

***Generation Interconnection Request
System Impact Study Report
For
PJM Generation Interconnection Request
Queue Position AD2-066***

***Mazon-Crescent Ridge 138 kV
116 MW Energy / 69.6 MW Capacity***

***Revision 0: November 7, 2021
Revision 1: November 11, 2021
Revision 2: May 2022***

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.

Revision History:

Revision 0: Issued November 7, 2021.

Revision 1: Issued November 11, 2021. Revision 1 updates references to AD2-066 – Mazon line voltage in the “System Reinforcement” section from 345 kV to 138 kV.

Revision 2: Issued May 2022 Revision 2 updates the report to include retooled load flow analysis results.

General

The Interconnection Customer (“IC”) for Queue **AD2-066 Mazon-Crescent Ridge 138 kV** project has proposed to connect a 116 MW Energy (69.6 MW Capacity) solar PV facility to be located in Grundy County, IL. The IC has proposed a service date for this project of September 1, 2020. This study does not imply a Transmission Owner commitment to this date.

Point of Interconnection

The Interconnection Customer (IC) AD2-066, a 116 MW solar facility, proposes to interconnect with the ComEd transmission system by tying into the Crescent Ridge-Oglesby (Ameren)- Mazon 138kV Line 7713, approximately 6 miles from Mazon.

Cost Summary

Description	Cost Estimate
Total Physical Interconnection Costs	\$19,500,000
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	\$1,738,884
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	\$0
Allocation towards System Network Upgrade Costs (TO Identified)*	\$0
Total Costs	\$21,238,884

*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

Transmission Owner Scope of Work

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

Description	Cost Estimate
Attachment Facilities	\$1,000,000
Direct Connection Network Upgrades (Assumes ComEd will build the Interconnection Substation)	\$ 17,000,000
Non-Direct Connection Network Upgrades	\$1,500,000
Total Physical Interconnection Costs	\$ 19,500,000

Attachment Facilities

The IC AD2-066 generator lead would interconnect to a new 138kV Interconnection Substation. This interconnection would require one 138kV line MOD, a dead-end structure and revenue metering as shown in the one line diagram.

The cost for the attachment facilities is estimated at \$1M.

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

Direct Connection Network Upgrades

In order to accommodate interconnection of AD2-066, a new 138kV Interconnection Substation would need to be built close to the Crescent Ridge-Oglesby (Ameren)-Mazon 138kV Line 7713 approximately 6 miles from the Mazon TSS 77.

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 Crescent Ridge-Oglesby (Ameren)-Mazon 138kV Line 7713, as shown in the one-line diagram below.

The IC is responsible for constructing all of the facilities on the IC side of the point of interconnection 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 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-Oglesby (Ameren)-Mazon 138kV Line 7713.

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 Mazon TSS 77, Crescent Ridge TSS 981, and AMEREN's Oglesby substation. The ComEd cost is given below:

Scope of Work	Cost Estimate
Relay/communications/SCADA upgrades at Mazon TSS 77 substation	\$ 750,000
Relay/communications/SCADA upgrades at Crescent Ridge TSS 981 substation	\$ 750,000
Relay/communications/SCADA upgrades at Oglesby substation (Ameren to provide cost-estimate)	\$ 0
Total Cost Estimate (see notes below on cost estimate)	\$ 1,500,000

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. Per the PJM Tariff, IC will be responsible for paying all actual costs of ComEd's work.
- 4) The IC is responsible for all engineering, procurement, testing and construction of all equipment on the IC's side of the Point of Interconnection (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

Revenue Metering and SCADA Requirements

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.

Meteorological Data Reporting Requirements

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

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter²) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

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:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/>

Network Impacts

The Queue Project AD2-066 was evaluated as a 116.0 MW (Capacity 69.6 MW) injection tapping the **Mazon to Corbin 138kV** line in the ComEd area. Project AD2-066 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-066 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

Overload Number	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Flowgate Appendix
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA		
1	Non	Non	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	99.68	100.29	NR	1201	7.18	

Notes:

Overload 1: Above 1201 MVA Summer Normal (Violation valid)

Multiple Facility Contingency

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

Overload Number	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Flowgate Appendix
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA		
2	LFFB	COMED_P4_112-65-BT5-6__	CE - CE	WILTON ; B-WILTON ;3M 345 kV line	270926	275232	1	AC	94.75	95.89	LDR	1379	17.32	1
3	LFFB	COMED_P4_112-65-BT2-3__	CE - CE	WILTON ; R-WILTON ;4M 345 kV line	270927	275233	1	AC	96.74	97.9	LDR	1379	17.69	2
4	LFFB	COMED_P4_012-38-L1206__	CE - MISO AMIL	OGLESBY ; T-40GLESBY MN 138 kV line	272189	348935	1	AC	63.39	109.66	ER	202	95.16	3
5	DCTL	COMED_P7_138-L0903__R-S_+ _138-L1206__R-S-A	CE - MISO AMIL	OGLESBY ; T-40GLESBY MN 138 kV line	272189	348935	1	AC	63.38	109.65	ER	202	95.16	

6	DCTL	COMED_P7_138-L0903_R-S_+ 138-L1206_R-S_B	CE - MISO AMIL	OGLESBY ; T-4OGLESBY MN 138 kV line	272189	348935	1	AC	63.35	109.62	ER	202	95.16	
7	DCTL	COMED_P7_345-L11620_B-S_+ 345-L11622_R-S	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	99.83	100.56	LDR	1768	15.02	4
8	BUS	COMED_P2-2_111_EJ-345B_2	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	98.91	99.95	LDR	1479	15.08	
9	LFFB	COMED_P4_111-45-L11126_	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	98.91	99.95	LDR	1479	15.08	
10	LFFB	COMED_P4_112-65-BT5-6_	CE - CE	WILTON ; 765/345 kV transformer	275232	270644	1	AC	94.73	95.87	LDR	1379	17.32	5
11	LFFB	COMED_P4_112-65-BT2-3_	CE - CE	WILTON ; 765/345 kV transformer	275233	270644	1	AC	96.72	97.88	LDR	1379	17.69	6

Notes:

Overload 2: Facility loading below 100% (Not a violation)
Overload 3: Facility loading below 100% (Not a violation)
Overload 4: 202 MVA SE (Violation valid)
Overload 5: 202 MVA SE (Violation valid)
Overload 6: 202 MVA SE (Violation valid)
Overload 7: ComEd ALDR: 2033 MVA (Not a violation)
Overload 8: Facility loading below 100% (Not a violation)
Overload 9: Facility loading below 100% (Not a violation)
Overload 10: Facility loading below 100% (Not a violation)
Overload 11: Facility loading below 100% (Not a violation)

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)

Overload		Contingency			Bus			Loading %		Rating		MW	Flowgate	
Number	Type	Name	Affected Area	Facility Description	From	To	Circuit	Power Flow	Initial	Final	Type	MVA	Contribution	Appendix
12	LFFB	AEP_P4_#2978_05DUMONT 765	MISO NIPS - AEP	17STILLWELL-05DUMONT 345 kV line	255113	243219	1	AC	108.84	109.84	ER	1409	16.32	7

13	DCTL	COMED_P7_345-L11620_B-S_+ 345-L11622_R-S	CE - CE	DRESDEN ; B-KENDALL ;BU 345 kV line	270716	274702	1	AC	105.03	106.11		1195	15.38	8
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Notes:

Overload 12: AEP end ratings: 1409 MVA SE. MISO end ratings: 1779 MVA SE (Violation for AEP portion only).

Overload 13: ComEd ALDR: 1477 MVA (Not a violation)

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

None

Short Circuit

(Summary of impacted circuit breakers)

No overdutied breakers.

Affected System Analysis & Mitigation

MISO Impacts:

None.

Delivery of Energy Portion of Interconnection Request

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.

Only the most severely overloaded conditions are listed. 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 will study all overload conditions associated with the overloaded element(s) identified.

Overload		Contingency		Bus				Loading %		Rating				
Number	Type	Name	Affected Area	Facility Description	From	To	Circuit	Power Flow	Initial	Final	Type	MVA	MW Contribution	Flowgate Appendix
14	N-1	COMED_P1-2_695_B2	MISO NIPS - AEP	17STILLWELL-05DUMONT 345 kV line	255113	243219	1	AC	104.88	105.9	NR	1409	16.7	
15	N-1	COMED_P1-2_138-L0112__B-S	CE - CE	MAZON ; R-CHANNAHON; R 138 kV line	271987	271187	1	AC	76.08	104.31	ER	223	65.83	
16	Non	Non	CE - CE	MAZON ; R-CHANNAHON; R 138 kV line	271987	271187	1	AC	66.27	102.75	NR	173	64.66	
17	N-1	COMED_P1-2_138-L1206__R-S-A	CE - MISO AMIL	OGLESBY ; T-4OGLESBY MN 138 kV line	272189	348935	1	AC	63.29	109.56	ER	202	95.16	
18	N-1	COMED_P1-2_345-L11212_B-S_B	MISO AMIL - AEP	7CASEY-05SULLIVAN 345 kV line	346809	247712	1	AC	99.89	100.28	NR	1466	6.55	
19	N-1	COMED_P1-2_138-L0112__B-S	CE - CE	AD2-066 TAP-MAZON ; R 138 kV line	936510	271987	1	AC	92.67	124.47	ER	223	74.74	
20	Non	Non	CE - CE	AD2-066 TAP-MAZON ; R 138 kV line	936510	271987	1	AC	80.26	121.31	NR	173	73.25	

Light Load Analysis - 2021

Light Load Analysis is not required for this fuel type.

System Reinforcements

Summary of Allocated Costs for System Reinforcements:

Summer Peak Load Flow Analysis Reinforcements

Facility	Upgrade Description	Cost	Cost Allocation	Upgrade Number																
KENDALL ;BU-LOCKPORT ; B 345 kV Ckt. 1	Basecase overload of normal rating 1201 MVA. Project ID: N5144 Description: Re-conductor 16.1 miles with 2156 kcmil ACSR (84/19) Str. Bluebird. Estimate is \$38.672 M with a construction time of 30 months. New ratings to be 1334/1726/1837/2084 MVA SN/SLTE/SSTE/SLD. Cost: \$38,672,000 Time Estimate: 30 Months Ratings: 1334/1726/1837/2084 MVA SN/SLTE/SSTE/SLD. <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$38.672 M)</th></tr><tr><td>AB1-122</td><td>56.6</td><td>35.45%</td><td>\$14,039,995</td></tr><tr><td>AC1-204</td><td>95.9</td><td>60.1%</td><td>\$23,788,613</td></tr><tr><td>AD2-066</td><td>7.18</td><td>4.5%</td><td>\$1,738,884</td></tr></table>	Queue	MW Contribution	Cost %	Cost (\$38.672 M)	AB1-122	56.6	35.45%	\$14,039,995	AC1-204	95.9	60.1%	\$23,788,613	AD2-066	7.18	4.5%	\$1,738,884	\$38,672,000	\$1,738,884	N5144
Queue	MW Contribution	Cost %	Cost (\$38.672 M)																	
AB1-122	56.6	35.45%	\$14,039,995																	
AC1-204	95.9	60.1%	\$23,788,613																	
AD2-066	7.18	4.5%	\$1,738,884																	
OGLESBY ; T-4OGLESBY MN 138 kV Ckt. 1	Project ID: S1554 Description: Supplemental Project S1554 New Ameren Corbin Station L7713 Cut-In: Cut 138kV line 7713 (Crescent Ridge- Mazon - Oglesby) in and out of the new Ameren Oglesby substation (Requires additional structures to facilitate the installation of the new substation and the cutting in and out of the existing 138kV line 7713) Projected In Service Date: 12/31/2023. Note: Although your present cost allocation to a Supplemental Project 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.	\$0	\$0	S1554																
17STILLWELL-05DUMONT 345 kV Ckt. 1	AEP Portion: Project ID: N4058 Description: Sag study results from Z1-043 & Z1-070 Facilities Studies To Sag mitigation work will include the replacement of tower 20 with a custom steel pole, replacement of tower 24 with a custom H-frame and the removal of swing angle brackets on 2 structures. Cost estimate is \$1.613M. New SE rating will be 1718 MVA limited by a Dumont wave trap. Based on updated Sag study results, the cost to rebuild the entire 8.6 mile section of line if it is deemed necessary is \$20M. Sag study time estimate is 6-12 months and the construction time for the rebuild is 2-3 years after execution of the ISA/CSA. PJM Network Upgrade N4058. Cost: \$1,613,000 Time Estimate: N/A Ratings: 1718 MVA SE Notes:	\$1,613,000	\$0	N4058																

	1. Since the cost of the upgrade is less than \$5M, based on PJM cost allocation criteria, AD2-066 currently does not receive cost allocation towards this upgrade. This upgrade is driver by prior AD1 queue. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AD2-066 could receive cost allocation. 3. Although Queue Project AD2-066 may not presently have cost responsibility for this upgrade, Queue Project AD2-066 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AD2-066 comes into service prior to completion of the upgrade, Queue Project AD2-066 will need an interim study. <u>MISO Portion:</u> MISO end SE rating is 1779 MVA. No upgrades required.			
DRESDEN ; B-KENDALL ;BU 345 kV Ckt. 1	ComEd ALDR: 1477 MVA is sufficient. No upgrades required.	\$0	\$0	
	Total Cost	\$40,285,000	\$1,738,884	

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

None

Stability and Reactive Power Requirement

No mitigations are required for stability. However, the reactive power capability of AD2-066 does NOT meet the 0.95 lagging PF requirement whereas 0.95 leading PF requirement was met at the high side of the main transformer as shown in below.

Table 1: Error! Reference source not found. **Reactive Power Capability Assessment**

Generator	MFO	Required pF Range		Maximum (Lagging)	Minimum (Leading)
		Lagging	Leading		
AD2-066	116	0.95	0.95		
Total MVAR Required				38.13	-38.13
MVAR from Generators				Qmax	Qmin
				57.59	-57.59
Customer Planned Compensation				0	0
Qloss				-21.47	-21.47
Total Available MVAR at high side of Main transformer				36.48	-79.42
Deficiency in MVAR				1.65	Meet

Contingencies

Contingency Name	Description
AEP_P4_#2978_05DUMONT 765	CONTINGENCY 'AEP_P4_#2978_05DUMONT 765' OPEN BRANCH FROM BUS 243206 TO BUS 243207 CKT 1 / 243206 05DUMONT 765 05GRNTWN OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1 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_P1-2_138-L1206__R-S-A	CONTINGENCY 'COMED_P1-2_138-L1206__R-S-A' TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138 TRIP BRANCH FROM BUS 271987 TO BUS 936510 CKT 1 / MAZON ; R 138 AD2-066 TAP 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 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138 MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274836 / EQUISTAR ; R 13.8 END

COMED_P1-2_345-L11212_B-S_B	CONTINGENCY 'COMED_P1-2_345-L11212_B-S_B' TRIP BRANCH FROM BUS 934720 TO BUS 270704 CKT 1 / AD1-100 TAP 345 LORET; B 345 END
COMED_P1-2_695_B2	CONTINGENCY 'COMED_P1-2_695_B2' OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1 END
COMED_P2-2_111_EJ-345B__2	CONTINGENCY 'COMED_P2-2_111_EJ-345B__2' TRIP BRANCH FROM BUS 270730 TO BUS 270846 CKT 1 / ELECT; B 345 PLANO; B 345 TRIP BRANCH FROM BUS 270730 TO BUS 270916 CKT 1 / ELECT; B 345 WAYNE; B 345 TRIP BRANCH FROM BUS 270730 TO BUS 270928 CKT 1 / ELECT; B 345 WOLFS; B 345 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1 / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5 DISCONNECT BUS 275239 / ELECT;2M 138 END
COMED_P4_012-38-L1206__	CONTINGENCY 'COMED_P4_012-38-L1206__' TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138 TRIP BRANCH FROM BUS 271987 TO BUS 936510 CKT 1 / MAZON ; R 138 AD2-066 TAP 138 /* CONTINGENCY LINE ADDED FOR AD2 BUILD 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 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138 MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138

	CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274836 / EQUISTAR ; R 13.8 TRIP BRANCH FROM BUS 271337 TO BUS 271336 CKT 1 / DRESDEN ; R 138 DRESDEN ; B 138 TRIP BRANCH FROM BUS 271337 TO BUS 271567 CKT 1 / DRESDEN ; R 138 GOOSE LK ; R 138 END
COMED_P4_111-45-L11126_	CONTINGENCY 'COMED_P4_111-45-L11126_' TRIP BRANCH FROM BUS 270730 TO BUS 270916 CKT 1 / ELECT; B 345 WAYNE; B 345 TRIP BRANCH FROM BUS 270730 TO BUS 270846 CKT 1 / ELECT; B 345 PLANO; B 345 TRIP BRANCH FROM BUS 270730 TO BUS 270928 CKT 1 / ELECT; B 345 WOLFS; B 345 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1 / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5 DISCONNECT BUS 275239 / ELECT;2M 138 END
COMED_P4_112-65-BT2-3__	CONTINGENCY 'COMED_P4_112-65-BT2-3__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33 END

COMED_P4_112-65-BT5-6__	CONTINGENCY 'COMED_P4_112-65-BT5-6__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33 END
COMED_P7_138-L0903__R-S+_138-L1206__R-S_B	CONTINGENCY 'COMED_P7_138-L0903__R-S+_138-L1206__R-S_B' TRIP BRANCH FROM BUS 271567 TO BUS 271337 CKT 1 / GOOSE LK ; R 138 DRESDEN ; R 138 TRIP BRANCH FROM BUS 271567 TO BUS 274190 CKT 7 / GOOSE LK ; R 138 GOOSE LK ; 34.5 TRIP BRANCH FROM BUS 271725 TO BUS 271723 CKT 1 / ESS J370 ;RT 138 ESS J370 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 271181 TO BUS 271180 / ESS J326 ; R 138 ESS J326 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271783 TO BUS 271416 / JOLIET374; R 138 ESS J390 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272019 TO BUS 272018 / MINOOKA ; R 138 MINOOKA ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272318 TO BUS 272319 / ESS J375 ; B 138 ESS J375 ; R 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 271185 / ESS J326 ;RT 138 DISCONNECT BUS 271417 / ESS J390 ; R 138 DISCONNECT BUS 271473 / ESS J305 ;RT 138

	TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138
	TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138
	TRIP BRANCH FROM BUS 271987 TO BUS 936510 CKT 1 / MAZON ; R 138 AD2-066 TAP T 138 /* CONTINGENCY LINE ADDED FOR AD2 BUILD
	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
	CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
	DISCONNECT BUS 274836 END
COMED_P7_138- L0903__R-S+_138- L1206__R-S-A	CONTINGENCY 'COMED_P7_138-L0903__R-S+_138-L1206__R-S-A' TRIP BRANCH FROM BUS 271567 TO BUS 271337 CKT 1 / GOOSE LK ; R 138 DRESDEN ; R 138 TRIP BRANCH FROM BUS 271567 TO BUS 274190 CKT 7 / GOOSE LK ; R 138 GOOSE LK ; 34.5 TRIP BRANCH FROM BUS 271725 TO BUS 271723 CKT 1 / ESS J370 ;RT 138 ESS J370 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 271181 TO BUS 271180 / ESS J326 ; R 138 ESS J326 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271783 TO BUS 271416 / JOLIET374; R 138 ESS J390 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272019 TO BUS 272018 / MINOOKA ; R 138 MINOOKA ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 272318 TO BUS 272319 / ESS J375 ; B 138 ESS J375 ; R 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 /

	MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 271185 / ESS J326 ;RT 138 DISCONNECT BUS 271417 / ESS J390 ; R 138 DISCONNECT BUS 271473 / ESS J305 ;RT 138 TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138 TRIP BRANCH FROM BUS 271987 TO BUS 936510 CKT 1 / MAZON ; R 138 AD2-066 TAP 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 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138 MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138 DISCONNECT BUS 274836 / EQUISTAR ; R 13.8 END
COMED_P7_345- L11620_B-S_+_345- L11622_R-S	CONTINGENCY 'COMED_P7_345-L11620_B-S_+_345-L11622_R-S' TRIP BRANCH FROM BUS 270736 TO BUS 270770 CKT 1 / ELWOO; B 345 GOODI;3B 345 TRIP BRANCH FROM BUS 270737 TO BUS 270769 CKT 1 / ELWOO; R 345 GOODI;1R 345 END

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information 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 Appendices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the Appendices. 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 and appendices sections are full contributions, whereas the loading percentages reported in the body of the report, take into consideration the commercial probability of each project as well as the ramping impact of "Adder" contributions.

Appendix 1

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 94.75% to 95.89% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 17.32 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765
COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345
WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345
WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345
WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	2.93
932891	AC2-115 2	2.93
932921	AC2-116	1.02
932931	AC2-117	6.55
933411	AC2-154 C	3.18
933412	AC2-154 E	5.19
933911	AD1-013 C O1	2.26
933912	AD1-013 E O1	3.61
933931	AD1-016 C	1.14
933932	AD1-016 E	1.86
934051	AD1-031 C O1	3.53
934052	AD1-031 E O1	5.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
934701	AD1-098 C O1	8.46
934702	AD1-098 E O1	6.18
934721	AD1-100 C	29.38
934722	AD1-100 E	137.09
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934971	AD1-129 C	1.11
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.56
935002	AD1-133 E O1	18.37
934101	AD2-000 1	7.26
934111	AD2-000 2	7.33
936291	AD2-038 C O1	3.92

936292	AD2-038 E O1	18.36
936371	AD2-047 C O1	5.7
936372	AD2-047 E O1	27.81
936461	AD2-060	3.35
936511	AD2-066 C O1	10.39
936512	AD2-066 E O1	6.93
936791	AD2-102 C	17.4
936792	AD2-102 E	11.6
937001	AD2-134 C	3.18
937002	AD2-134 E	12.71
937311	AD2-172 C	3.03
937312	AD2-172 E	4.18
937401	AD2-194 C1	9.6
937411	AD2-194 C2	9.6
937531	AD2-214 C	5.43
937532	AD2-214 E	3.62
LTF	BLUEG	2.68
294401	BSHIL;1U E	10.63
294410	BSHIL;2U E	10.63
LTF	CALDERWOOD	0.06
LTF	CANNELTON	0.13
LTF	CARR	0.95
LTF	CATAWBA	0.35
274890	CAYUG;1U E	20.38
274891	CAYUG;2U E	20.38
LTF	CBM-S1	1.88
LTF	CBM-W1	75.21
LTF	CBM-W2	52.82
LTF	CHEOAH	0.07
LTF	CLIFTY	16.
274849	CRESCENT ;1U	6.01
274859	EASYR;U1 E	13.53
274860	EASYR;U2 E	13.53
LTF	ELMERSMITH	0.25
LTF	G-007	2.58
LTF	GIBSON	0.01
290051	GSG-6; E	12.85
LTF	HAMLET	0.67
275149	KEMPTON ;1E	23.45
990901	L-005 E	15.64
290108	LEEDK;1U E	29.84
274770	LINCOLN ;1U	3.94
274771	LINCOLN ;2U	3.94
274772	LINCOLN ;3U	3.94
274773	LINCOLN ;4U	3.94

274774	LINCOLN ;5U	3.94
274775	LINCOLN ;6U	3.94
274776	LINCOLN ;7U	3.94
274777	LINCOLN ;8U	3.94
LTF	MEC	46.95
274850	MENDOTA H;RU	6.63
293061	N-015 E	19.46
293516	O-009 E1	11.24
293517	O-009 E2	5.71
293518	O-009 E3	6.29
293715	O-029 E	12.02
293716	O-029 E	6.59
293717	O-029 E	6.06
293771	O-035 E	7.95
LTF	O-066	16.56
293644	O22 E1	12.61
293645	O22 E2	24.49
290021	O50 E	23.86
294392	P-010 E	24.72
294763	P-046 E	11.53
274888	PILOT HIL;1E	23.45
LTF	RENSSELAER	0.75
295111	SUBLETTE E	3.34
LTF	TRIMBLE	0.55
274853	TWINGROVE;U1	20.55
274854	TWINGROVE;U2	20.55
299993	U3-031C	11.47
LTF	WEC	9.81
295109	WESTBROOK E	6.88
910542	X3-005 E	0.9
915011	Y3-013 1	4.6
915021	Y3-013 2	4.6
915031	Y3-013 3	4.6
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.18
916522	Z1-108 E	3.06
917501	Z2-087 C	3.87
917502	Z2-087 E	25.91
918051	AA1-018 C	3.02
918052	AA1-018 E	20.23
919221	AA1-146	21.65
919581	AA2-030	21.65
920272	AA2-123 E	3.
930481	AB1-089	80.85

930761	AB1-122 1	89.75
930771	AB1-122 2	90.68
924041	AB2-047 C O1	4.84
924042	AB2-047 E O1	32.39
925301	AB2-191 C	1.23
925302	AB2-191 E	1.7
925581	AC1-033 C	1.74
925582	AC1-033 E	11.65
926311	AC1-109 1	2.35
926321	AC1-109 2	2.35
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.93
927451	AC1-142A 1	5.15
927461	AC1-142A 2	5.15
926821	AC1-168 C	1.45
926822	AC1-168 E	9.72
926841	AC1-171 C	1.25
926842	AC1-171 E	8.36
927531	AC1-185 1	0.85
927541	AC1-185 2	0.85
927551	AC1-185 3	0.85
927561	AC1-185 4	0.85
927571	AC1-185 5	0.85
927581	AC1-185 6	0.85
927591	AC1-185 7	0.85
927601	AC1-185 8	0.85
927091	AC1-204 1	89.32
927101	AC1-204 2	89.32
927201	AC1-214 C	2.55
927202	AC1-214 E	8.11

Appendix 2

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 96.74% to 97.9% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 17.69 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765
COLLI; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345
WILTO; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345
WILTO; B 345

TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345
WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	2.99
932891	AC2-115 2	2.99
932921	AC2-116	1.05
932931	AC2-117	6.69
933411	AC2-154 C	3.25
933412	AC2-154 E	5.3
933911	AD1-013 C O1	2.31
933912	AD1-013 E O1	3.69
933931	AD1-016 C	1.16
933932	AD1-016 E	1.9
934051	AD1-031 C O1	3.61
934052	AD1-031 E O1	5.89
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
934701	AD1-098 C O1	8.64
934702	AD1-098 E O1	6.31
934721	AD1-100 C	29.96
934722	AD1-100 E	139.8
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934971	AD1-129 C	1.13
934972	AD1-129 E	0.76
935001	AD1-133 C O1	28.13
935002	AD1-133 E O1	18.75
934101	AD2-000 1	7.41
934111	AD2-000 2	7.49

936291	AD2-038 C O1	4.01
936292	AD2-038 E O1	18.76
936371	AD2-047 C O1	5.81
936372	AD2-047 E O1	28.39
936461	AD2-060	3.42
936511	AD2-066 C O1	10.61
936512	AD2-066 E O1	7.08
936791	AD2-102 C	17.76
936792	AD2-102 E	11.84
937001	AD2-134 C	3.25
937002	AD2-134 E	12.98
937311	AD2-172 C	3.09
937312	AD2-172 E	4.27
937401	AD2-194 C1	9.81
937411	AD2-194 C2	9.81
937531	AD2-214 C	5.55
937532	AD2-214 E	3.7
LTF	BIG_CAJUN1 /* 35% REVERSE 4646887 4392735	< 0.01
LTF	BLUEG	2.74
294401	BSHIL;1U E	10.85
294410	BSHIL;2U E	10.85
LTF	CALDERWOOD	0.06
LTF	CANNELTON	0.13
LTF	CARR	0.97
LTF	CATAWBA	0.36
274890	CAYUG;1U E	20.78
274891	CAYUG;2U E	20.78
LTF	CBM-S1	1.91
LTF	CBM-W1	76.82
LTF	CBM-W2	53.91
LTF	CHEOAH	0.07
LTF	CLIFTY	16.34
274849	CRESCENT ;1U	6.14
274859	EASYR;U1 E	13.81
274860	EASYR;U2 E	13.81
LTF	ELMERSMITH	0.26
LTF	G-007	2.64
LTF	GIBSON	0.01
290051	GSG-6; E	13.12
LTF	HAMLET	0.69
275149	KEMPTON ;1E	23.94
990901	L-005 E	15.97
290108	LEEDK;1U E	30.48
274770	LINCOLN ;1U	4.05

274771	LINCOLN ;2U	4.05
274772	LINCOLN ;3U	4.05
274773	LINCOLN ;4U	4.05
274774	LINCOLN ;5U	4.05
274775	LINCOLN ;6U	4.05
274776	LINCOLN ;7U	4.05
274777	LINCOLN ;8U	4.05
LTF	MEC	47.95
274850	MENDOTA H;RU	6.77
293061	N-015 E	19.87
293516	O-009 E1	11.48
293517	O-009 E2	5.83
293518	O-009 E3	6.42
293715	O-029 E	12.28
293716	O-029 E	6.73
293717	O-029 E	6.19
293771	O-035 E	8.12
LTF	O-066	16.91
293644	O22 E1	12.88
293645	O22 E2	25.
290021	O50 E	24.37
294392	P-010 E	25.24
294763	P-046 E	11.78
274888	PILOT HIL;1E	23.94
LTF	RENSSELAER	0.77
LTF	ROWAN /* 35% REVERSE 4479078	< 0.01
295111	SUBLETTE E	3.42
LTF	TRIMBLE	0.56
274853	TWINGROVE;U1	20.97
274854	TWINGROVE;U2	20.97
299993	U3-031C	11.78
LTF	WEC	10.02
295109	WESTBROOK E	7.03
910542	X3-005 E	0.92
915011	Y3-013 1	4.7
915021	Y3-013 2	4.7
915031	Y3-013 3	4.7
916502	Z1-106 E1	1.59
916504	Z1-106 E2	1.59
916512	Z1-107 E	3.24
916522	Z1-108 E	3.12
917501	Z2-087 C	3.95
917502	Z2-087 E	26.44
918051	AA1-018 C	3.09
918052	AA1-018 E	20.67

919221	AA1-146	22.11
919581	AA2-030	22.11
920272	AA2-123 E	3.06
930481	AB1-089	82.57
930761	AB1-122 1	91.65
930771	AB1-122 2	92.61
924041	AB2-047 C O1	4.94
924042	AB2-047 E O1	33.05
925301	AB2-191 C	1.26
925302	AB2-191 E	1.74
925581	AC1-033 C	1.78
925582	AC1-033 E	11.9
926311	AC1-109 1	2.4
926321	AC1-109 2	2.4
926331	AC1-110 1	2.38
926341	AC1-110 2	2.38
926351	AC1-111 1	0.96
926361	AC1-111 2	0.96
926371	AC1-111 3	0.96
926381	AC1-111 4	0.96
926391	AC1-111 5	0.96
926401	AC1-111 6	0.96
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.99
927451	AC1-142A 1	5.26
927461	AC1-142A 2	5.26
926821	AC1-168 C	1.48
926822	AC1-168 E	9.93
926841	AC1-171 C	1.27
926842	AC1-171 E	8.53
927531	AC1-185 1	0.86
927541	AC1-185 2	0.86
927551	AC1-185 3	0.86
927561	AC1-185 4	0.86
927571	AC1-185 5	0.86
927581	AC1-185 6	0.86
927591	AC1-185 7	0.86
927601	AC1-185 8	0.86
927091	AC1-204 1	91.23
927101	AC1-204 2	91.22
927201	AC1-214 C	2.61
927202	AC1-214 E	8.29

Appendix 3

(CE - MISO AMIL) The OGLESBY ; T-4OGLESBY MN 138 kV line (from bus 272189 to bus 348935 ckt 1) loads from 63.39% to 109.66% (AC power flow) of its emergency rating (202 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_012-38-L1206__'. This project contributes approximately 95.16 MW to the thermal violation.

CONTINGENCY 'COMED_P4_012-38-L1206__'

TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R
138 MAZON ; R 138

TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138
ESS J339 ; R 138

TRIP BRANCH FROM BUS 271987 TO BUS 936510 CKT 1 / MAZON ; R 138
AD2-066 TAP 138 /* CONTINGENCY LINE ADDED FOR AD2 BUILD

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 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON;
R 138 GOOSE LK ; B 138

MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON;
R 138 GOOSE LK ; R 138

MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R
138 ESS J339 ; B 138

CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138
MAZON ; R 138

DISCONNECT BUS 274836 / EQUISTAR ; R 13.8

TRIP BRANCH FROM BUS 271337 TO BUS 271336 CKT 1 / DRESDEN ; R 138
DRESDEN ; B 138

TRIP BRANCH FROM BUS 271337 TO BUS 271567 CKT 1 / DRESDEN ; R 138
GOOSE LK ; R 138

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934051	AD1-031 C O1	1.94
934052	AD1-031 E O1	3.16
936511	AD2-066 C O1	57.1
936512	AD2-066 E O1	38.06
LTF	BLUEG	0.07
294401	BSHIL;1U E	5.84
294410	BSHIL;2U E	5.84
LTF	CANNELTON	0.01
LTF	CARR	0.01
LTF	CATAWBA	< 0.01
LTF	CBM-S1	0.06
LTF	CBM-W1	2.59
LTF	CBM-W2	0.98

<i>LTF</i>	<i>CLIFTY</i>	<i>0.28</i>
<i>274849</i>	<i>CRESCENT ;1U</i>	<i>14.5</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.03</i>
<i>LTF</i>	<i>G-007</i>	<i>0.03</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.03</i>
<i>LTF</i>	<i>HAMLET</i>	<i>< 0.01</i>
<i>990901</i>	<i>L-005 E</i>	<i>7.66</i>
<i>LTF</i>	<i>MEC</i>	<i>2.18</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.05</i>
<i>293771</i>	<i>O-035 E</i>	<i>19.18</i>
<i>LTF</i>	<i>O-066</i>	<i>0.2</i>
<i>274851</i>	<i>PROVIDENC;RU</i>	<i>0.86</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>< 0.01</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.12</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.01</i>
<i>LTF</i>	<i>WEC</i>	<i>0.17</i>
<i>916211</i>	<i>Z1-072</i>	<i>0.56</i>
<i>925581</i>	<i>AC1-033 C</i>	<i>0.96</i>
<i>925582</i>	<i>AC1-033 E</i>	<i>6.45</i>
<i>927201</i>	<i>AC1-214 C</i>	<i>6.16</i>
<i>927202</i>	<i>AC1-214 E</i>	<i>19.57</i>

Appendix 4

(CE - CE) The KENDALL ;BU-LOCKPORT ; B 345 kV line (from bus 274702 to bus 270810 ckt 1) loads from 99.83% to 100.56% (AC power flow) of its load dump rating (1768 MVA) for the tower line contingency outage of 'COMED_P7_345-L11620_B-S+_345-L11622_R-S'. This project contributes approximately 15.02 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L11620_B-S+_345-L11622_R-S'

TRIP BRANCH FROM BUS 270736 TO BUS 270770 CKT 1 / ELWOO; B 345
GOODI;3B 345

TRIP BRANCH FROM BUS 270737 TO BUS 270769 CKT 1 / ELWOO; R 345
GOODI;1R 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934101	AD2-000 1	3.66
934111	AD2-000 2	13.57
936511	AD2-066 C O1	9.01
936512	AD2-066 E O1	6.01
937401	AD2-194 C1	11.18
937411	AD2-194 C2	11.1
LTF	BLUEG	0.62
LTF	CALDERWOOD	0.05
LTF	CANNELTON	0.05
LTF	CARR	0.2
LTF	CATAWBA	0.09
LTF	CBM-S1	0.13
LTF	CBM-W2	8.81
LTF	CHEOAH	0.05
LTF	CLIFTY	3.38
274658	DRESDEN ;2U	47.77
LTF	ELMERSMITH	0.11
274728	ELWOOD EC;5P	4.99
274730	ELWOOD EC;6P	4.99
274732	ELWOOD EC;7P	4.99
274734	ELWOOD EC;8P	4.99
274736	ELWOOD EC;9P	4.99
LTF	G-007	0.55
LTF	GIBSON	0.06
LTF	HAMLET	0.16
274704	KENDALL ;1C	15.51
274705	KENDALL ;1S	10.35
274706	KENDALL ;2C	15.51
274707	KENDALL ;2S	10.35
LTF	MEC	6.54
LTF	O-066	3.53

<i>290021</i>	<i>O50 E</i>	<i>26.22</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.16</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.12</i>
<i>930761</i>	<i>AB1-122 1</i>	<i>45.27</i>
<i>930771</i>	<i>AB1-122 2</i>	<i>167.82</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>103.98</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>103.27</i>

Appendix 5

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 94.73% to 95.87% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 17.32 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765
COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345
WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345
WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345
WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	2.93
932891	AC2-115 2	2.93
932921	AC2-116	1.02
932931	AC2-117	6.55
933411	AC2-154 C	3.18
933412	AC2-154 E	5.19
933911	AD1-013 C O1	2.26
933912	AD1-013 E O1	3.61
933931	AD1-016 C	1.14
933932	AD1-016 E	1.86
934051	AD1-031 C O1	3.53
934052	AD1-031 E O1	5.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
934701	AD1-098 C O1	8.46
934702	AD1-098 E O1	6.18
934721	AD1-100 C	29.38
934722	AD1-100 E	137.09
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934971	AD1-129 C	1.11
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.56
935002	AD1-133 E O1	18.37
934101	AD2-000 1	7.26
934111	AD2-000 2	7.33
936291	AD2-038 C O1	3.92

936292	AD2-038 E O1	18.36
936371	AD2-047 C O1	5.7
936372	AD2-047 E O1	27.81
936461	AD2-060	3.35
936511	AD2-066 C O1	10.39
936512	AD2-066 E O1	6.93
936791	AD2-102 C	17.4
936792	AD2-102 E	11.6
937001	AD2-134 C	3.18
937002	AD2-134 E	12.71
937311	AD2-172 C	3.03
937312	AD2-172 E	4.18
937401	AD2-194 C1	9.6
937411	AD2-194 C2	9.6
937531	AD2-214 C	5.43
937532	AD2-214 E	3.62
LTF	BLUEG	2.68
294401	BSHIL;1U E	10.63
294410	BSHIL;2U E	10.63
LTF	CALDERWOOD	0.06
LTF	CANNELTON	0.13
LTF	CARR	0.95
LTF	CATAWBA	0.35
274890	CAYUG;1U E	20.38
274891	CAYUG;2U E	20.38
LTF	CBM-S1	1.88
LTF	CBM-W1	75.21
LTF	CBM-W2	52.82
LTF	CHEOAH	0.07
LTF	CLIFTY	16.
274849	CRESCENT ;1U	6.01
274859	EASYR;U1 E	13.53
274860	EASYR;U2 E	13.53
LTF	ELMERSMITH	0.25
LTF	G-007	2.58
LTF	GIBSON	0.01
290051	GSG-6; E	12.85
LTF	HAMLET	0.67
275149	KEMPTON ;1E	23.45
990901	L-005 E	15.64
290108	LEEDK;1U E	29.84
274770	LINCOLN ;1U	3.94
274771	LINCOLN ;2U	3.94
274772	LINCOLN ;3U	3.94
274773	LINCOLN ;4U	3.94

274774	LINCOLN ;5U	3.94
274775	LINCOLN ;6U	3.94
274776	LINCOLN ;7U	3.94
274777	LINCOLN ;8U	3.94
LTF	MEC	46.95
274850	MENDOTA H;RU	6.63
293061	N-015 E	19.46
293516	O-009 E1	11.24
293517	O-009 E2	5.71
293518	O-009 E3	6.29
293715	O-029 E	12.02
293716	O-029 E	6.59
293717	O-029 E	6.06
293771	O-035 E	7.95
LTF	O-066	16.56
293644	O22 E1	12.61
293645	O22 E2	24.49
290021	O50 E	23.86
294392	P-010 E	24.72
294763	P-046 E	11.53
274888	PILOT HIL;1E	23.45
LTF	RENSSELAER	0.75
295111	SUBLETTE E	3.34
LTF	TRIMBLE	0.55
274853	TWINGROVE;U1	20.55
274854	TWINGROVE;U2	20.55
299993	U3-031C	11.47
LTF	WEC	9.81
295109	WESTBROOK E	6.88
910542	X3-005 E	0.9
915011	Y3-013 1	4.6
915021	Y3-013 2	4.6
915031	Y3-013 3	4.6
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.18
916522	Z1-108 E	3.06
917501	Z2-087 C	3.87
917502	Z2-087 E	25.91
918051	AA1-018 C	3.02
918052	AA1-018 E	20.23
919221	AA1-146	21.65
919581	AA2-030	21.65
920272	AA2-123 E	3.
930481	AB1-089	80.85

930761	AB1-122 1	89.75
930771	AB1-122 2	90.68
924041	AB2-047 C O1	4.84
924042	AB2-047 E O1	32.39
925301	AB2-191 C	1.23
925302	AB2-191 E	1.7
925581	AC1-033 C	1.74
925582	AC1-033 E	11.65
926311	AC1-109 1	2.35
926321	AC1-109 2	2.35
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.93
927451	AC1-142A 1	5.15
927461	AC1-142A 2	5.15
926821	AC1-168 C	1.45
926822	AC1-168 E	9.72
926841	AC1-171 C	1.25
926842	AC1-171 E	8.36
927531	AC1-185 1	0.85
927541	AC1-185 2	0.85
927551	AC1-185 3	0.85
927561	AC1-185 4	0.85
927571	AC1-185 5	0.85
927581	AC1-185 6	0.85
927591	AC1-185 7	0.85
927601	AC1-185 8	0.85
927091	AC1-204 1	89.32
927101	AC1-204 2	89.32
927201	AC1-214 C	2.55
927202	AC1-214 E	8.11

Appendix 6

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 96.72% to 97.88% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 17.69 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765
COLLI; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345
WILTO; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345
WILTO; B 345

TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345
WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	2.99
932891	AC2-115 2	2.99
932921	AC2-116	1.05
932931	AC2-117	6.69
933411	AC2-154 C	3.25
933412	AC2-154 E	5.3
933911	AD1-013 C O1	2.31
933912	AD1-013 E O1	3.69
933931	AD1-016 C	1.16
933932	AD1-016 E	1.9
934051	AD1-031 C O1	3.61
934052	AD1-031 E O1	5.89
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
934701	AD1-098 C O1	8.64
934702	AD1-098 E O1	6.31
934721	AD1-100 C	29.96
934722	AD1-100 E	139.8
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934971	AD1-129 C	1.13
934972	AD1-129 E	0.76
935001	AD1-133 C O1	28.13
935002	AD1-133 E O1	18.75
934101	AD2-000 1	7.41
934111	AD2-000 2	7.49

936291	AD2-038 C O1	4.01
936292	AD2-038 E O1	18.76
936371	AD2-047 C O1	5.81
936372	AD2-047 E O1	28.39
936461	AD2-060	3.42
936511	AD2-066 C O1	10.61
936512	AD2-066 E O1	7.08
936791	AD2-102 C	17.76
936792	AD2-102 E	11.84
937001	AD2-134 C	3.25
937002	AD2-134 E	12.98
937311	AD2-172 C	3.09
937312	AD2-172 E	4.27
937401	AD2-194 C1	9.81
937411	AD2-194 C2	9.81
937531	AD2-214 C	5.55
937532	AD2-214 E	3.7
LTF	BIG_CAJUN1 /* 35% REVERSE 4646887 4392735	< 0.01
LTF	BLUEG	2.74
294401	BSHIL;1U E	10.85
294410	BSHIL;2U E	10.85
LTF	CALDERWOOD	0.06
LTF	CANNELTON	0.13
LTF	CARR	0.97
LTF	CATAWBA	0.36
274890	CAYUG;1U E	20.78
274891	CAYUG;2U E	20.78
LTF	CBM-S1	1.91
LTF	CBM-W1	76.82
LTF	CBM-W2	53.91
LTF	CHEOAH	0.07
LTF	CLIFTY	16.34
274849	CRESCENT ;1U	6.14
274859	EASYR;U1 E	13.81
274860	EASYR;U2 E	13.81
LTF	ELMERSMITH	0.26
LTF	G-007	2.64
LTF	GIBSON	0.01
290051	GSG-6; E	13.12
LTF	HAMLET	0.69
275149	KEMPTON ;1E	23.94
990901	L-005 E	15.97
290108	LEEDK;1U E	30.48
274770	LINCOLN ;1U	4.05

274771	LINCOLN ;2U	4.05
274772	LINCOLN ;3U	4.05
274773	LINCOLN ;4U	4.05
274774	LINCOLN ;5U	4.05
274775	LINCOLN ;6U	4.05
274776	LINCOLN ;7U	4.05
274777	LINCOLN ;8U	4.05
LTF	MEC	47.95
274850	MENDOTA H;RU	6.77
293061	N-015 E	19.87
293516	O-009 E1	11.48
293517	O-009 E2	5.83
293518	O-009 E3	6.42
293715	O-029 E	12.28
293716	O-029 E	6.73
293717	O-029 E	6.19
293771	O-035 E	8.12
LTF	O-066	16.91
293644	O22 E1	12.88
293645	O22 E2	25.
290021	O50 E	24.37
294392	P-010 E	25.24
294763	P-046 E	11.78
274888	PILOT HIL;1E	23.94
LTF	RENSSELAER	0.77
LTF	ROWAN /* 35% REVERSE 4479078	< 0.01
295111	SUBLETTE E	3.42
LTF	TRIMBLE	0.56
274853	TWINGROVE;U1	20.97
274854	TWINGROVE;U2	20.97
299993	U3-031C	11.78
LTF	WEC	10.02
295109	WESTBROOK E	7.03
910542	X3-005 E	0.92
915011	Y3-013 1	4.7
915021	Y3-013 2	4.7
915031	Y3-013 3	4.7
916502	Z1-106 E1	1.59
916504	Z1-106 E2	1.59
916512	Z1-107 E	3.24
916522	Z1-108 E	3.12
917501	Z2-087 C	3.95
917502	Z2-087 E	26.44
918051	AA1-018 C	3.09
918052	AA1-018 E	20.67

919221	AA1-146	22.11
919581	AA2-030	22.11
920272	AA2-123 E	3.06
930481	AB1-089	82.57
930761	AB1-122 1	91.65
930771	AB1-122 2	92.61
924041	AB2-047 C O1	4.94
924042	AB2-047 E O1	33.05
925301	AB2-191 C	1.26
925302	AB2-191 E	1.74
925581	AC1-033 C	1.78
925582	AC1-033 E	11.9
926311	AC1-109 1	2.4
926321	AC1-109 2	2.4
926331	AC1-110 1	2.38
926341	AC1-110 2	2.38
926351	AC1-111 1	0.96
926361	AC1-111 2	0.96
926371	AC1-111 3	0.96
926381	AC1-111 4	0.96
926391	AC1-111 5	0.96
926401	AC1-111 6	0.96
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.99
927451	AC1-142A 1	5.26
927461	AC1-142A 2	5.26
926821	AC1-168 C	1.48
926822	AC1-168 E	9.93
926841	AC1-171 C	1.27
926842	AC1-171 E	8.53
927531	AC1-185 1	0.86
927541	AC1-185 2	0.86
927551	AC1-185 3	0.86
927561	AC1-185 4	0.86
927571	AC1-185 5	0.86
927581	AC1-185 6	0.86
927591	AC1-185 7	0.86
927601	AC1-185 8	0.86
927091	AC1-204 1	91.23
927101	AC1-204 2	91.22
927201	AC1-214 C	2.61
927202	AC1-214 E	8.29

Appendix 7

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 108.84% to 109.84% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 16.32 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 243207 CKT 1 / 243206
05DUMONT 765 05GRNTWN

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206
05DUMONT 765 270644 WILTON ; 765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	2.77
932891	AC2-115 2	2.77
932921	AC2-116	0.97
932931	AC2-117	5.87
933411	AC2-154 C	3.06
933412	AC2-154 E	4.99
933911	AD1-013 C O1	2.14
933912	AD1-013 E O1	3.42
933931	AD1-016 C	1.08
933932	AD1-016 E	1.76
934051	AD1-031 C O1	3.32
934052	AD1-031 E O1	5.42
934431	AD1-067 C	0.15
934432	AD1-067 E	0.64
934701	AD1-098 C O1	8.01
934702	AD1-098 E O1	5.85
934721	AD1-100 C	22.64
934722	AD1-100 E	105.64
934871	AD1-116 C	1.1
934872	AD1-116 E	1.8
934971	AD1-129 C	1.05
934972	AD1-129 E	0.7
935001	AD1-133 C O1	24.37
935002	AD1-133 E O1	16.25
934101	AD2-000 1	6.74
934111	AD2-000 2	6.95
936291	AD2-038 C O1	3.69
936292	AD2-038 E O1	17.27
936371	AD2-047 C O1	5.47

936372	AD2-047 E O1	26.72
936461	AD2-060	3.22
936511	AD2-066 C O1	9.79
936512	AD2-066 E O1	6.53
936791	AD2-102 C	16.5
936792	AD2-102 E	11.
937001	AD2-134 C	3.01
937002	AD2-134 E	12.03
937311	AD2-172 C	2.87
937312	AD2-172 E	3.96
937401	AD2-194 C1	9.06
937411	AD2-194 C2	9.05
937531	AD2-214 C	5.16
937532	AD2-214 E	3.44
LTF	BIG_CAJUN1 /* 35% REVERSE 4646887 4392735	< 0.01
LTF	BLUEG	0.19
294401	BSHIL;1U E	9.99
294410	BSHIL;2U E	9.99
LTF	CARR	0.91
LTF	CATAWBA	0.18
274890	CAYUG;1U E	15.98
274891	CAYUG;2U E	15.98
LTF	CBM-S1	4.04
LTF	CBM-W1	73.51
LTF	CBM-W2	62.69
LTF	CIN	3.03
LTF	CLIFTY	8.19
274849	CRESCENT ;1U	5.64
274859	EASYR;U1 E	12.83
274860	EASYR;U2 E	12.83
LTF	G-007	2.39
290051	GSG-6; E	12.17
LTF	HAMLET	0.41
LTF	IPL	1.29
940531	J351	434.12
951131	J643	25.78
938961	J847	13.12
275149	KEMPTON ;1E	22.53
990901	L-005 E	14.7
290108	LEEDK;1U E	28.24
LTF	MEC	45.43
274850	MENDOTA H;RU	6.28
293061	N-015 E	17.74
293516	O-009 E1	10.64

293517	O-009 E2	5.4
293518	O-009 E3	5.95
293715	O-029 E	11.38
293716	O-029 E	6.24
293717	O-029 E	5.73
293771	O-035 E	7.46
LTF	O-066	15.32
293644	O22 E1	12.1
293645	O22 E2	23.49
290021	O50 E	22.59
294392	P-010 E	22.52
294763	P-046 E	10.94
274888	PILOT HIL;1E	22.53
LTF	RENSSELAER	0.72
LTF	ROWAN /* 35% REVERSE 4479078	< 0.01
274789	SE CHICAG;6U	1.34
274790	SE CHICAG;7U	1.34
274791	SE CHICAG;8U	1.34
295111	SUBLETTE E	3.17
LTF	TRIMBLE	0.06
299993	U3-031C	6.3
LTF	WEC	9.32
295109	WESTBROOK E	6.51
910542	X3-005 E	1.01
915011	Y3-013 1	4.37
915021	Y3-013 2	4.37
915031	Y3-013 3	4.37
916502	Z1-106 E1	1.47
916504	Z1-106 E2	1.47
916512	Z1-107 E	3.06
916522	Z1-108 E	2.89
917501	Z2-087 C	3.22
917502	Z2-087 E	21.53
918051	AA1-018 C	2.83
918052	AA1-018 E	18.94
919221	AA1-146	20.55
919581	AA2-030	20.55
920272	AA2-123 E	2.84
930481	AB1-089	76.61
930761	AB1-122 1	83.4
930771	AB1-122 2	85.95
924041	AB2-047 C O1	4.02
924042	AB2-047 E O1	26.91
925301	AB2-191 C	1.17
925302	AB2-191 E	1.61

925581	AC1-033 C	1.64
925582	AC1-033 E	10.95
926311	AC1-109 1	2.21
926321	AC1-109 2	2.21
926331	AC1-110 1	2.21
926341	AC1-110 2	2.21
926351	AC1-111 1	0.89
926361	AC1-111 2	0.89
926371	AC1-111 3	0.89
926381	AC1-111 4	0.89
926391	AC1-111 5	0.89
926401	AC1-111 6	0.89
927511	AC1-113 1	1.39
927522	AC1-113 2	1.39
926431	AC1-114	2.77
927451	AC1-142A 1	4.89
927461	AC1-142A 2	4.89
926821	AC1-168 C	1.35
926822	AC1-168 E	9.05
926841	AC1-171 C	1.17
926842	AC1-171 E	7.83
927531	AC1-185 1	0.8
927541	AC1-185 2	0.8
927551	AC1-185 3	0.8
927561	AC1-185 4	0.8
927571	AC1-185 5	0.8
927581	AC1-185 6	0.8
927591	AC1-185 7	0.8
927601	AC1-185 8	0.8
927091	AC1-204 1	84.21
927101	AC1-204 2	84.18
927201	AC1-214 C	2.39
927202	AC1-214 E	7.61

Appendix 8

(CE - CE) The DRESDEN ; B-KENDALL ; BU 345 kV line (from bus 270716 to bus 274702 ckt 1) loads from 105.03% to 106.11% (AC power flow) of its load dump rating (1195 MVA) for the tower line contingency outage of 'COMED_P7_345-L11620_B-S+_345-L11622_R-S'. This project contributes approximately 15.38 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L11620_B-S+_345-L11622_R-S'

TRIP BRANCH FROM BUS 270736 TO BUS 270770 CKT 1 / ELWOO; B 345
GOODI;3B 345

TRIP BRANCH FROM BUS 270737 TO BUS 270769 CKT 1 / ELWOO; R 345
GOODI;1R 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934101	AD2-000 1	3.81
934111	AD2-000 2	13.72
936511	AD2-066 C O1	9.23
936512	AD2-066 E O1	6.15
937401	AD2-194 C1	11.37
937411	AD2-194 C2	11.29
LTF	BLUEG	0.06
LTF	CARR	0.09
LTF	CBM-S1	1.07
LTF	CBM-S2	0.18
LTF	CBM-W1	1.62
LTF	CBM-W2	14.46
LTF	CIN	0.39
LTF	CLIFTY	1.11
LTF	CPLE	< 0.01
274658	DRESDEN ;2U	48.28
274733	ELWOOD EC;3P	5.04
274735	ELWOOD EC;4P	5.04
274728	ELWOOD EC;5P	5.07
274730	ELWOOD EC;6P	5.07
274732	ELWOOD EC;7P	5.07
274734	ELWOOD EC;8P	5.07
274736	ELWOOD EC;9P	5.07
LTF	G-007	0.22
LTF	IPL	0.18
LTF	MEC	8.
LTF	O-066	1.4
290021	O50 E	26.72
LTF	RENSSELAER	0.07
LTF	TRIMBLE	0.02
930761	AB1-122 1	47.09

<i>930771</i>	<i>AB1-122 2</i>	<i>169.64</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>105.74</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>105.03</i>

Attachment 1: Single Line Diagram

