Generation Interconnection

Feasibility Study Report

for

Queue Project AF2-128

“CRESCENT RIDGE-CORBIN 138 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.

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.

The conduct of light load analysis as required under the PJM planning process is not performed during the Generation Interconnection Feasibility Study phase of the PJM study process. Additional reinforcement requirements for this Interconnection Request may be defined during the conduct of the light load analysis which shall be performed following execution of the System Impact Study agreement.

3 General

The Interconnection Customer (IC) has proposed a wind generating facility located in LaSalle County, Illinois. The installed facilities will have a total capability of 79.5 MW with 13.99 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is August 26, 2024. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-128
Project Name	CRESCENT RIDGE-CORBIN 138 KV
State	Illinois
County	LaSalle
Transmission Owner	ComEd
MFO	79.5
MWE	79.5
MWC	13.99
Fuel	Wind
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

Queue Position AF2-128, a 79.5 MW wind farm, proposes to interconnect with the ComEd transmission system by tying into the Crescent Ridge-Corbin (Ameren) 138kV Line 98105, approximately 3.6 miles from Corbin.

5 Cost Summary

The AF2-128 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs (ComEd build)	$18,500,000
Total System Network Upgrade Costs	$39,400,000
Total Costs	**$57,900,000**

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

The AF2-128 generator lead would interconnect to a new 138kV Interconnection Substation (see details in Direct Connection section below). The required Attachment Facilities are one 138kV line MOD, a dead-end structure and revenue metering.

Scope of Work	Cost Estimate
Installation of one 138kV line MOD, one dead-end structure and one set of revenue metering (see notes below on cost estimate)	$1,000,000
Total Cost Estimate (see notes below on cost estimate)	**$1,000,000**

Direct Connection Network Upgrades

In order to accommodate interconnection of AF2-128, a new 138kV Interconnection Substation would need to be built close to the Crescent Ridge-Corbin (Ameren) 138kV Line 98105, approximately 3.6 miles from Corbin.

The scope of work includes the installation of three 138kV circuit breakers in a "breaker-and-a-half" bus configuration and cutting in the Interconnection Substation to the Crescent Ridge-Corbin (Ameren) 138kV Line 98105, 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"). 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 138kV 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 Crescent Ridge-Corbin (Ameren) 138kV Line 98105.

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 138kV substation as described above	N/A

Transmission line tie in work (foundations, structures, conductors)	$2,000,000
ComEd oversight and testing	$1,000,000
Total Cost Estimate (see notes below on cost estimate)	**$3,000,000**

For ComEd building the interconnecting substation cost estimates:

Scope of Work	Cost Estimate
Installation of a new 138kV substation as described above	$15,000,000
Transmission line tie in work (foundations, structures, conductors)	$2,000,000
Total Cost Estimate (see notes below on cost estimate)	**$17,000,000**

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

Non-Direct Connection Network Upgrades

The integration of the new 138kV Interconnection Substation would require relay/communications/SCADA upgrades at the Crescent Ridge TSS 981 and Corbin substations. The ComEd cost is given below:

Scope of Work	Cost Estimate
Relay/communications/SCADA upgrades at the Crescent Ridge TSS 981 substation	$500,000
Relay/communications/SCADA upgrades at the Corbin Substation (Ameren to provide cost estimate)	
Total Cost Estimate (see notes below on cost estimate)	**$500,000**

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 11.5.

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 - Primary POI

The Queue Project AF2-128 was evaluated as a 79.5 MW (Capacity 13.992 MW) injection tapping the Crescent Ridge to Corbin 138 kV line in the ComEd area. Project AF2-128 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-128 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 PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96237810	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P2-2_001_LA-138B__1	bus	223.0	100.57	107.84	DC	16.21
96238169	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	100.57	107.84	DC	16.21
96238170	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	100.57	107.84	DC	16.21
96237683	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P2-2_001_LA-138B__1	bus	223.0	133.81	141.07	DC	16.21
96237952	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	133.81	141.07	DC	16.21
96237953	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	133.81	141.07	DC	16.21
96237645	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P2-2_074_KE-138___1	bus	179.0	273.4	317.81	DC	79.49
96239306	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	tower	179.0	273.4	317.81	DC	79.49
96239307	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-B	tower	179.0	273.4	317.81	DC	79.49

11.4 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96238291	271241	CRESCENT ; R	138.0	CE	271836	KEWANEE ;11	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	214.0	228.69	265.83	DC	79.49
96238293	271241	CRESCENT ; R	138.0	CE	271836	KEWANEE ;11	138.0	CE	1	Base Case	operation	190.0	101.17	110.57	DC	17.86
96238319	271836	KEWANEE ;11	138.0	CE	271837	KEWANEE ;12	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	246.0	197.62	225.21	DC	67.87
96238549	271837	KEWANEE ;12	138.0	CE	271838	KEWANEE ;13	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	449.0	109.28	122.43	DC	59.04
96238711	271844	KICKAPOO ; B	138.0	CE	271908	LASCO STA; B	138.0	CE	1	Base Case	operation	351.0	100.14	103.46	DC	11.64
96238637	271908	LASCO STA; B	138.0	CE	271986	MAZON ; B	138.0	CE	1	COMED_P1-3_TR81_LASCO_B-S	operation	223.0	114.23	115.74	DC	7.44
96238588	271987	MAZON ; R	138.0	CE	271187	CHANNAHON; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	112.35	118.76	DC	14.3
96238589	271987	MAZON ; R	138.0	CE	271187	CHANNAHON; R	138.0	CE	1	Base Case	operation	173.0	108.13	115.41	DC	12.59
96238722	272125	ESS J339 ; R	138.0	CE	271337	DRESDEN ; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	268.0	96.16	101.49	DC	14.27
96238621	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	214.0	110.0	116.38	DC	13.64
96238623	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	Base Case	operation	184.0	104.18	105.84	DC	6.79
96238625	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	COMED_P2-1_981-L98105___B	operation	214.0	110.0	116.38	DC	13.64
96238627	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	Base Case	operation	184.0	104.18	105.84	DC	6.79
96238667	272367	ROCK FALL; R	138.0	CE	272095	NELSON ; R	138.0	CE	1	COMED_P1-2_138-L15518GB-R-A	operation	223.0	107.52	108.95	DC	7.07
96238568	272505	SCHUAFF R;	138.0	CE	272367	ROCK FALL; R	138.0	CE	1	COMED_P2-1_187-L15508__	operation	214.0	119.37	120.56	DC	5.62
96238676	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	99.16	106.45	DC	16.26
96238484	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	132.53	139.82	DC	16.26
96238485	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	Base Case	operation	173.0	130.51	138.64	DC	14.06

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
96238321	946540	AF1-318 TAP	138.0	CE	271241	CRESCENT ; R	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	179.0	167.41	211.83	DC	79.5
96238296	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	271835	operation	179.0	215.38	249.77	DC	61.57
96238301	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	Base Case	operation	179.0	201.11	235.54	DC	61.63

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
96239306,96239307,96237645	3	AF2-128 TAP 138.0 kV - 4OGLESBY MN 138.0 kV Ckt 1	**ComEd** **CE_NUN_L7713_2 (905) : Re-conductor a portion of the line. A preliminary estimate for this upgrade is $7.2M with a estmated construction timeline of 30 months. Upon completion of the upgrade the new ratings will be 351/449/459/498/688 MVA (SN/SLTE/SSTE/SLD/ALDR).** **Project Type : FAC** **Cost : $7,200,000** **Time Estimate : 30.0 Months** **AMIL** **NonPJMArea : The external (i.e. Non-PJM) Transmission Owner, AMIL, will not evaluate this violation until the impact study phase.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months**	$7,200,000
96238170,96238169,96237810	1	4OGLESBY MN 138.0 kV - AD2-066 TAP 138.0 kV Ckt 1		
96237953,96237683,96237952	2	AD2-066 TAP 138.0 kV - MAZON ; R 138.0 kV Ckt 1	**ComEd** **CE_NUN_L7713_1 (845) : ComEd 138kV L7713 ALDR rating is 265 MVA. The upgrade will be to replace a circuit breaker and re-conductor a portion of the line. A preliminary estimate for the upgrade is $32.2M with an estimated construction timeline of 24-30 months. Upon completion of the upgrade the ratings will be 292/321/367/280/433 MVA SN/SLTE/SSTE/SLD.** **Project Type : FAC** **Cost : $32,200,000** **Time Estimate : 24-30 Months**	$32,200,000
			Total System Network Upgrade Costs	**$39,400,000**

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

11.6 Flow Gate Details - Primary POI

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

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96238170	348935	4CORBIN	AMIL	936510	AD2-066 TAP	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	100.57	107.84	DC	16.21

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.9119	50/50	0.9119
274849	CRESCENT ;1U	0.2163	50/50	0.2163
274851	PROVIDENC;RU	0.3300	50/50	0.3300
274871	GR RIDGE ;2U	1.1581	50/50	1.1581
276173	Z2-081	0.3940	50/50	0.3940
293061	N-015 E	21.1452	50/50	21.1452
293771	O-035 E	7.6522	50/50	7.6522
294392	P-010 E	26.8544	50/50	26.8544
294401	BSHIL;1U E	5.7786	Adder	6.8
294410	BSHIL;2U E	5.7786	Adder	6.8
925581	AC1-033 C	0.9466	Adder	1.11
925582	AC1-033 E	6.3371	Adder	7.46
926821	AC1-168 C O1	1.6744	50/50	1.6744
926822	AC1-168 E O1	11.2368	50/50	11.2368
927201	AC1-214 C O1	2.4559	50/50	2.4559
927202	AC1-214 E O1	7.8073	50/50	7.8073
934051	AD1-031 C O1	1.9214	Adder	2.26
934052	AD1-031 E O1	3.1349	Adder	3.69
946541	AF1-318 C O1	10.0887	50/50	10.0887
946542	AF1-318 E O1	47.2386	50/50	47.2386
953201	J715 C	3.3343	PJM External (MISO)	3.3343
953202	J715 E	18.0397	PJM External (MISO)	18.0397
957751	AF2-069 C	0.2844	50/50	0.2844
957752	AF2-069 E	0.9177	50/50	0.9177
957761	AF2-070 C	0.4007	50/50	0.4007
957762	AF2-070 E	1.9454	50/50	1.9454
958341	AF2-128 C O1	2.8524	50/50	2.8524
958342	AF2-128 E O1	13.3545	50/50	13.3545
990901	L-005 E	7.6265	Adder	8.97
LGEE	LGEE	0.0610	Confirmed LTF	0.0610
CPLE	CPLE	0.0701	Confirmed LTF	0.0701
G-007A	G-007A	0.0527	Confirmed LTF	0.0527
VFT	VFT	0.1419	Confirmed LTF	0.1419
CBM-W2	CBM-W2	3.7920	Confirmed LTF	3.7920
CBM-W1	CBM-W1	3.1650	Confirmed LTF	3.1650
TVA	TVA	0.3920	Confirmed LTF	0.3920
CBM-S2	CBM-S2	0.7572	Confirmed LTF	0.7572
CBM-S1	CBM-S1	2.1130	Confirmed LTF	2.1130
MADISON	MADISON	1.3406	Confirmed LTF	1.3406
MEC	MEC	1.3824	Confirmed LTF	1.3824

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
96237953	936510	AD2-066 TAP	CE	271987	MAZON ; R	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	133.81	141.07	DC	16.21

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.9119	50/50	0.9119
274849	CRESCENT ;1U	0.2163	50/50	0.2163
274851	PROVIDENC;RU	0.3300	50/50	0.3300
274871	GR RIDGE ;2U	1.1581	50/50	1.1581
276173	Z2-081	0.3940	50/50	0.3940
293061	N-015 E	21.1452	50/50	21.1452
293771	O-035 E	7.6522	50/50	7.6522
294392	P-010 E	26.8544	50/50	26.8544
294401	BSHIL;1U E	5.7786	Adder	6.8
294410	BSHIL;2U E	5.7786	Adder	6.8
925581	AC1-033 C	0.9466	Adder	1.11
925582	AC1-033 E	6.3371	Adder	7.46
926821	AC1-168 C O1	1.6744	50/50	1.6744
926822	AC1-168 E O1	11.2368	50/50	11.2368
927201	AC1-214 C O1	2.4559	50/50	2.4559
927202	AC1-214 E O1	7.8073	50/50	7.8073
934051	AD1-031 C O1	1.9214	Adder	2.26
934052	AD1-031 E O1	3.1349	Adder	3.69
936511	AD2-066 C O1	44.5329	50/50	44.5329
936512	AD2-066 E O1	29.6886	50/50	29.6886
946541	AF1-318 C O1	10.0887	50/50	10.0887
946542	AF1-318 E O1	47.2386	50/50	47.2386
953201	J715 C	3.3343	PJM External (MISO)	3.3343
953202	J715 E	18.0397	PJM External (MISO)	18.0397
957751	AF2-069 C	0.2844	50/50	0.2844
957752	AF2-069 E	0.9177	50/50	0.9177
957761	AF2-070 C	0.4007	50/50	0.4007
957762	AF2-070 E	1.9454	50/50	1.9454
958341	AF2-128 C O1	2.8524	50/50	2.8524
958342	AF2-128 E O1	13.3545	50/50	13.3545
990901	L-005 E	7.6265	Adder	8.97
LGEE	LGEE	0.0610	Confirmed LTF	0.0610
CPLE	CPLE	0.0701	Confirmed LTF	0.0701
G-007A	G-007A	0.0527	Confirmed LTF	0.0527
VFT	VFT	0.1419	Confirmed LTF	0.1419
CBM-W2	CBM-W2	3.7920	Confirmed LTF	3.7920
CBM-W1	CBM-W1	3.1650	Confirmed LTF	3.1650
TVA	TVA	0.3920	Confirmed LTF	0.3920
CBM-S2	CBM-S2	0.7572	Confirmed LTF	0.7572
CBM-S1	CBM-S1	2.1130	Confirmed LTF	2.1130
MADISON	MADISON	1.3406	Confirmed LTF	1.3406

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
MEC	MEC	1.3824	Confirmed LTF	1.3824

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
96239307	958340	AF2-128 TAP	CE	348935	4CORBIN	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-B	tower	179.0	273.4	317.81	DC	79.49

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274849	CRESCENT ;1U	1.6730	50/50	1.6730
274851	PROVIDENC;RU	2.5526	50/50	2.5526
293771	O-035 E	59.1923	50/50	59.1923
927201	AC1-214 C O1	18.9975	50/50	18.9975
927202	AC1-214 E O1	60.3921	50/50	60.3921
946541	AF1-318 C O1	52.7831	50/50	52.7831
946542	AF1-318 E O1	247.1479	50/50	247.1479
957751	AF2-069 C	2.1997	50/50	2.1997
957752	AF2-069 E	7.0991	50/50	7.0991
957761	AF2-070 C	3.0996	50/50	3.0996
957762	AF2-070 E	15.0480	50/50	15.0480
958341	AF2-128 C O1	13.9902	50/50	13.9902
958342	AF2-128 E O1	65.4995	50/50	65.4995
NEWTON	NEWTON	0.0140	Confirmed LTF	0.0140
FARMERCITY	FARMERCITY	0.0007	Confirmed LTF	0.0007
CALDERWOOD	CALDERWOOD	0.0065	Confirmed LTF	0.0065
NY	NY	0.0072	Confirmed LTF	0.0072
PRAIRIE	PRAIRIE	0.0336	Confirmed LTF	0.0336
O-066	O-066	0.0874	Confirmed LTF	0.0874
CHEOAH	CHEOAH	0.0065	Confirmed LTF	0.0065
EDWARDS	EDWARDS	0.0046	Confirmed LTF	0.0046
TILTON	TILTON	0.0082	Confirmed LTF	0.0082
G-007	G-007	0.0135	Confirmed LTF	0.0135
GIBSON	GIBSON	0.0071	Confirmed LTF	0.0071
BLUEG	BLUEG	0.0226	Confirmed LTF	0.0226
TRIMBLE	TRIMBLE	0.0072	Confirmed LTF	0.0072
CATAWBA	CATAWBA	0.0046	Confirmed LTF	0.0046

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
AC1-033	Kewanee	Active
AC1-168	Kewanee-Streator	Active
AC1-214	Crescent Ridge	Engineering and Procurement
AD1-031	Kewanee 138 kV	Active
AD2-066	Mazon-Crescent Ridge	Active
AF1-318	Crescent Ridge-Corbin	Active
AF2-069	Crescent Ridge 138 kV	Active
AF2-070	Crescent Ridge 138 kV	Active
AF2-128	Crescent Ridge-Corbin 138 kV	Active
Z2-081	Streator 34.5kV	In Service
J715	MISO	MISO

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
COMED_P2-2_001_LA-138B__1	CONTINGENCY 'COMED_P2-2_001_LA-138B__1' DISCONNECT BUS 271908 / LASCO STA; B 138 END
COMED_P1-2_138-L0112__B-S	CONTINGENCY 'COMED_P1-2_138-L0112__B-S' TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138 LASCO; B 138 END
COMED_P1-3_TR81_LASCO_B-S	CONTINGENCY 'COMED_P1-3_TR81_LASCO_B-S' TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 END
COMED_P1-2_138-L15518GB-R-A	CONTINGENCY 'COMED_P1-2_138-L15518GB-R-A' TRIP BRANCH FROM BUS 272094 TO BUS 272366 CKT 1 / NELSO; B 138 R FAL; B 138 TRIP BRANCH FROM BUS 272366 TO BUS 272512 CKT 1 / R FAL; B 138 H71 ;BT 138 TRIP BRANCH FROM BUS 272512 TO BUS 937530 CKT 1 / H71 ;BT 138 AD2-214 TAP 138 TRIP BRANCH FROM BUS 272512 TO BUS 272514 CKT 1 / H71 ;BT 138 H71 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272514 TO BUS 272515 / H71 ; B 138 H71 ; R 138 CLOSE LINE FROM BUS 272366 TO BUS 272367 CKT 1 / R FAL; B 138 R FAL; R 138 END

Contingency Name	Contingency Definition
271835	CONTINGENCY '271835' OPEN BRANCH FROM BUS 271835 TO BUS 271839 CKT 1 END
COMED_P4_001-38-L0108__	CONTINGENCY 'COMED_P4_001-38-L0108__' TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO; B 138 MAZON; B 138 DISCONNECT BUS 271908 / LASCO; B 138 END
COMED_P2-2_074_KE-138___1	CONTINGENCY 'COMED_P2-2_074_KE-138___1' DISCONNECT BUS 271836 / KEWAN; 1 138 DISCONNECT BUS 271837 / KEWAN; 5 138 DISCONNECT BUS 271838 / KEWAN; 4 138 END
Base Case	
COMED_P4_001-38-TR81___	CONTINGENCY 'COMED_P4_001-38-TR81___' TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 DISCONNECT BUS 271908 / LASCO STA; B 138 TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 END
COMED_P2-1_981-L98105___B	CONTINGENCY 'COMED_P2-1_981-L98105___B' TRIP BRANCH FROM BUS 958340 TO BUS 348935 CKT 1 / AF1-318 TAP 138 4CORBIN 138 END
COMED_P2-1_187-L15508__	CONTINGENCY 'COMED_P2-1_187-L15508__' TRIP BRANCH FROM BUS 272505 TO BUS 272097 CKT 1 / SCHAUFF ; 138 NELSO;RT 138 END
COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7413__R-S-A' TRIP BRANCH FROM BUS 272521 TO BUS 926820 CKT 1 / STREATOR ; 138 AC1-168 TAP 138 TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWANEE ;11 138 CRESCENT ; R 138 END

Contingency Name	Contingency Definition
COMED_P7_138-L6101___-S_+_138-L7413__R-S-B	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7413__R-S-B' TRIP BRANCH FROM BUS 271655 TO BUS 271835 CKT 1 / HENNEEPIN; T 138 KEWANEE ;23 138 TRIP BRANCH FROM BUS 271655 TO BUS 348918 CKT 1 / HENNEEPIN; T 138 4HENNEPIN S 138 TRIP BRANCH FROM BUS 926820 TO BUS 271655 CKT 1 / AC1-168 TAP ; 138 HENNEEPIN; T 138 TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWANEE ;11 138 CRESCENT ; R 138 END

12 Short Circuit Analysis - Primary POI

The following breakers are overdutied

None

12.1 System Reinforcements - Short Circuit

None

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AF2-128 was evaluated as a 79.5 MW (Capacity 13.992 MW) injection tapping the Crescent Ridge to Corbin 138 kV line in the ComEd area. Project AF2-128 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-128 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

13.1 Generation Deliverability

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

None

13.2 Multiple Facility Contingency

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

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
14755769 3	271908	LASCO STA; B	138.0	CE	270802	LASCO STA; B	345.0	CE	1	COMED_P4_012-38-L1205__	breaker	498.0	98.59	100.96	DC	11.79

13.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
148521243	271844	KICKAPOO ; B	138.0	CE	271908	LASCO STA; B	138.0	CE	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	tower	498.0	124.63	125.28	DC	7.26
148521244	271844	KICKAPOO ; B	138.0	CE	271908	LASCO STA; B	138.0	CE	1	COMED_P7_138-L6101___-S_+_138-L7713__R-S-A	tower	498.0	122.75	123.38	DC	7.0
148521310	271908	LASCO STA; B	138.0	CE	270802	LASCO STA; B	345.0	CE	1	COMED_P7_138-L1205__B-S_+_138-L7719__R-S	tower	498.0	107.02	109.93	DC	14.46
148521311	271908	LASCO STA; B	138.0	CE	270802	LASCO STA; B	345.0	CE	1	COMED_P7_138-L1205__B-S_+_138-L1206__R-S	tower	498.0	105.78	108.68	DC	14.46
104856611	272124	ESS J339 ; B	138.0	CE	271336	DRESDEN ; B	138.0	CE	1	COMED_P4_001-45-BT1-9__	breaker	268.0	126.36	129.47	DC	8.33
104856612	272124	ESS J339 ; B	138.0	CE	271336	DRESDEN ; B	138.0	CE	1	COMED_P4_001-45-BT1-2__	breaker	268.0	126.36	129.47	DC	8.33
96237786	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	COMED_P2-2_001_LA-138B__1	bus	214.0	124.19	125.82	DC	7.76
96239450	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	COMED_P7_138-L7411__R-R_+_138-L7408__R-R_NON_FSA	tower	230.0	105.3	109.34	DC	9.27
96239451	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	COMED_P7_138-L7411__R-R_+_138-L7408__R-R_FSA	tower	230.0	105.3	109.34	DC	9.27
96237789	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	COMED_P2-2_001_LA-138B__1	bus	214.0	124.19	125.82	DC	7.76
96239412	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	COMED_P7_138-L7411__R-R_+_138-L7408__R-R_FSA	tower	214.0	113.13	117.46	DC	9.27
96239413	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	COMED_P7_138-L7411__R-R_+_138-L7408__R-R_NON_FSA	tower	214.0	113.13	117.46	DC	9.27
96237810	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P2-2_001_LA-138B__1	bus	223.0	123.74	131.14	DC	16.5
96238169	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	123.74	131.14	DC	16.5
96238170	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	123.74	131.14	DC	16.5
96237683	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P2-2_001_LA-138B__1	bus	223.0	156.97	164.38	DC	16.5
96237952	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	156.97	164.38	DC	16.5
96237953	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	156.97	164.38	DC	16.5

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
96239306	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	tower	179.0	273.4	317.81	DC	79.49
96239307	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-B	tower	179.0	273.4	317.81	DC	79.49
148521165	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-C	tower	179.0	273.4	317.81	DC	79.49

13.4 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96238291	271241	CRESCENT ; R	138.0	CE	271836	KEWANEE ;11	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	214.0	228.69	265.83	DC	79.49
96238293	271241	CRESCENT ; R	138.0	CE	271836	KEWANEE ;11	138.0	CE	1	Base Case	operation	190.0	101.17	109.65	DC	16.11
96238319	271836	KEWANEE ;11	138.0	CE	271837	KEWANEE ;12	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	246.0	197.62	225.21	DC	67.87
96238549	271837	KEWANEE ;12	138.0	CE	271838	KEWANEE ;13	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	449.0	109.3	122.45	DC	59.04
96238711	271844	KICKAPOO ; B	138.0	CE	271908	LASCO STA; B	138.0	CE	1	Base Case	operation	351.0	145.51	148.87	DC	11.8
96238637	271908	LASCO STA; B	138.0	CE	271986	MAZON ; B	138.0	CE	1	COMED_P1-3_TR81_LASCO_B-S	operation	223.0	162.22	163.74	DC	7.54
147871742	271908	LASCO STA; B	138.0	CE	270802	LASCO STA; B	345.0	CE	1	COMED_P1-2_138-L0108__B-S	operation	449.0	109.31	111.92	DC	11.7
147871745	271908	LASCO STA; B	138.0	CE	270802	LASCO STA; B	345.0	CE	1	Base Case	operation	351.0	98.49	101.62	DC	10.98
96238588	271987	MAZON ; R	138.0	CE	271187	CHANNAHON; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	132.79	139.32	DC	14.56
96238589	271987	MAZON ; R	138.0	CE	271187	CHANNAHON; R	138.0	CE	1	Base Case	operation	173.0	113.89	121.3	DC	12.82
105158083	272124	ESS J339 ; B	138.0	CE	271336	DRESDEN ; B	138.0	CE	1	COMED_P1-3_TR81_LASCO_B-S	operation	268.0	126.33	129.44	DC	8.33

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
96238722	272125	ESS J339 ; R	138.0	CE	271337	DRESDEN ; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	268.0	113.12	118.54	DC	14.53
96238723	272125	ESS J339 ; R	138.0	CE	271337	DRESDEN ; R	138.0	CE	1	Base Case	operation	210.0	97.33	103.43	DC	12.79
96238621	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	214.0	110.0	116.38	DC	13.64
96238623	272269	POWERTON ;	138.0	CE	272285	POWERTON ;RT	138.0	CE	1	Base Case	operation	184.0	104.18	105.79	DC	6.6
96238625	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	COMED_P2-1_981-L98105___B	operation	214.0	110.0	116.38	DC	13.64
96238627	272285	POWERTON ;RT	138.0	CE	349600	4TOWERLINE	138.0	AMIL	1	Base Case	operation	184.0	104.18	105.79	DC	6.6
96238667	272367	ROCK FALL; R	138.0	CE	272095	NELSON ; R	138.0	CE	1	COMED_P1-2_138-L15518GB-R-A	operation	223.0	110.68	112.08	DC	6.9
96238568	272505	SCHUAFFR;	138.0	CE	272367	ROCK FALL; R	138.0	CE	1	COMED_P2-1_187-L15508__	operation	214.0	119.37	120.53	DC	5.48
147871466	272521	STREATOR ;	138.0	CE	271977	MARSEILLE; T	138.0	CE	1	Base Case	operation	208.0	106.08	107.66	DC	7.29
105157993	272607	TOULON ; R	138.0	CE	272269	POWERTON ;	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	194.0	105.55	107.35	DC	7.75
96238676	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	122.4	129.83	DC	16.56
96238677	348935	4CORBIN	138.0	AMIL	936510	AD2-066 TAP	138.0	CE	1	Base Case	operation	173.0	94.05	102.33	DC	14.33
96238484	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	COMED_P1-2_138-L0112__B-S	operation	223.0	155.77	163.2	DC	16.56
96238485	936510	AD2-066 TAP	138.0	CE	271987	MAZON ; R	138.0	CE	1	Base Case	operation	173.0	136.19	144.48	DC	14.33
96238321	946540	AF1-318 TAP	138.0	CE	271241	CRESCENT ; R	138.0	CE	1	COMED_P2-1_981-L98105___B	operation	179.0	167.41	211.83	DC	79.5
147871247	957020	AF2-003 TAP	138.0	CE	272521	STREATOR ;	138.0	CE	1	Base Case	operation	142.0	179.48	181.8	DC	7.3
96238296	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	271835	operation	179.0	215.38	250.7	DC	63.22
96238301	958340	AF2-128 TAP	138.0	CE	348935	4CORBIN	138.0	AMIL	1	Base Case	operation	179.0	201.11	236.51	DC	63.38

13.5 Flow Gate Details - Secondary POI

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

13.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
148521310	271908	LASCO STA; B	CE	270802	LASCO STA; B	CE	1	COMED_P7_138-L1205__B-S_+_138-L7719__R-S	tower	498.0	107.02	109.93	DC	14.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	4.4852	50/50	4.4852
274849	CRESCENT ;1U	0.2115	50/50	0.2115
274851	PROVIDENC;RU	0.3227	50/50	0.3227
274871	GR RIDGE ;2U	5.6962	50/50	5.6962
276173	Z2-081	1.3282	50/50	1.3282
293061	N-015 E	104.0088	50/50	104.0088
293771	O-035 E	7.4829	50/50	7.4829
294392	P-010 E	132.0912	50/50	132.0912
294401	BSHIL;1U E	6.4641	Adder	7.6
294410	BSHIL;2U E	6.4641	Adder	7.6
925581	AC1-033 C	1.0584	Adder	1.25
925582	AC1-033 E	7.0855	Adder	8.34
926821	AC1-168 C O1	2.8521	50/50	2.8521
926822	AC1-168 E O1	19.1400	50/50	19.1400
927201	AC1-214 C O1	2.4016	50/50	2.4016
927202	AC1-214 E O1	7.6346	50/50	7.6346
934051	AD1-031 C O1	2.1500	Adder	2.53
934052	AD1-031 E O1	3.5079	Adder	4.13
936511	AD2-066 C O1	13.1419	50/50	13.1419
936512	AD2-066 E O1	8.7612	50/50	8.7612
946541	AF1-318 C O1	8.9870	50/50	8.9870

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946542	AF1-318 E O1	42.0799	50/50	42.0799
953201	J715 C	2.8752	PJM External (MISO)	2.8752
953202	J715 E	15.5558	PJM External (MISO)	15.5558
957021	AF2-003 C O2	28.2905	50/50	28.2905
957022	AF2-003 E O2	132.4510	50/50	132.4510
957751	AF2-069 C	0.2781	50/50	0.2781
957752	AF2-069 E	0.8974	50/50	0.8974
957761	AF2-070 C	0.3918	50/50	0.3918
957762	AF2-070 E	1.9023	50/50	1.9023
958341	AF2-128 C O2	2.5457	50/50	2.5457
958342	AF2-128 E O2	11.9185	50/50	11.9185
990901	L-005 E	8.5670	Adder	10.08
WEC	WEC	0.0372	Confirmed LTF	0.0372
LGEE	LGEE	0.0468	Confirmed LTF	0.0468
CPLE	CPLE	0.0582	Confirmed LTF	0.0582
CBM-W2	CBM-W2	4.2424	Confirmed LTF	4.2424
NY	NY	0.0105	Confirmed LTF	0.0105
CBM-W1	CBM-W1	4.4911	Confirmed LTF	4.4911
TVA	TVA	0.4214	Confirmed LTF	0.4214
O-066	O-066	0.1008	Confirmed LTF	0.1008
CBM-S2	CBM-S2	0.6820	Confirmed LTF	0.6820
CBM-S1	CBM-S1	2.2152	Confirmed LTF	2.2152
G-007	G-007	0.0156	Confirmed LTF	0.0156
MADISON	MADISON	1.7983	Confirmed LTF	1.7983
MEC	MEC	1.7384	Confirmed LTF	1.7384

13.5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
148521243	271844	KICKAPOO ; B	CE	271908	LASCO STA; B	CE	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	tower	498.0	124.63	125.28	DC	7.26

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	4.9322	50/50	4.9322
274871	GR RIDGE ;2U	6.2639	50/50	6.2639
276173	Z2-081	2.0808	50/50	2.0808
293061	N-015 E	114.3744	50/50	114.3744
293771	O-035 E	4.5942	Adder	5.4
294392	P-010 E	145.2555	50/50	145.2555
926821	AC1-168 C O1	9.2515	50/50	9.2515
926822	AC1-168 E O1	62.0848	50/50	62.0848
927201	AC1-214 C O1	1.4745	Adder	1.73
927202	AC1-214 E O1	4.6873	Adder	5.51
946541	AF1-318 C O1	4.0968	Adder	4.82
946542	AF1-318 E O1	19.1824	Adder	22.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
953201	J715 C	1.4093	PJM External (MISO)	1.4093
953202	J715 E	7.6247	PJM External (MISO)	7.6247
957021	AF2-003 C O2	48.3685	50/50	48.3685
957022	AF2-003 E O2	226.4525	50/50	226.4525
957751	AF2-069 C	0.0905	Adder	0.2
957752	AF2-069 E	0.2920	Adder	0.65
957761	AF2-070 C	0.1275	Adder	0.28
957762	AF2-070 E	0.6190	Adder	1.37
958341	AF2-128 C O2	0.5755	Adder	1.28
958342	AF2-128 E O2	2.6944	Adder	5.98
LGEE	LGEE	0.0011	Confirmed LTF	0.0011
CBM-W2	CBM-W2	1.0811	Confirmed LTF	1.0811
NY	NY	0.0177	Confirmed LTF	0.0177
CBM-W1	CBM-W1	0.6630	Confirmed LTF	0.6630
TVA	TVA	0.0868	Confirmed LTF	0.0868
O-066	O-066	0.2083	Confirmed LTF	0.2083
CBM-S2	CBM-S2	0.0462	Confirmed LTF	0.0462
CBM-S1	CBM-S1	0.4345	Confirmed LTF	0.4345
G-007	G-007	0.0322	Confirmed LTF	0.0322
MADISON	MADISON	0.4778	Confirmed LTF	0.4778
MEC	MEC	0.4004	Confirmed LTF	0.4004
TRIMBLE	TRIMBLE	0.0017	Confirmed LTF	0.0017

13.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
104856612	272124	ESS J339 ; B	CE	271336	DRESDEN ; B	CE	1	COMED_P4_001-45-BT1-2__	breaker	268.0	126.36	129.47	DC	8.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274837	EQUISTAR ; B	8.6952	50/50	8.6952
274847	GR RIDGE ;BU	2.7607	50/50	2.7607
274871	GR RIDGE ;2U	3.5061	50/50	3.5061
276173	Z2-081	0.8119	50/50	0.8119
293061	N-015 E	64.0188	50/50	64.0188
293771	O-035 E	3.6658	Adder	4.31
294392	P-010 E	81.3039	50/50	81.3039
294401	BSHIL;1U E	3.7284	Adder	4.39
294410	BSHIL;2U E	3.7284	Adder	4.39
925581	AC1-033 C	0.6104	Adder	0.72
925582	AC1-033 E	4.0866	Adder	4.81
926821	AC1-168 C O1	1.7061	50/50	1.7061
926822	AC1-168 E O1	11.4489	50/50	11.4489
927201	AC1-214 C O1	1.1765	Adder	1.38
927202	AC1-214 E O1	3.7401	Adder	4.4
934051	AD1-031 C O1	1.2402	Adder	1.46
934052	AD1-031 E O1	2.0234	Adder	2.38

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
936511	AD2-066 C O1	5.5800	Adder	6.56
936512	AD2-066 E O1	3.7200	Adder	4.38
946541	AF1-318 C O1	4.4001	Adder	5.18
946542	AF1-318 E O1	20.6027	Adder	24.24
953201	J715 C	1.6662	PJM External (MISO)	1.6662
953202	J715 E	9.0148	PJM External (MISO)	9.0148
957021	AF2-003 C O2	17.2628	50/50	17.2628
957022	AF2-003 E O2	80.8213	50/50	80.8213
957751	AF2-069 C	0.0722	Adder	0.16
957752	AF2-069 E	0.2330	Adder	0.52
957761	AF2-070 C	0.1017	Adder	0.23
957762	AF2-070 E	0.4939	Adder	1.1
958341	AF2-128 C O2	1.4662	50/50	1.4662
958342	AF2-128 E O2	6.8646	50/50	6.8646
CPLE	CPLE	0.0040	Confirmed LTF	0.0040
CBM-W2	CBM-W2	1.8427	Confirmed LTF	1.8427
NY	NY	0.0265	Confirmed LTF	0.0265
CBM-W1	CBM-W1	1.8515	Confirmed LTF	1.8515
TVA	TVA	0.1582	Confirmed LTF	0.1582
O-066	O-066	0.3024	Confirmed LTF	0.3024
CBM-S2	CBM-S2	0.1214	Confirmed LTF	0.1214
CBM-S1	CBM-S1	0.7838	Confirmed LTF	0.7838
G-007	G-007	0.0468	Confirmed LTF	0.0468
MADISON	MADISON	0.9395	Confirmed LTF	0.9395
MEC	MEC	0.8628	Confirmed LTF	0.8628
BLUEG	BLUEG	0.0052	Confirmed LTF	0.0052
TRIMBLE	TRIMBLE	0.0039	Confirmed LTF	0.0039

13.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96237786	272269	POWERTON ;	CE	272285	POWERTON ;RT	CE	1	COMED_P2-2_001_LA-138B__1	bus	214.0	124.19	125.82	DC	7.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.5179	50/50	0.5179
274848	CAMPGROVE;RU	1.5464	50/50	1.5464
274849	CRESCENT ;1U	0.2415	50/50	0.2415
274851	PROVIDENC;RU	0.3684	50/50	0.3684
274871	GR RIDGE ;2U	0.6578	50/50	0.6578
274877	BISHOP HL;1U	0.5914	50/50	0.5914
274878	BISHOP HL;2U	0.5914	50/50	0.5914
276173	Z2-081	0.2318	50/50	0.2318
293061	N-015 E	12.0108	50/50	12.0108
293516	O-009 E1	4.3110	Adder	5.07
293517	O-009 E2	2.1896	Adder	2.58

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
293518	O-009 E3	2.4114	Adder	2.84
293715	O-029 E	4.6089	Adder	5.42
293716	O-029 E	2.5270	Adder	2.97
293717	O-029 E	2.3226	Adder	2.73
293771	O-035 E	8.5432	50/50	8.5432
294392	P-010 E	15.2537	50/50	15.2537
294401	BSHIL;1U E	13.7144	50/50	13.7144
294410	BSHIL;2U E	13.7144	50/50	13.7144
925581	AC1-033 C	2.2379	50/50	2.2379
925582	AC1-033 E	14.9818	50/50	14.9818
926821	AC1-168 C O1	1.0471	50/50	1.0471
926822	AC1-168 E O1	7.0271	50/50	7.0271
926841	AC1-171 C O1	7.9843	50/50	7.9843
926842	AC1-171 E O1	53.3317	50/50	53.3317
927201	AC1-214 C O1	2.7419	50/50	2.7419
927202	AC1-214 E O1	8.7163	50/50	8.7163
934051	AD1-031 C O1	4.5670	50/50	4.5670
934052	AD1-031 E O1	7.4513	50/50	7.4513
943401	AF1-011 C	0.5885	Adder	0.69
943402	AF1-011 E	0.9879	Adder	1.16
946541	AF1-318 C O1	5.6691	50/50	5.6691
946542	AF1-318 E O1	26.5447	50/50	26.5447
953201	J715 C	1.3993	PJM External (MISO)	1.3993
953202	J715 E	7.5707	PJM External (MISO)	7.5707
957021	AF2-003 C O2	5.4027	50/50	5.4027
957022	AF2-003 E O2	25.2943	50/50	25.2943
957751	AF2-069 C	0.3175	50/50	0.3175
957752	AF2-069 E	1.0246	50/50	1.0246
957761	AF2-070 C	0.4474	50/50	0.4474
957762	AF2-070 E	2.1719	50/50	2.1719
958341	AF2-128 C O2	0.6149	Adder	1.36
958342	AF2-128 E O2	2.8788	Adder	6.39
990901	L-005 E	35.8608	50/50	35.8608
WEC	WEC	0.2170	Confirmed LTF	0.2170
NEWTON	NEWTON	0.3309	Confirmed LTF	0.3309
CALDERWOOD	CALDERWOOD	0.0452	Confirmed LTF	0.0452
NY	NY	0.0481	Confirmed LTF	0.0481
CBM-W1	CBM-W1	5.4293	Confirmed LTF	5.4293
PRAIRIE	PRAIRIE	0.4856	Confirmed LTF	0.4856
O-066	O-066	0.5779	Confirmed LTF	0.5779
CHEOAH	CHEOAH	0.0455	Confirmed LTF	0.0455
EDWARDS	EDWARDS	0.7718	Confirmed LTF	0.7718
TILTON	TILTON	0.2488	Confirmed LTF	0.2488
G-007	G-007	0.0894	Confirmed LTF	0.0894
MADISON	MADISON	1.1310	Confirmed LTF	1.1310
MEC	MEC	1.1314	Confirmed LTF	1.1314
GIBSON	GIBSON	0.1054	Confirmed LTF	0.1054
BLUEG	BLUEG	0.2378	Confirmed LTF	0.2378
TRIMBLE	TRIMBLE	0.0751	Confirmed LTF	0.0751
CATAWBA	CATAWBA	0.0308	Confirmed LTF	0.0308

13.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96237789	272285	POWERTON ;RT	CE	349600	4TOWERLINE	AMIL	1	COMED_P2-2_001_LA-138B__1	bus	214.0	124.19	125.82	DC	7.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.5179	50/50	0.5179
274848	CAMPGROVE;RU	1.5464	50/50	1.5464
274849	CRESCENT ;1U	0.2415	50/50	0.2415
274851	PROVIDENC;RU	0.3684	50/50	0.3684
274871	GR RIDGE ;2U	0.6578	50/50	0.6578
274877	BISHOP HL;1U	0.5914	50/50	0.5914
274878	BISHOP HL;2U	0.5914	50/50	0.5914
276173	Z2-081	0.2318	50/50	0.2318
293061	N-015 E	12.0108	50/50	12.0108
293516	O-009 E1	4.3110	Adder	5.07
293517	O-009 E2	2.1896	Adder	2.58
293518	O-009 E3	2.4114	Adder	2.84
293715	O-029 E	4.6089	Adder	5.42
293716	O-029 E	2.5270	Adder	2.97
293717	O-029 E	2.3226	Adder	2.73
293771	O-035 E	8.5432	50/50	8.5432
294392	P-010 E	15.2537	50/50	15.2537
294401	BSHIL;1U E	13.7144	50/50	13.7144
294410	BSHIL;2U E	13.7144	50/50	13.7144
925581	AC1-033 C	2.2379	50/50	2.2379
925582	AC1-033 E	14.9818	50/50	14.9818
926821	AC1-168 C O1	1.0471	50/50	1.0471
926822	AC1-168 E O1	7.0271	50/50	7.0271
926841	AC1-171 C O1	7.9843	50/50	7.9843
926842	AC1-171 E O1	53.3317	50/50	53.3317
927201	AC1-214 C O1	2.7419	50/50	2.7419
927202	AC1-214 E O1	8.7163	50/50	8.7163
934051	AD1-031 C O1	4.5670	50/50	4.5670
934052	AD1-031 E O1	7.4513	50/50	7.4513
943401	AF1-011 C	0.5885	Adder	0.69
943402	AF1-011 E	0.9879	Adder	1.16
946541	AF1-318 C O1	5.6691	50/50	5.6691
946542	AF1-318 E O1	26.5447	50/50	26.5447
953201	J715 C	1.3993	PJM External (MISO)	1.3993
953202	J715 E	7.5707	PJM External (MISO)	7.5707
957021	AF2-003 C O2	5.4027	50/50	5.4027
957022	AF2-003 E O2	25.2943	50/50	25.2943
957751	AF2-069 C	0.3175	50/50	0.3175
957752	AF2-069 E	1.0246	50/50	1.0246
957761	AF2-070 C	0.4474	50/50	0.4474
957762	AF2-070 E	2.1719	50/50	2.1719

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
958341	AF2-128 C O2	0.6149	Adder	1.36
958342	AF2-128 E O2	2.8788	Adder	6.39
990901	L-005 E	35.8608	50/50	35.8608
WEC	WEC	0.2170	Confirmed LTF	0.2170
NEWTON	NEWTON	0.3309	Confirmed LTF	0.3309
CALDERWOOD	CALDERWOOD	0.0452	Confirmed LTF	0.0452
NY	NY	0.0481	Confirmed LTF	0.0481
CBM-W1	CBM-W1	5.4293	Confirmed LTF	5.4293
PRAIRIE	PRAIRIE	0.4856	Confirmed LTF	0.4856
O-066	O-066	0.5779	Confirmed LTF	0.5779
CHEOAH	CHEOAH	0.0455	Confirmed LTF	0.0455
EDWARDS	EDWARDS	0.7718	Confirmed LTF	0.7718
TILTON	TILTON	0.2488	Confirmed LTF	0.2488
G-007	G-007	0.0894	Confirmed LTF	0.0894
MADISON	MADISON	1.1310	Confirmed LTF	1.1310
MEC	MEC	1.1314	Confirmed LTF	1.1314
GIBSON	GIBSON	0.1054	Confirmed LTF	0.1054
BLUEG	BLUEG	0.2378	Confirmed LTF	0.2378
TRIMBLE	TRIMBLE	0.0751	Confirmed LTF	0.0751
CATAWBA	CATAWBA	0.0308	Confirmed LTF	0.0308

13.5.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96238170	348935	4CORBIN	AMIL	936510	AD2-066 TAP	CE	1	COMED_P4_001-38-TR81___	breaker	223.0	123.74	131.14	DC	16.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.9119	50/50	0.9119
274849	CRESCENT ;1U	0.2163	50/50	0.2163
274851	PROVIDENC;RU	0.3300	50/50	0.3300
274871	GR RIDGE ;2U	1.1581	50/50	1.1581
276173	Z2-081	0.3940	50/50	0.3940
293061	N-015 E	21.1452	50/50	21.1452
293771	O-035 E	7.6522	50/50	7.6522
294392	P-010 E	26.8544	50/50	26.8544
294401	BSHIL;1U E	5.7786	Adder	6.8
294410	BSHIL;2U E	5.7786	Adder	6.8
925581	AC1-033 C	0.9466	Adder	1.11
925582	AC1-033 E	6.3371	Adder	7.46
926821	AC1-168 C O1	1.6744	50/50	1.6744
926822	AC1-168 E O1	11.2368	50/50	11.2368
927201	AC1-214 C O1	2.4559	50/50	2.4559
927202	AC1-214 E O1	7.8073	50/50	7.8073
934051	AD1-031 C O1	1.9214	Adder	2.26
934052	AD1-031 E O1	3.1349	Adder	3.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
946541	AF1-318 C O1	10.0887	50/50	10.0887
946542	AF1-318 E O1	47.2386	50/50	47.2386
953201	J715 C	3.3343	PJM External (MISO)	3.3343
953202	J715 E	18.0397	PJM External (MISO)	18.0397
957021	AF2-003 C O2	9.0930	50/50	9.0930
957022	AF2-003 E O2	42.5716	50/50	42.5716
957751	AF2-069 C	0.2844	50/50	0.2844
957752	AF2-069 E	0.9177	50/50	0.9177
957761	AF2-070 C	0.4007	50/50	0.4007
957762	AF2-070 E	1.9454	50/50	1.9454
958341	AF2-128 C O2	2.9049	50/50	2.9049
958342	AF2-128 E O2	13.6001	50/50	13.6001
990901	L-005 E	7.6265	Adder	8.97
LGEE	LGEE	0.0610	Confirmed LTF	0.0610
CPLE	CPLE	0.0701	Confirmed LTF	0.0701
G-007A	G-007A	0.0527	Confirmed LTF	0.0527
VFT	VFT	0.1419	Confirmed LTF	0.1419
CBM-W2	CBM-W2	3.7920	Confirmed LTF	3.7920
CBM-W1	CBM-W1	3.1650	Confirmed LTF	3.1650
TVA	TVA	0.3920	Confirmed LTF	0.3920
CBM-S2	CBM-S2	0.7572	Confirmed LTF	0.7572
CBM-S1	CBM-S1	2.1130	Confirmed LTF	2.1130
MADISON	MADISON	1.3406	Confirmed LTF	1.3406
MEC	MEC	1.3824	Confirmed LTF	1.3824

13.5.7 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
96237953	936510	AD2-066 TAP	CE	271987	MAZON ; R	CE	1	COMED_P4_001-38-L0108__	breaker	223.0	156.97	164.38	DC	16.5

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274847	GR RIDGE ;BU	0.9119	50/50	0.9119
274849	CRESCENT ;1U	0.2163	50/50	0.2163
274851	PROVIDENC;RU	0.3300	50/50	0.3300
274871	GR RIDGE ;2U	1.1581	50/50	1.1581
276173	Z2-081	0.3940	50/50	0.3940
293061	N-015 E	21.1452	50/50	21.1452
293771	O-035 E	7.6522	50/50	7.6522
294392	P-010 E	26.8544	50/50	26.8544
294401	BSHIL;1U E	5.7786	Adder	6.8
294410	BSHIL;2U E	5.7786	Adder	6.8
925581	AC1-033 C	0.9466	Adder	1.11
925582	AC1-033 E	6.3371	Adder	7.46
926821	AC1-168 C O1	1.6744	50/50	1.6744
926822	AC1-168 E O1	11.2368	50/50	11.2368

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
927201	AC1-214 C O1	2.4559	50/50	2.4559
927202	AC1-214 E O1	7.8073	50/50	7.8073
934051	AD1-031 C O1	1.9214	Adder	2.26
934052	AD1-031 E O1	3.1349	Adder	3.69
936511	AD2-066 C O1	44.5329	50/50	44.5329
936512	AD2-066 E O1	29.6886	50/50	29.6886
946541	AF1-318 C O1	10.0887	50/50	10.0887
946542	AF1-318 E O1	47.2386	50/50	47.2386
953201	J715 C	3.3343	PJM External (MISO)	3.3343
953202	J715 E	18.0397	PJM External (MISO)	18.0397
957021	AF2-003 C O2	9.0930	50/50	9.0930
957022	AF2-003 E O2	42.5716	50/50	42.5716
957751	AF2-069 C	0.2844	50/50	0.2844
957752	AF2-069 E	0.9177	50/50	0.9177
957761	AF2-070 C	0.4007	50/50	0.4007
957762	AF2-070 E	1.9454	50/50	1.9454
958341	AF2-128 C O2	2.9049	50/50	2.9049
958342	AF2-128 E O2	13.6001	50/50	13.6001
990901	L-005 E	7.6265	Adder	8.97
LGEE	LGEE	0.0610	Confirmed LTF	0.0610
CPLE	CPLE	0.0701	Confirmed LTF	0.0701
G-007A	G-007A	0.0527	Confirmed LTF	0.0527
VFT	VFT	0.1419	Confirmed LTF	0.1419
CBM-W2	CBM-W2	3.7920	Confirmed LTF	3.7920
CBM-W1	CBM-W1	3.1650	Confirmed LTF	3.1650
TVA	TVA	0.3920	Confirmed LTF	0.3920
CBM-S2	CBM-S2	0.7572	Confirmed LTF	0.7572
CBM-S1	CBM-S1	2.1130	Confirmed LTF	2.1130
MADISON	MADISON	1.3406	Confirmed LTF	1.3406
MEC	MEC	1.3824	Confirmed LTF	1.3824

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
148521165	958340	AF2-128 TAP	CE	348935	4CORBIN	AMIL	1	COMED_P7_138-L6101___-S_+_138-L7413__R-S-C	tower	179.0	273.4	317.81	DC	79.49

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274849	CRESCENT ;1U	1.6730	50/50	1.6730
274851	PROVIDENC;RU	2.5526	50/50	2.5526
293771	O-035 E	59.1923	50/50	59.1923
927201	AC1-214 C O1	18.9975	50/50	18.9975
927202	AC1-214 E O1	60.3921	50/50	60.3921
946541	AF1-318 C O1	52.7831	50/50	52.7831
946542	AF1-318 E O1	247.1479	50/50	247.1479

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957751	AF2-069 C	2.1997	50/50	2.1997
957752	AF2-069 E	7.0991	50/50	7.0991
957761	AF2-070 C	3.0996	50/50	3.0996
957762	AF2-070 E	15.0480	50/50	15.0480
958341	AF2-128 C O2	13.9902	50/50	13.9902
958342	AF2-128 E O2	65.4995	50/50	65.4995
NEWTON	NEWTON	0.0140	Confirmed LTF	0.0140
FARMERCITY	FARMERCITY	0.0007	Confirmed LTF	0.0007
CALDERWOOD	CALDERWOOD	0.0065	Confirmed LTF	0.0065
NY	NY	0.0072	Confirmed LTF	0.0072
PRAIRIE	PRAIRIE	0.0336	Confirmed LTF	0.0336
O-066	O-066	0.0874	Confirmed LTF	0.0874
CHEOAH	CHEOAH	0.0065	Confirmed LTF	0.0065
EDWARDS	EDWARDS	0.0046	Confirmed LTF	0.0046
TILTON	TILTON	0.0082	Confirmed LTF	0.0082
G-007	G-007	0.0135	Confirmed LTF	0.0135
GIBSON	GIBSON	0.0071	Confirmed LTF	0.0071
BLUEG	BLUEG	0.0226	Confirmed LTF	0.0226
TRIMBLE	TRIMBLE	0.0072	Confirmed LTF	0.0072
CATAWBA	CATAWBA	0.0046	Confirmed LTF	0.0046

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
COMED_P2-2_001_LA-138B__1	CONTINGENCY 'COMED_P2-2_001_LA-138B__1' DISCONNECT BUS 271908 / LASCO STA; B 138 END
COMED_P4_001-38-TR81___	CONTINGENCY 'COMED_P4_001-38-TR81___' TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 DISCONNECT BUS 271908 / LASCO STA; B 138 TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 END
COMED_P2-1_981-L98105___B	CONTINGENCY 'COMED_P2-1_981-L98105___B' TRIP BRANCH FROM BUS 958340 TO BUS 348935 CKT 1 / AF1-318 TAP 138 4CORBIN 138 END

Contingency Name	Contingency Definition
COMED_P7_138-L7411__R-R_+_138-L7408__R-R_FSA	CONTINGENCY 'COMED_P7_138-L7411__R-R_+_138-L7408__R-R_FSA' TRIP BRANCH FROM BUS 348962 TO BUS 271835 CKT 1 / NORMA; R 138 KEWAN; 2 138 TRIP BRANCH FROM BUS 271018 TO BUS 271836 CKT 1 / U4-027 KEWAN; 1 138 END
COMED_P7_138-L7411__R-R_+_138-L7408__R-R_NON_FSA	CONTINGENCY 'COMED_P7_138-L7411__R-R_+_138-L7408__R-R_NON_FSA' TRIP BRANCH FROM BUS 348962 TO BUS 271835 CKT 1 / NORMA; R 138 KEWAN; 2 138 TRIP BRANCH FROM BUS 271018 TO BUS 271836 CKT 1 / U4-027 KEWAN; 1 138 TRIP BRANCH FROM BUS 271018 TO BUS 272110 CKT 1 END
COMED_P2-1_187-L15508__	CONTINGENCY 'COMED_P2-1_187-L15508__' TRIP BRANCH FROM BUS 272505 TO BUS 272097 CKT 1 / SCHAUFF ; 138 NELSO;RT 138 END
COMED_P1-2_138-L15518GB-R-A	CONTINGENCY 'COMED_P1-2_138-L15518GB-R-A' TRIP BRANCH FROM BUS 272094 TO BUS 272366 CKT 1 / NELSO; B 138 R FAL; B 138 TRIP BRANCH FROM BUS 272366 TO BUS 272512 CKT 1 / R FAL; B 138 H71 ;BT 138 TRIP BRANCH FROM BUS 272512 TO BUS 937530 CKT 1 / H71 ;BT 138 AD2-214 TAP 138 TRIP BRANCH FROM BUS 272512 TO BUS 272514 CKT 1 / H71 ;BT 138 H71 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272514 TO BUS 272515 / H71 ; B 138 H71 ; R 138 CLOSE LINE FROM BUS 272366 TO BUS 272367 CKT 1 / R FAL; B 138 R FAL; R 138 END
COMED_P4_001-38-L0108__	CONTINGENCY 'COMED_P4_001-38-L0108__' TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO; B 138 MAZON; B 138 DISCONNECT BUS 271908 / LASCO; B 138 END
271835	CONTINGENCY '271835' OPEN BRANCH FROM BUS 271835 TO BUS 271839 CKT 1 END

Contingency Name	Contingency Definition
COMED_P4_012-38-L1205__	CONTINGENCY 'COMED_P4_012-38-L1205__' TRIP BRANCH FROM BUS 271336 TO BUS 272124 CKT 1 / DRESDEN ; B 138 ESS J339 ; B 138 TRIP BRANCH FROM BUS 271986 TO BUS 271908 CKT 1 / MAZON ; B 138 LASCO STA; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 271986 CKT 1 / ESS J375 ; B 138 MAZON ; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 272124 CKT 1 / ESS J375 ; B 138 ESS J339 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272124 TO BUS 272125 / ESS J339 ; B 138 ESS J339 ; R 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274837 / EQUISTAR ; B 13.8 TRIP BRANCH FROM BUS 271336 TO BUS 271566 CKT 1 / DRESDEN ; B 138 GOOSE LK ; B 138 END
COMED_P7_138-L6101___-S_+_138-L7713__R-S-A	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7713__R-S-A' TRIP BRANCH FROM BUS 271655 TO BUS 271835 CKT 1 / HENNEEPIN; T 138 KEWANEE ;23 138 TRIP BRANCH FROM BUS 271655 TO BUS 348918 CKT 1 / HENNEEPIN; T 138 4HENNEPIN S 138 TRIP BRANCH FROM BUS 926820 TO BUS 271655 CKT 1 / AC1-168 TAP 138 HENNEEPIN; T 138 TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R138 138 MAZON ; R138 END
COMED_P4_001-45-BT1-9__	CONTINGENCY 'COMED_P4_001-45-BT1-9__' TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1 / LASCO STA; B 345 PLANO ; B 345 TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345 END
COMED_P4_001-45-BT1-2__	CONTINGENCY 'COMED_P4_001-45-BT1-2__' TRIP BRANCH FROM BUS 270803 TO BUS 270847 CKT 1 / LASCO; R 345 PLANO; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO; B 345 LASCO; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 END
Base Case	

Contingency Name	Contingency Definition
COMED_P7_138-L1205__B-S_+_138-L7719__R-S	CONTINGENCY 'COMED_P7_138-L1205__B-S_+_138-L7719__R-S' TRIP BRANCH FROM BUS 271336 TO BUS 272124 CKT 1 / DRESDEN ; B 138 ESS J339 ; B 138 TRIP BRANCH FROM BUS 271986 TO BUS 271908 CKT 1 / MAZON ; B 138 LASCO STA; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 271986 CKT 1 / ESS J375 ; B 138 MAZON ; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 272124 CKT 1 / ESS J375 ; B 138 ESS J339 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272124 TO BUS 272125 / ESS J339 ; B 138 ESS J339 ; R 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274837 / EQUISTAR ; B 13.8 TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R138 138 MAZON ; R138 END
COMED_P1-2_138-L0112__B-S	CONTINGENCY 'COMED_P1-2_138-L0112__B-S' TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138 LASCO; B 138 END
COMED_P1-3_TR81_LASCO_B-S	CONTINGENCY 'COMED_P1-3_TR81_LASCO_B-S' TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138 END
COMED_P1-2_138-L0108__B-S	CONTINGENCY 'COMED_P1-2_138-L0108__B-S' TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO; B 138 MAZON; B 138 END

Contingency Name	Contingency Definition
COMED_P7_138-L1205__B-S_+_138-L1206__R-S	CONTINGENCY 'COMED_P7_138-L1205__B-S_+_138-L1206__R-S' TRIP BRANCH FROM BUS 271336 TO BUS 272124 CKT 1 / DRESDEN ; B 138 ESS J339 ; B 138 TRIP BRANCH FROM BUS 271986 TO BUS 271908 CKT 1 / MAZON ; B 138 LASCO STA; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 271986 CKT 1 / ESS J375 ; B 138 MAZON ; B 138 TRIP BRANCH FROM BUS 272318 TO BUS 272124 CKT 1 / ESS J375 ; B 138 ESS J339 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272124 TO BUS 272125 / ESS J339 ; B 138 ESS J339 ; R 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274837 / EQUISTAR ; B 13.8 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138 TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138 TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138 DISCONNECT BUS 274836 / EQUISTAR ; R 13.8 END
COMED_P7_138-L6101___-S_+_138-L7413__R-S-A	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7413__R-S-A' TRIP BRANCH FROM BUS 271655 TO BUS 271835 CKT 1 / HENNEEPIN; T 138 KEWANEE ;23 138 TRIP BRANCH FROM BUS 271655 TO BUS 348918 CKT 1 / HENNEEPIN; T 138 4HENNEPIN S 138 TRIP BRANCH FROM BUS 926820 TO BUS 271655 CKT 1 / AC1-168 TAP 138 HENNEEPIN; T 138 TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWANEE ;11 138 CRESCENT ; R 138 END
COMED_P7_138-L6101___-S_+_138-L7413__R-S-C	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7413__R-S-C' TRIP BRANCH FROM BUS 271655 TO BUS 271835 CKT 1 / HENNEEPIN; T 138 KEWANEE ;23 138 TRIP BRANCH FROM BUS 271655 TO BUS 348918 CKT 1 / HENNEEPIN; T 138 4HENNEPIN S 138 TRIP BRANCH FROM BUS 272521 TO BUS 957020 CKT 1 / STREATOR ; 138 AF2-003 TAP 138 TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWANEE ;11 138 CRESCENT ; R 138 END

Contingency Name	Contingency Definition
COMED_P7_138-L6101___-S_+_138-L7413__R-S-B	CONTINGENCY 'COMED_P7_138-L6101___-S_+_138-L7413__R-S-B' TRIP BRANCH FROM BUS 271655 TO BUS 271835 CKT 1 / HENNEEPIN; T 138 KEWANEE ;23 138 TRIP BRANCH FROM BUS 271655 TO BUS 348918 CKT 1 / HENNEEPIN; T 138 4HENNEPIN S 138 TRIP BRANCH FROM BUS 957020 TO BUS 926820 CKT 1 / AF2-003 TAP 138 AC1-168 TAP 138 TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWANEE ;11 138 CRESCENT ; R 138 END

14 Affected Systems

14.1 MISO

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