Generation Interconnection Request
System Impact Study Report
For
PJM Generation Interconnection Request
Queue Position AD2-194

Elwood 345 kV

Revision 1: June 2022
Initial Issue: December 2021

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 December 2021
Revision 1 – Issued June 2022. The revised report updates the Summer Peak Analysis to include retooled load flow analysis results.

General

Queue Position AD2-194 is an uprate to Queue AC1-204 for an additional 60 MW to the Maximum Facility Output (combined is 1260.9 MW) and 120 MW of CIRs (1235.9 MW total) to the proposed combined cycle to be located in Will County, IL, consisting of two 1x1 CCGT (single shaft). The IC has proposed a service date for this project of March 1, 2022. This study does not imply a TO commitment to this date.

Point of Interconnection

AD2-194 will connect to the ComEd transmission system via the 345kV bus at TSS 900 Elwood.

Cost Summary

Description	Cost Estimate
Total Physical Interconnection Costs	$ 0
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	$ 26,908,000
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	$ 0
Allocation towards System Network Upgrade Costs (TO Identified)*	$ 0
Total Costs	$ 26,908,000

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.
This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.
Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.
Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc., the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required

Transmission Owner Scope of Work

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

Description	Cost Estimate
Attachment Facilities	$ 0
Direct Connection Network Upgrades	$ 0
Non-Direct Connection Network Upgrades	$ 0
Total Physical Interconnection Costs	$ 0

Attachment Facilities

None

Direct Connection Network Upgrades

In order to accommodate interconnection of AD2-194, there will be no electrical changes to the generators, transformers, etc., as shown in the one-line diagram. Therefore, no Direct Connection Network Upgrade cost is anticipated.

Non-Direct Connection Cost Estimate

None

Network Impacts

The Queue Project AD2-194 was evaluated as a 120.0 MW (Capacity 120.0 MW) injection as an uprate to AC1-204 at the Elwood 345kV substation in the ComEd area. Project AD2-194 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-194 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 Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Circuit	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Flowgate Appendix
1	N-1	COMED_P1-2_345-L10805_B-S	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	98.07	100.18	ER	1479	30.59	

Notes:
Violation 1: ComEd SSTE rating is 1568 MVA (Not a violation)

Multiple Facility Contingency

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

Overload Number	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Circuit	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Flowgate Appendix
2	LFFB	COMED_P4_112-65-BT5-6__	CE - CE	WILTON ; B-WILTON ;3M 345 kV line	270926	275232	1	AC	99.3	100.56	LDR	1379	19.21	1
3	LFFB	COMED_P4_111-45-L11126_	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	99.95	100.62	LDR	1479	11.55	
4	BUS	COMED_P2-2_111_EJ-345B__2	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	99.95	100.62	LDR	1479	11.55	

5	LFFB	COMED_P4_112-65-BT5-6__	CE - CE	WILTON ; 765/345 kV transformer	275232	270644	1	AC	99.29	100.55	LDR	1379	19.21	2

Notes:
Violation 2: ComEd SSTE rating is 1469 MVA (Not a violation)
Violation 3: ComEd SSTE rating is 1568 MVA (Not a violation)
Violation 4: ComEd SSTE rating is 1568 MVA (Not a violation)
Violation 5: ComEd SSTE rating is 1469 MVA (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 Number	Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Circuit	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Flowgate Appendix
6	LFFB	AEP_P4_#2978_05DUMONT 765	MISO NIPS - AEP	17STILLWELL-05DUMONT 345 kV line	255113	243219	1	AC	112.84	113.94	ER	1409	18.11	3
7	DCTL	COMED_P7_345-L11620_B-S_+_345-L11622_R-S	CE - CE	DRESDEN ; B-KENDALL ;BU 345 kV line	270716	274702	1	AC	106.11	107.85	LDR	1195	22.67	4
8	N-1	COMED_P1-2_345-L11622_R-S	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	112.65	115.36	ER	1479	39.09	5
9	LFFB	COMED_P4_116-45-L11614_	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	110.03	112.48	LDR	1479	39.11	
10	LFFB	COMED_P4_116-45-TR82___	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	109.16	111.61	LDR	1479	39.12	
11	BUS	COMED_P2-2_116_GG-345R__2	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	109.16	111.61	LDR	1479	39.12	
12	Non	Non	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	102.25	104.68	NR	1201	28.88	
13	N-1	COMED_P1-2_345-L10805_B-S	CE - CE	ELWOOD ; B-GOODINGS ;4B 345 kV line	270736	270770	1	AC	102.49	104.6	ER	1479	30.82	

14	N-1	COMED_P1-2_345-L11620_B-S	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	113.55	116.29	ER	1479	39.27	6
15	LFFB	COMED_P4_116-45-L11613_	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	111.01	113.53	LDR	1479	40.09	
16	LFFB	COMED_P4_116-45-TR84___	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	110.22	112.73	LDR	1479	40.11	
17	BUS	COMED_P2-2_116_GG-345B__4	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	110.22	112.73	LDR	1479	40.11	
18	Non	Non	CE - CE	ELWOOD ; R-GOODINGS ;2R 345 kV line	270737	270769	1	AC	104.28	106.76	NR	1201	29.27	
19	LFFB	COMED_P4_116-45-L11614_	CE - CE	GOODINGS ;4B-GOODINGS ;3B 345 kV line	270770	270766	1	AC	105.58	106.82	LDR	1802	23.9	7
20	LFFB	COMED_P4_116-45-TR82___	CE - CE	GOODINGS ;4B-GOODINGS ;3B 345 kV line	270770	270766	1	AC	100.98	102.22	LDR	1802	23.95	
21	BUS	COMED_P2-2_116_GG-345R__2	CE - CE	GOODINGS ;4B-GOODINGS ;3B 345 kV line	270770	270766	1	AC	100.98	102.22	LDR	1802	23.95	
22	LFFB	COMED_P4_112-65-BT2-3__	CE - CE	WILTON ; R-WILTON ;4M 345 kV line	270927	275233	1	AC	101.39	102.68	LDR	1379	19.62	8
23	DCTL	COMED_P7_345-L11620_B-S_+_345-L11622_R-S	CE - CE	KENDALL ;BU-LOCKPORT ; B 345 kV line	274702	270810	1	AC	100.56	101.74	LDR	1768	22.29	9
24	LFFB	COMED_P4_112-65-BT2-3__	CE - CE	WILTON ; 765/345 kV transformer	275233	270644	1	AC	101.37	102.66	LDR	1379	19.62	10

Notes:
Violation 6: AEP SE: 1409 MVA (Valid violation) MISO end ratings: 1779 MVA SE (Violation for AEP portion only).
Violation 7: ComEd ALDR 1477 MVA (Not a violation)
Violation 8-11: ComEd SSTE rating is 1568 MVA (Valid violation)
Violation 12: ComEd SN 1201 MVA (Valid violation)
Violation 13-17: ComEd SSTE 1568 MVA (Valid violation)
Violation 18: ComEd SN 1201 MVA (Valid violation)

Violation 19-21: ComEd SSTE 2083 MVA (Not a violation)
Violation 22: ComEd SSTE 1469 MVA (Not a violation)
Violation 23: ComEd ALDR 2033 MVA (Not a violation)
Violation 24: ComEd SSTE 2083 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 identified

Affected System Analysis & Mitigation

MISO Impacts:

- No MISO Impacts. (final)

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.

Not Applicable

Light Load Analysis – 2021

Light Load Studies to be conducted during the System Impact Study phase (as required by PJM Manual 14B).

Not required

System Reinforcements

Short Circuit

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

No mitigations required

Stability and Reactive Power Requirement

(Results of the dynamic studies will be inserted here)

No mitigations were found to be required due to instability.

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

Facility	Upgrade Description	Cost	Cost Allocation	Upgrade Number
17STILLWELL-05DUMONT 345 kV line	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	$1,613,000	$0	N4058

<table>
<tr><td></td><td><u>Time Estimate</u>: N/A
<u>Ratings</u>: 1718 MVA SE

<u>Notes:</u>
1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AD2-194 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.) AD2-194 could receive cost allocation.
3. Although Queue Project AD2-194 may not presently have cost responsibility for this upgrade, Queue Project AD2-194 may need this upgrade in-service to be deliverable to the PJM system.
4. If Queue Project AD2-194 comes into service prior to completion of the upgrade, Queue Project AD2-194 will need an interim study.

<u>MISO Portion</u>:
MISO end SE rating is 1779 MVA. No upgrades required.</td><td></td><td></td><td></td></tr>
<tr><td>DRESDEN ; B-KENDALL ;BU 345 kV line</td><td>ComEd ALDR: 1477 MVA is sufficient. No upgrades required.</td><td>$0</td><td>$0</td><td></td></tr>
<tr><td>The ELWOOD ; B-GOODINGS ;4B 345 kV line</td><td><u>Project ID</u>: N5915
<u>Description</u>: The upgrade will be to Reconductor 18.1 miles of the line with 2156 kcmil ACSR (84/19) Str. Bluebird conductor and replace some towers.

<u>Cost:</u> $42,200,000
<u>Time Estimate</u>: Project is Complete
<u>Ratings</u>: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)
<table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost ($42.2 M)</th></tr><tr><td>AC1-204</td><td>59.4</td><td>51.30%</td><td>$21,646.600</td></tr><tr><td>AD1-133</td><td>17.3</td><td>14.94%</td><td>$6,304,500</td></tr><tr><td>AD2-194</td><td>39.1</td><td>33.77%</td><td>$14,248,900</td></tr></table>
<u>Note:</u> This upgrade N5915 is in service (12/10/2020).</td><td>$42,000,000</td><td>$14,248,900</td><td>N5915</td></tr>
<tr><td>ELWOOD ; R-GOODINGS ;2R 345 kV line</td><td><u>Project ID</u>: N5916
<u>Description</u>: The upgrade will be to Reconductor 18.1 miles of the line with 2156 kcmil ACSR (84/19) Str Bluebird conductor and replace some towers.

<u>Cost:</u> $42,200,000
<u>Time Estimate</u>: Project is Complete
<u>Ratings</u>: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)
<table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost ($42.2 M)</th></tr><tr><td>AC1-204</td><td>76.7</td><td>57.36%</td><td>$24,207,200</td></tr><tr><td>AD1-133</td><td>16.9</td><td>12.64%</td><td>$5,333,800</td></tr><tr><td>AD2-194</td><td>40.11</td><td>30.00%</td><td>$12,659,100</td></tr></table>
<u>Note:</u> This upgrade N5916 is in service (12/10/2020).</td><td>$42,000,000</td><td>$12,659,100</td><td>N5916</td></tr>
<tr><td>GOODINGS ;4B-GOODINGS ;3B 345 kV line</td><td>ComEd SSTE: 2083 MVA is sufficient. No upgrades required.</td><td>$0</td><td>$0</td><td></td></tr>
</table>

WILTON ; R-WILTON ;4M 345 kV line	ComEd SSTE: 1469 MVA is sufficient. No upgrades required.	$0	$0
KENDALL ;BU-LOCKPORT ; B 345 kV	ComEd ALDR: 2033 MVA is sufficient. No upgrades required.	$0	$0
WILTON ; 765/345 kV transformer	ComEd SSTE: 2083 MVA is sufficient. No upgrades required.	$0	$0
	Total Cost	$85,613,000	$26,908,000

Light Load Load Flow Analysis Reinforcements

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

Not Applicable

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

Not Applicable

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_345-L10805_B-S	CONTINGENCY 'COMED_P1-2_345-L10805_B-S' TRIP BRANCH FROM BUS 270810 TO BUS 274702 CKT 1 / LOCKP; B 345 KENDA;BU 345 END
COMED_P1-2_345-L11620_B-S	CONTINGENCY 'COMED_P1-2_345-L11620_B-S' TRIP BRANCH FROM BUS 270736 TO BUS 270770 CKT 1 / ELWOO; B 345 GOODI;3B 345 END
COMED_P1-2_345-L11622_R-S	CONTINGENCY 'COMED_P1-2_345-L11622_R-S' TRIP BRANCH FROM BUS 270737 TO BUS 270769 CKT 1 / ELWOO; R 345 GOODI;1R 345 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_P2-2_116_GG-345B__4	CONTINGENCY 'COMED_P2-2_116_GG-345B__4' DISCONNECT BUS 270770 / GOODI;4B 345 END
COMED_P2-2_116_GG-345R__2	CONTINGENCY 'COMED_P2-2_116_GG-345R__2' DISCONNECT BUS 270769 / GOODI;2R 345 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_P4_116-45-L11613_	CONTINGENCY 'COMED_P4_116-45-L11613_' TRIP BRANCH FROM BUS 270666 TO BUS 270664 CKT 1 / B ISL;BT 345 B ISL; B 345 TRIP BRANCH FROM BUS 270666 TO BUS 270926 CKT 1 / B ISL;BT 345 WILTO; B 345 TRIP BRANCH FROM BUS 270770 TO BUS 270666 CKT 1 / GOODI;4B 345 B ISL;BT 345 DISCONNECT BUS 270770 / GOODI;4B 345 END
COMED_P4_116-45-L11614_	CONTINGENCY 'COMED_P4_116-45-L11614_' TRIP BRANCH FROM BUS 270667 TO BUS 270665 CKT 1 / B ISL;RT 345 B ISL; R 345 TRIP BRANCH FROM BUS 270667 TO BUS 270927 CKT 1 / B ISL;RT 345 WILTO; R 345 TRIP BRANCH FROM BUS 270769 TO BUS 270667 CKT 1 / GOODI;2R 345 B ISL;RT 345 DISCONNECT BUS 270769 / GOODI;2R 345 END
COMED_P4_116-45-TR82___	CONTINGENCY 'COMED_P4_116-45-TR82___' TRIP BRANCH FROM BUS 270769 TO BUS 271565 TO BUS 275324 CKT 1 / GOODINGS ;2R 345 GOODINGS ; R 138 GOODINGS ;2C 34.5 DISCONNECT BUS 270769 / GOODINGS ;2R 345 END
COMED_P4_116-45-TR84___	CONTINGENCY 'COMED_P4_116-45-TR84___' TRIP BRANCH FROM BUS 270770 TO BUS 271564 TO BUS 275368 CKT 1 / GOODINGS ;4B 345 GOODINGS ; B 138 GOODINGS ;4C 34.5 DISCONNECT BUS 270770 / GOODINGS ;4B 345 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 99.3% to 100.56% (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 19.21 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

Bus Number	*Bus Name*	*Full Contribution*
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 ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 99.29% to 100.55% (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 19.21 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

Bus Number	*Bus Name*	*Full Contribution*
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 3

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 112.84% to 113.94% (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 18.11 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

Bus Number	*Bus Name*	*Full Contribution*
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 4

(CE - CE) The DRESDEN ; B-KENDALL ;BU 345 kV line (from bus 270716 to bus 274702 ckt 1) loads from 106.11% to 107.85% (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 22.67 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

Bus Number	*Bus Name*	*Full Contribution*
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*

930771	*AB1-122 2*	*169.64*
927091	*AC1-204 1*	*105.74*
927101	*AC1-204 2*	*105.03*

Appendix 5

(CE - CE) The ELWOOD ; B-GOODINGS ;4B 345 kV line (from bus 270736 to bus 270770 ckt 1) loads from 112.65% to 115.36% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of 'COMED_P1-2_345-L11622_R-S'. This project contributes approximately 39.09 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L11622_R-S'
TRIP BRANCH FROM BUS 270737 TO BUS 270769 CKT 1 / ELWOO; R 345 GOODI;1R 345
END

Bus Number	*Bus Name*	*Full Contribution*
935001	*AD1-133 C O1*	*17.25*
934101	*AD2-000 1*	*6.49*
934111	*AD2-000 2*	*6.63*
936511	*AD2-066 C O1*	*5.12*
937401	*AD2-194 C1*	*19.61*
937411	*AD2-194 C2*	*19.48*
LTF	*BLUEG*	*0.6*
LTF	*CALDERWOOD*	*< 0.01*
LTF	*CANNELTON*	*0.03*
LTF	*CARR*	*0.22*
LTF	*CATAWBA*	*0.07*
LTF	*CBM-S1*	*0.48*
LTF	*CBM-W1*	*7.35*
LTF	*CBM-W2*	*12.65*
LTF	*CHEOAH*	*< 0.01*
LTF	*CLIFTY*	*3.51*
274658	*DRESDEN ;2U*	*23.32*
274659	*DRESDEN ;3U*	*22.72*
LTF	*ELMERSMITH*	*0.05*
274729	*ELWOOD EC;1P*	*8.69*
274731	*ELWOOD EC;2P*	*8.69*
274733	*ELWOOD EC;3P*	*8.69*
274735	*ELWOOD EC;4P*	*8.69*
274728	*ELWOOD EC;5P*	*8.75*
274730	*ELWOOD EC;6P*	*8.75*
274732	*ELWOOD EC;7P*	*8.75*
274734	*ELWOOD EC;8P*	*8.75*
274736	*ELWOOD EC;9P*	*8.75*
274837	*EQUISTAR ; B*	*0.71*
274836	*EQUISTAR ; R*	*1.25*
LTF	*GIBSON*	*0.02*
LTF	*HAMLET*	*0.14*
274704	*KENDALL ;1C*	*2.87*

274705	*KENDALL ;1S*	*1.92*
274706	*KENDALL ;2C*	*2.87*
274707	*KENDALL ;2S*	*1.92*
LTF	*MEC*	*9.74*
274879	*MINONK ;1U*	*0.59*
LTF	*RENSSELAER*	*0.17*
LTF	*TRIMBLE*	*0.12*
905493	*W4-086*	*0.03*
LTF	*WEC*	*1.02*
918111	*AA1-040 1*	*0.17*
918121	*AA1-040 2*	*0.15*
930761	*AB1-122 1*	*80.22*
930771	*AB1-122 2*	*82.*
927091	*AC1-204 1*	*182.37*
927101	*AC1-204 2*	*181.13*

Appendix 6

(CE - CE) The ELWOOD ; R-GOODINGS ;2R 345 kV line (from bus 270737 to bus 270769 ckt 1) loads from 113.55% to 116.29% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of 'COMED_P1-2_345-L11620_B-S'. This project contributes approximately 39.27 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L11620_B-S'
TRIP BRANCH FROM BUS 270736 TO BUS 270770 CKT 1 / ELWOO; B 345 GOODI;3B 345
END

Bus Number	*Bus Name*	*Full Contribution*
935001	*AD1-133 C O1*	*16.84*
934101	*AD2-000 1*	*6.35*
934111	*AD2-000 2*	*7.05*
936511	*AD2-066 C O1*	*5.2*
937401	*AD2-194 C1*	*19.58*
937411	*AD2-194 C2*	*19.7*
LTF	*BLUEG*	*0.58*
LTF	*CANNELTON*	*0.03*
LTF	*CARR*	*0.22*
LTF	*CATAWBA*	*0.07*
LTF	*CBM-S1*	*0.52*
LTF	*CBM-W1*	*8.24*
LTF	*CBM-W2*	*13.06*
LTF	*CLIFTY*	*3.48*
274658	*DRESDEN ;2U*	*24.8*
274659	*DRESDEN ;3U*	*22.22*
LTF	*ELMERSMITH*	*0.04*
274729	*ELWOOD EC;1P*	*8.79*
274731	*ELWOOD EC;2P*	*8.79*
274733	*ELWOOD EC;3P*	*8.79*
274735	*ELWOOD EC;4P*	*8.79*
274728	*ELWOOD EC;5P*	*8.74*
274730	*ELWOOD EC;6P*	*8.74*
274732	*ELWOOD EC;7P*	*8.74*
274734	*ELWOOD EC;8P*	*8.74*
274736	*ELWOOD EC;9P*	*8.74*
274837	*EQUISTAR ; B*	*0.68*
274836	*EQUISTAR ; R*	*1.27*
LTF	*GIBSON*	*< 0.01*
LTF	*HAMLET*	*0.14*
274704	*KENDALL ;1C*	*3.49*
274705	*KENDALL ;1S*	*2.33*
274706	*KENDALL ;2C*	*3.49*

274707	*KENDALL ;2S*	*2.33*
LTF	*MEC*	*10.09*
274879	*MINONK ;1U*	*0.64*
LTF	*RENSSELAER*	*0.17*
LTF	*TRIMBLE*	*0.12*
905493	*W4-086*	*0.03*
LTF	*WEC*	*1.06*
918111	*AA1-040 1*	*0.17*
918121	*AA1-040 2*	*0.14*
930761	*AB1-122 1*	*78.49*
930771	*AB1-122 2*	*87.19*
927091	*AC1-204 1*	*182.04*
927101	*AC1-204 2*	*183.16*

Appendix 7

(CE - CE) The GOODINGS ;4B-GOODINGS ;3B 345 kV line (from bus 270770 to bus 270766 ckt 1) loads from 105.58% to 106.82% (AC power flow) of its load dump rating (1802 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_116-45-L11614_'. This project contributes approximately 23.9 MW to the thermal violation.

CONTINGENCY 'COMED_P4_116-45-L11614_'
TRIP BRANCH FROM BUS 270667 TO BUS 270665 CKT 1 / B ISL;RT 345 B ISL; R 345
TRIP BRANCH FROM BUS 270667 TO BUS 270927 CKT 1 / B ISL;RT 345 WILTO; R 345
TRIP BRANCH FROM BUS 270769 TO BUS 270667 CKT 1 / GOODI;2R 345 B ISL;RT 345
DISCONNECT BUS 270769 / GOODI;2R 345
END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.64*
932891	*AC2-115 2*	*1.64*
932921	*AC2-116*	*0.57*
933911	*AD1-013 C O1*	*1.2*
933912	*AD1-013 E O1*	*1.92*
933931	*AD1-016 C*	*0.63*
933932	*AD1-016 E*	*1.02*
934051	*AD1-031 C O1*	*2.21*
934052	*AD1-031 E O1*	*3.6*
934431	*AD1-067 C*	*0.09*
934432	*AD1-067 E*	*0.36*
934701	*AD1-098 C O1*	*4.52*
934702	*AD1-098 E O1*	*3.3*
934871	*AD1-116 C*	*1.11*
934872	*AD1-116 E*	*1.81*
934971	*AD1-129 C*	*0.62*
934972	*AD1-129 E*	*0.41*
935001	*AD1-133 C O1*	*14.64*
935002	*AD1-133 E O1*	*9.76*
934101	*AD2-000 1*	*5.27*
934111	*AD2-000 2*	*7.53*
936291	*AD2-038 C O1*	*3.92*
936292	*AD2-038 E O1*	*18.33*
936511	*AD2-066 C O1*	*6.41*
936512	*AD2-066 E O1*	*4.27*
936791	*AD2-102 C*	*9.82*
936792	*AD2-102 E*	*6.55*
937001	*AD2-134 C*	*1.69*

937002	*AD2-134 E*	*6.76*
937311	*AD2-172 C*	*1.72*
937312	*AD2-172 E*	*2.37*
937401	*AD2-194 C1*	*11.98*
937411	*AD2-194 C2*	*11.91*
937531	*AD2-214 C*	*3.31*
937532	*AD2-214 E*	*2.21*
LTF	*BLUEG*	*1.02*
294401	*BSHIL;1U E*	*6.6*
294410	*BSHIL;2U E*	*6.6*
LTF	*CANNELTON*	*0.03*
LTF	*CARR*	*0.37*
LTF	*CATAWBA*	*0.05*
LTF	*CBM-S1*	*1.96*
LTF	*CBM-W1*	*37.27*
LTF	*CBM-W2*	*32.72*
LTF	*CLIFTY*	*6.02*
274849	*CRESCENT ;1U*	*3.58*
274859	*EASYR;U1 E*	*7.89*
274860	*EASYR;U2 E*	*7.89*
LTF	*ELMERSMITH*	*0.01*
274733	*ELWOOD EC;3P*	*5.32*
274735	*ELWOOD EC;4P*	*5.32*
274728	*ELWOOD EC;5P*	*5.35*
274730	*ELWOOD EC;6P*	*5.35*
274732	*ELWOOD EC;7P*	*5.35*
274734	*ELWOOD EC;8P*	*5.35*
274736	*ELWOOD EC;9P*	*5.35*
LTF	*G-007*	*0.96*
LTF	*GIBSON*	*0.05*
290051	*GSG-6; E*	*6.83*
LTF	*HAMLET*	*0.13*
990901	*L-005 E*	*9.75*
290108	*LEEDK;1U E*	*15.34*
LTF	*MEC*	*29.76*
274850	*MENDOTA H;RU*	*3.53*
293516	*O-009 E1*	*6.73*
293517	*O-009 E2*	*3.42*
293518	*O-009 E3*	*3.77*
293715	*O-029 E*	*7.2*
293716	*O-029 E*	*3.95*
293717	*O-029 E*	*3.63*
293771	*O-035 E*	*4.73*
LTF	*O-066*	*6.17*
293644	*O22 E1*	*23.65*

293645	*O22 E2*	*45.9*
290021	*O50 E*	*24.99*
294763	*P-046 E*	*6.54*
LTF	*RENSSELAER*	*0.29*
295111	*SUBLETTE E*	*1.78*
274861	*TOP CROP ;1U*	*1.06*
274862	*TOP CROP ;2U*	*2.05*
LTF	*TRIMBLE*	*0.21*
LTF	*WEC*	*5.59*
295109	*WESTBROOK E*	*3.66*
915011	*Y3-013 1*	*2.58*
915021	*Y3-013 2*	*2.58*
915031	*Y3-013 3*	*2.58*
916502	*Z1-106 E1*	*0.81*
916504	*Z1-106 E2*	*0.8*
916522	*Z1-108 E*	*1.66*
918051	*AA1-018 C*	*2.84*
918052	*AA1-018 E*	*19.01*
919221	*AA1-146*	*12.91*
919581	*AA2-030*	*12.91*
920272	*AA2-123 E*	*1.65*
930481	*AB1-089*	*45.23*
930761	*AB1-122 1*	*65.14*
930771	*AB1-122 2*	*93.17*
925301	*AB2-191 C*	*0.66*
925302	*AB2-191 E*	*0.9*
925581	*AC1-033 C*	*1.08*
925582	*AC1-033 E*	*7.24*
926311	*AC1-109 1*	*1.14*
926321	*AC1-109 2*	*1.14*
926331	*AC1-110 1*	*1.24*
926341	*AC1-110 2*	*1.24*
926351	*AC1-111 1*	*0.45*
926361	*AC1-111 2*	*0.45*
926371	*AC1-111 3*	*0.45*
926381	*AC1-111 4*	*0.45*
926391	*AC1-111 5*	*0.45*
926401	*AC1-111 6*	*0.45*
927511	*AC1-113 1*	*0.82*
927522	*AC1-113 2*	*0.82*
926431	*AC1-114*	*1.64*
927451	*AC1-142A 1*	*3.87*
927461	*AC1-142A 2*	*3.9*
926841	*AC1-171 C*	*0.79*
926842	*AC1-171 E*	*5.29*

927531	*AC1-185 1*	*0.49*
927541	*AC1-185 2*	*0.49*
927551	*AC1-185 3*	*0.49*
927561	*AC1-185 4*	*0.49*
927571	*AC1-185 5*	*0.49*
927581	*AC1-185 6*	*0.49*
927591	*AC1-185 7*	*0.49*
927601	*AC1-185 8*	*0.49*
927091	*AC1-204 1*	*111.41*
927101	*AC1-204 2*	*110.8*
927201	*AC1-214 C*	*1.52*
927202	*AC1-214 E*	*4.83*

Appendix 8

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 101.39% to 102.68% (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 19.62 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

Bus Number	*Bus Name*	*Full Contribution*
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 9

(CE - CE) The KENDALL ;BU-LOCKPORT ; B 345 kV line (from bus 274702 to bus 270810 ckt 1) loads from 100.56% to 101.74% (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 22.29 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
```

Bus Number	*Bus Name*	*Full Contribution*
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*
290021	*O50 E*	*26.22*

LTF	*RENSSELAER*	*0.16*
LTF	*TRIMBLE*	*0.12*
930761	*AB1-122 1*	*45.27*
930771	*AB1-122 2*	*167.82*
927091	*AC1-204 1*	*103.98*
927101	*AC1-204 2*	*103.27*

Appendix 10

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 101.37% to 102.66% (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 19.62 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

Bus Number	*Bus Name*	*Full Contribution*
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*

Attachment 1: Single Line Diagram

AD2-194