	AF2-199 E	23.7664	50/50	23.7664
959091	AF2-200 C O1	71.2992	50/50	71.2992
959092	AF2-200 E O1	47.5328	50/50	47.5328
960551	AF2-346 C	19.2713	50/50	19.2713
960552	AF2-346 E	12.8475	50/50	12.8475
961011	AF2-392 C O1	8.1451	Adder	9.58
961012	AF2-392 E O1	38.1340	Adder	44.86
961021	AF2-393 O1	13.8837	Adder	16.33
961031	AF2-394 O1	9.2558	Adder	10.89
990901	L-005 E	10.8712	Adder	12.79
LGEE	LGEE	0.0268	Confirmed LTF	0.0268
CPL	CPL	0.2441	Confirmed LTF	0.2441
BLUEG	BLUEG	0.0226	Confirmed LTF	0.0226
CBM-W2	CBM-W2	21.1630	Confirmed LTF	21.1630
NY	NY	0.1814	Confirmed LTF	0.1814
TVA	TVA	2.4920	Confirmed LTF	2.4920
O-066	O-066	2.0227	Confirmed LTF	2.0227
CBM-S2	CBM-S2	3.3177	Confirmed LTF	3.3177
CBM-S1	CBM-S1	12.4222	Confirmed LTF	12.4222
G-007	G-007	0.3120	Confirmed LTF	0.3120
MADISON	MADISON	14.5414	Confirmed LTF	14.5414
MEC	MEC	18.0574	Confirmed LTF	18.0574

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
TRIMBLE	TRIMBLE	0.0295	Confirmed LTF	0.0295
CBM-W1	CBM-W1	45.2362	Confirmed LTF	45.2362

11.7.5 Index 5

None

11.7.6 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
96083904	270678	BYRON ; B	CE	270694	CHERRY VA; B	CE	1	COMED_P4_006-45-BT7-8__	breaker	1441.0	115.51	117.43	AC	30.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274656	BYRON ;1U	97.7585	50/50	97.7585
274760	LEE CO EC;1U	4.1522	50/50	4.1522
274761	LEE CO EC;2U	4.1522	50/50	4.1522
274763	LEE CO EC;4U	4.1101	50/50	4.1101
274764	LEE CO EC;5U	4.1628	50/50	4.1628
274765	LEE CO EC;6U	4.1628	50/50	4.1628
274766	LEE CO EC;7U	4.0996	50/50	4.0996
274767	LEE CO EC;8U	4.0996	50/50	4.0996
274859	EASYR;U1 E	25.5555	Adder	30.07
274860	EASYR;U2 E	25.5555	Adder	30.07
276172	Z1-108 BAT	1.7730	Merchant Transmission	1.7730
293516	O-009 E1	8.6826	Adder	10.21
293517	O-009 E2	4.4101	Adder	5.19
293518	O-009 E3	4.8567	Adder	5.71
293715	O-029 E	9.2827	Adder	10.92
293716	O-029 E	5.0895	Adder	5.99
293717	O-029 E	4.6778	Adder	5.5
919581	AA2-030	25.6037	Adder	30.12
920273	AA2-123 BAT	2.9094	Merchant Transmission	2.9094
937531	AD2-214 C	4.6364	Adder	5.45
937532	AD2-214 E	3.0909	Adder	3.64
939051	AE1-134 1	1.9896	Adder	2.34
939061	AE1-134 2	1.9896	Adder	2.34
943411	AF1-012 C	14.3327	Adder	16.86
943412	AF1-012 E	9.5551	Adder	11.24
943803	AF1-048 BAT	7.8018	Merchant Transmission	7.8018
943922	AF1-060 BAT	1.2404	Merchant Transmission	1.2404
946151	AF1-280 C O1	32.1984	Adder	37.88
946152	AF1-280 E O1	14.8066	Adder	17.42
946161	AF1-281 C	0.7051	Adder	0.83
946162	AF1-281 E	3.9954	Adder	4.7
946321	AF1-296 C O1	3.8806	Adder	4.57
946322	AF1-296 E O1	18.1682	Adder	21.37
954792	J952 E	4.1796	PJM External (MISO)	4.1796
954901	J963	0.8465	PJM External (MISO)	0.8465
955051	J981 C	2.4139	PJM External (MISO)	2.4139
955052	J981 E	13.0601	PJM External (MISO)	13.0601
955971	J1084	19.5075	PJM External (MISO)	19.5075
956411	J1131	10.5060	PJM External (MISO)	10.5060
957471	AF2-041 C	15.3398	Adder	18.05
957472	AF2-041 E	10.2265	Adder	12.03
958911	AF2-182 C	42.3045	Adder	49.77

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
958912	AF2-182 E	28.2030	Adder	33.18
958921	AF2-183 C	7.5208	Adder	8.85
958922	AF2-183 E	11.2812	Adder	13.27
959081	AF2-199 C	5.1133	Adder	6.02
959082	AF2-199 E	3.4088	Adder	4.01
959091	AF2-200 C O1	10.2265	Adder	12.03
959092	AF2-200 E O1	6.8177	Adder	8.02
960551	AF2-346 C	6.1426	Adder	7.23
960552	AF2-346 E	4.0950	Adder	4.82
961011	AF2-392 C O1	3.8357	Adder	4.51
961012	AF2-392 E O1	17.9583	Adder	21.13
961021	AF2-393 O1	6.5382	Adder	7.69
961031	AF2-394 O1	4.3588	Adder	5.13
BLUEG	BLUEG	0.3368	Confirmed LTF	0.3368
CBM-W2	CBM-W2	6.8714	Confirmed LTF	6.8714
NY	NY	0.1869	Confirmed LTF	0.1869
TVA	TVA	0.6930	Confirmed LTF	0.6930
O-066	O-066	2.1840	Confirmed LTF	2.1840
CBM-S2	CBM-S2	0.1040	Confirmed LTF	0.1040
CBM-S1	CBM-S1	3.1609	Confirmed LTF	3.1609
G-007	G-007	0.3380	Confirmed LTF	0.3380
MADISON	MADISON	1.1834	Confirmed LTF	1.1834
MEC	MEC	6.4053	Confirmed LTF	6.4053
GIBSON	GIBSON	0.0268	Confirmed LTF	0.0268
TRIMBLE	TRIMBLE	0.1169	Confirmed LTF	0.1169

11.7.7 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
96083880	270770	GOODINGS ;4B	CE	270766	GOODINGS ;3B	CE	1	COMED_P4_116-45-L11614_	breaker	1802.0	116.74	117.53	AC	24.93

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274658	DRESDEN ;2U	120.9372	Adder	142.28
274659	DRESDEN ;3U	86.3964	Adder	101.64
274734	ELWOOD EC;8P	4.9640	50/50	4.9640
274736	ELWOOD EC;9P	4.9640	50/50	4.9640
274830	U3-021 1	3.5373	Adder	4.16
274831	U3-021 2	3.5373	Adder	4.16
274859	EASYR;U1 E	6.6586	Adder	7.83
274860	EASYR;U2 E	6.6586	Adder	7.83
274861	TOP CROP ;1U	0.9778	50/50	0.9778
274862	TOP CROP ;2U	1.8981	50/50	1.8981
276167	Z1-106 E2	0.6840	Adder	0.8
276168	Z1-106 E1	0.6842	Adder	0.8
276170	Z1-108 E	1.4219	Adder	1.67
290021	O50 E	20.6271	Adder	24.27
293516	O-009 E1	5.7321	Adder	6.74
293517	O-009 E2	2.9115	Adder	3.43
293518	O-009 E3	3.2063	Adder	3.77
293644	O22 E1	23.2756	50/50	23.2756
293645	O22 E2	45.1820	50/50	45.1820
293715	O-029 E	6.1283	Adder	7.21
293716	O-029 E	3.3600	Adder	3.95
293717	O-029 E	3.0883	Adder	3.63
293771	O-035 E	4.1277	Adder	4.86
294401	BSHIL;1U E	5.7902	Adder	6.81
294410	BSHIL;2U E	5.7902	Adder	6.81
294763	P-046 E	5.5461	Adder	6.52
915011	Y3-013 1	2.2004	Adder	2.59
915021	Y3-013 2	2.2004	Adder	2.59
915031	Y3-013 3	2.2004	Adder	2.59
916211	Z1-072 E	3.1237	Adder	3.67
918052	AA1-018 E OP	15.6426	Adder	18.4
919581	AA2-030	10.8655	Adder	12.78
920272	AA2-123 E	1.4071	Adder	1.66
924471	AB2-096	24.5646	Adder	28.9
925581	AC1-033 C	0.9483	Adder	1.12
925582	AC1-033 E	6.3483	Adder	7.47
926311	AC1-109 1	1.0024	Adder	1.18
926321	AC1-109 2	1.0024	Adder	1.18
926331	AC1-110 1	1.0297	Adder	1.21
926341	AC1-110 2	1.0297	Adder	1.21
926431	AC1-114	1.3903	Adder	1.64
926841	AC1-171 C O1	0.8245	Adder	0.97

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
926842	AC1-171 E O1	5.5071	Adder	6.48
927091	AC1-204 1	18.4646	50/50	18.4646
927201	AC1-214 C O1	1.3248	Adder	1.56
927202	AC1-214 E O1	4.2114	Adder	4.95
927451	AC1-142A 1	3.3179	Adder	3.9
927461	AC1-142A 2	3.3391	Adder	3.93
927511	AC1-113 1	0.6951	Adder	0.82
927521	AC1-113 2	0.6951	Adder	0.82
930481	AB1-089	38.3490	Adder	45.12
930741	AB1-122 1O1	55.5758	Adder	65.38
930751	AB1-122 2O1	76.9537	Adder	90.53
932881	AC2-115 1	1.3903	Adder	1.64
932891	AC2-115 2	1.3903	Adder	1.64
932921	AC2-116	0.4866	Adder	0.57
933931	AD1-016 C	0.5347	Adder	0.63
933932	AD1-016 E	0.8724	Adder	1.03
934051	AD1-031 C O1	1.9250	Adder	2.26
934052	AD1-031 E O1	3.1408	Adder	3.7
934101	AD1-039 1	5.4464	Adder	6.41
934111	AD1-039 2	7.5415	Adder	8.87
934701	AD1-098 C O1	3.8027	Adder	4.47
934702	AD1-098 E O1	2.7763	Adder	3.27
934871	AD1-116 C	0.9110	Adder	1.07
934872	AD1-116 E	1.4864	Adder	1.75
934971	AD1-129 C	0.5241	Adder	0.62
934972	AD1-129 E	0.3494	Adder	0.41
935001	AD1-133 C O1	12.5582	Adder	14.77
935002	AD1-133 E O1	8.3722	Adder	9.85
936291	AD2-038 C O1	2.3823	Adder	2.8
936292	AD2-038 E O1	15.9433	Adder	18.76
936511	AD2-066 C O1	5.4125	Adder	6.37
936512	AD2-066 E O1	3.6084	Adder	4.25
936791	AD2-102 C	8.3283	Adder	9.8
936792	AD2-102 E	5.5522	Adder	6.53
937001	AD2-134 C	0.5418	Adder	0.64
937002	AD2-134 E	2.2382	Adder	2.63
937311	AD2-172 C	1.4558	Adder	1.71
937312	AD2-172 E	2.0105	Adder	2.37
937401	AD2-194 1	10.0439	Adder	11.82
937411	AD2-194 2	9.9904	Adder	11.75
937531	AD2-214 C	2.7938	Adder	3.29
937532	AD2-214 E	1.8625	Adder	2.19
938511	AE1-070 1	11.8016	Adder	13.88
938521	AE1-070 2	10.7397	Adder	12.63
938851	AE1-113 C	8.5087	Adder	10.01
938852	AE1-113 E	30.1672	Adder	35.49
938861	AE1-114 C O1	2.3513	Adder	2.77
938862	AE1-114 E O1	8.0221	Adder	9.44
939051	AE1-134 1	0.8443	Adder	0.99
939061	AE1-134 2	0.8443	Adder	0.99
939321	AE1-163 C O1	5.9864	Adder	7.04
939322	AE1-163 E O1	36.7733	Adder	43.26

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939683	AE1-198 BAT	26.8299	50/50	26.8299
940501	AE2-035 C	1.4558	Adder	1.71
940502	AE2-035 E	2.0105	Adder	2.37
942421	AE2-255 C O1	3.2230	Adder	3.79
942422	AE2-255 E O1	9.6690	Adder	11.38
942651	AE2-281 C O1	0.8552	Adder	1.01
942652	AE2-281 E O1	5.2533	Adder	6.18
942991	AE2-321 C	4.7098	Adder	5.54
942992	AE2-321 E	2.3197	Adder	2.73
943411	AF1-012 C	7.3185	Adder	8.61
943412	AF1-012 E	4.8790	Adder	5.74
943801	AF1-048 C	2.2016	Adder	2.59
943802	AF1-048 E	1.4678	Adder	1.73
943921	AF1-060	0.7168	Adder	0.84
944041	AF1-072	1.2136	Adder	1.43
946151	AF1-280 C O1	9.4965	Adder	11.17
946152	AF1-280 E O1	4.3670	Adder	5.14
946161	AF1-281 C	0.2080	Adder	0.24
946162	AF1-281 E	1.1784	Adder	1.39
946321	AF1-296 C O1	2.5356	Adder	2.98
946322	AF1-296 E O1	11.8710	Adder	13.97
946501	AF1-314 C	2.5867	Adder	3.04
946502	AF1-314 E	12.1104	Adder	14.25
946541	AF1-318 C O1	3.4852	Adder	4.1
946542	AF1-318 E O1	16.3187	Adder	19.2
946661	AF1-330 C	1.1538	Adder	1.36
946662	AF1-330 E	0.2533	Adder	0.3
957331	AF2-027 C	1.4669	Adder	1.73
957332	AF2-027 E	2.2004	Adder	2.59
957401	AF2-034 C	1.5319	Adder	1.8
957402	AF2-034 E	1.3049	Adder	1.54
957471	AF2-041 C	12.7158	Adder	14.96
957472	AF2-041 E	8.4772	Adder	9.97
957751	AF2-069 C	0.1534	Adder	0.18
957752	AF2-069 E	0.4951	Adder	0.58
957761	AF2-070 C	0.2161	Adder	0.25
957762	AF2-070 E	1.0494	Adder	1.23
958023	AF2-096 BAT	6.8551	Merchant Transmission	6.8551
958481	AF2-142 C	10.7880	Adder	12.69
958482	AF2-142 E	7.1920	Adder	8.46
958491	AF2-143 C	10.9953	Adder	12.94
958492	AF2-143 E	7.3302	Adder	8.62
958911	AF2-182 C	12.4772	Adder	14.68
958912	AF2-182 E	8.3181	Adder	9.79
958921	AF2-183 C	2.2182	Adder	2.61
958922	AF2-183 E	3.3272	Adder	3.91
959081	AF2-199 C	4.2386	Adder	4.99
959082	AF2-199 E	2.8257	Adder	3.32
959091	AF2-200 C O1	8.4772	Adder	9.97
959092	AF2-200 E O1	5.6515	Adder	6.65
959101	AF2-201 C O1	3.5634	Adder	4.19
959102	AF2-201 E O1	10.2325	Adder	12.04

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959351	AF2-226 C	5.7048	50/50	5.7048
959352	AF2-226 E	8.5572	50/50	8.5572
960281	AF2-319 C	5.7048	50/50	5.7048
960282	AF2-319 E	8.5572	50/50	8.5572
960551	AF2-346 C	3.1365	Adder	3.69
960552	AF2-346 E	2.0910	Adder	2.46
960581	AF2-349 C	12.6332	Adder	14.86
960582	AF2-349 E	8.4221	Adder	9.91
960721	AF2-363 C O1	3.2501	Adder	3.82
960722	AF2-363 E O1	2.1668	Adder	2.55
960731	AF2-364 C O1	3.3983	Adder	4.0
960732	AF2-364 E O1	2.2656	Adder	2.67
961011	AF2-392 C O1	2.4295	Adder	2.86
961012	AF2-392 E O1	11.3745	Adder	13.38
961021	AF2-393 O1	4.1412	Adder	4.87
961031	AF2-394 O1	2.7608	Adder	3.25
990901	L-005 E	8.8791	Adder	10.45
BLUEG	BLUEG	0.7777	Confirmed LTF	0.7777
CBM-W2	CBM-W2	15.9377	Confirmed LTF	15.9377
NY	NY	0.5137	Confirmed LTF	0.5137
TVA	TVA	1.4042	Confirmed LTF	1.4042
WEC	WEC	2.6255	Confirmed LTF	2.6255
O-066	O-066	6.0077	Confirmed LTF	6.0077
CBM-S1	CBM-S1	6.3218	Confirmed LTF	6.3218
G-007	G-007	0.9277	Confirmed LTF	0.9277
MADISON	MADISON	13.7773	Confirmed LTF	13.7773
MEC	MEC	10.1632	Confirmed LTF	10.1632
TRIMBLE	TRIMBLE	0.2732	Confirmed LTF	0.2732
CATAWBA	CATAWBA	0.0364	Confirmed LTF	0.0364
CBM-W1	CBM-W1	39.2189	Confirmed LTF	39.2189

11.7.8 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
96084289	274750	CRETE EC ;BP	CE	255112	17STJOHN	NIPS	1	COMED_P1-2_695_B2	single	1399.0	102.19	102.23	AC	22.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274654	BRAIDWOOD;1U	29.2639	80/20	29.2639
274655	BRAIDWOOD;2U	28.4709	80/20	28.4709
274658	DRESDEN ;2U	106.0627	Adder	124.78
274659	DRESDEN ;3U	98.5874	Adder	115.99
274660	LASCO STA;1U	26.9109	80/20	26.9109
274661	LASCO STA;2U	27.0126	80/20	27.0126
274675	JOLIET 29;7U	12.2741	80/20	12.2741
274676	JOLIET 29;8U	12.2828	80/20	12.2828
274687	WILL CNTY;4U	12.3528	80/20	12.3528
274704	KENDALL ;1C	4.3408	80/20	4.3408
274705	KENDALL ;1S	2.9026	80/20	2.9026
274706	KENDALL ;2C	4.3408	80/20	4.3408
274707	KENDALL ;2S	2.9026	80/20	2.9026
274734	ELWOOD EC;8P	3.5197	80/20	3.5197
274736	ELWOOD EC;9P	3.5197	80/20	3.5197
274751	CRETE EC ;1U	6.3240	80/20	6.3240
274752	CRETE EC ;2U	6.3240	80/20	6.3240
274753	CRETE EC ;3U	6.3240	80/20	6.3240
274754	CRETE EC ;4U	6.3240	80/20	6.3240
274830	U3-021 1	5.4244	Adder	6.38
274831	U3-021 2	5.4244	Adder	6.38
274861	TOP CROP ;1U	0.5183	80/20	0.5183
274862	TOP CROP ;2U	1.0062	80/20	1.0062
915011	Y3-013 1	3.3507	Adder	3.94
915021	Y3-013 2	3.3507	Adder	3.94
915031	Y3-013 3	3.3507	Adder	3.94
924471	AB2-096	37.6694	Adder	44.32
926311	AC1-109 1	1.6931	Adder	1.99
926321	AC1-109 2	1.6931	Adder	1.99
926331	AC1-110 1	1.6890	Adder	1.99
926341	AC1-110 2	1.6890	Adder	1.99
926351	AC1-111 1	0.6760	Adder	0.8
926361	AC1-111 2	0.6760	Adder	0.8
926371	AC1-111 3	0.6760	Adder	0.8
926381	AC1-111 4	0.6760	Adder	0.8
926391	AC1-111 5	0.6760	Adder	0.8
926401	AC1-111 6	0.6760	Adder	0.8
926431	AC1-114	2.1131	Adder	2.49
927091	AC1-204 1	13.0923	80/20	13.0923
927451	AC1-142A 1	4.5123	80/20	4.5123
927461	AC1-142A 2	4.5155	80/20	4.5155
927511	AC1-113 1	1.0566	Adder	1.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
927521	AC1-113 2	1.0566	Adder	1.24
930481	AB1-089	58.4095	Adder	68.72
930501	AB1-091 O1	55.8756	Adder	65.74
930741	AB1-122 1O1	63.0976	Adder	74.23
930751	AB1-122 2O1	67.4182	Adder	79.32
932881	AC2-115 1	2.1131	Adder	2.49
932891	AC2-115 2	2.1131	Adder	2.49
932921	AC2-116	0.7396	Adder	0.87
933431	AC2-156 C O1	0.8442	Adder	0.99
933911	AD1-013 C	1.6454	Adder	1.94
933931	AD1-016 C	0.8267	Adder	0.97
934101	AD1-039 1	6.1836	Adder	7.27
934111	AD1-039 2	6.6070	Adder	7.77
934431	AD1-067 C	0.1170	Adder	0.14
934701	AD1-098 C O1	6.1290	Adder	7.21
934721	AD1-100 C	16.8631	Adder	19.84
934871	AD1-116 C	0.7908	Adder	0.93
934971	AD1-129 C	0.8036	Adder	0.95
936511	AD2-066 C O1	7.3761	Adder	8.68
936791	AD2-102 C	12.5552	Adder	14.77
937001	AD2-134 C	2.4353	Adder	2.87
937311	AD2-172 C	2.1831	Adder	2.57
937401	AD2-194 1	7.1216	Adder	8.38
937411	AD2-194 2	7.1089	Adder	8.36
938511	AE1-070 1	8.3679	Adder	9.84
938521	AE1-070 2	7.6421	Adder	8.99
938851	AE1-113 C	7.2251	Adder	8.5
939351	AE1-166 C O1	9.0221	Adder	10.61
939631	AE1-193 C	32.5293	80/20	32.5293
939641	AE1-194 C	32.5293	80/20	32.5293
939651	AE1-195 C	32.5293	80/20	32.5293
939681	AE1-198 C	96.5869	80/20	96.5869
940501	AE2-035 C	2.1831	Adder	2.57
941131	AE2-107 C	5.8206	Adder	6.85
941551	AE2-152 C O1	10.4101	Adder	12.25
941561	AE2-153 C O1	4.1400	Adder	4.87
942421	AE2-255 C O1	2.7368	Adder	3.22
942991	AE2-321 C	7.2771	Adder	8.56
943121	AE2-341 C	11.2591	Adder	13.25
943591	AF1-030 C O1	7.4874	Adder	8.81
943801	AF1-048 C	3.4018	Adder	4.0
943921	AF1-060	1.0749	Adder	1.26
944041	AF1-072	1.9190	Adder	2.26
944911	AF1-156 C	10.5853	Adder	12.45
945351	AF1-200 FTIR	273.6261	Merchant Transmission	273.6261
946501	AF1-314 C	3.8788	Adder	4.56
946661	AF1-330 C	1.7839	Adder	2.1
946671	AF1-331	2.1369	Adder	2.51
957331	AF2-027 C	2.2338	Adder	2.63
957401	AF2-034 C	1.5304	80/20	1.5304
957471	AF2-041 C	18.9659	Adder	22.31
958021	AF2-096 C	40.5782	80/20	40.5782

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
958481	AF2-142 C	9.3644	Adder	11.02
959081	AF2-199 C	6.3220	Adder	7.44
959091	AF2-200 C O1	12.6439	Adder	14.88
959101	AF2-201 C O1	5.3433	Adder	6.29
959351	AF2-226 C	3.0242	80/20	3.0242
960281	AF2-319 C	3.0242	80/20	3.0242
960381	AF2-329	5.8422	Adder	6.87
960581	AF2-349 C	19.3729	Adder	22.79
960721	AF2-363 C O1	5.2453	Adder	6.17
960731	AF2-364 C O1	5.4670	Adder	6.43
960751	AF2-366 C	6.1752	Adder	7.26
BLUEG	BLUEG	2.0658	Confirmed LTF	2.0658
CBM-W2	CBM-W2	18.7060	Confirmed LTF	18.7060
NY	NY	1.1154	Confirmed LTF	1.1154
TVA	TVA	1.2166	Confirmed LTF	1.2166
WEC	WEC	3.9381	Confirmed LTF	3.9381
CHEOAH	CHEOAH	0.0671	Confirmed LTF	0.0671
CBM-S1	CBM-S1	4.2515	Confirmed LTF	4.2515
MADISON	MADISON	20.2023	Confirmed LTF	20.2023
MEC	MEC	13.3889	Confirmed LTF	13.3889
GIBSON	GIBSON	0.1813	Confirmed LTF	0.1813
CALDERWOOD	CALDERWOOD	0.0567	Confirmed LTF	0.0567
TRIMBLE	TRIMBLE	0.7012	Confirmed LTF	0.7012
CATAWBA	CATAWBA	0.2769	Confirmed LTF	0.2769
CBM-W1	CBM-W1	55.4693	Confirmed LTF	55.4693

11.7.9 Index 9

ID	FROM BUS#	FRO M BUS	FRO M BUS AREA	TO BUS#	TO BUS	TO BUS ARE A	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
9519738 1	95682 0	J1180 TAP	AMIL	24771 2	05SULLIVA N	AEP	1	AEP_P4_#3128_05EUGEN E 345_A2	break er	1466. 0	136.94	136.95	AC	20.07

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274650	KINCAID ;1U	16.0540	50/50	16.0540
274651	KINCAID ;2U	16.0475	50/50	16.0475
274830	U3-021 1	2.7272	Adder	3.21
274831	U3-021 2	2.7272	Adder	3.21
274853	TWINGROVE;U1	0.8595	50/50	0.8595
274854	TWINGROVE;U2	0.8595	50/50	0.8595
274859	EASYR;U1 E	5.8711	Adder	6.91
274860	EASYR;U2 E	5.8711	Adder	6.91
274880	GENERATOR;	1.1391	50/50	1.1391
274882	W4-005 E	45.3963	50/50	45.3963
274890	CAYUG;1U E	8.8679	Adder	10.43
274891	CAYUG;2U E	8.8679	Adder	10.43
276153	W2-048 E	9.4919	50/50	9.4919
290021	O50 E	9.3949	Adder	11.05
290051	GSG-6; E	4.8362	Adder	5.69
290108	LEEDK;1U E	10.6760	Adder	12.56
290261	S-027 E	20.4589	50/50	20.4589
290265	S-028 E	20.4589	50/50	20.4589
293516	O-009 E1	5.4560	Adder	6.42
293517	O-009 E2	2.7712	Adder	3.26
293518	O-009 E3	3.0519	Adder	3.59
293715	O-029 E	5.8331	Adder	6.86
293716	O-029 E	3.1982	Adder	3.76
293717	O-029 E	2.9395	Adder	3.46
293771	O-035 E	4.3889	Adder	5.16
294401	BSHIL;1U E	5.9656	Adder	7.02
294410	BSHIL;2U E	5.9656	Adder	7.02
294763	P-046 E	4.6580	Adder	5.48
295109	WESTBROOK E	2.5892	Adder	3.05
295111	SUBLETTE E	1.2587	Adder	1.48
909052	X2-022 E	28.5516	50/50	28.5516
916211	Z1-072 E	3.3213	Adder	3.91
916221	Z1-073 E	2.4954	Adder	2.94
917501	Z2-087 C	0.4474	50/50	0.4474
917502	Z2-087 E	17.8193	50/50	17.8193
919581	AA2-030	10.0381	Adder	11.81
924041	AB2-047 C O1	3.3283	50/50	3.3283
924042	AB2-047 E O1	22.2742	50/50	22.2742
924261	AB2-070 C O1	3.8373	50/50	3.8373
924262	AB2-070 E O1	25.6807	50/50	25.6807
924471	AB2-096	18.9389	Adder	22.28
925302	AB2-191 E	0.6404	Adder	0.75

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
925581	AC1-033 C	0.9768	Adder	1.15
925582	AC1-033 E	6.5391	Adder	7.69
925771	AC1-053 C	3.8730	50/50	3.8730
925772	AC1-053 E	25.9190	50/50	25.9190
926431	AC1-114	1.1239	Adder	1.32
926821	AC1-168 C O1	0.7075	Adder	0.83
926822	AC1-168 E O1	4.7477	Adder	5.59
926841	AC1-171 C O1	1.0459	50/50	1.0459
926842	AC1-171 E O1	6.9860	50/50	6.9860
927201	AC1-214 C O1	1.4086	Adder	1.66
927202	AC1-214 E O1	4.4779	Adder	5.27
927511	AC1-113 1	0.5619	Adder	0.66
927521	AC1-113 2	0.5619	Adder	0.66
930481	AB1-089	30.6025	Adder	36.0
930741	AB1-122 1O1	11.4368	Adder	13.46
932881	AC2-115 1	1.1239	Adder	1.32
932891	AC2-115 2	1.1239	Adder	1.32
932921	AC2-116	0.3934	Adder	0.46
933911	AD1-013 C	0.8406	Adder	0.99
933912	AD1-013 E	1.3428	Adder	1.58
934051	AD1-031 C O1	1.9833	Adder	2.33
934052	AD1-031 E O1	3.2360	Adder	3.81
934101	AD1-039 1	2.9912	Adder	3.52
934431	AD1-067 C	0.0607	Adder	0.07
934432	AD1-067 E	0.2553	Adder	0.3
934701	AD1-098 C O1	3.2136	Adder	3.78
934702	AD1-098 E O1	2.3463	Adder	2.76
934971	AD1-129 C	0.4095	Adder	0.48
934972	AD1-129 E	0.2730	Adder	0.32
935001	AD1-133 C O1	12.3395	Adder	14.52
935002	AD1-133 E O1	8.2263	Adder	9.68
935141	AD1-148	7.4416	50/50	7.4416
936291	AD2-038 C O1	1.1710	Adder	1.38
936292	AD2-038 E O1	7.8369	Adder	9.22
936511	AD2-066 C O1	4.0998	Adder	4.82
936512	AD2-066 E O1	2.7332	Adder	3.22
936771	AD2-100 C	22.5427	50/50	22.5427
936772	AD2-100 E	15.0284	50/50	15.0284
936791	AD2-102 C	6.8534	Adder	8.06
936792	AD2-102 E	4.5689	Adder	5.38
936971	AD2-131 C	1.4850	50/50	1.4850
936972	AD2-131 E	7.4605	50/50	7.4605
937001	AD2-134 C	1.2643	Adder	1.49
937002	AD2-134 E	5.2226	Adder	6.14
937211	AD2-159 C	4.9058	50/50	4.9058
937212	AD2-159 E	22.9680	50/50	22.9680
937311	AD2-172 C	1.2227	Adder	1.44
937312	AD2-172 E	1.6885	Adder	1.99
937531	AD2-214 C	2.7806	Adder	3.27
937532	AD2-214 E	1.8538	Adder	2.18
938851	AE1-113 C	3.8754	Adder	4.56
938852	AE1-113 E	13.7400	Adder	16.16

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938861	AE1-114 C O1	2.0429	Adder	2.4
938862	AE1-114 E O1	6.9700	Adder	8.2
939051	AE1-134 1	0.7800	Adder	0.92
939061	AE1-134 2	0.7800	Adder	0.92
939321	AE1-163 C O1	2.9426	Adder	3.46
939322	AE1-163 E O1	18.0758	Adder	21.27
939401	AE1-172 C O1	2.9839	Adder	3.51
939402	AE1-172 E O1	14.0006	Adder	16.47
939741	AE1-205 C O1	8.6024	50/50	8.6024
939742	AE1-205 E O1	11.8796	50/50	11.8796
940101	AE1-252 C O1	5.9945	Adder	7.05
940102	AE1-252 E O1	3.9964	Adder	4.7
940501	AE2-035 C	1.2227	Adder	1.44
940502	AE2-035 E	1.6885	Adder	1.99
941131	AE2-107 C	2.8825	Adder	3.39
941132	AE2-107 E	1.9217	Adder	2.26
941343	AE2-130 BAT	31.6860	50/50	31.6860
941731	AE2-173 O1	5.1205	50/50	5.1205
942111	AE2-223 C	1.9970	50/50	1.9970
942112	AE2-223 E	13.3645	50/50	13.3645
942421	AE2-255 C O1	1.4680	Adder	1.73
942422	AE2-255 E O1	4.4039	Adder	5.18
942481	AE2-261 C	31.1690	50/50	31.1690
942482	AE2-261 E	20.7793	50/50	20.7793
942602	AE2-276 BAT	13.9795	50/50	13.9795
942651	AE2-281 C O1	0.4204	Adder	0.49
942652	AE2-281 E O1	2.5823	Adder	3.04
943411	AF1-012 C	6.4599	Adder	7.6
943412	AF1-012 E	4.3066	Adder	5.07
943921	AF1-060	0.6020	Adder	0.71
944202	AF1-088 FTWR	279.5900	50/50	279.5900
944221	AF1-090 C O1	6.8316	50/50	6.8316
944222	AF1-090 E O1	31.9844	50/50	31.9844
945871	AF1-252 O1	12.1106	50/50	12.1106
945881	AF1-253 O1	8.3843	50/50	8.3843
946151	AF1-280 C O1	8.4939	Adder	9.99
946152	AF1-280 E O1	3.9059	Adder	4.6
946161	AF1-281 C	0.1860	Adder	0.22
946162	AF1-281 E	1.0540	Adder	1.24
946321	AF1-296 C O1	2.6349	Adder	3.1
946322	AF1-296 E O1	12.3360	Adder	14.51
946501	AF1-314 C	2.1725	Adder	2.56
946502	AF1-314 E	10.1712	Adder	11.97
946541	AF1-318 C O1	3.8827	Adder	4.57
946542	AF1-318 E O1	18.1802	Adder	21.39
946671	AF1-331	1.0917	Adder	1.28
957381	AF2-032 C	2.3369	50/50	2.3369
957382	AF2-032 E	1.0997	50/50	1.0997
957471	AF2-041 C	10.2372	Adder	12.04
957472	AF2-041 E	6.8248	Adder	8.03
957751	AF2-069 C	0.1631	Adder	0.19
957752	AF2-069 E	0.5264	Adder	0.62

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957761	AF2-070 C	0.2298	Adder	0.27
957762	AF2-070 E	1.1158	Adder	1.31
958341	AF2-128 C O1	1.0275	Adder	1.21
958342	AF2-128 E O1	4.8104	Adder	5.66
958491	AF2-143 C	5.4047	Adder	6.36
958492	AF2-143 E	3.6032	Adder	4.24
958911	AF2-182 C	11.1598	Adder	13.13
958912	AF2-182 E	7.4399	Adder	8.75
958921	AF2-183 C	1.9840	Adder	2.33
958922	AF2-183 E	2.9760	Adder	3.5
959081	AF2-199 C	3.4124	Adder	4.01
959082	AF2-199 E	2.2749	Adder	2.68
959091	AF2-200 C O1	6.8248	Adder	8.03
959092	AF2-200 E O1	4.5499	Adder	5.35
959101	AF2-201 C O1	2.9928	Adder	3.52
959102	AF2-201 E O1	8.5940	Adder	10.11
959341	AF2-225 C	6.4518	50/50	6.4518
959342	AF2-225 E	8.9097	50/50	8.9097
959611	AF2-252 C	2.5832	50/50	2.5832
959612	AF2-252 E	3.8748	50/50	3.8748
960141	AF2-305	1.3578	50/50	1.3578
960261	AF2-317	2.3813	50/50	2.3813
960551	AF2-346 C	2.7685	Adder	3.26
960552	AF2-346 E	1.8457	Adder	2.17
960581	AF2-349 C	9.7400	Adder	11.46
960582	AF2-349 E	6.4933	Adder	7.64
960611	AF2-352 C	2.5832	50/50	2.5832
960612	AF2-352 E	3.8748	50/50	3.8748
960721	AF2-363 C O1	2.6353	Adder	3.1
960722	AF2-363 E O1	1.7569	Adder	2.07
961011	AF2-392 C O1	2.2311	Adder	2.62
961012	AF2-392 E O1	10.4458	Adder	12.29
961021	AF2-393 O1	3.8031	Adder	4.47
961031	AF2-394 O1	2.5354	Adder	2.98
990901	L-005 E	9.2453	Adder	10.88
CPL	CPL	0.6364	Confirmed LTF	0.6364
BLUEG	BLUEG	2.6075	Confirmed LTF	2.6075
CBM-W2	CBM-W2	70.9745	Confirmed LTF	70.9745
NY	NY	0.4136	Confirmed LTF	0.4136
TVA	TVA	7.8806	Confirmed LTF	7.8806
WEC	WEC	2.0396	Confirmed LTF	2.0396
O-066	O-066	4.6032	Confirmed LTF	4.6032
CBM-S2	CBM-S2	8.9763	Confirmed LTF	8.9763
CBM-S1	CBM-S1	37.4624	Confirmed LTF	37.4624
G-007	G-007	0.7103	Confirmed LTF	0.7103
MADISON	MADISON	25.0367	Confirmed LTF	25.0367
MEC	MEC	15.8598	Confirmed LTF	15.8598
TRIMBLE	TRIMBLE	0.9694	Confirmed LTF	0.9694
CBM-W1	CBM-W1	62.3373	Confirmed LTF	62.3373

11.8 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
AA1-146	Nelson	Active
AA2-030	Nelson	Active
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	Engineering and Procurement
AB2-047	Brokaw-Pontiac Midpoint	Partially in Service - Under Construction
AB2-070	Mt. Pulaski-Brokaw	Active
AB2-096	Silver Lake-Cherry Valley	Active
AB2-191	Mendota Hills	In Service
AC1-033	Kewanee	Active
AC1-053	Lanesville-Brokaw	Active
AC1-109	Aurora 345kV	In Service
AC1-110	Aurora 138kV	Active
AC1-111	Aurora 138kV	In Service
AC1-113	Rockford	Partially in Service - Under Construction
AC1-114	Rockford II	Partially in Service - Under Construction
AC1-142A	Joliet	Active
AC1-168	Kewanee-Streator	Active
AC1-171	Powerton	Active
AC1-185	Lee County	In Service
AC1-204	Elwood	Under Construction
AC1-214	Crescent Ridge	Partially in Service - Under Construction
AC2-115	Rockford	Partially in Service - Under Construction
AC2-116	Rockford II	Partially in Service - Under Construction
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	In Service
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
AD1-148	Brokaw-Lanesville	Active
AD2-038	Powerton	Active

Queue Number	Project Name	Status
AD2-066	Mazon-Crescent Ridge	Active
AD2-100	Kincaid-Pana	Active
AD2-102	Wempletown 345 kV	Active
AD2-131	Latham Kincaid	Active
AD2-134	Shady Oaks	Active
AD2-159	Chestnut 345kV	Active
AD2-172	Lena 138kV	Active
AD2-194	Elwood	Active
AD2-214	Rock Falls-Garden Plains	Active
AE1-070	Elwood 345 kV	Active
AE1-113	Mole Creek 345 kV	Active
AE1-114	Maryland-Lancaster 138 kV	Active
AE1-134	Nelson 345 kV	Active
AE1-163	Powerton-Nevada 345 kV	Active
AE1-166	Loretto-Wilton & Braidwood-Davis Creek	Active
AE1-172	Loretto-Wilton Center	Active
AE1-193	Crete 345 kV	Active
AE1-194	Crete 345 kV	Active
AE1-195	Crete 345 kV	Active
AE1-198	Crete 345 kV	Active
AE1-205	McLean 345 kV	Active
AE1-252	Loretto-Wilton Center	Active
AE2-035	Lena 138 kV	Active
AE2-062	Romeoville 12 kV	Active
AE2-107	Haumesser Road 138 kV	Active
AE2-130	Rockport 765 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
AE2-261	Kincaid-Pana	Active
AE2-276	Sullivan 345kV	Active
AE2-281	Powerton-Nevada 345 kV	Active
AE2-321	Belvidere-Marengo 138 kV	Active
AE2-341	Sandwich-Plano	Active
AF1-012	Electric Junc-Nelson	Active
AF1-030	Plano-R 138 kV	Active
AF1-048	Belvidere-Marengo	Active
AF1-060	Lena 138 kV	Active
AF1-072	Rocky Road	Active
AF1-088	Sullivan 345 kV	Active
AF1-090	Kincaid-Pana	Active
AF1-156	Braidwood-Davis Creek	Active
AF1-200	Plano 345 kV	Active
AF1-252	Kincaid-Pana	Active
AF1-253	Kincaid-Pana	Active
AF1-280	Nelson-Lee County	Active
AF1-281	Nelson-Lee County	Active
AF1-296	Garden Plain 138 kV	Active
AF1-314	Lena 138 kV	Active
AF1-318	Crescent Ridge-Corbin	Active

Queue Number	Project Name	Status
AF1-330	Marengo	Active
AF1-331	Twombly Road	Active
AF2-027	Zion Energy Center 345 kV	Active
AF2-032	Kincaid	Active
AF2-034	Kendall	Active
AF2-041	Nelson-Electric Junction 345 kV	Active
AF2-069	Crescent Ridge 138 kV	Active
AF2-070	Crescent Ridge 138 kV	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
AF2-182	Nelson-Lee County 345 kV II	Active
AF2-183	Nelson-Lee County 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
AF2-252	Blue Mound 345 kV	Active
AF2-305	Brokaw-Lanesville 345 kV	Active
AF2-317	Hill Topper 345 kV	Active
AF2-319	Katydid Road 345 kV	Active
AF2-329	Sandwich-Plano 138 kV	Active
AF2-346	Electric Junction-Nelson 345 kV	Active
AF2-349	Garden Prairie-Silver Lake 345 kV	Active
AF2-352	Blue Mound 34.5 kV	Active
AF2-363	Glidden 138 kV	Active
AF2-364	Wayne Red 138 kV	Active
AF2-366	Glidden-Waterman 138 kV	Active
AF2-392	Nelson-Dixon 138 kV	Active
AF2-393	Nelson-Dixon 138 kV	Active
AF2-394	Nelson-Dixon 138 kV	Active
U3-021	Silver Lake-Cherry Valley	Active
W2-048	Brokaw-Lanesville	In Service
W4-005	Blue Mound-Latham	In Service
W4-084	Dixon 12kV	Deactivated
X2-022	Brokaw-Lanesville	In Service
Y3-013	Zion Energy Center	Active
Z1-072	Crescent Ridge	In Service
Z1-073	Mendota Hills	In Service
Z1-106	West Chicago 34kV	In Service
Z1-108	McHenry 34kV	In Service
Z2-081	Streator 34.5kV	In Service
Z2-087	Pontiac MidPoint-Brokaw 345kV	In Service
J1000	MISO	MISO
J1084	MISO	MISO
J1131	MISO	MISO
J1154	MISO	MISO
J1181	MISO	MISO
J1188	MISO	MISO
J390	MISO	MISO

Queue Number	Project Name	Status
J438	MISO	MISO
J504	MISO	MISO
J514	MISO	MISO
J530	MISO	MISO
J760	MISO	MISO
J818	MISO	MISO
J844	MISO	MISO
J850	MISO	MISO
J864	MISO	MISO
J873	MISO	MISO
J952	MISO	MISO
J959	MISO	MISO
J963	MISO	MISO
J981	MISO	MISO

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
COMED_P4_112-45-BT4-5__	CONTINGENCY 'COMED_P4_112-45-BT4-5__' TRIP BRANCH FROM BUS 270666 TO BUS 270664 CKT 1 / B ISL;BT 345 B ISL; B 345 TRIP BRANCH FROM BUS 270666 TO BUS 270926 CKT 1 / B ISL;BT 345 WILTO; B 345 TRIP BRANCH FROM BUS 270770 TO BUS 270666 CKT 1 / GOODI;4B 345 B ISL;BT 345 TRIP BRANCH FROM BUS 270852 TO BUS 270704 CKT 1 / PONTI; B 345 LORET; B 345 END
COMED_P1-2_345-L15502_B-R-C	CONTINGENCY 'COMED_P1-2_345-L15502_B-R-C' TRIP BRANCH FROM BUS 957470 TO BUS 270730 CKT 1 / AF2-041 TAP 345 ELEC JUNC; B 345 END
COMED_P2-1_111-L11120__	CONTINGENCY 'COMED_P2-1_111-L11120__' TRIP BRANCH FROM BUS 270733 TO BUS 270747 CKT 1 / ELECT;3R 345 W407K;OT 345 END
COMED_P4_116-45-L9801__FSA	CONTINGENCY 'COMED_P4_116-45-L9801__FSA' TRIP BRANCH FROM BUS 918050 TO BUS 270769 CKT 1 / AA1-018 GOODINGS ;2R 345 DISCONNECT BUS 270769 / GOODI;2R 345 END
COMED_P4_006-45-BT3-4__	CONTINGENCY 'COMED_P4_006-45-BT3-4__' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 REMOVE UNIT 1 FROM BUS 274656 / BYRON;1U 25 END

Contingency Name	Contingency Definition
COMED_P1-2_345-L0627__B-R	CONTINGENCY 'COMED_P1-2_345-L0627__B-R' TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 END
COMED_P4_020-45-BT1-3__A	CONTINGENCY 'COMED_P4_020-45-BT1-3__A' TRIP BRANCH FROM BUS 270802 TO BUS 270670 CKT 1 / LASCO STA; B 345 BRAIDWOOD; B 345 TRIP BRANCH FROM BUS 270670 TO BUS 958020 CKT 1 / BRAID; B 345 AF2-096 345 END
COMED_P2-2_111_EJ-345R__3	CONTINGENCY 'COMED_P2-2_111_EJ-345R__3' DISCONNECT BUS 270733 / ELEC JUNC;3R 345 DISCONNECT BUS 275183 / ELEC JUNC;3M 138 END
AEP_P4_#3128_05EUGENE 345_A2	CONTINGENCY 'AEP_P4_#3128_05EUGENE 345_A2' OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1 / 243221 05EUGENE 345 249504 08CAYSUB 345 1 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1 END
COMED_P4_167-45-BT5-6__	CONTINGENCY 'COMED_P4_167-45-BT5-6__' TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345 TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345 TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765 TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345 TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33 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_116-45-L11614__	CONTINGENCY 'COMED_P4_116-45-L11614__' TRIP BRANCH FROM BUS 270667 TO BUS 270665 CKT 1 / B ISL;RT 345 B ISL; R 345 TRIP BRANCH FROM BUS 270667 TO BUS 270927 CKT 1 / B ISL;RT 345 WILTO; R 345 TRIP BRANCH FROM BUS 270769 TO BUS 270667 CKT 1 / GOODI;2R 345 B ISL;RT 345 DISCONNECT BUS 270769 / GOODI;2R 345 END

Contingency Name	Contingency Definition
COMED_P2-2_116_GG-345R__2	CONTINGENCY 'COMED_P2-2_116_GG-345R__2' DISCONNECT BUS 270769 / GOODI;2R 345 END
COMED_P4_080-45-BT7-8__	CONTINGENCY 'COMED_P4_080-45-BT7-8__' TRIP BRANCH FROM BUS 270853 TO BUS 917500 CKT 1 / PONTIAC ; R 345 Z2-087 TAP 345 TRIP BRANCH FROM BUS 270853 TO BUS 935000 CKT 1 / PONTIAC ; R 345 AD1-133 TAP 345 END
AEP_P1-2_#286	CONTINGENCY 'AEP_P1-2_#286' OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1 END
COMED_P4_006-45-BT7-8__	CONTINGENCY 'COMED_P4_006-45-BT7-8__' TRIP BRANCH FROM BUS 270678 TO BUS 930480 CKT 1 / BYRON ; B 345 AB1-089 TAP 345 TRIP BRANCH FROM BUS 270678 TO BUS 270679 CKT 1 / BYRON ; B 345 BYRON ; R 345 END
Base Case	
COMED_P4_080-45-BT4-5__	CONTINGENCY 'COMED_P4_080-45-BT4-5__' TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1 / PONTI; B 345 BLUEM; B 345 TRIP BRANCH FROM BUS 270852 TO BUS 270704 CKT 1 / PONTI; B 345 LORET; B 345 END
COMED_P4_116-45-TR82__	CONTINGENCY 'COMED_P4_116-45-TR82__' TRIP BRANCH FROM BUS 270769 TO BUS 271565 TO BUS 275324 CKT 1 / GOODINGS ;2R 345 GOODINGS ; R 138 GOODINGS ;2C 34.5 DISCONNECT BUS 270769 / GOODINGS ;2R 345 END
COMED_P1-2_345-L2001__B-S-A	CONTINGENCY 'COMED_P1-2_345-L2001__B-S-A' TRIP BRANCH FROM BUS 270670 TO BUS 958020 CKT 1 / BRAID; B 345 AF2-096 TAP; B 345 END
COMED_P7_345-L13821_R-R+_345-L18502AB-N	CONTINGENCY 'COMED_P7_345-L13821_R-R+_345-L18502AB-N' TRIP BRANCH FROM BUS 270883 TO BUS 270807 CKT 1 / SILVE; R 345 LIBER; R 345 TRIP BRANCH FROM BUS 270900 TO BUS 270806 CKT 1 / TOLLW; B 345 LIBER; B 345 END

12 Short Circuit Analysis

No breakers were identified as overdutied as part of this study.

13 Stability and Reactive Power

Analysis to be run in the Facilities Study Phase.

14 Affected Systems

14.1 MISO

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

Attachment 1: One Line Diagram

AF2-041
PRIMARY POI

