Generation Interconnection Request
System Impact Study Report
For
PJM Merchant Transmission Request
Queue Position AF1-200

Plano 345 kV
2035 MW Capacity / 2100 MW Energy

November 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.

General

The Interconnection Customer (IC) has proposed a 350 mile, 525 kV underground high voltage direct current (HVDC) Merchant Transmission line from Killdeer 345 kV Substation in Iowa into ComEd's transmission system in Illinois. The installed facilities will have a capability of 2035 MWs. The IC requested rights are summarized below:

Description	Requested MW
Capacity (Firm) Transmission Injection Rights	2035 MW
Energy (Non-Firm) Transmission Injection Rights	0
Capacity (Firm) Transmission Withdrawal Rights	0 MW
Energy (Non-Firm) Transmission Withdrawal Rights	2100 MW

The project details are summarized below:

Queue Number	AF1-200
Project Name	Plano 345
State	Illinois
County	Kendall
Transmission Owner	ComEd
Basecase Study Year	2023

Point of Interconnection

Queue Position AF1-200 proposes to interconnect with the ComEd transmission system by tying to 345kV bus at TSS 167 Plano (See Attachment 1).

Cost Summary

The AF1-200 project will be responsible for the following costs.

Description	Cost Estimate
Total Physical Interconnection Costs	$6,200,000
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	$45,903,000
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	$117,496,789
Allocation towards System Network Upgrade Costs (TO Identified)*	$0
Total Costs	$169,599,789

*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	$200,000
Direct Connection Network Upgrades	$6,000,000
Non-Direct Connection Network Upgrades	$0
Total Physical Interconnection Costs	**$6,200,000**

Attachment Facilities

The two generator leads for AF1-200 will interconnect to 345kV buses at TSS 167 Plano (see details in Direct Connection section below). The required Attachment Facilities are two 345kV line MODs, two dead-end structures and two sets of revenue-metering as shown in the one-line diagram.

Scope of Work	Cost Estimate
Installation of two 345kV line MOD, two dead-end structure and two set of revenue metering (see notes below on cost estimate)	**$ 2,000,000**

Direct Connection Network Upgrades

In order to accommodate interconnection of AF1-200, TSS 167 Plano would need to be expanded to create two bus positions.

The scope of work includes installation of two 345kV circuit breakers at TSS 167 Plano to interconnect IC's generator leads, as shown in the one-line diagram below.

The Interconnection Customer is responsible for constructing all the facilities on the Interconnection Customer side of the Point of Interconnection (POI).

ComEd would design, engineer and construct expansion of TSS 167 Plano. The preliminary cost estimate for Direct Connection Network Upgrade is given in the following tables.

Scope of Work	Cost Estimate
Installation of two 345kV circuit breakers at TSS 167 Plano as described above	$6,000,000
Total Cost Estimate (see notes below on cost estimate)	**$ 6,000,000**

Non-Direct Connection Network Upgrades

None

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 Interconnection Customer.

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 Interconnection Customer and the actual costs of ComEd's work may differ significantly from these estimates. Interconnection Customer will be responsible for paying actual costs of ComEd's work in accordance with Sections 212.1 and 217 of the PJM Open Access Transmission Tariff.

4) The Interconnection Customer is responsible for all engineering, procurement, testing and construction of all equipment on the Interconnection Customer's side of the POI.

5) These cost estimates do not include cost of acquiring right-of-way for the transmission line and purchasing any additional land, if needed, for the line terminations. The need and cost for acquiring property and associated legal costs will be investigation during Facilities Study for this project.

Schedule:

Normally it takes about 24-months to engineer, design, procure material and construct 345kV facilities after ISA/ICSA are signed.

Interconnected Transmission Owner Requirements

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

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

ComEd distribution line drops to move customer cranes and heavy equipment is not part of PJM process. The customer should directly contact ComEd New Business Group to arrange for line drops, if needed.

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.

Network Impacts

The Queue Project AF1-200 was evaluated as a 2035.0 MW (Capacity 2035.0 MW) injection / 2100 MW withdrawal at Plano 345kV substation in the ComEd area. Project AF1-200 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-200 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis

Generator Deliverability

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

1. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 84.38% to 106.68% (AC power flow) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 309.18 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Note: *AEP SE rating is 1409 MVA*
See Light Load for Reinforcement

2. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 84.38% to 106.68% (AC power flow) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 309.18 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Note: *AEP SE rating is 1409 MVA*
See Light Load for Reinforcement

3. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 99.44% to 115.5% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 205.45 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'

TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345
END

Note: *ComEd SSTE rating is 1915 MVA*
See Light Load for Reinforcement

Please refer to Appendix 1 for a table containing the generators having contribution to this flowgate.

4. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 99.44% to 115.5% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 205.45 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'
TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345
END

Note: *ComEd SSTE rating is 1915 MVA*
See Light Load for Reinforcement

7. (CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 64.17% to 105.14% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L16703_R-S'. This project contributes approximately 565.36 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16703_R-S'
TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
END

Note: *ComEd SSTE rating is 1603 MVA (Not a violation).*

8. (CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 64.17% to 105.14% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L16703_R-S'. This project contributes approximately 565.36 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16703_R-S'
TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
END

Note: *ComEd SSTE rating is 1603 MVA (Not a violation).*

9. (CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 67.67% to 106.66% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L16704TB-S'. This project contributes approximately 609.67 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16704TB-S'
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Note: *ComEd SSTE rating is 1837 MVA (Not a violation).*

10. (CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 67.67% to 106.66% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L16704TB-S'. This project contributes approximately 609.67 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16704TB-S'
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Note: *ComEd SSTE rating is 1837 MVA (Not a violation).*

11. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 81.37% to 104.61% (AC power flow) of its emergency rating (1399

MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 271.43 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Note: *ComEd SSTE rating is 1483 MVA*

12. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 81.37% to 104.61% (AC power flow) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 271.43 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Note: *ComEd SSTE rating is 1483 MVA*

Multiple Facility Contingency

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

1. (AEP - AEP) The 05COOK-05OLIVE 345 kV line (from bus 243215 to bus 243229 ckt 1) loads from 93.48% to 103.03% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#7443_05DUMONT 765_A'. This project contributes approximately 142.7 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#7443_05DUMONT 765_A'
OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1
OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1 / 243206 05DUMONT 765 246999 05SORENS 765 1
END

Note: *AEP SE rating is 1409 MVA*

Please refer to Appendix 2 for a table containing the generators having contribution to this flowgate.

2. (MISO NIPS - CE) The 17MUNSTER-BURNHAM ;0R 345 kV line (from bus 255109 to bus 270677 ckt 1) loads from 69.79% to 109.94% (AC power flow) of its emergency rating (1441

MVA) for the tower line contingency outage of 'COMED_P7_345-L6607__B-S_+_345-L6608__R-S'. This project contributes approximately 211.66 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L6607__B-S_+_345-L6608__R-S'
 TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1 / E FRA; B 345 CRETE;BP 345
 TRIP BRANCH FROM BUS 270729 TO BUS 274804 CKT 1 / E FRA; R 345 UPNOR;RP 345
 END

Note: *ComEd SSTE rating is 1768 MVA and ALDR rating is 2033 MVA (Not a violation).*

Please refer to Appendix 3 for a table containing the generators having contribution to this flowgate.

3. (MISO NIPS - CE) The 17MUNSTER-BURNHAM ;0R 345 kV line (from bus 255109 to bus 270677 ckt 1) loads from 63.44% to 103.56% (AC power flow) of its emergency rating (1441 MVA) for the tower line contingency outage of 'COMED_P7_345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 210.5 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L6607__B-S_+_345-L97008_R-S'
 TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1 / E FRANKFO; B 345 CRETE EC ;BP 345
 TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1 / UNIV PK N;RP 345 05OLIVE 345
 END

Note: *ComEd SSTE rating is 1768 MVA and ALDR rating is 2033 MVA (Not a violation).*

4. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 89.98% to 104.04% (AC power flow) of its load dump rating (1915 MVA) for the tower line contingency outage of 'COMED_P7_345-L2001__B-S_+_345-L2003__R-S'. This project contributes approximately 248.9 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L2001__B-S_+_345-L2003__R-S'
 TRIP BRANCH FROM BUS 270670 TO BUS 270728 CKT 1 / BRAID; B 345 E FRA; B 345
 TRIP BRANCH FROM BUS 270728 TO BUS 270766 CKT 1 / E FRA; B 345 GOODI;3B 345
 TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1 / E FRA; B 345 CRETE;BP 345
 TRIP BRANCH FROM BUS 270671 TO BUS 270729 CKT 1 / BRAID; R 345 E FRA; R 345
 END

Note: *ComEd ALDR rating is 1915 MVA*
See Light Load for Reinforcement

5. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.88% to 106.0% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 278.88 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1483 MVA*

Please refer to Appendix 4 for a table containing the generators having contribution to this flowgate.

6. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.71% to 105.6% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 275.25 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END
Note: *ComEd SSTE rating is 1483 MVA*

7. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.7% to 105.59% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 275.17 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1483 MVA*

8. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.42% to 105.22% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 273.22 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1483 MVA*

9. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.41% to 105.22% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 273.22 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1483 MVA*

10. (CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 95.89% to 106.31% (AC power flow) of its load dump rating (1479 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_012-45-BT5-6__'. This project contributes approximately 152.58 MW to the thermal violation.

CONTINGENCY 'COMED_P4_012-45-BT5-6__'

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  TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1          / DRESD; B 345
ELWOO; B 345
  TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1          / ELWOO; B 345
ELWOO; R 345
  TRIP BRANCH FROM BUS 274702 TO BUS 270716 CKT 1          / KENDA; B 345
DRESD; B 345
  END
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Note: *ComEd SSTE rating is 1568 MVA*

Please refer to Appendix 5 for a table containing the generators having contribution to this flowgate.

11. (CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 90.69% to 102.5% (AC power flow) of its load dump rating (1479 MVA) for the bus fault outage of 'COMED_P2-2_111_EJ-345R__3'. This project contributes approximately 174.6 MW to the thermal violation.

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CONTINGENCY 'COMED_P2-2_111_EJ-345R__3'
  DISCONNECT BUS 270733                          / ELEC JUNC;3R 345
  DISCONNECT BUS 275183                          / ELEC JUNC;3M 138
  END
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Note: *ComEd SSTE rating is 1568 MVA*

12. (CE - CE) The LASCO STA; B-PLANO ; B 345 kV line (from bus 270802 to bus 270846 ckt 1) loads from 85.02% to 111.29% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT2-5__'. This project contributes approximately 406.01 MW to the thermal violation.

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CONTINGENCY 'COMED_P4_167-45-BT2-5__'
  TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1          / PLANO;4M 345
PLANO; 765
  TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1          / PLANO;4M 345
PLANO; R 345
  TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1          / PLANO;4M 345
PLANO;4C 33
  TRIP BRANCH FROM BUS 270803 TO BUS 270847 CKT 1          / LASCO; R 345
PLANO; R 345
  END
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Note: *ComEd SSTE rating is 1702 MVA (Not a violation).*

Please refer to Appendix 6 for a table containing the generators having contribution to this flowgate.

13. (CE - CE) The LASCO STA; R-PLANO ; R 345 kV line (from bus 270803 to bus 270847 ckt 1) loads from 85.07% to 111.13% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT9-12_'. This project contributes approximately 402.63 MW to the thermal violation.

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CONTINGENCY 'COMED_P4_167-45-BT9-12_'
  TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1              / LASCO STA; B
345 PLANO ; B 345
  TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1              / PLANO ; B 345
PLANO ; R 345
  TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1              / PLANO ;3M 345
PLANO ; 765
  TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1              / PLANO ;3M 345
PLANO ; B 345
  TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1              / PLANO ;3M 345
PLANO ;3C 33
  END
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Note: *ComEd SSTE rating is 1702 MVA (Not a violation).*

Please refer to Appendix 7 for a table containing the generators having contribution to this flowgate.

14. (CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 67.28% to 114.72% (AC power flow) of its load dump rating (1341 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 652.26 MW to the thermal violation.

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CONTINGENCY 'COMED_P4_167-45-BT5-6__'
  TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1              / PLANO ; B 345
PLANO ; R 345
  TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1              / PLANO ; R 345
ELEC JUNC;3R 345
  TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1              / PLANO ;4M 345
PLANO ; 765
  TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1              / PLANO ;4M 345
PLANO ; R 345
  TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1              / PLANO ;4M 345
PLANO ;4C 33
  END
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Note: *ComEd SSTE rating is 1603 MVA (Not a violation).*

Please refer to Appendix 8 for a table containing the generators having contribution to this flowgate.

15. (CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 71.47% to 111.94% (AC power flow) of its load dump rating (1341 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_111-45-L16703_'. This project contributes approximately 557.28 MW to the thermal violation.

CONTINGENCY 'COMED_P4_111-45-L16703_'
 TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
 TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
 TRIP BRANCH FROM BUS 270731 TO BUS 270717 CKT 1 / ELEC JUNC;4R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 270731 TO BUS 274749 CKT 1 / ELEC JUNC;4R 345 AURORA EC;RP 345
 DISCONNECT BUS 275184 / ELEC JUNC;4M 138
 END

Note: *ComEd SSTE rating is 1603 MVA (Not a violation).*

16. (CE - CE) The PLANO ; B-PLANO ;3M 345 kV line (from bus 270846 to bus 275207 ckt 1) loads from 64.96% to 100.79% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 581.93 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'
 TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
 TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
 TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765
 TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345
 TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33
 END

Note: *ComEd SSTE rating is 1469 MVA (Not a violation).*

Please refer to Appendix 9 for a table containing the generators having contribution to this flowgate.

17. (CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 69.59% to 114.51% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 703.09 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'
TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345
TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Note: *ComEd SSTE rating is 1837 MVA (Not a violation).*

Please refer to Appendix 10 for a table containing the generators having contribution to this flowgate.

18. (CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 73.01% to 111.4% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_111-45-L16704T'. This project contributes approximately 601.73 MW to the thermal violation.

CONTINGENCY 'COMED_P4_111-45-L16704T'
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
TRIP BRANCH FROM BUS 270730 TO BUS 270916 CKT 1 / ELEC JUNC; B 345 WAYNE ; B 345
TRIP BRANCH FROM BUS 270730 TO BUS 270928 CKT 1 / ELEC JUNC; 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 / ELEC JUNC;2M 138
END

Note: *ComEd SSTE rating is 1837 MVA (Not a violation).*

19. (CE - CE) The PLANO ; R-PLANO ;4M 345 kV line (from bus 270847 to bus 275208 ckt 1) loads from 62.04% to 102.1% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 627.35 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'
TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345
TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Note: *ComEd SSTE rating is 1469 MVA (Not a violation).*

Please refer to Appendix 11 for a table containing the generators having contribution to this flowgate.

20. (CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.13% to 159.99% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 287.78 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1483 MVA*

Please refer to Appendix 12 for a table containing the generators having contribution to this flowgate.

21. (CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.05% to 159.47% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 284.05 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *ComEd SSTE rating is 1483 MVA*

22. (CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.04% to 159.46% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 283.96 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1483 MVA*

23. (CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.04% to 159.39% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 283.42 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345

TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *ComEd SSTE rating is 1483 MVA*

24. (CE - CE) The PLANO ; 765/345 kV transformer (from bus 275207 to bus 270630 ckt 1) loads from 65.18% to 101.34% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 581.93 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'
TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345
TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33
END

Note: *ComEd SSTE rating is 1469 MVA (Not a violation).*

Please refer to Appendix 13 for a table containing the generators having contribution to this flowgate.

25. (CE - CE) The PLANO ; 765/345 kV transformer (from bus 275208 to bus 270630 ckt 1) loads from 62.2% to 102.65% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 627.35 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'
TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345
TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Note: *ComEd SSTE rating is 1469 MVA (Not a violation).*

Please refer to Appendix 14 for a table containing the generators having contribution to this flowgate.

26. (CE - CE) The AE2-153 TAP-DAVIS CRK; R 345 kV line (from bus 941560 to bus 270711 ckt 1) loads from 95.21% to 104.07% (AC power flow) of its load dump rating (1341 MVA) for the line fault with failed breaker contingency outage of 'ADD AD1-100 2'. This project contributes approximately 112.84 MW to the thermal violation.

CONTINGENCY 'ADD AD1-100 2'
OPEN BRANCH FROM BUS 934720 TO BUS 939400 CKT 1 / AD1-100 - AE1-172 TAP (LORETTO)
OPEN BRANCH FROM BUS 934730 TO BUS 270670 CKT 1 / AD1-100 - BRAIDWOOD
END

Note: *ComEd SSTE rating is 1837 MVA (Not a violation).*

Please refer to Appendix 15 for a table containing the generators having contribution to this flowgate.

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)

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.88% to 128.17% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1

END

Note: *ComEd SSTE rating is 1134 MVA*

Please refer to Appendix 16 for a table containing the generators having contribution to this flowgate.

2. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.84% to 128.14% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.43% to 127.9% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 195.99 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1134 MVA*

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.39% to 127.74% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 194.42 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *ComEd SSTE rating is 1134 MVA*

5. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.39% to 127.74% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 194.4 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1134 MVA*

6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 107.29% to 109.56% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 300.77 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *AEP SE rating is 1409 MVA*
See Light Load for Reinforcement

Please refer to Appendix 17 for a table containing the generators having contribution to this flowgate.

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 107.29% to 109.56% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 300.77 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *AEP SE rating is 1409 MVA*
See Light Load for Reinforcement

8. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 105.01% to 107.14% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 174.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

Please refer to Appendix 18 for a table containing the generators having contribution to this flowgate.

9. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 105.01% to 107.14% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 174.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1

END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

10. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 105.0% to 107.13% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 174.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

11. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 105.0% to 107.13% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 174.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

12. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 104.21% to 106.48% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 176.76 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345

TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

13. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 104.21% to 106.48% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 176.76 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

14. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.86% to 128.16% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

Please refer to Appendix 19 for a table containing the generators having contribution to this flowgate.

15. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.83% to 128.12% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.41% to 127.89% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 195.99 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

17. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.37% to 127.73% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 194.42 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.37% to 127.72% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 194.4 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

19. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 125.85% to 129.8% (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 323.32 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

Note: *ComEd SSTE rating is 1469 MVA*
See Light Load for Reinforcement

Please refer to Appendix 20 for a table containing the generators having contribution to this flowgate.

20. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 128.48% to 132.52% (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 330.16 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

Note: *ComEd SSTE rating is 1469 MVA*
See Light Load for Reinforcement

Please refer to Appendix 21 for a table containing the generators having contribution to this flowgate.

21. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 156.02% to 160.77% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 270.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1483 MVA*
See Light Load for Reinforcement

Please refer to Appendix 22 for a table containing the generators having contribution to this flowgate.

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.98% to 160.74% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 270.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
 END

Note: *ComEd SSTE rating is 1483 MVA*

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.69% to 160.51% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 272.12 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
 TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
 END

Note: *ComEd SSTE rating is 1483 MVA*

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.68% to 160.5% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 272.04 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
 TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345

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

Note: *ComEd SSTE rating is 1483 MVA*

25. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.65% to 160.43% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 271.51 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *ComEd SSTE rating is 1483 MVA*

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.64% to 114.63% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 213.88 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

Please refer to Appendix 23 for a table containing the generators having contribution to this flowgate.

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.64% to 114.63% (AC power flow) of its emergency rating (971 MVA) for the

line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 213.88 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

28. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.62% to 114.6% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 213.88 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

29. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.62% to 114.6% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_FSA'. This project contributes approximately 213.88 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_FSA'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

30. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.09% to 114.06% (AC power flow) of its emergency rating (971 MVA) for the

line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 216.59 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

31. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.09% to 114.06% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 216.59 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

32. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 107.84% to 113.95% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 215.81 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

33. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 107.84% to 113.95% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 215.81 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

34. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 107.84% to 113.95% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 215.81 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

35. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 107.84% to 113.95% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 215.81 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *ComEd SSTE rating is 1134 MVA*
See Light Load for Reinforcement

36. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 125.85% to 129.8% (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 323.32 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

Note: *ComEd SSTE rating is 1469 MVA*
See Light Load for Reinforcement

Please refer to Appendix 24 for a table containing the generators having contribution to this flowgate.

37. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 128.48% to 132.52% (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 330.16 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

Note: *ComEd SSTE rating is 1469 MVA*
See Light Load for Reinforcement

Please refer to Appendix 25 for a table containing the generators having contribution to this flowgate.

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.

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.38% to 127.72% (AC power flow) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 194.24 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

2. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 105.13% to 107.61% (AC power flow) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 309.18 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

3. (CE - CE) The BLUEMOUND; B-PONTIAC ; B 345 kV line (from bus 270668 to bus 270852 ckt 1) loads from 154.38% to 164.01% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L8001___-S'. This project contributes approximately 147.34 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L8001___-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 917500 CKT 1 / PONTI; R 345 Z2-087 TAP 345
 END

4. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 116.27% to 132.28% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 205.45 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'
 TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345
 END

5. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.66% to 105.52% (AC power flow) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 274.56 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
 END

6. (CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 94.56% to 106.18% (AC power flow) of its normal rating (1201 MVA) for non-contingency condition. This project contributes approximately 139.56 MW to the thermal violation.

7. (CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 94.56% to 106.18% (AC power flow) of its normal rating (1201 MVA) for non-contingency condition. This project contributes approximately 139.56 MW to the thermal violation.

8. (CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 90.91% to 102.45% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of 'COMED_P2-1_111-L11120__'. This project contributes approximately 170.57 MW to the thermal violation.

CONTINGENCY 'COMED_P2-1_111-L11120__'
 TRIP BRANCH FROM BUS 270733 TO BUS 270747 CKT 1 / ELECT;3R 345 W407K;0T 345
 END

9. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 104.24% to 106.45% (AC power flow) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 176.17 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
 END

10. (CE - CE) The LASCO STA; B-PLANO ; B 345 kV line (from bus 270802 to bus 270846 ckt 1) loads from 84.6% to 107.53% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L0102__R-S'. This project contributes approximately 356.12 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L0102__R-S'
 TRIP BRANCH FROM BUS 270803 TO BUS 270847 CKT 1 / LASCO; R 345 PLANO; R 345
 END

11. (CE - CE) The LASCO STA; R-PLANO ; R 345 kV line (from bus 270803 to bus 270847 ckt 1) loads from 84.66% to 107.6% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L0101__B-S'. This project contributes approximately 356.29 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L0101__B-S'
 TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1 / LASCO STA; B 345 PLANO ; B 345
 TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
 END

12. (CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 66.52% to 107.51% (AC power flow) of its emergency rating (1341 MVA) for the

single line contingency outage of 'COMED_P1-2_345-L16703_R-S'. This project contributes approximately 565.36 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16703_R-S'
 TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
 TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
 END

13. (CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 68.36% to 107.21% (AC power flow) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L16704TB-S'. This project contributes approximately 609.67 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L16704TB-S'
 TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
 TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
 TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
 TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
 END

14. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.36% to 127.7% (AC power flow) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 194.24 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
 END

15. (CE - CE) The CHESTNUT ;-BLUEMOUND; B 345 kV line (from bus 270912 to bus 270668 ckt 1) loads from 158.85% to 169.77% (AC power flow) of its emergency rating (1334 MVA) for the single line contingency outage of 'COMED_P1-2_345-L8001___-S'. This project contributes approximately 146.5 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L8001___-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 917500 CKT 1 / PONTI; R 345 Z2-087 TAP 345
 END

16. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.65% to 160.43% (AC power flow) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 271.43 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
  OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
  END

17. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 147.07% to 155.24% (AC power flow) of its normal rating (1091 MVA) for non-contingency condition. This project contributes approximately 155.76 MW to the thermal violation.

18. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 147.07% to 155.24% (AC power flow) of its normal rating (1091 MVA) for non-contingency condition. This project contributes approximately 155.76 MW to the thermal violation.

19. (CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.02% to 159.37% (AC power flow) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 283.33 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
  OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
  END

20. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 107.83% to 113.92% (AC power flow) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 215.63 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
  OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
  END

21. (MISO AMIL - CE) The 7BROKAW-Z2-087 TAP 345 kV line (from bus 348847 to bus 917500 ckt 1) loads from 125.89% to 135.36% (AC power flow) of its emergency rating (1793 MVA) for the single line contingency outage of 'COMED_P1-2_345-L8002___-S'. This project contributes approximately 170.73 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L8002___-S'
TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1 / PONTI; B 345 BLUEM; B 345
END

22. (CE - CE) The AD1-100 TAP-BRAIDWOOD; B 345 kV line (from bus 934730 to bus 270670 ckt 1) loads from 103.97% to 115.42% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L11212_B-S-A'. This project contributes approximately 153.01 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L11212_B-S-A'
TRIP BRANCH FROM BUS 270926 TO BUS 934720 CKT 1 / WILTO; B 345 AD1-100 TAP 345
END

Short Circuit

(Summary of impacted circuit breakers)

No overdutied breakers identified.

Affected System Analysis & Mitigation

MISO Impacts:

Preliminary MISO impacts have been identified. Please refer to the MISO Affected System report for details. Final MISO impacts to be determined by MISO during the Facilities Study phase.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

To be determined during the Facilities Study.

Steady-State Voltage Requirements

To be determined during the Facility Study.

N-1-1 Analysis:

To be determined during the Facility Study.

Load Delivery Analysis:

Not Required

Light Load Analysis – 2023

Network Impacts

The Queue Project AF1-200 was evaluated as a 2035 MW (Capacity 2035 MW) injection at Plano 345 kV substation in the ComEd area. Project AF1-200 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-200 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Generator Deliverability

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

2. (AEP - AEP) The 05SORENS-05MARYSV 765 kV line (from bus 246999 to bus 242928 ckt 1) loads from 86.39% to 100.59% (AC power flow) of its normal rating (4047 MVA) for non-contingency condition. This project contributes approximately 336.9 MW to the thermal violation.

Please refer to Appendix 2 for a table containing the generators having contribution to this flowgate.

Note: *AEP: 4047 MVA SN. (Valid AEP violation)*

4. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 94.74% to 112.79% (AC power flow) of its normal rating (3555 MVA) for non-contingency condition. This project contributes approximately 551.32 MW to the thermal violation.

Note*: Voltage Collapse observed for this Flow Gate. Further Analysis required during Facility Study.*

5. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 90.85% to 104.4% (**DC power flow**) of its normal rating (4105 MVA) for the single line contingency outage of 'COMED_P1-2_345-L94507_B-S'. This project contributes approximately 579.19 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L94507_B-S'

TRIP BRANCH FROM BUS 274750 TO BUS 255112 CKT 1 / CRETE;BP 345 17STJOHN 345
END

***Note**: ComEd SSTE: 4553 MVA. AEP: 4105 MVA SE. (Violation valid)*

6. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 87.89% to 101.54% (**DC power flow**) of its normal rating (4105 MVA) for the single line contingency outage of 'COMED_P1-2_345-L6608__R-S'. This project contributes approximately 583.52 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L6608__R-S'
TRIP BRANCH FROM BUS 270729 TO BUS 274804 CKT 1 / E FRA; R 345 UPNOR;RP 345
END

***Note**: ComEd SSTE: 4553 MVA. AEP: 4105 MVA SE. (Violation for AEP valid)*

7. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 90.16% to 105.45% (**DC power flow**) of its emergency rating (1441 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 201.12 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 5 for a table containing the generators having contribution to this flowgate.

***Note**: ComEd SSTE: 1568 MVA. MISO 1591 SE (Not a violation)*

8. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 97.18% to 111.18% (AC power flow) of its normal rating (1091 MVA) for non-contingency condition. This project contributes approximately 121.09 MW to the thermal violation.
***Note**: ComEd: 1091 MVA Summer Normal. (Violation valid - See Summer Peak Reinforcement).*

9. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 90.15% to 102.28% (**DC power flow**) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_1094_B2'. This project contributes approximately 143.8 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_1094_B2'
OPEN BRANCH FROM BUS 255109 TO BUS 270677 CKT 1 / 255109 17MUNSTR 345 270677 BURNH;0R 345 1
END

***Note**: ComEd: 1483 MVA SSTE. (Not a violation).*

12. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 86.69% to 100.98% (**DC power flow**) of its emergency rating (1379 MVA) for the single line contingency outage of 'COMED_P1-2_765-L11216__-S'. This project contributes approximately 166.79 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_765-L11216__-S'
TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765
END

***Note**: ComEd: 1693 MVA SSTE. (Not a violation)*

Multiple Facility Contingency

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

1. (AEP - AEP) The 05ALLEN-05RPMONE 345 kV line (from bus 243211 to bus 242933 ckt 1) loads from 99.12% to 115.78% (AC power flow) of its emergency rating (897 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#7445_05MARYSV 765_B'. This project contributes approximately 149.98 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#7445_05MARYSV 765_B'
OPEN BRANCH FROM BUS 242922 TO BUS 242928 CKT 1 / 242922 05FLTLCK 765 242928 05MARYSV 765 1
OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1
END

***Note**: AEP: 897 MVA SE. (Violation valid)*

2. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 92.99% to 107.59% (AC power flow) of its emergency rating (1310 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 191.23 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

***Note**: Refer to Summer Peak Reinforcement*

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 92.92% to 107.4% (AC power flow) of its emergency rating (1310 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 189.7 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

***Note**: Refer to Summer Peak Reinforcement*

4. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 95.04% to 109.23% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_641'. This project contributes approximately 606.58 MW to the thermal violation.

CONTINGENCY 'COMED_P7_641'
OPEN BRANCH FROM BUS 243229 TO BUS 270771 CKT 1 / 243229 05OLIVE 345 270771 GREENACRE; T 345 1
OPEN BRANCH FROM BUS 243229 TO BUS 274804 CKT 1 / 243229 05OLIVE 345 274804 UNIV PK N;RP 345 1
END

***Note**: ComEd ALDR: 5522 MVA. (Not a violation)*

5. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 88.34% to 104.94% (**DC power flow**) of its emergency rating (1441

MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 202.56 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

***Note**: Refer to Summer Peak Reinforcement*

6. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 87.49% to 105.23% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 172.26 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

***Note**: Refer to Summer Peak Reinforcement*

7. (CE - CE) The PLANO ; B-PLANO ;3M 345 kV line (from bus 270846 to bus 275207 ckt 1) loads from 59.75% to 100.2% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 459.31 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'
TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345
TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33
END

Please refer to Appendix 8 for a table containing the generators having contribution to this flowgate.

***Note**: Refer to Summer Peak Reinforcement*

8. (CE - CE) The PLANO ; R-PLANO ;4M 345 kV line (from bus 270847 to bus 275208 ckt 1) loads from 57.01% to 100.91% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 495.71 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'
TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345
TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Please refer to Appendix 9 for a table containing the generators having contribution to this flowgate.

***Note**: Refer to Summer Peak Reinforcement*

9. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 92.98% to 107.58% (AC power flow) of its emergency rating (1310 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 191.23 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

***Note**: Refer to Summer Peak Reinforcement*

10. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 92.91% to 107.39% (AC power flow) of its emergency rating (1310 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 189.7 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

***Note**: Refer to Summer Peak Reinforcement*

11. (CE - CE) The LASCO STA; B-MAZON ; B 138 kV line (from bus 271908 to bus 271986 ckt 1) loads from 96.2% to 117.1% (AC power flow) of its load dump rating (230 MVA) for the tower line contingency outage of 'COMED_P7_345-L0103__R-S_+_345-L0104__B-S'. This project contributes approximately 48.07 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L0103__R-S_+_345-L0104__B-S'
TRIP BRANCH FROM BUS 270803 TO BUS 270671 CKT 1 / LASCO STA; R 345 BRAIDWOOD; R 345
TRIP BRANCH FROM BUS 270802 TO BUS 270670 CKT 1 / LASCO STA; B 345 BRAIDWOOD; B 345

END

Please refer to Appendix 10 for a table containing the generators having contribution to this flowgate.

***Note**: ComEd: 264.5 MVA ALDR. (Violation valid)*

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)

1. (AEP - OVEC) The 05JEFRSO-06CLIFTY 345 kV line (from bus 242865 to bus 248000 ckt Z1) loads from 106.65% to 113.63% (**DC power flow**) of its normal rating (2354 MVA) for the single line contingency outage of 'AEP_P1-2_#709'. This project contributes approximately 155.1 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#709'
OPEN BRANCH FROM BUS 242924 TO BUS 243208 CKT 1 / 242924 05HANG R 765 243208 05JEFRSO 765 1
END

Please refer to Appendix 11 for a table containing the generators having contribution to this flowgate.

***Note**: AEP: 2354 MVA SE. (Violation valid). See LL Reinforcement.*

2. (AEP - AEP) The 05ALLEN-05RPMONE 345 kV line (from bus 243211 to bus 242933 ckt 1) loads from 122.49% to 137.46% (**DC power flow**) of its normal rating (897 MVA) for the single line contingency outage of 'AEP_P1-2_#7441'. This project contributes approximately 121.29 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#7441'
OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1
END

Please refer to Appendix 12 for a table containing the generators having contribution to this flowgate.

***Note**: AEP: 895 MVA SE. (Violation valid). See LL Reinforcement*

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 104.71% to 118.37% (**DC power flow**) of its emergency rating (1310

MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 151.62 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 13 for a table containing the generators having contribution to this flowgate.

Note: *No violation for MISO. ComEd SSTE: 1134 MVA (violation valid). See Summer Peak Reinforcement.*

4. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 117.43% to 135.47% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 241.81 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 14 for a table containing the generators having contribution to this flowgate.

Note: *MISO: 1779 SE MVA. AEP: 1409 MVA SE. (Violation valid for MISO & AEP)*

5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 117.85% to 133.83% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 242.78 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765
TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *MISO: 1779 SE MVA. AEP: 1409 MVA SE. (Violation valid for MISO & AEP)*

6. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 101.45% to 115.88% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 619.01 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'
TRIP BRANCH FROM BUS 274750 TO BUS 255112 CKT 1 / CRETE;BP 345 17STJOHN 345
TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1 / UPNOR;RP 345 05OLIVE 345
END

Note: *ComEd SSTE: 1134 MVA (violation valid)*

Please refer to Appendix 4 for a table containing the generators having contribution to this flowgate.

7. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 122.39% to 138.2% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 148.05 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'
TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345
END

Please refer to Appendix 15 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

8. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 118.05% to 133.72% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of '270671 BRAIDWOOD; R 345 941560 AE2-153 TAP 345 1'. This project contributes approximately 148.05 MW to the thermal violation.

CONTINGENCY '270671 BRAIDWOOD; R 345 941560 AE2-153 TAP 345 1'
OPEN BRANCH FROM BUS 270671 TO BUS 941560 CKT 1
END

Note: *See Summer Reinforcement.*

9. (CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 101.61% to 114.81% (AC power flow) of its load dump rating (1915 MVA) for the tower line contingency outage of 'COMED_P7_345-L2001__B-S_+_345-L2003__R-S'. This project contributes approximately 178.41 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L2001__B-S_+_345-L2003__R-S'
TRIP BRANCH FROM BUS 270670 TO BUS 270728 CKT 1 / BRAID; B 345 E FRA; B 345
TRIP BRANCH FROM BUS 270728 TO BUS 270766 CKT 1 / E FRA; B 345 GOODI;3B 345
TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1 / E FRA; B 345 CRETE;BP 345
TRIP BRANCH FROM BUS 270671 TO BUS 270729 CKT 1 / BRAID; R 345 E FRA; R 345
END

Note: *See Summer Reinforcement.*

10. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 114.64% to 132.41% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 215.4 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Please refer to Appendix 16 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

11. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 114.46% to 131.98% (**DC power flow**) of its load dump rating (1399

MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 212.55 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *See Summer Reinforcement.*

12. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 114.45% to 131.96% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 212.49 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *See Summer Reinforcement.*

13. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 114.4% to 131.88% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 212.03 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT4-5__'
TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765

TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345
TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
END

Note: *See Summer Reinforcement.*

14. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 115.68% to 131.82% (**DC power flow**) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 212.0 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Note: *See Summer Reinforcement.*

15. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 101.91% to 118.68% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 137.35 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 17 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 104.66% to 118.33% (**DC power flow**) of its emergency rating (1310 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 151.62 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'

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

Please refer to Appendix 18 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

17. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 140.76% to 157.06% (**DC 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 253.09 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

Please refer to Appendix 19 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

18. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 144.0% to 161.16% (**DC 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 258.44 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

Please refer to Appendix 20 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

19. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 141.58% to 155.27% (**DC power flow**) of its emergency rating (1557 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 212.0 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 21 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement.*

20. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 140.48% to 152.4% (**DC power flow**) of its emergency rating (1557 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 215.4 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *See Summer Reinforcement*

21. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 140.32% to 152.02% (**DC power flow**) of its emergency rating (1557 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 212.55 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *See Summer Reinforcement*

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 123.48% to 133.74% (AC power flow) of its normal rating (1310 MVA) for non-contingency condition. This project contributes approximately 121.09 MW to the thermal violation.

Note: *See Summer Reinforcement*

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 114.52% to 126.35% (**DC power flow**) of its emergency rating (1557 MVA) for the single line contingency outage of 'COMED_P1-2_765-L11216__-S'. This project contributes approximately 161.99 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_765-L11216__-S'
TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765
END

Note: *See Summer Reinforcement*

24. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 119.19% to 138.95% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 168.42 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Please refer to Appendix 22 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement*

25. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 105.69% to 126.43% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 168.56 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT4-5__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
END

Note: *See Summer Reinforcement*

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 105.69% to 126.42% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 168.56 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT3-4__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33
END

Note: *See Summer Reinforcement*

27. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 133.59% to 155.34% (**DC 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 253.09 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

Please refer to Appendix 23 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement*

28. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 137.35% to 159.56% (**DC 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 258.44 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

Please refer to Appendix 24 for a table containing the generators having contribution to this flowgate.

Note: *See Summer Reinforcement*

29. (CE - CE) The AD1-100 TAP-WILTON ; B 345 kV line (from bus 934720 to bus 270926 ckt 1) loads from 125.83% to 136.34% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_765-L11216__-S'. This project contributes approximately 141.0 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_765-L11216__-S'
TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765
END

Please refer to Appendix 25 for a table containing the generators having contribution to this flowgate.

Note: *ComEd: 1846 MVA SSTE (Violation valid)*

30. (CE - CE) The AD1-100 TAP-WILTON ; B 345 kV line (from bus 934720 to bus 270926 ckt 1) loads from 110.44% to 119.57% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_765-L2315___-S'. This project contributes approximately 116.58 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_765-L2315___-S'
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Note: *ComEd: 1846 MVA SSTE (Not a violation)*

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.

System Reinforcements

Summer Peak Load Flow Analysis Reinforcement

New System Reinforcements

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

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr><td>17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1)</td><td>See Light Load.</td><td>$0</td><td>$0</td><td>N/A</td></tr>
<tr><td>05COOK-05OLIVE 345 kV line (from bus 243215 to bus 243229 ckt 1)</td><td><u>AEP</u>
AEP SE rating is 1409 MVA

<u>AEP Reinforcement:</u>
<u>Project ID</u>: n3800
A sag study will be required for the ACSR ~ 954 ~ 45/7 ~ RAIL Conductor Section 1 to determine if the line section can be operated above its emergency rating of 1409 MVA. The results could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 23.6 mile section of line would need to be rebuilt for $47.2M. Estimated Cost: $93,600. Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. New expected SE rating of 1868 MVA.
<u>Type</u>: FAC
<u>Cost:</u> $936,000
<u>Time Estimate</u>: 24-36 Months
<u>Ratings</u>: 1868 MVA SE

<u>Notes</u>:
AF1-200 is the driver for this upgrade.

<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>147.2</td><td>100 %</td><td>$936,000</td></tr></table></td><td>$936,000</td><td>$936,000</td><td>N3800</td></tr>
<tr><td>17MUNSTER-BURNHAM ;0R 345 kV line (from bus 255109 to bus 270677 ckt 1)</td><td><u>MISO Reinforcement:</u>
SE rating is 1591 MVA and is sufficient. No upgrade required.

<u>ComEd Reinforcement:</u>
The ComEd SSTE rating is 1768 MVA and is sufficient. No upgrade required.</td><td>$0</td><td>$0</td><td>N/A</td></tr>
</table>

<table>
<tr><td>BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1)</td><td>See Light Load</td><td>$0</td><td>$0</td><td>N/A</td></tr>
<tr><td>PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1)</td><td><u>ComEd Reinforcement:</u>
The ComEd SSTE rating is 1603 MVA and is sufficient. No upgrade required.</td><td>$0</td><td>$0</td><td>N/A</td></tr>
<tr><td>PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1)</td><td><u>ComEd Reinforcement:</u>
The ComEd SSTE rating is 1837 MVA and is sufficient. No upgrade required.</td><td>$0</td><td>$0</td><td>N/A</td></tr>
<tr><td>E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1)</td><td><u>ComEd</u>
The applicable SSTE rating for this line segment is 1483 MVA.

<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n5917
<u>Description</u>: The upgrade will be to recondutor the line at a preliminary estimate of $10.3M with a preliminary construction timeline of 24-30 months. The post construction ratings will be 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD).
Time estimate is 24-30 months.
<u>Type</u>: FAC
<u>Cost:</u> $10,300,000
<u>Time Estimate</u>: 30 Months
<u>Ratings</u>: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)

<table><tr><td>Queue</td><td>MW</td><td>Cost %</td><td>$ cost ($ 10.3 M)</td></tr><tr><td>J974</td><td>16.30</td><td>5.36%</td><td>$ 0.552</td></tr><tr><td>AF1-200</td><td>287.78</td><td>94.64%</td><td>$ 9.748</td></tr></table>
<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n7960
<u>Description</u>: The upgrade will be to replace 1-345kV Circuit Breaker, station conductor at both terminals. A preliminary estimate for the upgrade is $5.2M. A preliminary construction timeline is 30 months. Upon completion of the upgrade the ratings will be 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD).
<u>Type</u>: FAC
<u>Cost:</u> $5,200,000
<u>Time Estimate</u>: 30 Months
<u>Ratings</u>: 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD)

<u>Notes</u>:
AF1-200 is the driver for this upgrade.</td><td>$10,300,000
+
$5,200,000
+
$1,000,000
+
$2,000,000</td><td>$9,748,000
+
$5,200,000
+
$1,000,000
+
$2,000,000</td><td>N5917
N7960</td></tr>
</table>

	<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>278.88</td><td>100 %</td><td>$5,200,000</td></tr></table> **MISO** MISO Rating 1206/1508 MVA (SN/SE). MISO Reinforcement: **Description**: MISO end upgrade is to upgrade St John substation conductor drop and switch. $1M cost estimate. New MISO end SE rating will be 1900 MVA. **Type**: FAC **Cost:** $1,000,000 **Time Estimate**: N/A Months **Ratings**: 1900 MVA SE **Notes**: AF1-200 is the driver for this upgrade. <table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>278.88</td><td>100 %</td><td>$1,200,000</td></tr></table> MISO Reinforcement: **Description**: Upgrade switch to 4000 A and upgrade substation conductor drop to bundled 1590 AL. $2M. New MISO-end ratings to be 1961/2390 MVA SN/SE. **Type**: FAC **Cost:** $2,000,000 **Time Estimate**: N/A Months **Ratings**: 1900 MVA SE **Notes**: AF1-200 is the driver for this upgrade. <table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>278.88</td><td>100 %</td><td>$2,000,000</td></tr></table>			
ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1)	**ComEd** The applicable SSTE rating for this line segment is 1568 MVA. ComEd Reinforcement: **Project ID**: n7023.1 **Description**: The upgrade will be to reconductor the line. A preliminary estimate is $14.6M with an estimated construction timeline of 30 months. Cost Estimate: $14.6 M **Type**: FAC **Cost:** $14,600,000 **Time Estimate**: 30 Months **Ratings**: 1461/1656/1837/1912 MVA (SN/SLTE/SSTE/SLD) **Notes**: AF1-200 is the driver for this upgrade.	$14,600,000 + $7,000,000	$14,600,000 + $7,000,000	N7023.1 N7023.2

	<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>152.58</td><td>100 %</td><td>$14,600,000</td></tr></table> **Project ID**: n7023.2 **Description**: Replace 2-345kV Circuit Breakers and station conductor. A preliminary estimate is $7M with an estimated construction timeline of 30 months. Cost Estimate: $7M **Type**: FAC **Cost:** $7,000,000 **Time Estimate**: 30 Months **Ratings**: 1461/1656/1837/1912 MVA (SN/SLTE/SSTE/SLD). **Notes**: AF1-200 is the driver for this upgrade. <table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>152.58</td><td>100 %</td><td>$7,000,000</td></tr></table>			
LASCO STA; B-PLANO ; B 345 kV line (from bus 270802 to bus 270846 ckt 1)	ComEd Reinforcement: The SSTE rating is 1702 MVA and is sufficient. No upgrade required.	$0	$0	N/A
LASCO STA; R-PLANO ; R 345 kV line (from bus 270803 to bus 270847 ckt 1)	ComEd Reinforcement: The SSTE rating is 1837 MVA and is sufficient. No upgrade required.	$0	$0	N/A
PLANO ; B-PLANO ;3M 345 kV line (from bus 270846 to bus 275207 ckt 1) & PLANO ; R-PLANO ;4M 345 kV line (from bus 270847 to bus 275208 ckt 1) & PLANO ; 765/345 kV transformer (from bus 275207 to bus 270630 ckt 1)	ComEd Reinforcement: The SSTE rating is 1469 MVA and is sufficient. No upgrade required.	$0	$0	N/A
AE2-153 TAP-DAVIS CRK; R 345 kV line (from bus 941560 to bus 270711 ckt 1)	ComEd Reinforcement: The SSTE rating is 1837 MVA and is sufficient. No upgrade required.	$0	$0	N/A
	Total Cost	**$41,036,000**	**$40,484,000**	

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
17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1)	**ComEd** ComEd SSTE rating is 1134 MVA. ComEd Reinforcement: **Project ID**: n5833 **Description**: The upgrade will be to mitigate the sag on the line. A preliminary estimate for the upgrade is $ 3.1M with a construction estimated timeline of 30 months. The estimate provided does not include potential tower upgrades. The cost for this potential work will not be identified until the Facilities Study phase. Upon completion of this work the new line will be a minimum of 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD). **Type**: FAC **Cost:** $3,100,000 **Time Estimate**: 30 Months **Ratings**: 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD) **Notes**: 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study. 5. This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase. MISO Reinforcement: MISO-end ratings are 1313/1591 MVA SN/SE and is sufficient.	$3,100,000	$0	N5833
GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1)	See Light Load	$0	$0	N/A

ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1)	**ComEd** ComEd SSTE rating is 1134 MVA. ComEd Reinforcement: **Project ID**: n5834 **Description**: The upgrade is to mitigate the sag on the line. A preliminary estimate for this upgrade is $3.8 M with a preliminary construction timeline of 30 months. The estimate provided does not include potential tower upgrades. The cost for this potential work will not be identified until the Facilities Study phase. Upon completion of the upgrade the new ratings will be 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD). **Type**: FAC **Cost:** $3,800,000 **Time Estimate**: 30 Months **Ratings**: 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD) **Notes**: 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study. 5. This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase. **MISO** MISO-end ratings are 1313/1591 MVA SN/SE and is sufficient.	$0	$0	N5834
WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) & WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) & WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1)	See Light Load	$0	$0	N/A

<table>
<tr>
<td>CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1)</td>
<td>
<u>ComEd</u>
ComEd SSTE rating is 1483 MVA.

<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n5253
<u>Description</u>: The upgrade will be to reconductor the line. A preliminary estimate for this upgrade is $14.9M with a preliminary construction timeline of 30-36 months. The estimate provided does not consider potential tower upgrades. This cost component will be determined during the Facilities Study phase. Upon completion of this upgrade the new will be a minimum of 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD).
<u>Type</u>: FAC
<u>Cost:</u> $14,900,000
<u>Time Estimate</u>: 30-36 Months
<u>Ratings</u>: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)

The cost allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost
($14.9 M)</th></tr>
<tr><td>AE1-193</td><td>99.5</td><td>8.50%</td><td>$1.2672</td></tr>
<tr><td>AE1-194</td><td>249.95</td><td>21.36%</td><td>$3.1834</td></tr>
<tr><td>AE1-195</td><td>249.95</td><td>21.36%</td><td>$3.1834</td></tr>
<tr><td>AE1-198</td><td>178.46</td><td>15.25%</td><td>$2.2729</td></tr>
<tr><td>AE1-252</td><td>17.69</td><td>1.51%</td><td>$0.2253</td></tr>
<tr><td>J974</td><td>16.24</td><td>1.39%</td><td>$0.2068</td></tr>
<tr><td>AE2-152</td><td>20.40</td><td>1.74%</td><td>$0.2598</td></tr>
<tr><td>AE2-153</td><td>27.51</td><td>2.35%</td><td>$0.3504</td></tr>
<tr><td>AE2-341</td><td>19.64</td><td>1.68%</td><td>$0.2501</td></tr>
<tr><td>AF1-156</td><td>20.48</td><td>1.75%</td><td>$0.2608</td></tr>
<tr><td>AF1-200</td><td>270.09</td><td>23.09%</td><td>$3.4399</td></tr>
</table>
<u>Notes</u>:
This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase.

<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n6629
<u>Description</u>: Replace a 345kV circuit breaker and associated equipment at Crete. A preliminary estimate for this upgrade is $6.0 M with a preliminary construction timeline of 30 months. Upon completion of this upgrade the new ratings will be 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD).
</td>
<td>$14,900,000
+
$6,000,000</td>
<td>$3,439,900
+
$1,980,000</td>
<td>N5253
N6629</td>
</tr>
</table>

Type: FAC
Cost: $6,000,000
Time Estimate: 30 Months
Ratings: 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD)

The cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	$ cost ($6 M)
AE1-195	248.03	30.30%	$1.818
AE1-198	178.46	21.80%	$1.308
AE1-252	17.69	2.16%	$0.130
J974	16.24	1.98%	$0.119
AE2-152	20.40	2.49%	$0.150
AE2-153	27.51	3.36%	$0.202
AE2-341	19.64	2.40%	$0.144
AF1-156	20.48	2.50%	$0.150
AF1-200	270.09	33.00%	$1.980

Notes:
This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase.

MISO
MISO end ratings are 1206/1508 MVA (SN/SE)

MISO Reinforcement:
Description: MISO end upgrade is to upgrade St John substation conductor drop and switch. $1M cost estimate. New MISO end SE rating will be 1900 MVA.
Type: FAC
Cost: $1,000,000
Time Estimate: N/A Months
Ratings: 1900 MVA SE

Notes:
1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade.
2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation.
3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200

	may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study. MISO Reinforcement: **Description**: Upgrade switch to 4000 A and upgrade substation conductor drop to bundled 1590 AL. $2M. New MISO-end ratings to be 1961/2390 MVA SN/SE. **Type**: FAC **Cost:** $2,000,000 **Time Estimate**: N/A Months **Ratings**: 1961/2390 MVA SN/SE **Notes**: 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study.			
UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1)	See Light Load	$0	$0	N/A
	Total Cost	**$24,000,000**	**$5,419,000**	

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)

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr><td>05SORENS-05MARYSV 765 kV line (from bus 246999 to bus 242928 ckt 1)</td><td>AEP Reinforcement:
Project ID: n3985
Description: Replace 3 Marysville 765 kV wave traps. Estimated Cost: $900,000.
Estimated schedule for this project is 12-18 months
Type: FAC
Cost: $900,000
Time Estimate: 12-18 Months
Ratings:
AEP New Ratings: 5075/5075 MVA SN/SE.
Notes: AF1-200 is the driver for this upgrade.

<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>336.9</td><td>100 %</td><td>$900,000</td></tr></table></td><td>$900,000</td><td>$900,000</td><td>N3985</td></tr>
<tr><td>WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1)</td><td>ComEd
The ComEd SSTE rating is 5331 MVA and is sufficient.

ComEd Reinforcement:
Project ID: n6860
Description: The upgrade will be require a ComEd Relay group review of the 765kV Bus Tie 3-4 Circuit Breaker Current Transformer settings. A possible upgrade of the relay scheme may be required
Type: FAC
Cost: $1,000,000
Time Estimate:18 Months
Ratings: 4142/4460/5331/6368 MVA (SN/SLTE/SSTE/SLD)
Notes: AF1-200 is the driver for this upgrade

<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>AF1-200</td><td>579.2</td><td>100 %</td><td>$1,000,000</td></tr></table>
AEP Reinforcement:
Project ID: n6600</td><td>$1,000,000
+
$3,000,000</td><td>$1,000,000
+
$3,000,000</td><td>N6860
N6600</td></tr>
</table>

	Description: Replace Dumont Circuit Breaker B1 [Breaker (3000A) Non-oil - Dumont]. $3M. 18 months. New SE rating to be 5001 MVA. PJM Network Upgrade N6600 **Type**: FAC **Cost:** $3,000,000 **Time Estimate**:18 Months **Ratings**: 5001 MVA SE **Notes**: AF1-200 is the driver for this upgrade Queue | MW | Cost % | Cost $ AF1-200 | 579.2 | 100 % | $3,000,000			
05ALLEN-05RPMONE 345 kV line (from bus 243211 to bus 242933 ckt 1)	AEP Reinforcement: **Project ID**: n6740 & n6740.1 **Description**: A sag study will be required on ACSR/PE~ 1275 ~ 54/19, conductor section 3, 12.25 miles of line. Cost of sag study is $49,000. New SE rating of conductor section 3 after sag study: 1301 MVA SE. New expected SE rating of line to be 971 MVA. If the sag study concludes a complete Rebuild/Reconductor is required, the estimated cost is $24.5M. PJM Network Upgrade N6740. A sag study will be required on ACSR/PE~ 1414 ~ 62/19, conductor section 2, 6.07 miles of line. The cost of the sag study is expected to be $24,280. New Ratings of conductor section 2 after sag study: S/N: 971 MVA S/E: 1419 MVA. New expected SE rating of line to be 1301 MVA. Rebuild/Reconductor, cost: $12.14M. PJM Network Upgrade N6740.1 Both Sag studies would be required. **Type**: FAC **Cost:** $73,280 **Time Estimate**: N/A **Ratings**: AEP SE: 971 MVA **Notes**: 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study.	$73,280	$0	N6740 N6740.1

LASCO STA; B-MAZON ; B 138 kV line (from bus 271908 to bus 271986 ckt 1)	ComEd Reinforcement: **Project ID**: n5786 **Description**: ComEd 138kV L0108 SSTE rating is 223 MVA. The upgrade will be to re-conductor the line. A preliminary estimate for the upgrade is $9.1M with an estimated construction timeline of 30 months. Upon completion of the upgrade the ratings will be 351/449/459/498 MVA (SN/SLTE/SSTE/SLD). **Type**: FAC **Cost:** $9,10,000 **Time Estimate**:30 Months **Ratings**: 351/449/459/498 MVA (SN/SLTE/SSTE/SLD) **Notes**: AF1-200 is the driver Queue: AF1-200 | MW: 39.3 | Cost %: 100 % | Cost $: $9,100,000	$9,100,000	$9,100,000	N5786
	Total	$14,073,280	$14,000,000	

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
05JEFRSO-06CLIFTY 345 kV line (from bus 242865 to bus 248000 ckt Z1)	AEP Reinforcement: **Project ID**: n4106.1, n4106.2, n4106.3, n4106.4 **Description**: 1. (N4106.1) Replace 4 Clifty switches. $2M. 2. (N4106.2) Replace 9 Clifty risers (Sub conductor 2-1700 KCM AAC 61 String). $175K. 3. (N4106.3) A sag check will be required for the ACSR ~ 2156 ~ 84/19 ~ BLUEBIRD Conductor Section 1 to determine if the line section can be operated above its emergency rating. Z1-070 LTF Facilities Study sag study results: Jefferson – Clifty Creek 345 kV line work will include one location of grading to remediate clearance location of concern in span 1 to 2. Cost is $244 K. 4. (N4106.4) Reconductor the 0.75 mile line. $1.5M. New SE rating to be 2826 MVA. **Type**: FAC	$2,000,000 + $175,000 + $244,000 + $1,500,000	$0	N4106.1 N4106.2 N4106.3 N4106.4

<table>
<tr><td></td><td><u>Cost:</u> $3,919,000
<u>Time Estimate</u>:30 Months
<u>Ratings</u>: 2826 MVA SE
<u>Notes</u>:
1. Since the cost of the upgrade is less than $5M and stays in AE2 Queue. Per PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade.
2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation.
3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system.</td><td></td><td></td><td></td></tr>
<tr><td>AD1-100 TAP-WILTON ; B 345 kV line (from bus 934720 to bus 270926 ckt 1)</td><td><u>ComEd:</u>
The ComEd SSTE rating is 1846 MVA

<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n6563
<u>Description</u>: The upgrade will be to re-conductor the line, upgrade station conductor at both terminals, upgrade 2-345kV circuit breakers at Wilton Center. A preliminary estimate for the upgrades is $ 43.2 M with an estimated construction timeline of 36 months. Upon completion of the upgrades the rating swill be 1912/1912/1912/2390/2749 MVA (SN/SLTE/SSTE/SLD/ALDR). PJM Network Upgrade N6563.
<u>Type</u>: FAC
<u>Cost:</u> $43,200,000
<u>Time Estimate</u>: 36 Months
<u>Ratings</u>: 1912/1912/1912/2390/2749 MVA SN/SLTE/SSTE/SLD/ALDR

The potential cost allocation is as follows:

<table><tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr><tr><td>Unknown Driver</td><td>76.7</td><td>35.2 %</td><td>$15,220,211</td></tr><tr><td>AF1-200</td><td>141</td><td>64.8 %</td><td>$27,979,789</td></tr></table></td><td>$43,200,000</td><td>$27,979,789</td><td>N6563</td></tr>
<tr><td>GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1)</td><td><u>ComEd</u>
ComEd SSTE rating is 1134 MVA.

<u>ComEd Reinforcement:</u>
<u>Project ID</u>: n6288
<u>Description</u>: CE SSTE rating is 1134 MVA. A preliminary estimate for sag mitigation is $13.9M with an estimated construction timeline of 30 months. Upon completion of the sag mitigation the new ratings will become 1091/1399/1483/1674 MVA SN/SLTE/SSTE/SLD.
<u>Type</u>: FAC
<u>Cost:</u> $13,900,000
<u>Time Estimate</u>: 30 Months
<u>Ratings</u>: 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD)

The cost allocation is as follows:</td><td>$13,900,000
+
$162,560</td><td>$11,480,000
+
$0</td><td>N6288
N5913</td></tr>
</table>

	<table><tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($13.9 M)</th></tr><tr><td>J1058</td><td>29.02</td><td>17.44%</td><td>2.42</td></tr><tr><td>AF1-200</td><td>137.35</td><td>82.56%</td><td>11.48</td></tr></table> **Notes:** This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase. **AEP** AEP SE ratings is 971 MVA. AEP Reinforcement: **Project ID**: n5913 **Description**: Upgrade is a sag study will be required for the entire 40.64 miles of ACSR/PE ~ 1414 ~ 62/19 Conductor section 1 to determine if the line can be operated above its emergency rating 971 MVA. Estimated Cost: $162,560. If deemed necessary to rebuild the entire 40.64 miles of the section of the line, Estimated Cost: $81,280,000. New expected SE rating is 1318 MVA. **Type**: FAC **Cost:** $162,560 **Time Estimate**: 30 Months **Notes:** 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study.			
BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1)	**ComEd** The applicable SSTE rating for this line segment is 1837 MVA. ComEd Reinforcement: **Project ID**: n6262 **Description**: Re-conductor the 345kV line, upgrade station conductor at a line terminal and upgrade 2-345kV CB's at Station 20 Braidwood. A preliminary estimate for this work is $38.3 M with an estimated construction timeline of 24-30 months (subject to outage coordination with Braidwood	$38,300,000	$20,770,000	N6262

	Station 20 unit outage schedule). PJM Network Upgrade N6262. Upon completion of the upgrade the new ratings will be 1826/2070/2385/2390 MVA (SN/SSTE/SLTE/SLD). **Type**: FAC **Cost:** $38,300,000 **Time Estimate**: 30 Months **Ratings**: 1826/2070/2385/2390MVA (SN/SLTE/SSTE/SLD) The cost allocation is as follows: Queue | MW contribution | Percentage of Cost | $ cost ($ 38.3 M) AE1-172 | 125 | 45.78% | $17.53 AF1-200 | 148.05 | 54.22% | $20.77			
WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) & WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) & WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1)	**ComEd** ComEd SSTE rating is 1469 MVA. ComEd Reinforcement: **Project ID**: n5145 **Description**: Build out the Wilton 765kV bus thereby allowing for 765kV L11216 (currently on Bus 6) to be relocated to Bus 8. Along with this line relocation, installation of 2-765kV BT CB's (6-8 & 8-2). **Type**: CON **Cost:** $12,000,000 **Time Estimate**: 36-40 Months **Ratings**: N/A The cost allocation is as follows: **Queue** \| **MW contribution** \| **Percentage of Cost** \| **$ cost ($ 12 M)** AD1-100 | 116.8 | 9.95% | $1.194 AD2-047 | 26.4 | 2.25% | $0.270 AD2-066 | 17.7 | 1.51% | $0.181 AD2-102 | 29.7 | 2.53% | $0.303 AD2-134 | 16.2 | 1.38% | $0.166 AD2-159 | 16.6 | 1.41% | $0.170 AD2-194 | 19.6 | 1.67% | $0.201 AE1-113 | 44.5 | 3.79% | $0.455	$12,000,000	$3,375,000	N5145

	AE1-114	21.2	1.81%	$0.217			
	AE1-163	51.7	4.40%	$0.528			
	AE1-166	27.9	2.38%	$0.285			
	AE1-172	45.9	3.91%	$0.470			
	AE1-193	45.8	3.90%	$0.468			
	AE1-194	45.8	3.90%	$0.468			
	AE1-195	45.8	3.90%	$0.468			
	AE1-205	29.7	2.53%	$0.303			
	AE1-252	27.0	2.30%	$0.276			
	AE2-107	15.2	1.29%	$0.155			
	AE2-152	28.5	2.42%	$0.291			
	AE2-153	35.1	2.99%	$0.359			
	AE2-223	22.6	1.93%	$0.231			
	AE2-255	15.1	1.29%	$0.155			
	AE2-321	15.2	1.30%	$0.156			
	AE2-341	23.8	2.03%	$0.243			
	J974	17.9	1.52%	$0.183			
	AF1-030	15.8	1.35%	$0.161			
	AF1-156	26.2	2.24%	$0.268			
	AF1-200	330.2	28.12%	$3.375			
UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1)	**AEP** AEP SE rating is 971 MVA AEP Reinforcement: **Project ID**: n4057 **Description**: To increase SE rating: AEP: a sag check will be required for the ACSR/PE ~ 1414 ~ 62/19 ~ Conductor to determine if the line section can be operated above its emergency rating of 971 MVA. The results could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 40.61 mile section of line would need to be rebuilt. Estimated Cost: $162,560. If deemed necessary to rebuild the entire 40.61 miles of the				$162,500 + $175,000 + $5,000,000	$0 + $175,000 + $4,492,000	N4057 N6690 N6281

section of the line, Estimated Cost: $81,280,000. Schedule: (1) Sag Study: 6 to 12 months. (2) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement.
Type: FAC
Cost: $162,560
Time Estimate: N/A Months
Ratings: 971/1304 MVA SN/SE

Notes:
1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade.
2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation.
3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system.
4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study.

AEP Reinforcement:
Project ID: n6690
Description: Replace 5 Jumpers (Sub cond 2156 ACSR 84/19 STD at Olive station), estimated cost: $175,000. New expected SE rating to be 1370 MVA.
Type: FAC
Cost: $175,000
Time Estimate: N/A Months
Ratings: 1370 MVA SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	168.42	100 %	$175,000

ComEd
ComEd SSTE is 1134 MVA.

ComEd Reinforcement:
Project ID: n6281
Description: ComEd upgrade is to mitigate sag on line. Preliminary estimate is $5M with an estimated constructed timeline of 24 months. Upon completion of the work the line ratings will be 1334/1334/1391/1532 MVA (SN/SLTE/SSTE/SLD).
Type: FAC
Cost: $5,000,000
Time Estimate: 24 Months
Ratings: 1334/1334/1391/1532 MVA (SN/SLTE/SSTE/SLD)

The cost allocation is as follows:

	<table><tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($5M)</th></tr><tr><td>AE2-153</td><td>0.12</td><td>0.08%</td><td>0.004</td></tr><tr><td>AE2-341</td><td>15.42</td><td>10.09%</td><td>0.504</td></tr><tr><td>AF1-200</td><td>137.35</td><td>89.84%</td><td>4.492</td></tr></table> **Notes:** This facility was purchased and is now owned by NEXTERA. NEXTERA will not evaluate this violation until the Facility Study phase.			
17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1)	**AEP** AEP SE rating is 1409 MVA. AEP Reinforcement: **Project ID**: n4058 **Description**: 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 wavetrap. **Type**: FAC **Cost:** $1,613,000 **Time Estimate**: 6-12 Months **Ratings**: 1718 MVA SE **Notes:** 1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade. 2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation. 3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system. 4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study. . AEP Reinforcement: **Project ID**: n4790 **Description**: Upgrade Dumont 2500A wavetrap at a cost of $200K. New AEP-end ratings to be 1409/1790 MVA (SN/SE). **Type**: FAC **Cost:** $200,000 **Time Estimate**: N/A **Ratings**: 1409/1790 MVA SN/SE **Notes:**	$1,613,000 + $200,000 + $25,000 + $2,000,000 + $17,200,000 + $1,500,000 + $8,000,000 + $6,500,000	$0 + $0 + $25,000 + $2,000,000 + $17,200,000 + $1,500,000 + $8,000,000 + $6,500,000	N4058 N4790 N5769.1 N5769.2 N5769.4

1. Since the cost of the upgrade is less than $5M, based on PJM cost allocation criteria, AF1-200 currently does not receive cost allocation towards this upgrade.
2. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF1-200 could receive cost allocation.
3. Although Queue Project AF1-200 may not presently have cost responsibility for this upgrade, Queue Project AF1-200 may need this upgrade in-service to be deliverable to the PJM system.
4. If Queue Project AF1-200 comes into service prior to completion of the upgrade, Queue Project AF1-200 will need an interim study.

AEP Reinforcement:
Project ID: N5769.1
Description: An Engineering study will need to be conducted to determine if the Dumont CT Thermal Limit settings can be adjusted to mitigate the overload. Estimated Cost: $25,000. New relay package will be required if the settings cannot be adjusted, Estimated Cost: $600,000. New AEP ratings: 1409/1868 MVA SN/SE.

Type: FAC
Cost: $25,000
Time Estimate: N/A Months
Ratings: 1409/1868 MVA SN/SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	241.81	100 %	$25,000

AEP Reinforcement:
Project ID: n5769.2
Description: Replace two Dumont 3000A Non-Oil breakers. Estimated cost: $2.0 M. New AEP ratings: 1409/1888 MVA SN/SE.
Type: FAC
Cost: $2,000,000
Time Estimate: N/A Months
Ratings: 1409/1868 MVA SN/SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	241.81	100 %	$2,000,000

AEP Reinforcement:
Project ID: n5769.4
Description: The existing 2-954 45/7 (Rail) ACSR has SN/SE ratings of 1409/1888 MVA if no clearance issues are identified. This conductor is the maximum the present structure class was intended to carry. It may be possible to install larger or higher-tensioned conductor without rebuilding the entire line,

but detailed mechanical loading analysis will be required to determine if (or how many of) the existing structures could be re-used. Cost estimate is $17.2 M assuming a complete wreck and rebuild of the AEP owned portion of the line. Using 2-954 ACSS, the new conductor rating will be 2650 MVA for both SN and SE. New overall AEP end line ratings after upgrade: S/N: 1740 MVA S/E: 2034 MVA.
Type: FAC
Cost: $17,200,000
Time Estimate: 24-36 Months
Ratings: 1740/2034 MVA SN/SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	241.81	100 %	$17,200,000

MISO
MISO Rating 1409/1779 MVA (SN/SE).

MISO Reinforcement:
Project ID:
Description: Upgrade Stillwell substation terminal equipment (upgrade substation conductor to bundled 2-1590 AL and replace wavetrap) at a cost of $1.5M. New expected MISO end SE rating will be 1832 MVA.
Type: FAC
Cost: $1,500,000
Time Estimate: N/A Months
Ratings: 1832 MVA SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	241.81	100 %	$1,500,000

MISO Reinforcement:
Project ID:
Description: Additional MISO-end upgrade (now needed for AE1-070 Fall 2020): Rebuild NIPSCO portion of line (2.87 miles) to 2-954 ACSR transmission conductor at a cost of $6.5M and upgrade substation conductor to 954 ACSR at a cost of $1.5 M (total $8M). New expected MISO end ratings will be 1582/1898 MVA SN/SE.
Type: FAC
Cost: $8,000,000
Time Estimate: N/A Months
Ratings: 1582/1898 MVA SN/SE

Notes:
AF1-200 is the driver for this upgrade.

Queue	MW	Cost %	Cost $
AF1-200	241.81	100 %	$8,000,000

<table>
<tr>
<td></td>
<td>MISO Reinforcement:
<u>Project ID</u>:
<u>Description</u>: Additional MISO-end upgrade (now needed for AE1-163 Fall 2020): Upgrade transmission conductor to 2-1590 ACSR and upgrade conductor drop to 2-1590 ACSR. Cost $6.5M. New expected ratings 2174/2390 SN/SE.
<u>Type</u>: FAC
<u>Cost:</u> $6,500,000
<u>Time Estimate</u>: N/A Months
<u>Ratings</u>: 2174/2390 MVA SN/SE

<u>Notes:</u>
AF1-200 is the driver for this upgrade.

<table>
<tr><th>Queue</th><th>MW</th><th>Cost %</th><th>Cost $</th></tr>
<tr><td>AF1-200</td><td>241.81</td><td>100 %</td><td>$6,500,000</td></tr>
</table>
</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>$153,857,060</td>
<td>$103,496,789</td>
<td></td>
</tr>
</table>

Short Circuit System Reinforcement

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

None.

Appendices (Summer Peak Analysis)

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 BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 99.44% to 115.5% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 205.45 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'

TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345

END

Bus Number	*Bus Name*	*Full Contribution*
932931	*AC2-117*	*4.05*
939631	*AE1-193 C*	*4.29*
939641	*AE1-194 C*	*4.29*
939651	*AE1-195 C*	*4.29*
939681	*AE1-198 C*	*12.74*
941561	*AE2-153 C O1*	*13.57*
943121	*AE2-341 C*	*6.14*
943591	*AF1-030 C O1*	*4.08*
944911	*AF1-156 C*	*34.69*
945351	*AF1-200 FTIR*	*205.45*
LTF	*BLUEG*	*2.61*
274654	*BRAIDWOOD;1U*	*84.15*
274655	*BRAIDWOOD;2U*	*81.54*
LTF	*CALDERWOOD*	*0.67*
LTF	*CATAWBA*	*0.45*
LTF	*CBM-W1*	*11.13*
LTF	*CHEOAH*	*0.68*
LTF	*COFFEEN*	*0.67*
274752	*CRETE EC ;2U*	*0.91*
274753	*CRETE EC ;3U*	*0.91*
274754	*CRETE EC ;4U*	*0.91*
LTF	*GIBSON*	*1.02*
274871	*GR RIDGE ;2U*	*1.45*
274847	*GR RIDGE ;BU*	*1.14*
274660	*LASCO STA;1U*	*55.38*
274661	*LASCO STA;2U*	*55.6*
LTF	*MADISON*	*3.72*
LTF	*MEC*	*1.18*
LTF	*NEWTON*	*2.76*

LTF	*NY*	*0.66*
LTF	*PRAIRIE*	*5.15*
LTF	*TILTON*	*2.12*
LTF	*TRIMBLE*	*0.83*
274814	*UNIV PK N;0U*	*0.75*
274805	*UNIV PK N;1U*	*0.75*
274806	*UNIV PK N;2U*	*0.75*
274807	*UNIV PK N;3U*	*0.75*
274808	*UNIV PK N;4U*	*0.75*
274809	*UNIV PK N;5U*	*0.75*
274810	*UNIV PK N;6U*	*0.75*
274811	*UNIV PK N;7U*	*0.75*
274812	*UNIV PK N;8U*	*0.75*
274813	*UNIV PK N;9U*	*0.75*
274815	*UNIV PK N;XU*	*0.75*
274816	*UNIV PK N;YU*	*0.75*
LTF	*WEC*	*1.13*
276173	*Z2-081*	*0.33*
924041	*AB2-047 C O1*	*-3.97*
926821	*AC1-168 C O1*	*0.62*

Appendix 2

(AEP - AEP) The 05COOK-05OLIVE 345 kV line (from bus 243215 to bus 243229 ckt 1) loads from 93.48% to 103.03% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#7443_05DUMONT 765_A'. This project contributes approximately 142.7 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#7443_05DUMONT 765_A'

OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1

OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1 / 243206 05DUMONT 765 246999 05SORENS 765 1

END

Bus Number	*Bus Name*	*Full Contribution*
243440	*05CKG1*	*53.94*
243441	*05CKG2*	*60.88*
247528	*05COVRT1*	*8.09*
247529	*05COVRT2*	*8.09*
247530	*05COVRT3*	*8.09*
247531	*05COVRT4*	*4.86*
247532	*05COVRT5*	*4.86*
247533	*05COVRT6*	*4.86*
244412	*05WTRV SLR C*	*0.06*
247966	*05WTRV SLR E*	*0.31*
932931	*AC2-117*	*-4.24*
933281	*AC2-140 C*	*11.*
933282	*AC2-140 E*	*0.58*
936141	*AD2-020 C O1*	*7.27*
936142	*AD2-020 E O1*	*4.47*
936601	*AD2-075*	*29.7*
938261	*AE1-039*	*0.11*
939391	*AE1-170 C O1*	*7.16*
939392	*AE1-170 E O1*	*9.88*
939683	*AE1-198 BAT*	*7.23*
943021	*AE2-325 C*	*3.68*
943022	*AE2-325 E*	*2.45*
943803	*AF1-048 BAT*	*3.51*
943922	*AF1-060 BAT*	*0.68*
944161	*AF1-084 C*	*6.69*
944162	*AF1-084 E*	*3.82*

944961	*AF1-161 C*	*2.94*
944962	*AF1-161 E*	*2.94*
945111	*AF1-176 C O1*	*15.06*
945112	*AF1-176 E O1*	*13.96*
945352	*AF1-200 NFTW*	*142.7*
946163	*AF1-281 BAT*	*1.29*
LTF	*BLUEG*	*3.08*
LTF	*CALDERWOOD*	*0.67*
LTF	*CATAWBA*	*0.24*
LTF	*CHEOAH*	*0.66*
LTF	*COFFEEN*	*0.88*
LTF	*EDWARDS*	*2.19*
LTF	*FARMERCITY*	*0.27*
LTF	*G-007A*	*1.9*
950311	*G934 C*	*4.42*
950312	*G934 E*	*17.66*
LTF	*GIBSON*	*1.44*
955591	*J1043 C*	*3.13*
955592	*J1043 E*	*55.42*
955781	*J1062*	*12.81*
955861	*J1071*	*15.69*
956741	*J1172*	*6.22*
950791	*J201 C*	*0.5*
950792	*J201 E*	*2.01*
950871	*J246 C*	*0.2*
950872	*J246 E*	*0.8*
950942	*J325 E*	*0.46*
950351	*J466*	*3.55*
951531	*J533 C*	*5.71*
951532	*J533 E*	*22.84*
951571	*J538 C*	*3.26*
951572	*J538 E*	*13.02*
952161	*J571*	*0.9*
952201	*J589 C*	*4.33*
952202	*J589 E*	*23.42*
952312	*J646 E*	*0.18*
953271	*J701 C*	*0.92*
953272	*J701 E*	*4.98*
952611	*J717 C*	*4.14*
952612	*J717 E*	*22.4*
952761	*J728 C*	*3.85*
952762	*J728 E*	*20.86*
952401	*J752 C*	*1.87*
952402	*J752 E*	*10.12*
952881	*J758*	*26.51*

952971	*J793*	*144.89*
953071	*J794 C*	*0.27*
953072	*J794 E*	*1.43*
953291	*J796*	*31.17*
953321	*J799*	*18.26*
953361	*J806*	*18.81*
953941	*J857*	*16.14*
954111	*J875*	*15.68*
955071	*J984 C*	*4.59*
955072	*J984 E*	*24.84*
955181	*J996*	*7.62*
LTF	*LGE-TSR-0092018*	*< 0.01*
LTF	*NEWTON*	*4.16*
LTF	*PRAIRIE*	*10.*
LTF	*TILTON*	*2.86*
LTF	*TRIMBLE*	*0.97*
LTF	*VFT*	*5.13*
247604	*X1-042*	*0.08*
916221	*Z1-073 E*	*-3.*
276166	*Z1-106 BAT1*	*0.69*
276165	*Z1-106 BAT2*	*0.69*
276171	*Z1-107 BAT*	*1.43*
276172	*Z1-108 BAT*	*1.36*
918052	*AA1-018 E OP*	*-9.23*
247651	*AA2-116*	*31.62*
920273	*AA2-123 BAT*	*1.35*
925302	*AB2-191 E*	*-0.77*
925961	*AC1-072*	*0.75*
926581	*AC1-141*	*2.89*

Appendix 3

(MISO NIPS - CE) The 17MUNSTER-BURNHAM ;0R 345 kV line (from bus 255109 to bus 270677 ckt 1) loads from 69.79% to 109.94% (AC power flow) of its emergency rating (1441 MVA) for the tower line contingency outage of 'COMED_P7_345-L6607__B-S_+_345-L6608__R-S'. This project contributes approximately 211.66 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L6607__B-S_+_345-L6608__R-S'

TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1 / E FRA; B 345 CRETE;BP 345

TRIP BRANCH FROM BUS 270729 TO BUS 274804 CKT 1 / E FRA; R 345 UPNOR;RP 345

END

Bus Number	*Bus Name*	*Full Contribution*
939631	*AE1-193 C*	*10.39*
939632	*AE1-193 E*	*69.52*
939641	*AE1-194 C*	*10.39*
939642	*AE1-194 E*	*69.52*
939651	*AE1-195 C*	*10.39*
939652	*AE1-195 E*	*69.52*
939681	*AE1-198 C*	*30.84*
939682	*AE1-198 E*	*26.21*
941732	*AE2-173 BAT*	*4.38*
943803	*AF1-048 BAT*	*5.53*
943922	*AF1-060 BAT*	*1.05*
945352	*AF1-200 NFTW*	*211.66*
946163	*AF1-281 BAT*	*1.96*
LTF	*CBM-S2*	*3.39*
LTF	*COFFEEN*	*0.71*
LTF	*CPLE*	*0.54*
274751	*CRETE EC ;1U*	*2.2*
274752	*CRETE EC ;2U*	*2.2*
274753	*CRETE EC ;3U*	*2.2*
274754	*CRETE EC ;4U*	*2.2*
LTF	*EDWARDS*	*3.22*
LTF	*FARMERCITY*	*0.34*
LTF	*G-007A*	*3.8*
950311	*G934 C*	*2.02*
950312	*G934 E*	*8.09*

955591	*J1043 C*	*1.36*
955592	*J1043 E*	*24.18*
955741	*J1058*	*58.29*
955781	*J1062*	*9.01*
955821	*J1067*	*20.89*
955841	*J1069 C*	*2.08*
955842	*J1069 E*	*11.23*
955861	*J1071*	*6.88*
956741	*J1172*	*3.25*
950791	*J201 C*	*0.26*
950792	*J201 E*	*1.04*
950871	*J246 C*	*0.09*
950872	*J246 E*	*0.37*
950942	*J325 E*	*0.26*
954751	*J351*	*78.49*
950351	*J466*	*1.93*
951811	*J513 C*	*1.03*
951812	*J513 E*	*5.57*
951531	*J533 C*	*2.68*
951532	*J533 E*	*10.71*
951571	*J538 C*	*1.95*
951572	*J538 E*	*7.79*
952161	*J571*	*0.45*
952201	*J589 C*	*2.08*
952202	*J589 E*	*11.24*
951721	*J643*	*32.71*
952312	*J646 E*	*0.1*
953271	*J701 C*	*0.49*
953272	*J701 E*	*2.66*
952611	*J717 C*	*2.06*
952612	*J717 E*	*11.12*
952761	*J728 C*	*1.91*
952762	*J728 E*	*10.36*
952401	*J752 C*	*1.*
952402	*J752 E*	*5.43*
952881	*J758*	*13.63*
952971	*J793*	*83.5*
953071	*J794 C*	*0.13*
953072	*J794 E*	*0.7*
953291	*J796*	*15.67*
953321	*J799*	*11.66*
953361	*J806*	*9.97*
953161	*J837 C*	*2.08*
953162	*J837 E*	*11.24*
953171	*J838 C*	*1.04*

953172	*J838 E*	*5.62*
953871	*J847*	*17.04*
953941	*J857*	*8.44*
954111	*J875*	*9.48*
954421	*J913 C*	*10.64*
954941	*J968 C*	*2.08*
954942	*J968 E*	*11.23*
955071	*J984 C*	*2.1*
955072	*J984 E*	*11.38*
955141	*J992*	*12.94*
955181	*J996*	*4.95*
LTF	*LGEE*	*0.53*
LTF	*LGE-TSR-0092018*	*< 0.01*
LTF	*NEWTON*	*1.83*
LTF	*PRAIRIE*	*7.89*
LTF	*TILTON*	*0.82*
LTF	*VFT*	*10.24*
909052	*X2-022 E*	*-11.67*
916211	*Z1-072 E*	*-4.19*
916221	*Z1-073 E*	*-4.65*
276166	*Z1-106 BAT1*	*1.09*
276165	*Z1-106 BAT2*	*1.09*
276171	*Z1-107 BAT*	*2.38*
276172	*Z1-108 BAT*	*2.17*
918052	*AA1-018 E OP*	*-15.92*
920273	*AA2-123 BAT*	*2.12*
924041	*AB2-047 C O1*	*-2.85*
925302	*AB2-191 E*	*-1.19*
927201	*AC1-214 C O1*	*-1.78*

Appendix 4

(CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.88% to 106.0% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 278.88 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765

TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*2.51*
932891	*AC2-115 2*	*2.51*
932921	*AC2-116*	*0.88*
933911	*AD1-013 C*	*1.95*
933912	*AD1-013 E*	*3.12*
933931	*AD1-016 C*	*0.98*
933932	*AD1-016 E*	*1.6*
934101	*AD1-039 1*	*7.29*
934111	*AD1-039 2*	*7.81*
934431	*AD1-067 C*	*0.14*
934432	*AD1-067 E*	*0.58*
934701	*AD1-098 C O1*	*7.28*
934702	*AD1-098 E O1*	*5.31*
934721	*AD1-100 C*	*19.88*
934722	*AD1-100 E*	*92.77*
934871	*AD1-116 C*	*0.93*
934872	*AD1-116 E*	*1.52*
934971	*AD1-129 C*	*0.95*
934972	*AD1-129 E*	*0.64*
936511	*AD2-066 C O1*	*8.72*
936512	*AD2-066 E O1*	*5.82*
936791	*AD2-102 C*	*14.89*
936792	*AD2-102 E*	*9.93*
937001	*AD2-134 C*	*2.74*
937002	*AD2-134 E*	*10.94*
937311	*AD2-172 C*	*2.59*

937312	*AD2-172 E*	*3.58*
937401	*AD2-194 1*	*8.4*
937411	*AD2-194 2*	*8.39*
938511	*AE1-070 1*	*9.87*
938521	*AE1-070 2*	*9.02*
938851	*AE1-113 C*	*8.54*
938852	*AE1-113 E*	*30.27*
939321	*AE1-163 C O1*	*4.47*
939322	*AE1-163 E O1*	*27.45*
939351	*AE1-166 C O1*	*10.65*
939352	*AE1-166 E O1*	*9.83*
939683	*AE1-198 BAT*	*44.42*
940501	*AE2-035 C*	*2.59*
940502	*AE2-035 E*	*3.58*
940752	*AE2-062 E*	*0.14*
941131	*AE2-107 C*	*6.91*
941132	*AE2-107 E*	*4.61*
941551	*AE2-152 C O1*	*12.29*
941552	*AE2-152 E O1*	*8.19*
941561	*AE2-153 C O1*	*4.89*
941562	*AE2-153 E O1*	*22.9*
942421	*AE2-255 C O1*	*3.23*
942422	*AE2-255 E O1*	*9.7*
942651	*AE2-281 C O1*	*0.86*
942652	*AE2-281 E O1*	*5.26*
942991	*AE2-321 C*	*8.63*
942992	*AE2-321 E*	*4.25*
943121	*AE2-341 C*	*13.4*
943122	*AE2-341 E*	*6.58*
943591	*AF1-030 C O1*	*8.91*
943592	*AF1-030 E O1*	*4.41*
943801	*AF1-048 C*	*4.03*
943802	*AF1-048 E*	*2.69*
943921	*AF1-060*	*1.27*
944041	*AF1-072*	*2.28*
944911	*AF1-156 C*	*12.51*
944912	*AF1-156 E*	*8.34*
945351	*AF1-200 FTIR*	*278.88*
946501	*AF1-314 C*	*4.6*
946502	*AF1-314 E*	*21.54*
946661	*AF1-330 C*	*2.12*
946662	*AF1-330 E*	*0.46*
946671	*AF1-331*	*2.54*
LTF	*BLUEG*	*1.99*
274654	*BRAIDWOOD;1U*	*32.05*

274655	*BRAIDWOOD;2U*	*31.18*
LTF	*CALDERWOOD*	*0.03*
LTF	*CATAWBA*	*0.26*
LTF	*CBM-S1*	*4.64*
LTF	*CBM-W1*	*58.48*
LTF	*CBM-W2*	*19.13*
LTF	*CHEOAH*	*0.04*
LTF	*G-007*	*1.99*
LTF	*GIBSON*	*0.16*
290051	*GSG-6; E*	*11.06*
274675	*JOLIET 29;7U*	*13.43*
274676	*JOLIET 29;8U*	*13.44*
274704	*KENDALL ;1C*	*4.75*
274705	*KENDALL ;1S*	*3.18*
274706	*KENDALL ;2C*	*4.75*
274707	*KENDALL ;2S*	*3.18*
274660	*LASCO STA;1U*	*29.62*
274661	*LASCO STA;2U*	*29.74*
290108	*LEEDK;1U E*	*25.61*
LTF	*MADISON*	*20.28*
LTF	*MEC*	*13.5*
293061	*N-015 E*	*16.53*
LTF	*NY*	*1.09*
LTF	*O-066*	*12.9*
293644	*O22 E1*	*12.37*
293645	*O22 E2*	*24.02*
290021	*O50 E*	*20.7*
294392	*P-010 E*	*20.99*
294763	*P-046 E*	*9.86*
295111	*SUBLETTE E*	*2.88*
274861	*TOP CROP ;1U*	*0.57*
274862	*TOP CROP ;2U*	*1.1*
LTF	*TRIMBLE*	*0.68*
LTF	*TVA*	*1.28*
274830	*U3-021 1*	*6.43*
274831	*U3-021 2*	*6.43*
LTF	*WEC*	*3.97*
295109	*WESTBROOK E*	*5.92*
274687	*WILL CNTY;4U*	*13.52*
915011	*Y3-013 1*	*3.97*
915021	*Y3-013 2*	*3.97*
915031	*Y3-013 3*	*3.97*
916221	*Z1-073 E*	*5.71*
276168	*Z1-106 E1*	*1.33*
276167	*Z1-106 E2*	*1.33*

276169	*Z1-107 E*	*2.55*
276170	*Z1-108 E*	*2.63*
918052	*AA1-018 E OP*	*16.03*
920272	*AA2-123 E*	*2.58*
930481	*AB1-089*	*69.29*
930501	*AB1-091 O1*	*67.34*
930741	*AB1-122 1O1*	*74.36*
930751	*AB1-122 2O1*	*79.67*
924471	*AB2-096*	*44.68*
925302	*AB2-191 E*	*1.46*
926311	*AC1-109 1*	*2.01*
926321	*AC1-109 2*	*2.01*
926331	*AC1-110 1*	*2.01*
926341	*AC1-110 2*	*2.01*
926351	*AC1-111 1*	*0.8*
926361	*AC1-111 2*	*0.8*
926371	*AC1-111 3*	*0.8*
926381	*AC1-111 4*	*0.8*
926391	*AC1-111 5*	*0.8*
926401	*AC1-111 6*	*0.8*
927511	*AC1-113 1*	*1.25*
927521	*AC1-113 2*	*1.25*
926431	*AC1-114*	*2.51*
927451	*AC1-142A 1*	*4.53*
927461	*AC1-142A 2*	*4.53*
927091	*AC1-204 1*	*14.31*

Appendix 5

(CE - CE) The ELECT JCT; B-LOMBARD ; B 345 kV line (from bus 270730 to bus 270812 ckt 1) loads from 95.89% to 106.31% (AC power flow) of its load dump rating (1479 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_012-45-BT5-6__'. This project contributes approximately 152.58 MW to the thermal violation.

CONTINGENCY 'COMED_P4_012-45-BT5-6__'

TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1 / DRESD; B 345 ELWOO; B 345

TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1 / ELWOO; B 345 ELWOO; R 345

TRIP BRANCH FROM BUS 274702 TO BUS 270716 CKT 1 / KENDA; B 345 DRESD; B 345

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.14*
932891	*AC2-115 2*	*1.14*
932921	*AC2-116*	*0.4*
933911	*AD1-013 C*	*1.56*
933912	*AD1-013 E*	*2.49*
934111	*AD1-039 2*	*7.63*
934431	*AD1-067 C*	*0.11*
934432	*AD1-067 E*	*0.46*
934701	*AD1-098 C O1*	*5.74*
934702	*AD1-098 E O1*	*4.19*
934971	*AD1-129 C*	*0.4*
934972	*AD1-129 E*	*0.26*
936511	*AD2-066 C O1*	*4.56*
936512	*AD2-066 E O1*	*3.04*
936791	*AD2-102 C*	*6.02*
936792	*AD2-102 E*	*4.01*
937001	*AD2-134 C*	*2.18*
937002	*AD2-134 E*	*8.69*
937311	*AD2-172 C*	*1.32*
937312	*AD2-172 E*	*1.82*
937531	*AD2-214 C*	*3.05*
937532	*AD2-214 E*	*2.04*

938851	*AE1-113 C*	*4.84*
938852	*AE1-113 E*	*17.17*
938861	*AE1-114 C O1*	*2.43*
938862	*AE1-114 E O1*	*8.29*
939051	*AE1-134 1*	*1.1*
939061	*AE1-134 2*	*1.1*
940501	*AE2-035 C*	*1.32*
940502	*AE2-035 E*	*1.82*
941131	*AE2-107 C*	*5.69*
941132	*AE2-107 E*	*3.79*
942421	*AE2-255 C O1*	*1.83*
942422	*AE2-255 E O1*	*5.5*
943121	*AE2-341 C*	*10.59*
943122	*AE2-341 E*	*5.2*
943411	*AF1-012 C*	*11.91*
943412	*AF1-012 E*	*7.94*
943591	*AF1-030 C O1*	*7.04*
943592	*AF1-030 E O1*	*3.48*
943921	*AF1-060*	*0.65*
944041	*AF1-072*	*1.05*
945351	*AF1-200 FTIR*	*152.58*
946151	*AF1-280 C O1*	*11.36*
946152	*AF1-280 E O1*	*5.22*
946161	*AF1-281 C*	*0.25*
946162	*AF1-281 E*	*1.41*
946321	*AF1-296 C O1*	*2.56*
946322	*AF1-296 E O1*	*12.*
946501	*AF1-314 C*	*2.35*
946502	*AF1-314 E*	*10.99*
946671	*AF1-331*	*2.03*
274738	*AURORA EC;3P*	*4.86*
274740	*AURORA EC;4P*	*4.86*
LTF	*BLUEG*	*0.21*
LTF	*CBM-S1*	*3.01*
LTF	*CBM-S2*	*0.35*
LTF	*CBM-W1*	*8.96*
LTF	*CBM-W2*	*6.14*
274658	*DRESDEN ;2U*	*22.76*
274859	*EASYR;U1 E*	*7.67*
274860	*EASYR;U2 E*	*7.67*
272364	*ESS H440N ;R*	*0.41*
LTF	*G-007*	*0.24*
LTF	*GIBSON*	*< 0.01*
274855	*GSG-6 ;RU*	*0.4*
290051	*GSG-6; E*	*8.78*

955971	*J1084*	*8.88*
292543	*L-013 2*	*0.55*
274872	*LEE DEKAL;1U*	*0.93*
290108	*LEEDK;1U E*	*21.08*
LTF	*MADISON*	*4.6*
LTF	*MEC*	*5.22*
274850	*MENDOTA H;RU*	*0.1*
LTF	*NY*	*0.13*
293516	*O-009 E1*	*6.24*
293517	*O-009 E2*	*3.17*
293518	*O-009 E3*	*3.49*
293715	*O-029 E*	*6.67*
293716	*O-029 E*	*3.66*
293717	*O-029 E*	*3.36*
LTF	*O-066*	*1.55*
290021	*O50 E*	*11.74*
294763	*P-046 E*	*5.03*
295110	*SUBLETTE C*	*0.06*
295111	*SUBLETTE E*	*2.29*
LTF	*TRIMBLE*	*0.08*
LTF	*TVA*	*0.64*
295108	*WESTBROOK C*	*0.14*
295109	*WESTBROOK E*	*4.7*
916221	*Z1-073 E*	*4.53*
276168	*Z1-106 E1*	*1.05*
276167	*Z1-106 E2*	*1.04*
919581	*AA2-030*	*14.12*
930481	*AB1-089*	*37.71*
930751	*AB1-122 2O1*	*77.9*
925301	*AB2-191*	*0.15*
925302	*AB2-191 E*	*1.16*
926331	*AC1-110 1*	*2.62*
926341	*AC1-110 2*	*2.62*
926351	*AC1-111 1*	*0.42*
926361	*AC1-111 2*	*0.42*
926371	*AC1-111 3*	*0.42*
926381	*AC1-111 4*	*0.42*
926391	*AC1-111 5*	*0.42*
926401	*AC1-111 6*	*0.42*
927511	*AC1-113 1*	*0.57*
927521	*AC1-113 2*	*0.57*
926431	*AC1-114*	*1.14*

Appendix 6

(CE - CE) The LASCO STA; B-PLANO ; B 345 kV line (from bus 270802 to bus 270846 ckt 1) loads from 85.02% to 111.29% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT2-5__'. This project contributes approximately 406.01 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT2-5__'

TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO;4M 345 PLANO; 765

TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO;4M 345 PLANO; R 345

TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO;4M 345 PLANO;4C 33

TRIP BRANCH FROM BUS 270803 TO BUS 270847 CKT 1 / LASCO; R 345 PLANO; R 345

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*1.23*
933412	*AC2-154 E*	*2.01*
934721	*AD1-100 C*	*11.6*
934722	*AD1-100 E*	*54.13*
936371	*AD2-047 C O1*	*2.2*
936372	*AD2-047 E O1*	*10.75*
936461	*AD2-060*	*1.3*
939351	*AE1-166 C O1*	*7.22*
939352	*AE1-166 E O1*	*6.67*
941551	*AE2-152 C O1*	*8.33*
941552	*AE2-152 E O1*	*5.56*
941561	*AE2-153 C O1*	*3.81*
941562	*AE2-153 E O1*	*17.82*
943803	*AF1-048 BAT*	*3.07*
943922	*AF1-060 BAT*	*0.55*
944911	*AF1-156 C*	*9.73*
944912	*AF1-156 E*	*6.49*
945352	*AF1-200 NFTW*	*406.01*
LTF	*BLUEG*	*0.32*

274654	*BRAIDWOOD;1U*	*27.1*
274655	*BRAIDWOOD;2U*	*26.5*
LTF	*CALDERWOOD*	*0.19*
LTF	*CATAWBA*	*0.12*
LTF	*CHEOAH*	*0.19*
LTF	*COFFEEN*	*0.02*
LTF	*EDWARDS*	*0.19*
LTF	*FARMERCITY*	*0.12*
LTF	*G-007*	*0.24*
LTF	*GIBSON*	*0.07*
274871	*GR RIDGE ;2U*	*1.47*
274847	*GR RIDGE ;BU*	*1.16*
275149	*KELLYCK ;1E*	*9.07*
274660	*LASCO STA;1U*	*57.06*
274661	*LASCO STA;2U*	*57.03*
293061	*N-015 E*	*25.3*
LTF	*NEWTON*	*0.14*
LTF	*NY*	*0.13*
LTF	*O-066*	*1.57*
294392	*P-010 E*	*32.13*
274881	*PILOT HIL;1E*	*9.07*
LTF	*PRAIRIE*	*1.45*
LTF	*TRIMBLE*	*0.1*
916221	*Z1-073 E*	*-3.07*
276166	*Z1-106 BAT1*	*0.73*
276165	*Z1-106 BAT2*	*0.73*
276172	*Z1-108 BAT*	*1.2*
276173	*Z2-081*	*0.32*
920273	*AA2-123 BAT*	*1.18*
930501	*AB1-091 O1*	*41.1*
925302	*AB2-191 E*	*-0.79*
926821	*AC1-168 C O1*	*0.53*
926822	*AC1-168 E O1*	*3.52*

Appendix 7

(CE - CE) The LASCO STA; R-PLANO ; R 345 kV line (from bus 270803 to bus 270847 ckt 1) loads from 85.07% to 111.13% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT9-12_'. This project contributes approximately 402.63 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT9-12_'

TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1 / LASCO STA; B 345 PLANO ; B 345

TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345

TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*1.24*
933412	*AC2-154 E*	*2.02*
934721	*AD1-100 C*	*11.65*
934722	*AD1-100 E*	*54.35*
936371	*AD2-047 C O1*	*2.22*
936372	*AD2-047 E O1*	*10.82*
936461	*AD2-060*	*1.3*
939351	*AE1-166 C O1*	*7.25*
939352	*AE1-166 E O1*	*6.7*
941551	*AE2-152 C O1*	*8.37*
941552	*AE2-152 E O1*	*5.58*
941561	*AE2-153 C O1*	*3.82*
941562	*AE2-153 E O1*	*17.9*
943803	*AF1-048 BAT*	*3.03*
943922	*AF1-060 BAT*	*0.54*
944911	*AF1-156 C*	*9.77*

944912	*AF1-156 E*	*6.52*
945352	*AF1-200 NFTW*	*402.63*
LTF	*BLUEG*	*0.33*
274654	*BRAIDWOOD;1U*	*27.21*
274655	*BRAIDWOOD;2U*	*26.61*
LTF	*CALDERWOOD*	*0.19*
LTF	*CATAWBA*	*0.12*
LTF	*CHEOAH*	*0.19*
LTF	*COFFEEN*	*0.01*
LTF	*EDWARDS*	*0.18*
LTF	*FARMERCITY*	*0.11*
LTF	*G-007*	*0.25*
LTF	*GIBSON*	*0.07*
274871	*GR RIDGE ;2U*	*1.47*
274847	*GR RIDGE ;BU*	*1.16*
275149	*KELLYCK ;1E*	*9.12*
274660	*LASCO STA;1U*	*56.97*
274661	*LASCO STA;2U*	*57.49*
293061	*N-015 E*	*25.27*
LTF	*NEWTON*	*0.13*
LTF	*NY*	*0.13*
LTF	*O-066*	*1.62*
294392	*P-010 E*	*32.1*
274881	*PILOT HIL;1E*	*9.12*
LTF	*PRAIRIE*	*1.42*
LTF	*TRIMBLE*	*0.11*
916221	*Z1-073 E*	*-3.03*
276166	*Z1-106 BAT1*	*0.72*
276165	*Z1-106 BAT2*	*0.72*
276172	*Z1-108 BAT*	*1.19*
276173	*Z2-081*	*0.32*
920273	*AA2-123 BAT*	*1.16*
930501	*AB1-091 O1*	*41.31*
925302	*AB2-191 E*	*-0.78*
926821	*AC1-168 C O1*	*0.53*
926822	*AC1-168 E O1*	*3.54*

Appendix 8

(CE - CE) The PLANO ; B-ELECT JCT; B 345 kV line (from bus 270846 to bus 270730 ckt 1) loads from 67.28% to 114.72% (AC power flow) of its load dump rating (1341 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 652.26 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'

TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345

TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345

TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33

END

Bus Number	*Bus Name*	*Full Contribution*
943803	*AF1-048 BAT*	*6.37*
943922	*AF1-060 BAT*	*1.18*
945351	*AF1-200 FTIR*	*652.26*
946163	*AF1-281 BAT*	*2.35*
LTF	*CALDERWOOD*	*0.14*
LTF	*CBM-S2*	*0.21*
LTF	*CHEOAH*	*0.14*
LTF	*COFFEEN*	*0.29*
LTF	*CPLE*	*0.12*
LTF	*EDWARDS*	*1.53*
LTF	*FARMERCITY*	*0.3*
LTF	*G-007A*	*1.52*
274871	*GR RIDGE ;2U*	*0.76*
274847	*GR RIDGE ;BU*	*0.6*
274660	*LASCO STA;1U*	*31.87*
274661	*LASCO STA;2U*	*32.01*

LTF	*LGEE*	*0.19*
293061	*N-015 E*	*13.04*
LTF	*NEWTON*	*0.86*
294392	*P-010 E*	*16.57*
LTF	*PRAIRIE*	*5.03*
LTF	*TILTON*	*0.14*
LTF	*VFT*	*4.08*
916221	*Z1-073 E*	*-4.06*
276166	*Z1-106 BAT1*	*1.38*
276165	*Z1-106 BAT2*	*1.38*
276172	*Z1-108 BAT*	*2.5*
920273	*AA2-123 BAT*	*2.45*
925302	*AB2-191 E*	*-1.04*

Appendix 9

(CE - CE) The PLANO ; B-PLANO ;3M 345 kV line (from bus 270846 to bus 275207 ckt 1) loads from 64.96% to 100.79% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 581.93 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'

TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345

TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345

TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.79*
932891	*AC2-115 2*	*1.79*
932921	*AC2-116*	*0.63*
933411	*AC2-154 C*	*1.19*
933412	*AC2-154 E*	*1.93*
933911	*AD1-013 C*	*1.72*
933912	*AD1-013 E*	*2.76*
933931	*AD1-016 C*	*0.69*
933932	*AD1-016 E*	*1.12*
934051	*AD1-031 C O1*	*1.81*
934052	*AD1-031 E O1*	*2.95*
934111	*AD1-039 2*	*3.79*
934431	*AD1-067 C*	*0.12*
934432	*AD1-067 E*	*0.51*
934701	*AD1-098 C O1*	*6.31*
934702	*AD1-098 E O1*	*4.61*

934721	*AD1-100 C*	*3.18*
934722	*AD1-100 E*	*14.84*
934971	*AD1-129 C*	*0.67*
934972	*AD1-129 E*	*0.45*
936371	*AD2-047 C O1*	*2.12*
936372	*AD2-047 E O1*	*10.36*
936461	*AD2-060*	*1.25*
936511	*AD2-066 C O1*	*4.83*
936512	*AD2-066 E O1*	*3.22*
936791	*AD2-102 C*	*10.42*
936792	*AD2-102 E*	*6.95*
937001	*AD2-134 C*	*2.4*
937002	*AD2-134 E*	*9.57*
937311	*AD2-172 C*	*1.86*
937312	*AD2-172 E*	*2.56*
937531	*AD2-214 C*	*3.24*
937532	*AD2-214 E*	*2.16*
938851	*AE1-113 C*	*3.85*
938852	*AE1-113 E*	*13.66*
938861	*AE1-114 C O1*	*3.*
938862	*AE1-114 E O1*	*10.23*
939051	*AE1-134 1*	*1.05*
939061	*AE1-134 2*	*1.05*
939351	*AE1-166 C O1*	*5.11*
939352	*AE1-166 E O1*	*4.72*
940501	*AE2-035 C*	*1.86*
940502	*AE2-035 E*	*2.56*
940752	*AE2-062 E*	*0.06*
941131	*AE2-107 C*	*6.29*
941132	*AE2-107 E*	*4.2*
941551	*AE2-152 C O1*	*5.89*
941552	*AE2-152 E O1*	*3.93*
941561	*AE2-153 C O1*	*2.76*
941562	*AE2-153 E O1*	*12.92*
942421	*AE2-255 C O1*	*1.46*
942422	*AE2-255 E O1*	*4.38*
942991	*AE2-321 C*	*6.05*
942992	*AE2-321 E*	*2.98*
943121	*AE2-341 C*	*16.02*
943122	*AE2-341 E*	*7.87*
943411	*AF1-012 C*	*9.63*
943412	*AF1-012 E*	*6.42*
943591	*AF1-030 C O1*	*10.65*
943592	*AF1-030 E O1*	*5.27*
943801	*AF1-048 C*	*2.83*

943802	*AF1-048 E*	*1.88*
943921	*AF1-060*	*0.91*
944041	*AF1-072*	*1.61*
944911	*AF1-156 C*	*7.06*
944912	*AF1-156 E*	*4.7*
945351	*AF1-200 FTIR*	*581.93*
946151	*AF1-280 C O1*	*11.86*
946152	*AF1-280 E O1*	*5.46*
946161	*AF1-281 C*	*0.26*
946162	*AF1-281 E*	*1.47*
946321	*AF1-296 C O1*	*2.82*
946322	*AF1-296 E O1*	*13.21*
946501	*AF1-314 C*	*3.3*
946502	*AF1-314 E*	*15.44*
946541	*AF1-318 C O1*	*3.68*
946542	*AF1-318 E O1*	*17.23*
946661	*AF1-330 C*	*1.48*
946662	*AF1-330 E*	*0.32*
946671	*AF1-331*	*2.24*
274738	*AURORA EC;3P*	*3.21*
274740	*AURORA EC;4P*	*3.21*
LTF	*BLUEG*	*1.34*
294401	*BSHIL;1U E*	*5.44*
294410	*BSHIL;2U E*	*5.44*
LTF	*CALDERWOOD*	*0.08*
LTF	*CATAWBA*	*0.19*
LTF	*CBM-S1*	*1.53*
LTF	*CBM-W1*	*43.51*
LTF	*CBM-W2*	*9.41*
LTF	*CHEOAH*	*0.09*
274859	*EASYR;U1 E*	*8.35*
274860	*EASYR;U2 E*	*8.35*
272364	*ESS H440N ;R*	*0.45*
LTF	*G-007*	*1.24*
LTF	*GIBSON*	*0.15*
274871	*GR RIDGE ;2U*	*0.95*
274847	*GR RIDGE ;BU*	*0.75*
274855	*GSG-6 ;RU*	*0.44*
290051	*GSG-6; E*	*9.67*
275149	*KELLYCK ;1E*	*8.73*
990901	*L-005 E*	*7.75*
292543	*L-013 2*	*0.53*
274660	*LASCO STA;1U*	*33.06*
274661	*LASCO STA;2U*	*33.19*
274872	*LEE DEKAL;1U*	*1.02*

290108	*LEEDK;1U E*	*23.31*
LTF	*MADISON*	*12.39*
LTF	*MEC*	*8.36*
274850	*MENDOTA H;RU*	*0.11*
293061	*N-015 E*	*16.27*
LTF	*NY*	*0.68*
293516	*O-009 E1*	*6.69*
293517	*O-009 E2*	*3.4*
293518	*O-009 E3*	*3.74*
293715	*O-029 E*	*7.16*
293716	*O-029 E*	*3.92*
293717	*O-029 E*	*3.61*
293771	*O-035 E*	*4.07*
LTF	*O-066*	*8.02*
290021	*O50 E*	*9.34*
294392	*P-010 E*	*20.66*
294763	*P-046 E*	*7.07*
274881	*PILOT HIL;1E*	*8.73*
295110	*SUBLETTE C*	*0.07*
295111	*SUBLETTE E*	*2.52*
LTF	*TRIMBLE*	*0.45*
LTF	*TVA*	*0.54*
274830	*U3-021 1*	*4.49*
274831	*U3-021 2*	*4.49*
LTF	*WEC*	*2.5*
295108	*WESTBROOK C*	*0.15*
295109	*WESTBROOK E*	*5.18*
915011	*Y3-013 1*	*2.44*
915021	*Y3-013 2*	*2.44*
915031	*Y3-013 3*	*2.44*
916211	*Z1-072 E*	*3.08*
916221	*Z1-073 E*	*4.99*
276168	*Z1-106 E1*	*1.01*
276167	*Z1-106 E2*	*1.01*
276169	*Z1-107 E*	*1.35*
276170	*Z1-108 E*	*1.8*
276173	*Z2-081*	*0.26*
919581	*AA2-030*	*13.46*
920272	*AA2-123 E*	*1.8*
930481	*AB1-089*	*49.56*
930501	*AB1-091 O1*	*34.66*
930751	*AB1-122 2O1*	*38.65*
924471	*AB2-096*	*31.19*
925301	*AB2-191*	*0.17*
925302	*AB2-191 E*	*1.28*

925581	*AC1-033 C*	*0.89*
925582	*AC1-033 E*	*5.97*
926311	*AC1-109 1*	*1.22*
926321	*AC1-109 2*	*1.22*
926331	*AC1-110 1*	*1.73*
926341	*AC1-110 2*	*1.73*
926351	*AC1-111 1*	*0.56*
926361	*AC1-111 2*	*0.56*
926371	*AC1-111 3*	*0.56*
926381	*AC1-111 4*	*0.56*
926391	*AC1-111 5*	*0.56*
926401	*AC1-111 6*	*0.56*
927511	*AC1-113 1*	*0.89*
927521	*AC1-113 2*	*0.89*
926431	*AC1-114*	*1.79*
927451	*AC1-142A 1*	*1.82*
927461	*AC1-142A 2*	*1.82*
926821	*AC1-168 C O1*	*0.82*
926822	*AC1-168 E O1*	*5.49*
927201	*AC1-214 C O1*	*1.31*
927202	*AC1-214 E O1*	*4.15*

Appendix 10

(CE - CE) The PLANO ; R-ELECT JCT;3R 345 kV line (from bus 270847 to bus 270733 ckt 1) loads from 69.59% to 114.51% (AC power flow) of its load dump rating (1528 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 703.09 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'

TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345

TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33

TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5

END

Bus Number	*Bus Name*	*Full Contribution*
943803	*AF1-048 BAT*	*6.71*
943922	*AF1-060 BAT*	*1.17*
945351	*AF1-200 FTIR*	*703.09*
946163	*AF1-281 BAT*	*2.07*
LTF	*CALDERWOOD*	*0.12*
LTF	*CBM-S2*	*0.4*
LTF	*CHEOAH*	*0.12*
LTF	*COFFEEN*	*0.31*
LTF	*CPLE*	*0.14*
LTF	*EDWARDS*	*1.53*
LTF	*FARMERCITY*	*0.28*

LTF	*G-007A*	*1.56*
274871	*GR RIDGE ;2U*	*0.81*
274847	*GR RIDGE ;BU*	*0.64*
274660	*LASCO STA;1U*	*34.12*
274661	*LASCO STA;2U*	*34.27*
LTF	*LGEE*	*0.19*
293061	*N-015 E*	*13.87*
LTF	*NEWTON*	*0.9*
294392	*P-010 E*	*17.62*
LTF	*PRAIRIE*	*4.91*
LTF	*TILTON*	*0.22*
LTF	*VFT*	*4.21*
916221	*Z1-073 E*	*-5.18*
276166	*Z1-106 BAT1*	*1.54*
276165	*Z1-106 BAT2*	*1.54*
276172	*Z1-108 BAT*	*2.69*
920273	*AA2-123 BAT*	*2.58*
925302	*AB2-191 E*	*-1.33*

Appendix 11

(CE - CE) The PLANO ; R-PLANO ;4M 345 kV line (from bus 270847 to bus 275208 ckt 1) loads from 62.04% to 102.1% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 627.35 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'

TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345

TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33

TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.59*
932891	*AC2-115 2*	*1.59*
932921	*AC2-116*	*0.56*
933411	*AC2-154 C*	*1.23*
933412	*AC2-154 E*	*2.*
933911	*AD1-013 C*	*1.22*
933912	*AD1-013 E*	*1.94*
933931	*AD1-016 C*	*0.64*
933932	*AD1-016 E*	*1.04*
934051	*AD1-031 C O1*	*1.64*
934052	*AD1-031 E O1*	*2.68*

934111	*AD1-039 2*	*3.29*
934431	*AD1-067 C*	*0.09*
934432	*AD1-067 E*	*0.36*
934701	*AD1-098 C O1*	*4.51*
934702	*AD1-098 E O1*	*3.29*
934721	*AD1-100 C*	*8.71*
934722	*AD1-100 E*	*40.66*
934971	*AD1-129 C*	*0.61*
934972	*AD1-129 E*	*0.41*
936371	*AD2-047 C O1*	*2.2*
936372	*AD2-047 E O1*	*10.72*
936461	*AD2-060*	*1.29*
936511	*AD2-066 C O1*	*4.57*
936512	*AD2-066 E O1*	*3.05*
936791	*AD2-102 C*	*9.35*
936792	*AD2-102 E*	*6.23*
937001	*AD2-134 C*	*1.7*
937002	*AD2-134 E*	*6.79*
937311	*AD2-172 C*	*1.61*
937312	*AD2-172 E*	*2.23*
937531	*AD2-214 C*	*2.68*
937532	*AD2-214 E*	*1.79*
938851	*AE1-113 C*	*1.74*
938852	*AE1-113 E*	*6.17*
938861	*AE1-114 C O1*	*2.54*
938862	*AE1-114 E O1*	*8.65*
939051	*AE1-134 1*	*0.85*
939061	*AE1-134 2*	*0.85*
939351	*AE1-166 C O1*	*5.44*
939352	*AE1-166 E O1*	*5.02*
940501	*AE2-035 C*	*1.61*
940502	*AE2-035 E*	*2.23*
940752	*AE2-062 E*	*0.06*
941131	*AE2-107 C*	*4.32*
941132	*AE2-107 E*	*2.88*
941551	*AE2-152 C O1*	*6.28*
941552	*AE2-152 E O1*	*4.19*
941561	*AE2-153 C O1*	*2.92*
941562	*AE2-153 E O1*	*13.68*
942421	*AE2-255 C O1*	*1.33*
942422	*AE2-255 E O1*	*3.98*
942991	*AE2-321 C*	*5.59*
942992	*AE2-321 E*	*2.75*
943121	*AE2-341 C*	*8.42*
943122	*AE2-341 E*	*4.13*

943411	*AF1-012 C*	*7.49*
943412	*AF1-012 E*	*4.99*
943591	*AF1-030 C O1*	*5.6*
943592	*AF1-030 E O1*	*2.77*
943801	*AF1-048 C*	*2.61*
943802	*AF1-048 E*	*1.74*
943921	*AF1-060*	*0.79*
944041	*AF1-072*	*1.55*
944911	*AF1-156 C*	*7.47*
944912	*AF1-156 E*	*4.98*
945351	*AF1-200 FTIR*	*627.35*
946151	*AF1-280 C O1*	*9.91*
946152	*AF1-280 E O1*	*4.56*
946161	*AF1-281 C*	*0.22*
946162	*AF1-281 E*	*1.23*
946321	*AF1-296 C O1*	*2.36*
946322	*AF1-296 E O1*	*11.05*
946501	*AF1-314 C*	*2.87*
946502	*AF1-314 E*	*13.41*
946541	*AF1-318 C O1*	*3.5*
946542	*AF1-318 E O1*	*16.37*
946661	*AF1-330 C*	*1.37*
946662	*AF1-330 E*	*0.3*
946671	*AF1-331*	*1.58*
274746	*AURORA EC;0P*	*0.63*
274737	*AURORA EC;1P*	*3.4*
274739	*AURORA EC;2P*	*3.4*
274745	*AURORA EC;9P*	*0.63*
LTF	*BLUEG*	*1.3*
294401	*BSHIL;1U E*	*4.95*
294410	*BSHIL;2U E*	*4.95*
LTF	*CALDERWOOD*	*0.1*
LTF	*CATAWBA*	*0.2*
LTF	*CBM-S1*	*1.03*
LTF	*CBM-W1*	*39.19*
LTF	*CBM-W2*	*8.5*
LTF	*CHEOAH*	*0.11*
274859	*EASYR;U1 E*	*7.06*
274860	*EASYR;U2 E*	*7.06*
LTF	*G-007*	*1.21*
LTF	*GIBSON*	*0.14*
274871	*GR RIDGE ;2U*	*1.01*
274847	*GR RIDGE ;BU*	*0.79*
290051	*GSG-6; E*	*6.87*
275149	*KELLYCK ;1E*	*9.04*

990901	*L-005 E*	*7.09*
274660	*LASCO STA;1U*	*35.44*
274661	*LASCO STA;2U*	*35.58*
290108	*LEEDK;1U E*	*16.*
LTF	*MADISON*	*11.33*
LTF	*MEC*	*7.34*
293061	*N-015 E*	*17.29*
LTF	*NY*	*0.66*
293516	*O-009 E1*	*5.59*
293517	*O-009 E2*	*2.84*
293518	*O-009 E3*	*3.12*
293715	*O-029 E*	*5.97*
293716	*O-029 E*	*3.27*
293717	*O-029 E*	*3.01*
293771	*O-035 E*	*3.77*
LTF	*O-066*	*7.82*
294392	*P-010 E*	*21.96*
294763	*P-046 E*	*6.14*
274881	*PILOT HIL;1E*	*9.04*
295111	*SUBLETTE E*	*1.79*
LTF	*TRIMBLE*	*0.44*
LTF	*TVA*	*0.44*
274830	*U3-021 1*	*4.13*
274831	*U3-021 2*	*4.13*
LTF	*WEC*	*2.36*
295109	*WESTBROOK E*	*3.68*
915011	*Y3-013 1*	*2.36*
915021	*Y3-013 2*	*2.36*
915031	*Y3-013 3*	*2.36*
916211	*Z1-072 E*	*2.86*
916221	*Z1-073 E*	*3.54*
276168	*Z1-106 E1*	*0.94*
276167	*Z1-106 E2*	*0.95*
276169	*Z1-107 E*	*1.25*
276170	*Z1-108 E*	*1.72*
276173	*Z2-081*	*0.27*
919581	*AA2-030*	*10.96*
920272	*AA2-123 E*	*1.67*
930481	*AB1-089*	*44.89*
930501	*AB1-091 O1*	*36.34*
930751	*AB1-122 2O1*	*33.6*
924471	*AB2-096*	*28.65*
925302	*AB2-191 E*	*0.91*
925581	*AC1-033 C*	*0.81*
925582	*AC1-033 E*	*5.43*

926311	*AC1-109 1*	*1.83*
926321	*AC1-109 2*	*1.83*
926331	*AC1-110 1*	*1.27*
926341	*AC1-110 2*	*1.27*
926351	*AC1-111 1*	*0.64*
926361	*AC1-111 2*	*0.64*
926371	*AC1-111 3*	*0.64*
926381	*AC1-111 4*	*0.64*
926391	*AC1-111 5*	*0.64*
926401	*AC1-111 6*	*0.64*
927511	*AC1-113 1*	*0.79*
927521	*AC1-113 2*	*0.79*
926431	*AC1-114*	*1.59*
927451	*AC1-142A 1*	*1.8*
927461	*AC1-142A 2*	*1.8*
926821	*AC1-168 C O1*	*0.8*
926822	*AC1-168 E O1*	*5.39*
927201	*AC1-214 C O1*	*1.21*
927202	*AC1-214 E O1*	*3.85*

Appendix 12

(CE - CE) The CRETE EC ;BP-E FRANKFO; B 345 kV line (from bus 274750 to bus 270728 ckt 1) loads from 99.13% to 159.99% (AC power flow) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 287.78 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765

TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765

END

Bus Number	*Bus Name*	*Full Contribution*
932931	*AC2-117*	*-4.78*
939631	*AE1-193 C*	*32.44*
939632	*AE1-193 E*	*217.12*
939641	*AE1-194 C*	*32.44*
939642	*AE1-194 E*	*217.12*
939651	*AE1-195 C*	*32.44*
939652	*AE1-195 E*	*217.12*
939681	*AE1-198 C*	*96.33*
939682	*AE1-198 E*	*81.86*
941732	*AE2-173 BAT*	*5.18*
943803	*AF1-048 BAT*	*6.72*
943922	*AF1-060 BAT*	*1.27*
945352	*AF1-200 NFTW*	*287.78*
946163	*AF1-281 BAT*	*2.39*
LTF	*CBM-S2*	*4.13*
LTF	*COFFEEN*	*0.87*
LTF	*CPLE*	*0.65*
274751	*CRETE EC ;1U*	*6.88*
274752	*CRETE EC ;2U*	*6.88*
274753	*CRETE EC ;3U*	*6.88*
274754	*CRETE EC ;4U*	*6.88*
LTF	*EDWARDS*	*3.86*
LTF	*FARMERCITY*	*0.41*
LTF	*G-007A*	*4.59*
950311	*G934 C*	*2.35*
950312	*G934 E*	*9.4*

955591	*J1043 C*	*1.58*
955592	*J1043 E*	*28.01*
955741	*J1058*	*76.04*
955781	*J1062*	*10.81*
955791	*J1063*	*17.48*
955821	*J1067*	*21.73*
955841	*J1069 C*	*2.34*
955842	*J1069 E*	*12.67*
955861	*J1071*	*7.95*
956561	*J1152*	*10.57*
956741	*J1172*	*3.81*
950791	*J201 C*	*0.31*
950792	*J201 E*	*1.22*
950871	*J246 C*	*0.11*
950872	*J246 E*	*0.44*
950942	*J325 E*	*0.3*
954751	*J351*	*59.87*
951731	*J446 C*	*1.89*
951732	*J446 E*	*10.23*
950351	*J466*	*2.27*
951811	*J513 C*	*1.13*
951812	*J513 E*	*6.12*
951531	*J533 C*	*3.12*
951532	*J533 E*	*12.46*
951571	*J538 C*	*2.28*
951572	*J538 E*	*9.12*
952161	*J571*	*0.51*
952201	*J589 C*	*2.42*
952202	*J589 E*	*13.1*
951721	*J643*	*25.34*
952312	*J646 E*	*0.12*
953271	*J701 C*	*0.58*
953272	*J701 E*	*3.13*
952611	*J717 C*	*2.4*
952612	*J717 E*	*13.*
952761	*J728 C*	*2.23*
952762	*J728 E*	*12.11*
952401	*J752 C*	*1.18*
952402	*J752 E*	*6.39*
952881	*J758*	*15.74*
952971	*J793*	*98.74*
953071	*J794 C*	*0.15*
953072	*J794 E*	*0.82*
953291	*J796*	*18.34*
953321	*J799*	*13.88*

953351	*J805*	*10.39*
953361	*J806*	*11.58*
953161	*J837 C*	*2.34*
953162	*J837 E*	*12.67*
953171	*J838 C*	*1.17*
953172	*J838 E*	*6.33*
953871	*J847*	*13.59*
953941	*J857*	*9.77*
954111	*J875*	*11.2*
954351	*J903*	*5.39*
954421	*J913 C*	*12.*
954941	*J968 C*	*2.34*
954942	*J968 E*	*12.67*
955071	*J984 C*	*2.44*
955072	*J984 E*	*13.22*
955141	*J992*	*15.14*
955151	*J993*	*10.35*
955181	*J996*	*5.88*
LTF	*LGEE*	*0.62*
LTF	*LGE-TSR-0092018*	*< 0.01*
LTF	*NEWTON*	*2.31*
LTF	*PRAIRIE*	*9.66*
LTF	*TILTON*	*1.13*
LTF	*VFT*	*12.37*
909052	*X2-022 E*	*-10.54*
916211	*Z1-072 E*	*-5.05*
916221	*Z1-073 E*	*-5.71*
276166	*Z1-106 BAT1*	*1.33*
276165	*Z1-106 BAT2*	*1.33*
276171	*Z1-107 BAT*	*2.55*
276172	*Z1-108 BAT*	*2.63*
918052	*AA1-018 E OP*	*-16.03*
920273	*AA2-123 BAT*	*2.58*
924041	*AB2-047 C O1*	*-3.36*
925302	*AB2-191 E*	*-1.46*
927201	*AC1-214 C O1*	*-2.14*

Appendix 13

(CE - CE) The PLANO ; 765/345 kV transformer (from bus 275207 to bus 270630 ckt 1) loads from 65.18% to 101.34% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 581.93 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'

TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345

TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345

TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345

TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.79*
932891	*AC2-115 2*	*1.79*
932921	*AC2-116*	*0.63*
933411	*AC2-154 C*	*1.19*
933412	*AC2-154 E*	*1.93*
933911	*AD1-013 C*	*1.72*
933912	*AD1-013 E*	*2.76*
933931	*AD1-016 C*	*0.69*
933932	*AD1-016 E*	*1.12*
934051	*AD1-031 C O1*	*1.81*
934052	*AD1-031 E O1*	*2.95*
934111	*AD1-039 2*	*3.79*
934431	*AD1-067 C*	*0.12*
934432	*AD1-067 E*	*0.51*
934701	*AD1-098 C O1*	*6.31*
934702	*AD1-098 E O1*	*4.61*

934721	*AD1-100 C*	*3.18*
934722	*AD1-100 E*	*14.84*
934971	*AD1-129 C*	*0.67*
934972	*AD1-129 E*	*0.45*
936371	*AD2-047 C O1*	*2.12*
936372	*AD2-047 E O1*	*10.36*
936461	*AD2-060*	*1.25*
936511	*AD2-066 C O1*	*4.83*
936512	*AD2-066 E O1*	*3.22*
936791	*AD2-102 C*	*10.42*
936792	*AD2-102 E*	*6.95*
937001	*AD2-134 C*	*2.4*
937002	*AD2-134 E*	*9.57*
937311	*AD2-172 C*	*1.86*
937312	*AD2-172 E*	*2.56*
937531	*AD2-214 C*	*3.24*
937532	*AD2-214 E*	*2.16*
938851	*AE1-113 C*	*3.85*
938852	*AE1-113 E*	*13.66*
938861	*AE1-114 C O1*	*3.*
938862	*AE1-114 E O1*	*10.23*
939051	*AE1-134 1*	*1.05*
939061	*AE1-134 2*	*1.05*
939351	*AE1-166 C O1*	*5.11*
939352	*AE1-166 E O1*	*4.72*
940501	*AE2-035 C*	*1.86*
940502	*AE2-035 E*	*2.56*
940752	*AE2-062 E*	*0.06*
941131	*AE2-107 C*	*6.29*
941132	*AE2-107 E*	*4.2*
941551	*AE2-152 C O1*	*5.89*
941552	*AE2-152 E O1*	*3.93*
941561	*AE2-153 C O1*	*2.76*
941562	*AE2-153 E O1*	*12.92*
942421	*AE2-255 C O1*	*1.46*
942422	*AE2-255 E O1*	*4.38*
942991	*AE2-321 C*	*6.05*
942992	*AE2-321 E*	*2.98*
943121	*AE2-341 C*	*16.02*
943122	*AE2-341 E*	*7.87*
943411	*AF1-012 C*	*9.63*
943412	*AF1-012 E*	*6.42*
943591	*AF1-030 C O1*	*10.65*
943592	*AF1-030 E O1*	*5.27*
943801	*AF1-048 C*	*2.83*

943802	*AF1-048 E*	*1.88*
943921	*AF1-060*	*0.91*
944041	*AF1-072*	*1.61*
944911	*AF1-156 C*	*7.06*
944912	*AF1-156 E*	*4.7*
945351	*AF1-200 FTIR*	*581.93*
946151	*AF1-280 C O1*	*11.86*
946152	*AF1-280 E O1*	*5.46*
946161	*AF1-281 C*	*0.26*
946162	*AF1-281 E*	*1.47*
946321	*AF1-296 C O1*	*2.82*
946322	*AF1-296 E O1*	*13.21*
946501	*AF1-314 C*	*3.3*
946502	*AF1-314 E*	*15.44*
946541	*AF1-318 C O1*	*3.68*
946542	*AF1-318 E O1*	*17.23*
946661	*AF1-330 C*	*1.48*
946662	*AF1-330 E*	*0.32*
946671	*AF1-331*	*2.24*
274738	*AURORA EC;3P*	*3.21*
274740	*AURORA EC;4P*	*3.21*
LTF	*BLUEG*	*1.34*
294401	*BSHIL;1U E*	*5.44*
294410	*BSHIL;2U E*	*5.44*
LTF	*CALDERWOOD*	*0.08*
LTF	*CATAWBA*	*0.19*
LTF	*CBM-S1*	*1.53*
LTF	*CBM-W1*	*43.51*
LTF	*CBM-W2*	*9.41*
LTF	*CHEOAH*	*0.09*
274859	*EASYR;U1 E*	*8.35*
274860	*EASYR;U2 E*	*8.35*
272364	*ESS H440N ;R*	*0.45*
LTF	*G-007*	*1.24*
LTF	*GIBSON*	*0.15*
274871	*GR RIDGE ;2U*	*0.95*
274847	*GR RIDGE ;BU*	*0.75*
274855	*GSG-6 ;RU*	*0.44*
290051	*GSG-6; E*	*9.67*
275149	*KELLYCK ;1E*	*8.73*
990901	*L-005 E*	*7.75*
292543	*L-013 2*	*0.53*
274660	*LASCO STA;1U*	*33.06*
274661	*LASCO STA;2U*	*33.19*
274872	*LEE DEKAL;1U*	*1.02*

290108	*LEEDK;1U E*	*23.31*
LTF	*MADISON*	*12.39*
LTF	*MEC*	*8.36*
274850	*MENDOTA H;RU*	*0.11*
293061	*N-015 E*	*16.27*
LTF	*NY*	*0.68*
293516	*O-009 E1*	*6.69*
293517	*O-009 E2*	*3.4*
293518	*O-009 E3*	*3.74*
293715	*O-029 E*	*7.16*
293716	*O-029 E*	*3.92*
293717	*O-029 E*	*3.61*
293771	*O-035 E*	*4.07*
LTF	*O-066*	*8.02*
290021	*O50 E*	*9.34*
294392	*P-010 E*	*20.66*
294763	*P-046 E*	*7.07*
274881	*PILOT HIL;1E*	*8.73*
295110	*SUBLETTE C*	*0.07*
295111	*SUBLETTE E*	*2.52*
LTF	*TRIMBLE*	*0.45*
LTF	*TVA*	*0.54*
274830	*U3-021 1*	*4.49*
274831	*U3-021 2*	*4.49*
LTF	*WEC*	*2.5*
295108	*WESTBROOK C*	*0.15*
295109	*WESTBROOK E*	*5.18*
915011	*Y3-013 1*	*2.44*
915021	*Y3-013 2*	*2.44*
915031	*Y3-013 3*	*2.44*
916211	*Z1-072 E*	*3.08*
916221	*Z1-073 E*	*4.99*
276168	*Z1-106 E1*	*1.01*
276167	*Z1-106 E2*	*1.01*
276169	*Z1-107 E*	*1.35*
276170	*Z1-108 E*	*1.8*
276173	*Z2-081*	*0.26*
919581	*AA2-030*	*13.46*
920272	*AA2-123 E*	*1.8*
930481	*AB1-089*	*49.56*
930501	*AB1-091 O1*	*34.66*
930751	*AB1-122 2O1*	*38.65*
924471	*AB2-096*	*31.19*
925301	*AB2-191*	*0.17*
925302	*AB2-191 E*	*1.28*

925581	*AC1-033 C*	*0.89*
925582	*AC1-033 E*	*5.97*
926311	*AC1-109 1*	*1.22*
926321	*AC1-109 2*	*1.22*
926331	*AC1-110 1*	*1.73*
926341	*AC1-110 2*	*1.73*
926351	*AC1-111 1*	*0.56*
926361	*AC1-111 2*	*0.56*
926371	*AC1-111 3*	*0.56*
926381	*AC1-111 4*	*0.56*
926391	*AC1-111 5*	*0.56*
926401	*AC1-111 6*	*0.56*
927511	*AC1-113 1*	*0.89*
927521	*AC1-113 2*	*0.89*
926431	*AC1-114*	*1.79*
927451	*AC1-142A 1*	*1.82*
927461	*AC1-142A 2*	*1.82*
926821	*AC1-168 C O1*	*0.82*
926822	*AC1-168 E O1*	*5.49*
927201	*AC1-214 C O1*	*1.31*
927202	*AC1-214 E O1*	*4.15*

Appendix 14

(CE - CE) The PLANO ; 765/345 kV transformer (from bus 275208 to bus 270630 ckt 1) loads from 62.2% to 102.65% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 627.35 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'

TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765

TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345

TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33

TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138

TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.59*
932891	*AC2-115 2*	*1.59*
932921	*AC2-116*	*0.56*
933411	*AC2-154 C*	*1.23*
933412	*AC2-154 E*	*2.*
933911	*AD1-013 C*	*1.22*
933912	*AD1-013 E*	*1.94*
933931	*AD1-016 C*	*0.64*
933932	*AD1-016 E*	*1.04*
934051	*AD1-031 C O1*	*1.64*
934052	*AD1-031 E O1*	*2.68*

934111	*AD1-039 2*	*3.29*
934431	*AD1-067 C*	*0.09*
934432	*AD1-067 E*	*0.36*
934701	*AD1-098 C O1*	*4.51*
934702	*AD1-098 E O1*	*3.29*
934721	*AD1-100 C*	*8.71*
934722	*AD1-100 E*	*40.66*
934971	*AD1-129 C*	*0.61*
934972	*AD1-129 E*	*0.41*
936371	*AD2-047 C O1*	*2.2*
936372	*AD2-047 E O1*	*10.72*
936461	*AD2-060*	*1.29*
936511	*AD2-066 C O1*	*4.57*
936512	*AD2-066 E O1*	*3.05*
936791	*AD2-102 C*	*9.35*
936792	*AD2-102 E*	*6.23*
937001	*AD2-134 C*	*1.7*
937002	*AD2-134 E*	*6.79*
937311	*AD2-172 C*	*1.61*
937312	*AD2-172 E*	*2.23*
937531	*AD2-214 C*	*2.68*
937532	*AD2-214 E*	*1.79*
938851	*AE1-113 C*	*1.74*
938852	*AE1-113 E*	*6.17*
938861	*AE1-114 C O1*	*2.54*
938862	*AE1-114 E O1*	*8.65*
939051	*AE1-134 1*	*0.85*
939061	*AE1-134 2*	*0.85*
939351	*AE1-166 C O1*	*5.44*
939352	*AE1-166 E O1*	*5.02*
940501	*AE2-035 C*	*1.61*
940502	*AE2-035 E*	*2.23*
940752	*AE2-062 E*	*0.06*
941131	*AE2-107 C*	*4.32*
941132	*AE2-107 E*	*2.88*
941551	*AE2-152 C O1*	*6.28*
941552	*AE2-152 E O1*	*4.19*
941561	*AE2-153 C O1*	*2.92*
941562	*AE2-153 E O1*	*13.68*
942421	*AE2-255 C O1*	*1.33*
942422	*AE2-255 E O1*	*3.98*
942991	*AE2-321 C*	*5.59*
942992	*AE2-321 E*	*2.75*
943121	*AE2-341 C*	*8.42*
943122	*AE2-341 E*	*4.13*

943411	*AF1-012 C*	*7.49*
943412	*AF1-012 E*	*4.99*
943591	*AF1-030 C O1*	*5.6*
943592	*AF1-030 E O1*	*2.77*
943801	*AF1-048 C*	*2.61*
943802	*AF1-048 E*	*1.74*
943921	*AF1-060*	*0.79*
944041	*AF1-072*	*1.55*
944911	*AF1-156 C*	*7.47*
944912	*AF1-156 E*	*4.98*
945351	*AF1-200 FTIR*	*627.35*
946151	*AF1-280 C O1*	*9.91*
946152	*AF1-280 E O1*	*4.56*
946161	*AF1-281 C*	*0.22*
946162	*AF1-281 E*	*1.23*
946321	*AF1-296 C O1*	*2.36*
946322	*AF1-296 E O1*	*11.05*
946501	*AF1-314 C*	*2.87*
946502	*AF1-314 E*	*13.41*
946541	*AF1-318 C O1*	*3.5*
946542	*AF1-318 E O1*	*16.37*
946661	*AF1-330 C*	*1.37*
946662	*AF1-330 E*	*0.3*
946671	*AF1-331*	*1.58*
274746	*AURORA EC;0P*	*0.63*
274737	*AURORA EC;1P*	*3.4*
274739	*AURORA EC;2P*	*3.4*
274745	*AURORA EC;9P*	*0.63*
LTF	*BLUEG*	*1.3*
294401	*BSHIL;1U E*	*4.95*
294410	*BSHIL;2U E*	*4.95*
LTF	*CALDERWOOD*	*0.1*
LTF	*CATAWBA*	*0.2*
LTF	*CBM-S1*	*1.03*
LTF	*CBM-W1*	*39.19*
LTF	*CBM-W2*	*8.5*
LTF	*CHEOAH*	*0.11*
274859	*EASYR;U1 E*	*7.06*
274860	*EASYR;U2 E*	*7.06*
LTF	*G-007*	*1.21*
LTF	*GIBSON*	*0.14*
274871	*GR RIDGE ;2U*	*1.01*
274847	*GR RIDGE ;BU*	*0.79*
290051	*GSG-6; E*	*6.87*
275149	*KELLYCK ;1E*	*9.04*

990901	*L-005 E*	*7.09*
274660	*LASCO STA;1U*	*35.44*
274661	*LASCO STA;2U*	*35.58*
290108	*LEEDK;1U E*	*16.*
LTF	*MADISON*	*11.33*
LTF	*MEC*	*7.34*
293061	*N-015 E*	*17.29*
LTF	*NY*	*0.66*
293516	*O-009 E1*	*5.59*
293517	*O-009 E2*	*2.84*
293518	*O-009 E3*	*3.12*
293715	*O-029 E*	*5.97*
293716	*O-029 E*	*3.27*
293717	*O-029 E*	*3.01*
293771	*O-035 E*	*3.77*
LTF	*O-066*	*7.82*
294392	*P-010 E*	*21.96*
294763	*P-046 E*	*6.14*
274881	*PILOT HIL;1E*	*9.04*
295111	*SUBLETTE E*	*1.79*
LTF	*TRIMBLE*	*0.44*
LTF	*TVA*	*0.44*
274830	*U3-021 1*	*4.13*
274831	*U3-021 2*	*4.13*
LTF	*WEC*	*2.36*
295109	*WESTBROOK E*	*3.68*
915011	*Y3-013 1*	*2.36*
915021	*Y3-013 2*	*2.36*
915031	*Y3-013 3*	*2.36*
916211	*Z1-072 E*	*2.86*
916221	*Z1-073 E*	*3.54*
276168	*Z1-106 E1*	*0.94*
276167	*Z1-106 E2*	*0.95*
276169	*Z1-107 E*	*1.25*
276170	*Z1-108 E*	*1.72*
276173	*Z2-081*	*0.27*
919581	*AA2-030*	*10.96*
920272	*AA2-123 E*	*1.67*
930481	*AB1-089*	*44.89*
930501	*AB1-091 O1*	*36.34*
930751	*AB1-122 2O1*	*33.6*
924471	*AB2-096*	*28.65*
925302	*AB2-191 E*	*0.91*
925581	*AC1-033 C*	*0.81*
925582	*AC1-033 E*	*5.43*

926311	*AC1-109 1*	*1.83*
926321	*AC1-109 2*	*1.83*
926331	*AC1-110 1*	*1.27*
926341	*AC1-110 2*	*1.27*
926351	*AC1-111 1*	*0.64*
926361	*AC1-111 2*	*0.64*
926371	*AC1-111 3*	*0.64*
926381	*AC1-111 4*	*0.64*
926391	*AC1-111 5*	*0.64*
926401	*AC1-111 6*	*0.64*
927511	*AC1-113 1*	*0.79*
927521	*AC1-113 2*	*0.79*
926431	*AC1-114*	*1.59*
927451	*AC1-142A 1*	*1.8*
927461	*AC1-142A 2*	*1.8*
926821	*AC1-168 C O1*	*0.8*
926822	*AC1-168 E O1*	*5.39*
927201	*AC1-214 C O1*	*1.21*
927202	*AC1-214 E O1*	*3.85*

Appendix 15

(CE - CE) The AE2-153 TAP-DAVIS CRK; R 345 kV line (from bus 941560 to bus 270711 ckt 1) loads from 95.21% to 104.07% (AC power flow) of its load dump rating (1341 MVA) for the line fault with failed breaker contingency outage of 'ADD AD1-100 2'. This project contributes approximately 112.84 MW to the thermal violation.

CONTINGENCY 'ADD AD1-100 2'

OPEN BRANCH FROM BUS 934720 TO BUS 939400 CKT 1 / AD1-100 - AE1-172 TAP (LORETTO)

OPEN BRANCH FROM BUS 934730 TO BUS 270670 CKT 1 / AD1-100 - BRAIDWOOD

END

Bus Number	*Bus Name*	*Full Contribution*
941561	*AE2-153 C O1*	*13.69*
941562	*AE2-153 E O1*	*64.09*
944911	*AF1-156 C*	*35.*
944912	*AF1-156 E*	*23.33*
945351	*AF1-200 FTIR*	*112.84*
LTF	*BLUEG*	*0.91*
274654	*BRAIDWOOD;1U*	*49.33*
274655	*BRAIDWOOD;2U*	*48.46*
LTF	*CALDERWOOD*	*0.19*
LTF	*CATAWBA*	*0.16*
LTF	*CBM-W1*	*4.74*
LTF	*CHEOAH*	*0.19*
LTF	*G-007*	*0.65*
LTF	*GIBSON*	*0.23*
274871	*GR RIDGE ;2U*	*0.84*
274847	*GR RIDGE ;BU*	*0.66*
274660	*LASCO STA;1U*	*32.34*
274661	*LASCO STA;2U*	*32.48*
LTF	*MADISON*	*3.04*
LTF	*MEC*	*1.52*
293061	*N-015 E*	*14.51*
LTF	*NEWTON*	*0.13*
LTF	*NY*	*0.35*
LTF	*O-066*	*4.2*
294392	*P-010 E*	*18.43*
LTF	*TILTON*	*0.12*

LTF	*TRIMBLE*	*0.3*
LTF	*WEC*	*0.49*

Appendix 16

(MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 124.88% to 128.17% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*1.71*
933412	*AC2-154 E*	*2.79*
933911	*AD1-013 C*	*1.36*
933912	*AD1-013 E*	*2.18*
933931	*AD1-016 C*	*0.68*
933932	*AD1-016 E*	*1.12*
934101	*AD1-039 1*	*5.13*
934111	*AD1-039 2*	*5.44*
934431	*AD1-067 C*	*0.1*
934432	*AD1-067 E*	*0.41*
934721	*AD1-100 C*	*14.09*
934722	*AD1-100 E*	*65.73*
934971	*AD1-129 C*	*0.67*
934972	*AD1-129 E*	*0.44*
936371	*AD2-047 C O1*	*3.06*
936372	*AD2-047 E O1*	*14.96*
936461	*AD2-060*	*1.8*
936511	*AD2-066 C O1*	*6.13*
936512	*AD2-066 E O1*	*4.08*
937001	*AD2-134 C*	*1.91*
937002	*AD2-134 E*	*7.64*
937401	*AD2-194 1*	*5.86*
937411	*AD2-194 2*	*5.85*

938511	*AE1-070 1*	*6.88*
938521	*AE1-070 2*	*6.29*
938851	*AE1-113 C*	*5.95*
938852	*AE1-113 E*	*21.11*
939351	*AE1-166 C O1*	*7.5*
939352	*AE1-166 E O1*	*6.92*
939631	*AE1-193 C*	*18.89*
939632	*AE1-193 E*	*126.45*
939641	*AE1-194 C*	*18.89*
939642	*AE1-194 E*	*126.45*
939651	*AE1-195 C*	*18.89*
939652	*AE1-195 E*	*126.45*
939681	*AE1-198 C*	*56.1*
939682	*AE1-198 E*	*47.67*
940752	*AE2-062 E*	*0.1*
941131	*AE2-107 C*	*4.82*
941132	*AE2-107 E*	*3.22*
941551	*AE2-152 C O1*	*8.66*
941552	*AE2-152 E O1*	*5.77*
941561	*AE2-153 C O1*	*3.45*
941562	*AE2-153 E O1*	*16.14*
942421	*AE2-255 C O1*	*2.26*
942422	*AE2-255 E O1*	*6.77*
942991	*AE2-321 C*	*6.02*
942992	*AE2-321 E*	*2.97*
943121	*AE2-341 C*	*9.34*
943122	*AE2-341 E*	*4.59*
943591	*AF1-030 C O1*	*6.21*
943592	*AF1-030 E O1*	*3.07*
943801	*AF1-048 C*	*2.82*
943802	*AF1-048 E*	*1.88*
944041	*AF1-072*	*1.59*
944911	*AF1-156 C*	*8.81*
944912	*AF1-156 E*	*5.88*
945351	*AF1-200 FTIR*	*192.82*
946661	*AF1-330 C*	*1.48*
946662	*AF1-330 E*	*0.32*
946671	*AF1-331*	*1.77*
LTF	*BLUEG*	*1.22*
274654	*BRAIDWOOD;1U*	*22.08*
274655	*BRAIDWOOD;2U*	*21.49*
LTF	*CALDERWOOD*	*0.02*
LTF	*CATAWBA*	*0.19*
LTF	*CBM-S1*	*3.57*
LTF	*CBM-W1*	*42.86*

LTF	*CBM-W2*	*13.91*
LTF	*CHEOAH*	*0.03*
274751	*CRETE EC ;1U*	*4.*
274752	*CRETE EC ;2U*	*4.*
274753	*CRETE EC ;3U*	*4.*
274754	*CRETE EC ;4U*	*4.*
LTF	*G-007*	*1.5*
LTF	*GIBSON*	*0.04*
290051	*GSG-6; E*	*7.72*
275149	*KELLYCK ;1E*	*12.62*
290108	*LEEDK;1U E*	*17.87*
LTF	*MADISON*	*14.23*
LTF	*MEC*	*9.48*
293061	*N-015 E*	*11.46*
LTF	*NY*	*0.82*
LTF	*O-066*	*9.71*
293644	*O22 E1*	*8.43*
293645	*O22 E2*	*16.37*
290021	*O50 E*	*14.43*
294392	*P-010 E*	*14.55*
274881	*PILOT HIL;1E*	*12.62*
295111	*SUBLETTE E*	*2.01*
274861	*TOP CROP ;1U*	*0.39*
274862	*TOP CROP ;2U*	*0.75*
LTF	*TRIMBLE*	*0.42*
LTF	*TVA*	*0.94*
274830	*U3-021 1*	*4.49*
274831	*U3-021 2*	*4.49*
LTF	*WEC*	*2.77*
295109	*WESTBROOK E*	*4.13*
274687	*WILL CNTY;4U*	*9.43*
915011	*Y3-013 1*	*2.77*
915021	*Y3-013 2*	*2.77*
915031	*Y3-013 3*	*2.77*
916221	*Z1-073 E*	*3.98*
276168	*Z1-106 E1*	*0.93*
276167	*Z1-106 E2*	*0.93*
276169	*Z1-107 E*	*1.83*
276170	*Z1-108 E*	*1.84*
920272	*AA2-123 E*	*1.8*
930481	*AB1-089*	*13.41*
930501	*AB1-091 O1*	*49.85*
930741	*AB1-122 1O1*	*52.35*
930751	*AB1-122 2O1*	*55.48*
924471	*AB2-096*	*31.19*

925302	*AB2-191 E*	*1.02*
926311	*AC1-109 1*	*1.4*
926321	*AC1-109 2*	*1.4*
926331	*AC1-110 1*	*1.4*
926341	*AC1-110 2*	*1.4*
926351	*AC1-111 1*	*0.56*
926361	*AC1-111 2*	*0.56*
926371	*AC1-111 3*	*0.56*
926381	*AC1-111 4*	*0.56*
926391	*AC1-111 5*	*0.56*
926401	*AC1-111 6*	*0.56*
927451	*AC1-142A 1*	*3.16*
927461	*AC1-142A 2*	*3.16*

Appendix 17

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 107.29% to 109.56% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 300.77 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*3.02*
933412	*AC2-154 E*	*4.93*
933911	*AD1-013 C*	*2.14*
933912	*AD1-013 E*	*3.41*
933931	*AD1-016 C*	*1.07*
933932	*AD1-016 E*	*1.74*
934101	*AD1-039 1*	*8.05*
934111	*AD1-039 2*	*8.31*
934431	*AD1-067 C*	*0.15*
934432	*AD1-067 E*	*0.64*
934701	*AD1-098 C O1*	*7.96*
934702	*AD1-098 E O1*	*5.81*
934721	*AD1-100 C*	*22.39*
934722	*AD1-100 E*	*104.48*
934871	*AD1-116 C*	*1.09*
934872	*AD1-116 E*	*1.77*
934971	*AD1-129 C*	*1.04*
934972	*AD1-129 E*	*0.69*
936291	*AD2-038 C O1*	*3.63*
936292	*AD2-038 E O1*	*17.*
936371	*AD2-047 C O1*	*5.41*
936372	*AD2-047 E O1*	*26.39*
936461	*AD2-060*	*3.18*

936511	*AD2-066 C O1*	*9.68*
936512	*AD2-066 E O1*	*6.45*
937001	*AD2-134 C*	*3.*
937002	*AD2-134 E*	*11.96*
937401	*AD2-194 1*	*8.93*
937411	*AD2-194 2*	*8.93*
938511	*AE1-070 1*	*10.5*
938521	*AE1-070 2*	*9.6*
938851	*AE1-113 C*	*9.17*
938852	*AE1-113 E*	*32.52*
939321	*AE1-163 C O1*	*6.74*
939322	*AE1-163 E O1*	*41.41*
939351	*AE1-166 C O1*	*11.77*
939352	*AE1-166 E O1*	*10.86*
939631	*AE1-193 C*	*10.25*
939632	*AE1-193 E*	*68.57*
939641	*AE1-194 C*	*10.25*
939642	*AE1-194 E*	*68.57*
939651	*AE1-195 C*	*10.25*
939652	*AE1-195 E*	*68.57*
939681	*AE1-198 C*	*30.42*
939682	*AE1-198 E*	*25.85*
940752	*AE2-062 E*	*0.15*
941131	*AE2-107 C*	*7.55*
941132	*AE2-107 E*	*5.03*
941551	*AE2-152 C O1*	*13.58*
941552	*AE2-152 E O1*	*9.05*
941561	*AE2-153 C O1*	*5.42*
941562	*AE2-153 E O1*	*25.37*
942421	*AE2-255 C O1*	*3.47*
942422	*AE2-255 E O1*	*10.42*
942651	*AE2-281 C O1*	*0.96*
942652	*AE2-281 E O1*	*5.92*
942991	*AE2-321 C*	*9.39*
942992	*AE2-321 E*	*4.63*
943121	*AE2-341 C*	*14.62*
943122	*AE2-341 E*	*7.18*
943591	*AF1-030 C O1*	*9.72*
943592	*AF1-030 E O1*	*4.81*
943801	*AF1-048 C*	*4.39*
943802	*AF1-048 E*	*2.93*
944041	*AF1-072*	*2.47*
944911	*AF1-156 C*	*13.86*
944912	*AF1-156 E*	*9.24*
945351	*AF1-200 FTIR*	*300.77*

946661	*AF1-330 C*	*2.3*
946662	*AF1-330 E*	*0.51*
946671	*AF1-331*	*2.77*
LTF	*BLUEG*	*< 0.01*
LTF	*CATAWBA*	*0.18*
LTF	*CBM-S1*	*11.77*
LTF	*CBM-W1*	*78.6*
LTF	*CBM-W2*	*29.21*
LTF	*G-007*	*2.38*
290051	*GSG-6; E*	*12.09*
275149	*KELLYCK ;1E*	*22.26*
290108	*LEEDK;1U E*	*27.96*
LTF	*MADISON*	*22.09*
LTF	*MEC*	*15.44*
293061	*N-015 E*	*17.53*
LTF	*NY*	*1.31*
LTF	*O-066*	*15.42*
293644	*O22 E1*	*11.93*
293645	*O22 E2*	*23.15*
290021	*O50 E*	*22.24*
294392	*P-010 E*	*22.26*
274881	*PILOT HIL;1E*	*22.26*
274724	*RIVER EC ;11*	*5.68*
274793	*SE CHICAG;0U*	*7.32*
274794	*SE CHICAG;1U*	*7.32*
274795	*SE CHICAG;2U*	*7.32*
274788	*SE CHICAG;5U*	*7.29*
274789	*SE CHICAG;6U*	*7.31*
274790	*SE CHICAG;7U*	*7.41*
274791	*SE CHICAG;8U*	*7.41*
274792	*SE CHICAG;9U*	*7.32*
295111	*SUBLETTE E*	*3.15*
LTF	*TRIMBLE*	*0.04*
LTF	*TVA*	*2.38*
274830	*U3-021 1*	*7.01*
274831	*U3-021 2*	*7.01*
LTF	*WEC*	*4.32*
295109	*WESTBROOK E*	*6.47*
910542	*X3-005 E*	*1.*
915011	*Y3-013 1*	*4.3*
915021	*Y3-013 2*	*4.3*
915031	*Y3-013 3*	*4.3*
916221	*Z1-073 E*	*6.24*
276168	*Z1-106 E1*	*1.45*
276167	*Z1-106 E2*	*1.45*

276169	*Z1-107 E*	*3.03*
276170	*Z1-108 E*	*2.86*
918052	*AA1-018 E OP*	*18.67*
920272	*AA2-123 E*	*2.81*
930481	*AB1-089*	*31.67*
930501	*AB1-091 O1*	*88.07*
930741	*AB1-122 1O1*	*82.18*
930751	*AB1-122 2O1*	*84.77*
924471	*AB2-096*	*48.67*
925302	*AB2-191 E*	*1.6*
926311	*AC1-109 1*	*2.19*
926321	*AC1-109 2*	*2.19*
926331	*AC1-110 1*	*2.18*
926341	*AC1-110 2*	*2.18*
926351	*AC1-111 1*	*0.87*
926361	*AC1-111 2*	*0.87*
926371	*AC1-111 3*	*0.87*
926381	*AC1-111 4*	*0.87*
926391	*AC1-111 5*	*0.87*
926401	*AC1-111 6*	*0.87*
927451	*AC1-142A 1*	*4.83*
927461	*AC1-142A 2*	*4.83*

Appendix 18

(CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 105.01% to 107.14% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 174.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*1.67*
933412	*AC2-154 E*	*2.73*
933911	*AD1-013 C*	*1.23*
933912	*AD1-013 E*	*1.97*
933931	*AD1-016 C*	*0.62*
933932	*AD1-016 E*	*1.01*
934101	*AD1-039 1*	*4.64*
934111	*AD1-039 2*	*4.85*
934431	*AD1-067 C*	*0.09*
934432	*AD1-067 E*	*0.37*
934701	*AD1-098 C O1*	*4.58*
934702	*AD1-098 E O1*	*3.35*
934721	*AD1-100 C*	*12.87*
934722	*AD1-100 E*	*60.07*
934871	*AD1-116 C*	*0.61*
934872	*AD1-116 E*	*1.*
934971	*AD1-129 C*	*0.6*
934972	*AD1-129 E*	*0.4*
936371	*AD2-047 C O1*	*3.*
936372	*AD2-047 E O1*	*14.63*
936461	*AD2-060*	*1.76*
936511	*AD2-066 C O1*	*5.55*
936512	*AD2-066 E O1*	*3.7*

937001	*AD2-134 C*	*1.73*
937002	*AD2-134 E*	*6.89*
937401	*AD2-194 1*	*5.22*
937411	*AD2-194 2*	*5.21*
938511	*AE1-070 1*	*6.13*
938521	*AE1-070 2*	*5.61*
938851	*AE1-113 C*	*5.32*
938852	*AE1-113 E*	*18.86*
939351	*AE1-166 C O1*	*6.8*
939352	*AE1-166 E O1*	*6.28*
939631	*AE1-193 C*	*10.88*
939632	*AE1-193 E*	*72.84*
939641	*AE1-194 C*	*10.88*
939642	*AE1-194 E*	*72.84*
939651	*AE1-195 C*	*10.88*
939652	*AE1-195 E*	*72.84*
939681	*AE1-198 C*	*32.32*
939682	*AE1-198 E*	*27.46*
940752	*AE2-062 E*	*0.09*
941131	*AE2-107 C*	*4.35*
941132	*AE2-107 E*	*2.9*
941551	*AE2-152 C O1*	*7.85*
941552	*AE2-152 E O1*	*5.23*
941561	*AE2-153 C O1*	*3.13*
941562	*AE2-153 E O1*	*14.67*
942421	*AE2-255 C O1*	*2.02*
942422	*AE2-255 E O1*	*6.05*
942991	*AE2-321 C*	*5.43*
942992	*AE2-321 E*	*2.67*
943121	*AE2-341 C*	*8.45*
943122	*AE2-341 E*	*4.15*
943591	*AF1-030 C O1*	*5.62*
943592	*AF1-030 E O1*	*2.78*
943801	*AF1-048 C*	*2.54*
943802	*AF1-048 E*	*1.69*
944041	*AF1-072*	*1.43*
944911	*AF1-156 C*	*8.01*
944912	*AF1-156 E*	*5.34*
945351	*AF1-200 FTIR*	*174.09*
946661	*AF1-330 C*	*1.33*
946662	*AF1-330 E*	*0.29*
946671	*AF1-331*	*1.6*
LTF	*BLUEG*	*0.77*
LTF	*CATAWBA*	*0.14*
LTF	*CBM-S1*	*4.36*

LTF	*CBM-W1*	*44.*
LTF	*CBM-W2*	*13.74*
274751	*CRETE EC ;1U*	*2.31*
274752	*CRETE EC ;2U*	*2.31*
274753	*CRETE EC ;3U*	*2.31*
274754	*CRETE EC ;4U*	*2.31*
LTF	*G-007*	*1.31*
290051	*GSG-6; E*	*6.97*
275149	*KELLYCK ;1E*	*12.34*
290108	*LEEDK;1U E*	*16.13*
LTF	*MADISON*	*12.67*
LTF	*MEC*	*8.63*
293061	*N-015 E*	*10.21*
LTF	*NY*	*0.72*
LTF	*O-066*	*8.48*
293644	*O22 E1*	*7.22*
293645	*O22 E2*	*14.02*
290021	*O50 E*	*12.9*
294392	*P-010 E*	*12.97*
274881	*PILOT HIL;1E*	*12.34*
274793	*SE CHICAG;0U*	*3.65*
274794	*SE CHICAG;1U*	*3.65*
274795	*SE CHICAG;2U*	*3.65*
274788	*SE CHICAG;5U*	*3.54*
274789	*SE CHICAG;6U*	*3.55*
274790	*SE CHICAG;7U*	*3.6*
274791	*SE CHICAG;8U*	*3.6*
274792	*SE CHICAG;9U*	*3.65*
295111	*SUBLETTE E*	*1.81*
LTF	*TRIMBLE*	*0.27*
LTF	*TVA*	*1.02*
274830	*U3-021 1*	*4.05*
274831	*U3-021 2*	*4.05*
LTF	*WEC*	*2.49*
295109	*WESTBROOK E*	*3.73*
910542	*X3-005 E*	*0.52*
915011	*Y3-013 1*	*2.49*
915021	*Y3-013 2*	*2.49*
915031	*Y3-013 3*	*2.49*
916221	*Z1-073 E*	*3.6*
276168	*Z1-106 E1*	*0.84*
276167	*Z1-106 E2*	*0.84*
276169	*Z1-107 E*	*1.71*
276170	*Z1-108 E*	*1.65*
918052	*AA1-018 E OP*	*10.53*

920272	*AA2-123 E*	*1.62*
930481	*AB1-089*	*35.99*
930501	*AB1-091 O1*	*48.93*
930741	*AB1-122 1O1*	*47.33*
930751	*AB1-122 2O1*	*49.48*
924471	*AB2-096*	*28.09*
925302	*AB2-191 E*	*0.92*
926311	*AC1-109 1*	*1.26*
926321	*AC1-109 2*	*1.26*
926331	*AC1-110 1*	*1.26*
926341	*AC1-110 2*	*1.26*
926351	*AC1-111 1*	*0.51*
926361	*AC1-111 2*	*0.51*
926371	*AC1-111 3*	*0.51*
926381	*AC1-111 4*	*0.51*
926391	*AC1-111 5*	*0.51*
926401	*AC1-111 6*	*0.51*
927451	*AC1-142A 1*	*2.82*
927461	*AC1-142A 2*	*2.82*

Appendix 19

(CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 124.86% to 128.16% (AC power flow) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 192.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
933411	*AC2-154 C*	*1.71*
933412	*AC2-154 E*	*2.79*
933911	*AD1-013 C*	*1.36*
933912	*AD1-013 E*	*2.18*
933931	*AD1-016 C*	*0.68*
933932	*AD1-016 E*	*1.12*
934101	*AD1-039 1*	*5.13*
934111	*AD1-039 2*	*5.44*
934431	*AD1-067 C*	*0.1*
934432	*AD1-067 E*	*0.41*
934721	*AD1-100 C*	*14.09*
934722	*AD1-100 E*	*65.73*
934971	*AD1-129 C*	*0.67*
934972	*AD1-129 E*	*0.44*
936371	*AD2-047 C O1*	*3.06*
936372	*AD2-047 E O1*	*14.96*
936461	*AD2-060*	*1.8*
936511	*AD2-066 C O1*	*6.13*
936512	*AD2-066 E O1*	*4.08*
937001	*AD2-134 C*	*1.91*
937002	*AD2-134 E*	*7.64*
937401	*AD2-194 1*	*5.86*
937411	*AD2-194 2*	*5.85*

938511	*AE1-070 1*	*6.88*
938521	*AE1-070 2*	*6.29*
938851	*AE1-113 C*	*5.95*
938852	*AE1-113 E*	*21.11*
939351	*AE1-166 C O1*	*7.5*
939352	*AE1-166 E O1*	*6.92*
939631	*AE1-193 C*	*18.89*
939632	*AE1-193 E*	*126.45*
939641	*AE1-194 C*	*18.89*
939642	*AE1-194 E*	*126.45*
939651	*AE1-195 C*	*18.89*
939652	*AE1-195 E*	*126.45*
939681	*AE1-198 C*	*56.1*
939682	*AE1-198 E*	*47.67*
940752	*AE2-062 E*	*0.1*
941131	*AE2-107 C*	*4.82*
941132	*AE2-107 E*	*3.22*
941551	*AE2-152 C O1*	*8.66*
941552	*AE2-152 E O1*	*5.77*
941561	*AE2-153 C O1*	*3.45*
941562	*AE2-153 E O1*	*16.14*
942421	*AE2-255 C O1*	*2.26*
942422	*AE2-255 E O1*	*6.77*
942991	*AE2-321 C*	*6.02*
942992	*AE2-321 E*	*2.97*
943121	*AE2-341 C*	*9.34*
943122	*AE2-341 E*	*4.59*
943591	*AF1-030 C O1*	*6.21*
943592	*AF1-030 E O1*	*3.07*
943801	*AF1-048 C*	*2.82*
943802	*AF1-048 E*	*1.88*
944041	*AF1-072*	*1.59*
944911	*AF1-156 C*	*8.81*
944912	*AF1-156 E*	*5.88*
945351	*AF1-200 FTIR*	*192.82*
946661	*AF1-330 C*	*1.48*
946662	*AF1-330 E*	*0.32*
946671	*AF1-331*	*1.77*
LTF	*BLUEG*	*1.22*
274654	*BRAIDWOOD;1U*	*22.08*
274655	*BRAIDWOOD;2U*	*21.49*
LTF	*CALDERWOOD*	*0.02*
LTF	*CATAWBA*	*0.19*
LTF	*CBM-S1*	*3.57*
LTF	*CBM-W1*	*42.86*

LTF	*CBM-W2*	*13.91*
LTF	*CHEOAH*	*0.03*
274751	*CRETE EC ;1U*	*4.*
274752	*CRETE EC ;2U*	*4.*
274753	*CRETE EC ;3U*	*4.*
274754	*CRETE EC ;4U*	*4.*
LTF	*G-007*	*1.5*
LTF	*GIBSON*	*0.04*
290051	*GSG-6; E*	*7.72*
275149	*KELLYCK ;1E*	*12.62*
290108	*LEEDK;1U E*	*17.87*
LTF	*MADISON*	*14.23*
LTF	*MEC*	*9.48*
293061	*N-015 E*	*11.46*
LTF	*NY*	*0.82*
LTF	*O-066*	*9.71*
293644	*O22 E1*	*8.43*
293645	*O22 E2*	*16.37*
290021	*O50 E*	*14.43*
294392	*P-010 E*	*14.55*
274881	*PILOT HIL;1E*	*12.62*
295111	*SUBLETTE E*	*2.01*
274861	*TOP CROP ;1U*	*0.39*
274862	*TOP CROP ;2U*	*0.75*
LTF	*TRIMBLE*	*0.42*
LTF	*TVA*	*0.94*
274830	*U3-021 1*	*4.49*
274831	*U3-021 2*	*4.49*
LTF	*WEC*	*2.77*
295109	*WESTBROOK E*	*4.13*
274687	*WILL CNTY;4U*	*9.43*
915011	*Y3-013 1*	*2.77*
915021	*Y3-013 2*	*2.77*
915031	*Y3-013 3*	*2.77*
916221	*Z1-073 E*	*3.98*
276168	*Z1-106 E1*	*0.93*
276167	*Z1-106 E2*	*0.93*
276169	*Z1-107 E*	*1.83*
276170	*Z1-108 E*	*1.84*
920272	*AA2-123 E*	*1.8*
930481	*AB1-089*	*13.41*
930501	*AB1-091 O1*	*49.85*
930741	*AB1-122 1O1*	*52.35*
930751	*AB1-122 2O1*	*55.48*
924471	*AB2-096*	*31.19*

925302	*AB2-191 E*	*1.02*
926311	*AC1-109 1*	*1.4*
926321	*AC1-109 2*	*1.4*
926331	*AC1-110 1*	*1.4*
926341	*AC1-110 2*	*1.4*
926351	*AC1-111 1*	*0.56*
926361	*AC1-111 2*	*0.56*
926371	*AC1-111 3*	*0.56*
926381	*AC1-111 4*	*0.56*
926391	*AC1-111 5*	*0.56*
926401	*AC1-111 6*	*0.56*
927451	*AC1-142A 1*	*3.16*
927461	*AC1-142A 2*	*3.16*

Appendix 20

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 125.85% to 129.8% (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 323.32 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

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*0.17*
932891	*AC2-115 2*	*0.17*
932921	*AC2-116*	*1.02*
933411	*AC2-154 C*	*3.19*
933412	*AC2-154 E*	*5.2*
933911	*AD1-013 C*	*2.27*
933912	*AD1-013 E*	*3.62*
933931	*AD1-016 C*	*1.13*
933932	*AD1-016 E*	*1.85*
934101	*AD1-039 1*	*8.7*
934111	*AD1-039 2*	*8.81*
934431	*AD1-067 C*	*0.16*
934432	*AD1-067 E*	*0.68*
934701	*AD1-098 C O1*	*8.45*
934702	*AD1-098 E O1*	*6.17*
934721	*AD1-100 C*	*29.29*
934722	*AD1-100 E*	*136.68*
934871	*AD1-116 C*	*1.17*
934872	*AD1-116 E*	*1.9*
934971	*AD1-129 C*	*1.1*

934972	*AD1-129 E*	*0.73*
935001	*AD1-133 C O1*	*27.15*
935002	*AD1-133 E O1*	*18.1*
936291	*AD2-038 C O1*	*3.88*
936292	*AD2-038 E O1*	*18.16*
936371	*AD2-047 C O1*	*5.71*
936372	*AD2-047 E O1*	*27.87*
936461	*AD2-060*	*3.36*
936511	*AD2-066 C O1*	*10.33*
936512	*AD2-066 E O1*	*6.89*
937001	*AD2-134 C*	*3.18*
937002	*AD2-134 E*	*12.7*
937401	*AD2-194 1*	*9.51*
937411	*AD2-194 2*	*9.51*
938511	*AE1-070 1*	*11.18*
938521	*AE1-070 2*	*10.23*
938851	*AE1-113 C*	*9.74*
938852	*AE1-113 E*	*34.54*
939321	*AE1-163 C O1*	*7.2*
939322	*AE1-163 E O1*	*44.23*
939351	*AE1-166 C O1*	*14.45*
939352	*AE1-166 E O1*	*13.34*
939401	*AE1-172 C O1*	*8.01*
939402	*AE1-172 E O1*	*37.58*
939741	*AE1-205 C O1*	*12.26*
939742	*AE1-205 E O1*	*16.93*
940101	*AE1-252 C O1*	*16.09*
940102	*AE1-252 E O1*	*10.73*
940752	*AE2-062 E*	*0.16*
941131	*AE2-107 C*	*8.02*
941132	*AE2-107 E*	*5.35*
941551	*AE2-152 C O1*	*16.68*
941552	*AE2-152 E O1*	*11.12*
941561	*AE2-153 C O1*	*6.04*
941562	*AE2-153 E O1*	*28.28*
941731	*AE2-173 O1*	*7.3*
942111	*AE2-223 C*	*2.85*
942112	*AE2-223 E*	*19.05*
942421	*AE2-255 C O1*	*3.69*
942422	*AE2-255 E O1*	*11.07*
942651	*AE2-281 C O1*	*1.03*
942652	*AE2-281 E O1*	*6.32*
942991	*AE2-321 C*	*9.96*
942992	*AE2-321 E*	*4.91*
943121	*AE2-341 C*	*15.57*

943122	*AE2-341 E*	*7.65*
943591	*AF1-030 C O1*	*10.36*
943592	*AF1-030 E O1*	*5.12*
943801	*AF1-048 C*	*4.66*
943802	*AF1-048 E*	*3.11*
944041	*AF1-072*	*2.62*
944911	*AF1-156 C*	*15.45*
944912	*AF1-156 E*	*10.3*
945351	*AF1-200 FTIR*	*323.32*
946661	*AF1-330 C*	*2.44*
946662	*AF1-330 E*	*0.54*
946671	*AF1-331*	*2.95*
LTF	*BLUEG*	*2.25*
LTF	*CALDERWOOD*	*0.05*
LTF	*CATAWBA*	*0.35*
274890	*CAYUG;1U E*	*20.05*
274891	*CAYUG;2U E*	*20.05*
LTF	*CBM-S1*	*6.34*
LTF	*CBM-W1*	*81.53*
LTF	*CBM-W2*	*25.41*
LTF	*CHEOAH*	*0.06*
LTF	*G-007*	*2.59*
290051	*GSG-6; E*	*12.84*
275149	*KELLYCK ;1E*	*23.51*
290108	*LEEDK;1U E*	*29.71*
274771	*LINCOLN ;2U*	*4.*
274772	*LINCOLN ;3U*	*4.*
274773	*LINCOLN ;4U*	*4.*
274774	*LINCOLN ;5U*	*4.*
274775	*LINCOLN ;6U*	*4.*
274776	*LINCOLN ;7U*	*4.*
274777	*LINCOLN ;8U*	*4.*
LTF	*MADISON*	*24.35*
LTF	*MEC*	*16.06*
293061	*N-015 E*	*19.38*
LTF	*NY*	*1.41*
LTF	*O-066*	*16.77*
293644	*O22 E1*	*12.49*
293645	*O22 E2*	*24.24*
290021	*O50 E*	*23.61*
294392	*P-010 E*	*24.62*
274881	*PILOT HIL;1E*	*23.51*
295111	*SUBLETTE E*	*3.34*
LTF	*TRIMBLE*	*0.78*
LTF	*TVA*	*1.66*

274830	*U3-021 1*	*7.43*
274831	*U3-021 2*	*7.43*
LTF	*WEC*	*4.57*
295109	*WESTBROOK E*	*6.88*
910542	*X3-005 E*	*0.89*
915011	*Y3-013 1*	*4.56*
915021	*Y3-013 2*	*4.56*
915031	*Y3-013 3*	*4.56*
916221	*Z1-073 E*	*6.63*
276168	*Z1-106 E1*	*1.54*
276167	*Z1-106 E2*	*1.54*
276169	*Z1-107 E*	*3.15*
276170	*Z1-108 E*	*3.03*
917502	*Z2-087 E*	*25.4*
918052	*AA1-018 E OP*	*20.02*
920272	*AA2-123 E*	*2.98*
930481	*AB1-089*	*80.19*
930501	*AB1-091 O1*	*93.53*
930741	*AB1-122 1O1*	*88.79*
930751	*AB1-122 2O1*	*89.88*
924041	*AB2-047 C O1*	*4.74*
924042	*AB2-047 E O1*	*31.75*
924471	*AB2-096*	*51.62*
925302	*AB2-191 E*	*1.7*
926311	*AC1-109 1*	*2.33*
926321	*AC1-109 2*	*2.33*
926331	*AC1-110 1*	*2.31*
926341	*AC1-110 2*	*2.31*
926351	*AC1-111 1*	*0.93*
926361	*AC1-111 2*	*0.93*
926371	*AC1-111 3*	*0.93*
926381	*AC1-111 4*	*0.93*
926391	*AC1-111 5*	*0.93*
926401	*AC1-111 6*	*0.93*
927451	*AC1-142A 1*	*5.1*
927461	*AC1-142A 2*	*5.1*

Appendix 21

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 128.48% to 132.52% (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 330.16 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*	*0.17*
932891	*AC2-115 2*	*0.17*
932921	*AC2-116*	*1.04*
933411	*AC2-154 C*	*3.26*
933412	*AC2-154 E*	*5.31*
933911	*AD1-013 C*	*2.32*
933912	*AD1-013 E*	*3.7*
933931	*AD1-016 C*	*1.16*
933932	*AD1-016 E*	*1.89*
934101	*AD1-039 1*	*8.89*
934111	*AD1-039 2*	*9.*
934431	*AD1-067 C*	*0.16*
934432	*AD1-067 E*	*0.69*
934701	*AD1-098 C O1*	*8.63*
934702	*AD1-098 E O1*	*6.3*
934721	*AD1-100 C*	*29.87*
934722	*AD1-100 E*	*139.4*
934871	*AD1-116 C*	*1.19*
934872	*AD1-116 E*	*1.94*
934971	*AD1-129 C*	*1.13*

934972	*AD1-129 E*	*0.75*
935001	*AD1-133 C O1*	*27.71*
935002	*AD1-133 E O1*	*18.47*
936291	*AD2-038 C O1*	*3.96*
936292	*AD2-038 E O1*	*18.55*
936371	*AD2-047 C O1*	*5.83*
936372	*AD2-047 E O1*	*28.45*
936461	*AD2-060*	*3.43*
936511	*AD2-066 C O1*	*10.55*
936512	*AD2-066 E O1*	*7.04*
937001	*AD2-134 C*	*3.25*
937002	*AD2-134 E*	*12.97*
937401	*AD2-194 1*	*9.72*
937411	*AD2-194 2*	*9.72*
938511	*AE1-070 1*	*11.42*
938521	*AE1-070 2*	*10.45*
938851	*AE1-113 C*	*9.95*
938852	*AE1-113 E*	*35.27*
939321	*AE1-163 C O1*	*7.36*
939322	*AE1-163 E O1*	*45.19*
939351	*AE1-166 C O1*	*14.74*
939352	*AE1-166 E O1*	*13.61*
939401	*AE1-172 C O1*	*8.17*
939402	*AE1-172 E O1*	*38.32*
939741	*AE1-205 C O1*	*12.51*
939742	*AE1-205 E O1*	*17.28*
940101	*AE1-252 C O1*	*16.41*
940102	*AE1-252 E O1*	*10.94*
940752	*AE2-062 E*	*0.16*
941131	*AE2-107 C*	*8.19*
941132	*AE2-107 E*	*5.46*
941551	*AE2-152 C O1*	*17.01*
941552	*AE2-152 E O1*	*11.34*
941561	*AE2-153 C O1*	*6.17*
941562	*AE2-153 E O1*	*28.87*
941731	*AE2-173 O1*	*7.45*
942111	*AE2-223 C*	*2.9*
942112	*AE2-223 E*	*19.44*
942421	*AE2-255 C O1*	*3.77*
942422	*AE2-255 E O1*	*11.31*
942651	*AE2-281 C O1*	*1.05*
942652	*AE2-281 E O1*	*6.46*
942991	*AE2-321 C*	*10.18*
942992	*AE2-321 E*	*5.01*
943121	*AE2-341 C*	*15.9*

943122	*AE2-341 E*	*7.81*
943591	*AF1-030 C O1*	*10.58*
943592	*AF1-030 E O1*	*5.23*
943801	*AF1-048 C*	*4.76*
943802	*AF1-048 E*	*3.17*
944041	*AF1-072*	*2.68*
944911	*AF1-156 C*	*15.76*
944912	*AF1-156 E*	*10.51*
945351	*AF1-200 FTIR*	*330.16*
946661	*AF1-330 C*	*2.49*
946662	*AF1-330 E*	*0.55*
946671	*AF1-331*	*3.01*
LTF	*BLUEG*	*2.3*
LTF	*CALDERWOOD*	*0.05*
LTF	*CATAWBA*	*0.36*
274890	*CAYUG;1U E*	*20.45*
274891	*CAYUG;2U E*	*20.45*
LTF	*CBM-S1*	*6.47*
LTF	*CBM-W1*	*83.28*
LTF	*CBM-W2*	*25.94*
LTF	*CHEOAH*	*0.06*
LTF	*G-007*	*2.65*
290051	*GSG-6; E*	*13.12*
275149	*KELLYCK ;1E*	*24.*
290108	*LEEDK;1U E*	*30.34*
274771	*LINCOLN ;2U*	*4.11*
274772	*LINCOLN ;3U*	*4.11*
274773	*LINCOLN ;4U*	*4.11*
274774	*LINCOLN ;5U*	*4.11*
274775	*LINCOLN ;6U*	*4.11*
274776	*LINCOLN ;7U*	*4.11*
274777	*LINCOLN ;8U*	*4.11*
LTF	*MADISON*	*24.87*
LTF	*MEC*	*16.41*
293061	*N-015 E*	*19.79*
LTF	*NY*	*1.44*
LTF	*O-066*	*17.12*
293644	*O22 E1*	*12.75*
293645	*O22 E2*	*24.75*
290021	*O50 E*	*24.12*
294392	*P-010 E*	*25.13*
274881	*PILOT HIL;1E*	*24.*
295111	*SUBLETTE E*	*3.41*
LTF	*TRIMBLE*	*0.8*
LTF	*TVA*	*1.7*

274830	*U3-021 1*	*7.59*
274831	*U3-021 2*	*7.59*
LTF	*WEC*	*4.67*
295109	*WESTBROOK E*	*7.02*
910542	*X3-005 E*	*0.91*
915011	*Y3-013 1*	*4.65*
915021	*Y3-013 2*	*4.65*
915031	*Y3-013 3*	*4.65*
916221	*Z1-073 E*	*6.77*
276168	*Z1-106 E1*	*1.57*
276167	*Z1-106 E2*	*1.57*
276169	*Z1-107 E*	*3.22*
276170	*Z1-108 E*	*3.1*
917502	*Z2-087 E*	*25.91*
918052	*AA1-018 E OP*	*20.46*
920272	*AA2-123 E*	*3.04*
930481	*AB1-089*	*81.9*
930501	*AB1-091 O1*	*95.47*
930741	*AB1-122 1O1*	*90.67*
930751	*AB1-122 2O1*	*91.8*
924041	*AB2-047 C O1*	*4.84*
924042	*AB2-047 E O1*	*32.39*
924471	*AB2-096*	*52.72*
925302	*AB2-191 E*	*1.74*
926311	*AC1-109 1*	*2.38*
926321	*AC1-109 2*	*2.38*
926331	*AC1-110 1*	*2.36*
926341	*AC1-110 2*	*2.36*
926351	*AC1-111 1*	*0.95*
926361	*AC1-111 2*	*0.95*
926371	*AC1-111 3*	*0.95*
926381	*AC1-111 4*	*0.95*
926391	*AC1-111 5*	*0.95*
926401	*AC1-111 6*	*0.95*
927451	*AC1-142A 1*	*5.21*
927461	*AC1-142A 2*	*5.21*

Appendix 22

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 156.02% to 160.77% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 270.09 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
933911	*AD1-013 C*	*1.91*
933912	*AD1-013 E*	*3.05*
933931	*AD1-016 C*	*0.96*
933932	*AD1-016 E*	*1.57*
934101	*AD1-039 1*	*7.18*
934111	*AD1-039 2*	*7.68*
934431	*AD1-067 C*	*0.14*
934432	*AD1-067 E*	*0.57*
934701	*AD1-098 C O1*	*0.32*
934702	*AD1-098 E O1*	*0.23*
934721	*AD1-100 C*	*19.58*
934722	*AD1-100 E*	*91.37*
934971	*AD1-129 C*	*0.93*
934972	*AD1-129 E*	*0.62*
937001	*AD2-134 C*	*2.68*
937002	*AD2-134 E*	*10.7*
937401	*AD2-194 1*	*8.27*
937411	*AD2-194 2*	*8.26*
938511	*AE1-070 1*	*9.72*
938521	*AE1-070 2*	*8.88*
938851	*AE1-113 C*	*8.4*
938852	*AE1-113 E*	*29.76*
939351	*AE1-166 C O1*	*10.48*

939352	*AE1-166 E O1*	*9.67*
939631	*AE1-193 C*	*32.4*
939632	*AE1-193 E*	*216.81*
939641	*AE1-194 C*	*32.4*
939642	*AE1-194 E*	*216.81*
939651	*AE1-195 C*	*32.4*
939652	*AE1-195 E*	*216.81*
939681	*AE1-198 C*	*96.19*
939682	*AE1-198 E*	*81.74*
940752	*AE2-062 E*	*0.14*
941131	*AE2-107 C*	*6.76*
941132	*AE2-107 E*	*4.51*
941551	*AE2-152 C O1*	*12.09*
941552	*AE2-152 E O1*	*8.06*
941561	*AE2-153 C O1*	*4.81*
941562	*AE2-153 E O1*	*22.5*
942421	*AE2-255 C O1*	*3.18*
942422	*AE2-255 E O1*	*9.54*
942991	*AE2-321 C*	*8.45*
942992	*AE2-321 E*	*4.16*
943121	*AE2-341 C*	*13.08*
943122	*AE2-341 E*	*6.42*
943591	*AF1-030 C O1*	*8.7*
943592	*AF1-030 E O1*	*4.3*
943801	*AF1-048 C*	*3.95*
943802	*AF1-048 E*	*2.63*
944041	*AF1-072*	*2.23*
944911	*AF1-156 C*	*12.29*
944912	*AF1-156 E*	*8.19*
945351	*AF1-200 FTIR*	*270.09*
946661	*AF1-330 C*	*2.07*
946662	*AF1-330 E*	*0.45*
946671	*AF1-331*	*2.48*
LTF	*BLUEG*	*1.99*
274654	*BRAIDWOOD;1U*	*31.51*
274655	*BRAIDWOOD;2U*	*30.66*
LTF	*CALDERWOOD*	*0.08*
LTF	*CATAWBA*	*0.3*
LTF	*CBM-S1*	*4.04*
LTF	*CBM-W1*	*55.56*
LTF	*CBM-W2*	*18.48*
LTF	*CHEOAH*	*0.09*
274751	*CRETE EC ;1U*	*6.87*
274752	*CRETE EC ;2U*	*6.87*
274753	*CRETE EC ;3U*	*6.87*

274754	*CRETE EC ;4U*	*6.87*
LTF	*G-007*	*2.14*
LTF	*GIBSON*	*0.16*
290051	*GSG-6; E*	*10.82*
274704	*KENDALL ;1C*	*4.67*
274705	*KENDALL ;1S*	*3.13*
274706	*KENDALL ;2C*	*4.67*
274707	*KENDALL ;2S*	*3.13*
274660	*LASCO STA;1U*	*28.97*
274661	*LASCO STA;2U*	*29.08*
290108	*LEEDK;1U E*	*25.04*
LTF	*MADISON*	*20.08*
LTF	*MEC*	*13.22*
293061	*N-015 E*	*16.18*
LTF	*NY*	*1.17*
LTF	*O-066*	*13.86*
293644	*O22 E1*	*12.2*
293645	*O22 E2*	*23.68*
290021	*O50 E*	*20.35*
294392	*P-010 E*	*20.55*
295111	*SUBLETTE E*	*2.82*
274861	*TOP CROP ;1U*	*0.56*
274862	*TOP CROP ;2U*	*1.08*
LTF	*TRIMBLE*	*0.68*
LTF	*TVA*	*1.16*
274830	*U3-021 1*	*6.3*
274831	*U3-021 2*	*6.3*
LTF	*WEC*	*3.89*
295109	*WESTBROOK E*	*5.79*
274687	*WILL CNTY;4U*	*13.3*
915011	*Y3-013 1*	*3.89*
915021	*Y3-013 2*	*3.89*
915031	*Y3-013 3*	*3.89*
916221	*Z1-073 E*	*5.58*
276168	*Z1-106 E1*	*1.3*
276167	*Z1-106 E2*	*1.3*
276169	*Z1-107 E*	*2.51*
276170	*Z1-108 E*	*2.58*
920272	*AA2-123 E*	*2.53*
930481	*AB1-089*	*67.84*
930741	*AB1-122 1O1*	*73.28*
930751	*AB1-122 2O1*	*78.32*
924471	*AB2-096*	*43.75*
925302	*AB2-191 E*	*1.43*
926311	*AC1-109 1*	*1.97*

926321	*AC1-109 2*	*1.97*
926331	*AC1-110 1*	*1.96*
926341	*AC1-110 2*	*1.96*
926351	*AC1-111 1*	*0.79*
926361	*AC1-111 2*	*0.79*
926371	*AC1-111 3*	*0.79*
926381	*AC1-111 4*	*0.79*
926391	*AC1-111 5*	*0.79*
926401	*AC1-111 6*	*0.79*
927451	*AC1-142A 1*	*4.46*
927461	*AC1-142A 2*	*4.46*

Appendix 23

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 108.64% to 114.63% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT_NON_FSA'. This project contributes approximately 213.88 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT_NON_FSA'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1 / 243206 05DUMONT 765 X1-020

OPEN BRANCH FROM BUS 243207 TO BUS 907040 CKT 1

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

END

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*1.93*
932891	*AC2-115 2*	*1.93*
932921	*AC2-116*	*0.68*
932931	*AC2-117*	*10.49*
933411	*AC2-154 C*	*2.03*
933412	*AC2-154 E*	*3.31*
933911	*AD1-013 C*	*1.51*
933912	*AD1-013 E*	*2.41*
933931	*AD1-016 C*	*0.76*
933932	*AD1-016 E*	*1.23*
934101	*AD1-039 1*	*5.73*
934111	*AD1-039 2*	*5.89*
934431	*AD1-067 C*	*0.11*
934432	*AD1-067 E*	*0.45*
934701	*AD1-098 C O1*	*5.63*
934702	*AD1-098 E O1*	*4.11*
934721	*AD1-100 C*	*15.65*
934722	*AD1-100 E*	*73.05*
934871	*AD1-116 C*	*0.84*
934872	*AD1-116 E*	*1.37*
934971	*AD1-129 C*	*0.74*
934972	*AD1-129 E*	*0.49*
935001	*AD1-133 C O1*	*16.69*

935002	*AD1-133 E O1*	*11.13*
936291	*AD2-038 C O1*	*2.68*
936292	*AD2-038 E O1*	*12.56*
936371	*AD2-047 C O1*	*3.63*
936372	*AD2-047 E O1*	*17.73*
936461	*AD2-060*	*2.14*
936511	*AD2-066 C O1*	*6.88*
936512	*AD2-066 E O1*	*4.59*
936791	*AD2-102 C*	*11.49*
936792	*AD2-102 E*	*7.66*
937001	*AD2-134 C*	*2.12*
937002	*AD2-134 E*	*8.46*
937311	*AD2-172 C*	*2.*
937312	*AD2-172 E*	*2.76*
937401	*AD2-194 1*	*6.4*
937411	*AD2-194 2*	*6.4*
938511	*AE1-070 1*	*7.52*
938521	*AE1-070 2*	*6.88*
938851	*AE1-113 C*	*6.47*
938852	*AE1-113 E*	*22.95*
938861	*AE1-114 C O1*	*3.19*
938862	*AE1-114 E O1*	*10.89*
939321	*AE1-163 C O1*	*4.98*
939322	*AE1-163 E O1*	*30.59*
939351	*AE1-166 C O1*	*8.32*
939352	*AE1-166 E O1*	*7.68*
939401	*AE1-172 C O1*	*4.17*
939402	*AE1-172 E O1*	*19.56*
940101	*AE1-252 C O1*	*8.38*
940102	*AE1-252 E O1*	*5.58*
940501	*AE2-035 C*	*2.*
940502	*AE2-035 E*	*2.76*
940752	*AE2-062 E*	*0.11*
941131	*AE2-107 C*	*5.35*
941132	*AE2-107 E*	*3.56*
941551	*AE2-152 C O1*	*9.6*
941552	*AE2-152 E O1*	*6.4*
941561	*AE2-153 C O1*	*3.85*
941562	*AE2-153 E O1*	*18.02*
942421	*AE2-255 C O1*	*2.45*
942422	*AE2-255 E O1*	*7.36*
942651	*AE2-281 C O1*	*0.71*
942652	*AE2-281 E O1*	*4.37*
942991	*AE2-321 C*	*6.66*
942992	*AE2-321 E*	*3.28*

943121	*AE2-341 C*	*10.4*
943122	*AE2-341 E*	*5.11*
943411	*AF1-012 C*	*3.42*
943412	*AF1-012 E*	*2.28*
943591	*AF1-030 C O1*	*6.91*
943592	*AF1-030 E O1*	*3.42*
943801	*AF1-048 C*	*3.11*
943802	*AF1-048 E*	*2.08*
943921	*AF1-060*	*0.98*
944041	*AF1-072*	*1.76*
944911	*AF1-156 C*	*9.84*
944912	*AF1-156 E*	*6.56*
945351	*AF1-200 FTIR*	*213.88*
946501	*AF1-314 C*	*3.55*
946502	*AF1-314 E*	*16.63*
946661	*AF1-330 C*	*1.63*
946662	*AF1-330 E*	*0.36*
946671	*AF1-331*	*1.96*
LTF	*BLUEG*	*1.28*
LTF	*CALDERWOOD*	*0.02*
LTF	*CATAWBA*	*0.21*
LTF	*CBM-S1*	*4.14*
LTF	*CBM-W1*	*48.49*
LTF	*CBM-W2*	*15.59*
LTF	*CHEOAH*	*0.02*
274859	*EASYR;U1 E*	*8.92*
274860	*EASYR;U2 E*	*8.92*
LTF	*G-007*	*1.66*
LTF	*GIBSON*	*0.02*
290051	*GSG-6; E*	*8.55*
275149	*KELLYCK ;1E*	*14.95*
290108	*LEEDK;1U E*	*19.8*
LTF	*MADISON*	*15.69*
LTF	*MEC*	*10.48*
293061	*N-015 E*	*12.7*
LTF	*NY*	*0.91*
LTF	*O-066*	*10.73*
293644	*O22 E1*	*7.88*
293645	*O22 E2*	*15.3*
290021	*O50 E*	*15.69*
294392	*P-010 E*	*16.13*
294763	*P-046 E*	*7.62*
274881	*PILOT HIL;1E*	*14.95*
295111	*SUBLETTE E*	*2.23*
LTF	*TRIMBLE*	*0.44*

LTF	*TVA*	*1.06*
274830	*U3-021 1*	*4.97*
274831	*U3-021 2*	*4.97*
274814	*UNIV PK N;0U*	*1.95*
274806	*UNIV PK N;2U*	*1.95*
274808	*UNIV PK N;4U*	*1.95*
274809	*UNIV PK N;5U*	*1.95*
274811	*UNIV PK N;7U*	*1.95*
274812	*UNIV PK N;8U*	*1.95*
274815	*UNIV PK N;XU*	*1.95*
LTF	*WEC*	*3.06*
295109	*WESTBROOK E*	*4.58*
915011	*Y3-013 1*	*3.06*
915021	*Y3-013 2*	*3.06*
915031	*Y3-013 3*	*3.06*
916221	*Z1-073 E*	*4.41*
276168	*Z1-106 E1*	*1.03*
276167	*Z1-106 E2*	*1.03*
276169	*Z1-107 E*	*2.19*
276170	*Z1-108 E*	*2.03*
918052	*AA1-018 E OP*	*14.42*
920272	*AA2-123 E*	*1.99*
930481	*AB1-089*	*53.48*
930501	*AB1-091 O1*	*57.46*
930741	*AB1-122 1O1*	*58.44*
930751	*AB1-122 2O1*	*60.1*
924471	*AB2-096*	*34.49*
925302	*AB2-191 E*	*1.13*
926311	*AC1-109 1*	*1.56*
926321	*AC1-109 2*	*1.56*
926331	*AC1-110 1*	*1.55*
926341	*AC1-110 2*	*1.55*
926351	*AC1-111 1*	*0.62*
926361	*AC1-111 2*	*0.62*
926371	*AC1-111 3*	*0.62*
926381	*AC1-111 4*	*0.62*
926391	*AC1-111 5*	*0.62*
926401	*AC1-111 6*	*0.62*
927511	*AC1-113 1*	*0.97*
927521	*AC1-113 2*	*0.97*
926431	*AC1-114*	*1.93*
927451	*AC1-142A 1*	*3.47*
927461	*AC1-142A 2*	*3.47*

Appendix 24

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 125.85% to 129.8% (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 323.32 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

Bus Number	*Bus Name*	*Full Contribution*
932881	*AC2-115 1*	*0.17*
932891	*AC2-115 2*	*0.17*
932921	*AC2-116*	*1.02*
933411	*AC2-154 C*	*3.19*
933412	*AC2-154 E*	*5.2*
933911	*AD1-013 C*	*2.27*
933912	*AD1-013 E*	*3.62*
933931	*AD1-016 C*	*1.13*
933932	*AD1-016 E*	*1.85*
934101	*AD1-039 1*	*8.7*
934111	*AD1-039 2*	*8.81*
934431	*AD1-067 C*	*0.16*
934432	*AD1-067 E*	*0.68*
934701	*AD1-098 C O1*	*8.45*
934702	*AD1-098 E O1*	*6.17*
934721	*AD1-100 C*	*29.29*
934722	*AD1-100 E*	*136.68*
934871	*AD1-116 C*	*1.17*
934872	*AD1-116 E*	*1.9*
934971	*AD1-129 C*	*1.1*

934972	*AD1-129 E*	*0.73*
935001	*AD1-133 C O1*	*27.15*
935002	*AD1-133 E O1*	*18.1*
936291	*AD2-038 C O1*	*3.88*
936292	*AD2-038 E O1*	*18.16*
936371	*AD2-047 C O1*	*5.71*
936372	*AD2-047 E O1*	*27.87*
936461	*AD2-060*	*3.36*
936511	*AD2-066 C O1*	*10.33*
936512	*AD2-066 E O1*	*6.89*
937001	*AD2-134 C*	*3.18*
937002	*AD2-134 E*	*12.7*
937401	*AD2-194 1*	*9.51*
937411	*AD2-194 2*	*9.51*
938511	*AE1-070 1*	*11.18*
938521	*AE1-070 2*	*10.23*
938851	*AE1-113 C*	*9.74*
938852	*AE1-113 E*	*34.54*
939321	*AE1-163 C O1*	*7.2*
939322	*AE1-163 E O1*	*44.23*
939351	*AE1-166 C O1*	*14.45*
939352	*AE1-166 E O1*	*13.34*
939401	*AE1-172 C O1*	*8.01*
939402	*AE1-172 E O1*	*37.58*
939741	*AE1-205 C O1*	*12.26*
939742	*AE1-205 E O1*	*16.93*
940101	*AE1-252 C O1*	*16.09*
940102	*AE1-252 E O1*	*10.73*
940752	*AE2-062 E*	*0.16*
941131	*AE2-107 C*	*8.02*
941132	*AE2-107 E*	*5.35*
941551	*AE2-152 C O1*	*16.68*
941552	*AE2-152 E O1*	*11.12*
941561	*AE2-153 C O1*	*6.04*
941562	*AE2-153 E O1*	*28.28*
941731	*AE2-173 O1*	*7.3*
942111	*AE2-223 C*	*2.85*
942112	*AE2-223 E*	*19.05*
942421	*AE2-255 C O1*	*3.69*
942422	*AE2-255 E O1*	*11.07*
942651	*AE2-281 C O1*	*1.03*
942652	*AE2-281 E O1*	*6.32*
942991	*AE2-321 C*	*9.96*
942992	*AE2-321 E*	*4.91*
943121	*AE2-341 C*	*15.57*

943122	*AE2-341 E*	*7.65*
943591	*AF1-030 C O1*	*10.36*
943592	*AF1-030 E O1*	*5.12*
943801	*AF1-048 C*	*4.66*
943802	*AF1-048 E*	*3.11*
944041	*AF1-072*	*2.62*
944911	*AF1-156 C*	*15.45*
944912	*AF1-156 E*	*10.3*
945351	*AF1-200 FTIR*	*323.32*
946661	*AF1-330 C*	*2.44*
946662	*AF1-330 E*	*0.54*
946671	*AF1-331*	*2.95*
LTF	*BLUEG*	*2.25*
LTF	*CALDERWOOD*	*0.05*
LTF	*CATAWBA*	*0.35*
274890	*CAYUG;1U E*	*20.05*
274891	*CAYUG;2U E*	*20.05*
LTF	*CBM-S1*	*6.34*
LTF	*CBM-W1*	*81.53*
LTF	*CBM-W2*	*25.41*
LTF	*CHEOAH*	*0.06*
LTF	*G-007*	*2.59*
290051	*GSG-6; E*	*12.84*
275149	*KELLYCK ;1E*	*23.51*
290108	*LEEDK;1U E*	*29.71*
274771	*LINCOLN ;2U*	*4.*
274772	*LINCOLN ;3U*	*4.*
274773	*LINCOLN ;4U*	*4.*
274774	*LINCOLN ;5U*	*4.*
274775	*LINCOLN ;6U*	*4.*
274776	*LINCOLN ;7U*	*4.*
274777	*LINCOLN ;8U*	*4.*
LTF	*MADISON*	*24.35*
LTF	*MEC*	*16.06*
293061	*N-015 E*	*19.38*
LTF	*NY*	*1.41*
LTF	*O-066*	*16.77*
293644	*O22 E1*	*12.49*
293645	*O22 E2*	*24.24*
290021	*O50 E*	*23.61*
294392	*P-010 E*	*24.62*
274881	*PILOT HIL;1E*	*23.51*
295111	*SUBLETTE E*	*3.34*
LTF	*TRIMBLE*	*0.78*
LTF	*TVA*	*1.66*

274830	*U3-021 1*	*7.43*
274831	*U3-021 2*	*7.43*
LTF	*WEC*	*4.57*
295109	*WESTBROOK E*	*6.88*
910542	*X3-005 E*	*0.89*
915011	*Y3-013 1*	*4.56*
915021	*Y3-013 2*	*4.56*
915031	*Y3-013 3*	*4.56*
916221	*Z1-073 E*	*6.63*
276168	*Z1-106 E1*	*1.54*
276167	*Z1-106 E2*	*1.54*
276169	*Z1-107 E*	*3.15*
276170	*Z1-108 E*	*3.03*
917502	*Z2-087 E*	*25.4*
918052	*AA1-018 E OP*	*20.02*
920272	*AA2-123 E*	*2.98*
930481	*AB1-089*	*80.19*
930501	*AB1-091 O1*	*93.53*
930741	*AB1-122 1O1*	*88.79*
930751	*AB1-122 2O1*	*89.88*
924041	*AB2-047 C O1*	*4.74*
924042	*AB2-047 E O1*	*31.75*
924471	*AB2-096*	*51.62*
925302	*AB2-191 E*	*1.7*
926311	*AC1-109 1*	*2.33*
926321	*AC1-109 2*	*2.33*
926331	*AC1-110 1*	*2.31*
926341	*AC1-110 2*	*2.31*
926351	*AC1-111 1*	*0.93*
926361	*AC1-111 2*	*0.93*
926371	*AC1-111 3*	*0.93*
926381	*AC1-111 4*	*0.93*
926391	*AC1-111 5*	*0.93*
926401	*AC1-111 6*	*0.93*
927451	*AC1-142A 1*	*5.1*
927461	*AC1-142A 2*	*5.1*

Appendix 25

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 128.48% to 132.52% (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 330.16 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*	*0.17*
932891	*AC2-115 2*	*0.17*
932921	*AC2-116*	*1.04*
933411	*AC2-154 C*	*3.26*
933412	*AC2-154 E*	*5.31*
933911	*AD1-013 C*	*2.32*
933912	*AD1-013 E*	*3.7*
933931	*AD1-016 C*	*1.16*
933932	*AD1-016 E*	*1.89*
934101	*AD1-039 1*	*8.89*
934111	*AD1-039 2*	*9.*
934431	*AD1-067 C*	*0.16*
934432	*AD1-067 E*	*0.69*
934701	*AD1-098 C O1*	*8.63*
934702	*AD1-098 E O1*	*6.3*
934721	*AD1-100 C*	*29.87*
934722	*AD1-100 E*	*139.4*
934871	*AD1-116 C*	*1.19*
934872	*AD1-116 E*	*1.94*
934971	*AD1-129 C*	*1.13*

934972	*AD1-129 E*	*0.75*
935001	*AD1-133 C O1*	*27.71*
935002	*AD1-133 E O1*	*18.47*
936291	*AD2-038 C O1*	*3.96*
936292	*AD2-038 E O1*	*18.55*
936371	*AD2-047 C O1*	*5.83*
936372	*AD2-047 E O1*	*28.45*
936461	*AD2-060*	*3.43*
936511	*AD2-066 C O1*	*10.55*
936512	*AD2-066 E O1*	*7.04*
937001	*AD2-134 C*	*3.25*
937002	*AD2-134 E*	*12.97*
937401	*AD2-194 1*	*9.72*
937411	*AD2-194 2*	*9.72*
938511	*AE1-070 1*	*11.42*
938521	*AE1-070 2*	*10.45*
938851	*AE1-113 C*	*9.95*
938852	*AE1-113 E*	*35.27*
939321	*AE1-163 C O1*	*7.36*
939322	*AE1-163 E O1*	*45.19*
939351	*AE1-166 C O1*	*14.74*
939352	*AE1-166 E O1*	*13.61*
939401	*AE1-172 C O1*	*8.17*
939402	*AE1-172 E O1*	*38.32*
939741	*AE1-205 C O1*	*12.51*
939742	*AE1-205 E O1*	*17.28*
940101	*AE1-252 C O1*	*16.41*
940102	*AE1-252 E O1*	*10.94*
940752	*AE2-062 E*	*0.16*
941131	*AE2-107 C*	*8.19*
941132	*AE2-107 E*	*5.46*
941551	*AE2-152 C O1*	*17.01*
941552	*AE2-152 E O1*	*11.34*
941561	*AE2-153 C O1*	*6.17*
941562	*AE2-153 E O1*	*28.87*
941731	*AE2-173 O1*	*7.45*
942111	*AE2-223 C*	*2.9*
942112	*AE2-223 E*	*19.44*
942421	*AE2-255 C O1*	*3.77*
942422	*AE2-255 E O1*	*11.31*
942651	*AE2-281 C O1*	*1.05*
942652	*AE2-281 E O1*	*6.46*
942991	*AE2-321 C*	*10.18*
942992	*AE2-321 E*	*5.01*
943121	*AE2-341 C*	*15.9*

943122	*AE2-341 E*	*7.81*
943591	*AF1-030 C O1*	*10.58*
943592	*AF1-030 E O1*	*5.23*
943801	*AF1-048 C*	*4.76*
943802	*AF1-048 E*	*3.17*
944041	*AF1-072*	*2.68*
944911	*AF1-156 C*	*15.76*
944912	*AF1-156 E*	*10.51*
945351	*AF1-200 FTIR*	*330.16*
946661	*AF1-330 C*	*2.49*
946662	*AF1-330 E*	*0.55*
946671	*AF1-331*	*3.01*
LTF	*BLUEG*	*2.3*
LTF	*CALDERWOOD*	*0.05*
LTF	*CATAWBA*	*0.36*
274890	*CAYUG;1U E*	*20.45*
274891	*CAYUG;2U E*	*20.45*
LTF	*CBM-S1*	*6.47*
LTF	*CBM-W1*	*83.28*
LTF	*CBM-W2*	*25.94*
LTF	*CHEOAH*	*0.06*
LTF	*G-007*	*2.65*
290051	*GSG-6; E*	*13.12*
275149	*KELLYCK ;1E*	*24.*
290108	*LEEDK;1U E*	*30.34*
274771	*LINCOLN ;2U*	*4.11*
274772	*LINCOLN ;3U*	*4.11*
274773	*LINCOLN ;4U*	*4.11*
274774	*LINCOLN ;5U*	*4.11*
274775	*LINCOLN ;6U*	*4.11*
274776	*LINCOLN ;7U*	*4.11*
274777	*LINCOLN ;8U*	*4.11*
LTF	*MADISON*	*24.87*
LTF	*MEC*	*16.41*
293061	*N-015 E*	*19.79*
LTF	*NY*	*1.44*
LTF	*O-066*	*17.12*
293644	*O22 E1*	*12.75*
293645	*O22 E2*	*24.75*
290021	*O50 E*	*24.12*
294392	*P-010 E*	*25.13*
274881	*PILOT HIL;1E*	*24.*
295111	*SUBLETTE E*	*3.41*
LTF	*TRIMBLE*	*0.8*
LTF	*TVA*	*1.7*

274830	*U3-021 1*	*7.59*
274831	*U3-021 2*	*7.59*
LTF	*WEC*	*4.67*
295109	*WESTBROOK E*	*7.02*
910542	*X3-005 E*	*0.91*
915011	*Y3-013 1*	*4.65*
915021	*Y3-013 2*	*4.65*
915031	*Y3-013 3*	*4.65*
916221	*Z1-073 E*	*6.77*
276168	*Z1-106 E1*	*1.57*
276167	*Z1-106 E2*	*1.57*
276169	*Z1-107 E*	*3.22*
276170	*Z1-108 E*	*3.1*
917502	*Z2-087 E*	*25.91*
918052	*AA1-018 E OP*	*20.46*
920272	*AA2-123 E*	*3.04*
930481	*AB1-089*	*81.9*
930501	*AB1-091 O1*	*95.47*
930741	*AB1-122 1O1*	*90.67*
930751	*AB1-122 2O1*	*91.8*
924041	*AB2-047 C O1*	*4.84*
924042	*AB2-047 E O1*	*32.39*
924471	*AB2-096*	*52.72*
925302	*AB2-191 E*	*1.74*
926311	*AC1-109 1*	*2.38*
926321	*AC1-109 2*	*2.38*
926331	*AC1-110 1*	*2.36*
926341	*AC1-110 2*	*2.36*
926351	*AC1-111 1*	*0.95*
926361	*AC1-111 2*	*0.95*
926371	*AC1-111 3*	*0.95*
926381	*AC1-111 4*	*0.95*
926391	*AC1-111 5*	*0.95*
926401	*AC1-111 6*	*0.95*
927451	*AC1-142A 1*	*5.21*
927461	*AC1-142A 2*	*5.21*

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Appendices (Light Load Analysis)

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

(AEP - AEP) The 05RPMONE-05MADDOX 345 kV line (from bus 242933 to bus 246929 ckt 1) loads from 84.45% to 94.77% (**DC power flow**) of its normal rating (1301 MVA) for the single line contingency outage of 'AEP_P1-2_#7441'. This project contributes approximately 121.29 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#7441'
OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
247536	*05BLUFF P WF*	*0.63*
243859	*05FR-11G C*	*0.53*
243862	*05FR-12G C*	*0.52*
247901	*05FR-12G E*	*2.08*
243864	*05FR-21G C*	*0.56*
247902	*05FR-21G E*	*2.22*
243866	*05FR-22G C*	*0.53*
243870	*05FR-3G C*	*1.08*
247904	*05FR-3G E*	*4.3*
243873	*05FR-4G C*	*0.83*
247905	*05FR-4G E*	*3.37*
243795	*05HDWTR1G C*	*0.66*
247963	*05HDWTR1G E*	*4.4*
246909	*05MDL-1G C*	*1.12*
247906	*05MDL-1G E*	*4.49*
246910	*05MDL-2G C*	*0.56*
247907	*05MDL-2G E*	*2.25*
246976	*05MDL-3G C*	*0.57*
247912	*05MDL-3G E*	*2.25*
246979	*05MDL-4G C*	*0.55*
247913	*05MDL-4G E*	*2.25*
246953	*05TIMB G C*	*1.11*
247911	*05TIMB G E*	*4.46*
246991	*05WLD G1 C*	*0.34*
247255	*05WLD G2 C*	*0.36*
247958	*05WLD G2 E*	*4.7*
933281	*AC2-140 C*	*3.14*
933282	*AC2-140 E*	*0.17*
933591	*AC2-176 C O1*	*0.25*
933592	*AC2-176 E O1*	*3.23*
934431	*AD1-067 C*	*0.06*

934432	*AD1-067 E*	*0.26*
934721	*AD1-100 C*	*8.9*
934722	*AD1-100 E*	*41.51*
935141	*AD1-148*	*2.43*
936291	*AD2-038 C O1*	*1.5*
936292	*AD2-038 E O1*	*7.02*
936371	*AD2-047 C O1*	*2.04*
936372	*AD2-047 E O1*	*9.95*
936722	*AD2-091 BAT*	*6.78*
936752	*AD2-096 BAT*	*3.1*
936971	*AD2-131 C*	*0.48*
936972	*AD2-131 E*	*2.43*
937001	*AD2-134 C*	*1.23*
937002	*AD2-134 E*	*4.91*
937211	*AD2-159 C*	*1.65*
937212	*AD2-159 E*	*7.73*
938851	*AE1-113 C*	*3.76*
938852	*AE1-113 E*	*13.33*
938861	*AE1-114 C O1*	*1.89*
938862	*AE1-114 E O1*	*6.43*
939321	*AE1-163 C O1*	*2.78*
939322	*AE1-163 E O1*	*17.09*
939401	*AE1-172 C O1*	*2.56*
939402	*AE1-172 E O1*	*12.*
939631	*AE1-193 C*	*4.03*
939632	*AE1-193 E*	*26.98*
939641	*AE1-194 C*	*4.03*
939642	*AE1-194 E*	*26.98*
939651	*AE1-195 C*	*4.03*
939652	*AE1-195 E*	*26.98*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*6.9*
939781	*AE1-209 C O1*	*0.75*
939782	*AE1-209 E O1*	*5.02*
939791	*AE1-210 C O1*	*0.75*
939792	*AE1-210 E O1*	*5.02*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*10.7*
940752	*AE2-062 E*	*0.07*
941561	*AE2-153 C O1*	*2.11*
941562	*AE2-153 E O1*	*9.86*
941571	*AE2-154 C*	*1.83*
941572	*AE2-154 E*	*12.24*
941691	*AE2-169*	*2.63*
941721	*AE2-172*	*2.9*

941731	*AE2-173 O1*	*3.41*
942042	*AE2-216 BAT*	*7.46*
942111	*AE2-223 C*	*1.07*
942112	*AE2-223 E*	*7.13*
942421	*AE2-255 C O1*	*1.42*
942422	*AE2-255 E O1*	*4.27*
942651	*AE2-281 C O1*	*0.4*
942652	*AE2-281 E O1*	*2.44*
943021	*AE2-325 C*	*2.65*
943022	*AE2-325 E*	*1.76*
943781	*AF1-046 C*	*3.46*
943782	*AF1-046 E*	*2.31*
943791	*AF1-047 C*	*1.24*
943792	*AF1-047 E*	*0.82*
943801	*AF1-048 C*	*2.23*
943802	*AF1-048 E*	*1.49*
943921	*AF1-060*	*0.72*
944221	*AF1-090 C O1*	*1.6*
944222	*AF1-090 E O1*	*7.49*
944241	*AF1-092 C O1*	*< 0.01*
944242	*AF1-092 E O1*	*12.58*
944831	*AF1-148 C O1*	*< 0.01*
944832	*AF1-148 E O1*	*15.89*
944931	*AF1-158 C O1*	*< 0.01*
944932	*AF1-158 E O1*	*12.5*
944961	*AF1-161 C*	*2.11*
944962	*AF1-161 E*	*2.11*
945111	*AF1-176 C O1*	*4.36*
945112	*AF1-176 E O1*	*6.53*
945351	*AF1-200 FTIR*	*121.29*
945371	*AF1-202 C O1*	*2.32*
945372	*AF1-202 E O1*	*11.34*
945391	*AF1-204 C O1*	*2.89*
945392	*AF1-204 E O1*	*8.68*
945421	*AF1-207 C*	*1.95*
945422	*AF1-207 E*	*8.37*
945871	*AF1-252 O1*	*3.55*
945881	*AF1-253 O1*	*2.46*
946161	*AF1-281 C*	*0.21*
946162	*AF1-281 E*	*1.17*
946203	*AF1-285 BAT*	*2.49*
946321	*AF1-296 C O1*	*1.97*
946322	*AF1-296 E O1*	*9.23*
946501	*AF1-314 C*	*2.08*
946502	*AF1-314 E*	*9.75*

946541	*AF1-318 C O1*	*2.89*
946542	*AF1-318 E O1*	*13.54*
274857	*BIG SKY ;U1*	*0.66*
274858	*BIG SKY ;U2*	*0.66*
274877	*BISHOP HL;1U*	*0.54*
274878	*BISHOP HL;2U*	*0.54*
294401	*BSHIL;1U E*	*2.16*
294410	*BSHIL;2U E*	*2.16*
274848	*CAMPGROVE;RU*	*0.81*
274890	*CAYUG;1U E*	*3.37*
274891	*CAYUG;2U E*	*3.37*
274863	*CAYUGA RI;1U*	*0.84*
274864	*CAYUGA RI;2U*	*0.84*
274849	*CRESCENT ;1U*	*0.26*
274859	*EASYR;U1 E*	*2.64*
274860	*EASYR;U2 E*	*2.64*
274856	*ECOGROVE ;U1*	*0.56*
274871	*GR RIDGE ;2U*	*1.12*
274847	*GR RIDGE ;BU*	*0.88*
274855	*GSG-6 ;RU*	*0.62*
290051	*GSG-6; E*	*2.48*
275149	*KELLYCK ;1E*	*4.19*
274888	*KELLYCK ;1U*	*1.05*
990901	*L-005 E*	*3.22*
274872	*LEE DEKAL;1U*	*1.37*
290108	*LEEDK;1U E*	*5.7*
274850	*MENDOTA H;RU*	*0.15*
274879	*MINONK ;1U*	*1.14*
293061	*N-015 E*	*3.53*
293513	*O-009 C1*	*0.56*
293514	*O-009 C2*	*0.28*
293515	*O-009 C3*	*0.31*
293516	*O-009 E1*	*2.23*
293517	*O-009 E2*	*1.13*
293518	*O-009 E3*	*1.25*
276156	*O-029 C*	*0.3*
276157	*O-029 C*	*0.33*
276158	*O-029 C*	*0.6*
293715	*O-029 E*	*2.38*
293716	*O-029 E*	*1.31*
293717	*O-029 E*	*1.2*
293771	*O-035 E*	*1.61*
293644	*O22 E1*	*2.36*
293645	*O22 E2*	*4.59*
290021	*O50 E*	*4.55*

294392	*P-010 E*	*4.48*
294763	*P-046 E*	*2.23*
274881	*PILOT HIL;1E*	*4.19*
274887	*PILOT HIL;1U*	*1.05*
274851	*PROVIDENC;RU*	*0.4*
290261	*S-027 E*	*4.11*
290265	*S-028 E*	*4.11*
247929	*S-071 E*	*2.52*
295110	*SUBLETTE C*	*0.09*
247556	*T-127 C*	*0.56*
247943	*T-127 E*	*2.25*
247521	*T-131 C*	*1.29*
247925	*T-131 E*	*5.16*
274861	*TOP CROP ;1U*	*0.59*
274862	*TOP CROP ;2U*	*1.15*
274853	*TWINGROVE;U1*	*1.03*
274854	*TWINGROVE;U2*	*1.03*
247543	*V3-007 C*	*0.66*
274882	*W4-005 E*	*5.66*
295108	*WESTBROOK C*	*0.2*
917501	*Z2-087 C*	*0.71*
917502	*Z2-087 E*	*4.74*
918051	*AA1-018 C OP*	*0.56*
930041	*AB1-006 C*	*0.73*
930042	*AB1-006 E*	*4.89*
924041	*AB2-047 C O1*	*1.78*
924042	*AB2-047 E O1*	*11.88*
924261	*AB2-070 C O1*	*1.3*
924262	*AB2-070 E O1*	*8.71*
925301	*AB2-191*	*0.24*
925581	*AC1-033 C*	*0.71*
925582	*AC1-033 E*	*4.74*
925771	*AC1-053 C*	*1.3*
925772	*AC1-053 E*	*8.69*
926821	*AC1-168 C O1*	*0.56*
926822	*AC1-168 E O1*	*3.79*
926841	*AC1-171 C O1*	*0.55*
926842	*AC1-171 E O1*	*3.65*
926861	*AC1-173 C*	*0.43*
926862	*AC1-173 E*	*2.9*
927201	*AC1-214 C O1*	*1.03*
927202	*AC1-214 E O1*	*3.28*

Appendix 2

(AEP - AEP) The 05SORENS-05MARYSV 765 kV line (from bus 246999 to bus 242928 ckt 1) loads from 86.39% to 100.59% (AC power flow) of its normal rating (4047 MVA) for non-contingency condition. This project contributes approximately 336.9 MW to the thermal violation.

Bus Number	*Bus Name*	*Full Contribution*
247536	*05BLUFF P WF*	*1.27*
243859	*05FR-11G C*	*1.35*
243862	*05FR-12G C*	*1.33*
247901	*05FR-12G E*	*5.31*
243864	*05FR-21G C*	*1.42*
247902	*05FR-21G E*	*5.68*
243866	*05FR-22G C*	*1.36*
243870	*05FR-3G C*	*2.75*
247904	*05FR-3G E*	*11.01*
243873	*05FR-4G C*	*2.13*
247905	*05FR-4G E*	*8.63*
243795	*05HDWTR1G C*	*1.43*
247963	*05HDWTR1G E*	*9.6*
246909	*05MDL-1G C*	*2.88*
247906	*05MDL-1G E*	*11.5*
246910	*05MDL-2G C*	*1.43*
247907	*05MDL-2G E*	*5.76*
246976	*05MDL-3G C*	*1.46*
247912	*05MDL-3G E*	*5.76*
246979	*05MDL-4G C*	*1.42*
247913	*05MDL-4G E*	*5.76*
246953	*05TIMB G C*	*1.81*
247911	*05TIMB G E*	*7.28*
246991	*05WLD G1 C*	*0.77*
247255	*05WLD G2 C*	*0.81*
247958	*05WLD G2 E*	*10.59*
933281	*AC2-140 C*	*9.2*
933282	*AC2-140 E*	*0.48*
933591	*AC2-176 C O1*	*0.5*
933592	*AC2-176 E O1*	*6.44*
934431	*AD1-067 C*	*0.17*
934432	*AD1-067 E*	*0.72*
934721	*AD1-100 C*	*24.45*
934722	*AD1-100 E*	*114.08*
935141	*AD1-148*	*6.5*

936291	*AD2-038 C O1*	*4.09*
936292	*AD2-038 E O1*	*19.14*
936371	*AD2-047 C O1*	*5.57*
936372	*AD2-047 E O1*	*27.22*
936752	*AD2-096 BAT*	*6.24*
936971	*AD2-131 C*	*1.29*
936972	*AD2-131 E*	*6.46*
937001	*AD2-134 C*	*3.37*
937002	*AD2-134 E*	*13.47*
937211	*AD2-159 C*	*4.42*
937212	*AD2-159 E*	*20.71*
938851	*AE1-113 C*	*10.27*
938852	*AE1-113 E*	*36.42*
938861	*AE1-114 C O1*	*5.16*
938862	*AE1-114 E O1*	*17.59*
939321	*AE1-163 C O1*	*7.59*
939322	*AE1-163 E O1*	*46.61*
939401	*AE1-172 C O1*	*7.*
939402	*AE1-172 E O1*	*32.85*
939631	*AE1-193 C*	*10.78*
939632	*AE1-193 E*	*72.13*
939641	*AE1-194 C*	*10.78*
939642	*AE1-194 E*	*72.13*
939651	*AE1-195 C*	*10.78*
939652	*AE1-195 E*	*72.13*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*18.45*
939781	*AE1-209 C O1*	*1.6*
939782	*AE1-209 E O1*	*10.74*
939791	*AE1-210 C O1*	*1.6*
939792	*AE1-210 E O1*	*10.74*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*29.3*
940752	*AE2-062 E*	*0.2*
941341	*AE2-130 C*	*< 0.01*
941342	*AE2-130 E*	*20.16*
941561	*AE2-153 C O1*	*5.77*
941562	*AE2-153 E O1*	*27.02*
941571	*AE2-154 C*	*4.69*
941572	*AE2-154 E*	*31.4*
941691	*AE2-169*	*5.4*
941721	*AE2-172*	*6.46*
941731	*AE2-173 O1*	*9.28*
942111	*AE2-223 C*	*2.9*
942112	*AE2-223 E*	*19.38*

942421	*AE2-255 C O1*	*3.89*
942422	*AE2-255 E O1*	*11.67*
942601	*AE2-276*	*6.11*
942651	*AE2-281 C O1*	*1.08*
942652	*AE2-281 E O1*	*6.66*
943021	*AE2-325 C*	*6.67*
943022	*AE2-325 E*	*4.44*
943781	*AF1-046 C*	*6.65*
943782	*AF1-046 E*	*4.43*
943791	*AF1-047 C*	*2.89*
943792	*AF1-047 E*	*1.93*
943801	*AF1-048 C*	*6.13*
943802	*AF1-048 E*	*4.09*
943921	*AF1-060*	*1.97*
944201	*AF1-088 FTIR*	*97.69*
944221	*AF1-090 C O1*	*4.23*
944222	*AF1-090 E O1*	*19.82*
944241	*AF1-092 C O1*	*< 0.01*
944242	*AF1-092 E O1*	*24.8*
944831	*AF1-148 C O1*	*< 0.01*
944832	*AF1-148 E O1*	*32.43*
944931	*AF1-158 C O1*	*< 0.01*
944932	*AF1-158 E O1*	*32.48*
944961	*AF1-161 C*	*5.32*
944962	*AF1-161 E*	*5.32*
945111	*AF1-176 C O1*	*10.36*
945112	*AF1-176 E O1*	*15.54*
945351	*AF1-200 FTIR*	*336.9*
945371	*AF1-202 C O1*	*4.84*
945372	*AF1-202 E O1*	*23.64*
945391	*AF1-204 C O1*	*7.37*
945392	*AF1-204 E O1*	*22.1*
945421	*AF1-207 C*	*5.*
945422	*AF1-207 E*	*21.49*
945871	*AF1-252 O1*	*9.38*
945881	*AF1-253 O1*	*6.49*
946161	*AF1-281 C*	*0.56*
946162	*AF1-281 E*	*3.19*
946321	*AF1-296 C O1*	*5.36*
946322	*AF1-296 E O1*	*25.1*
946501	*AF1-314 C*	*5.7*
946502	*AF1-314 E*	*26.69*
946541	*AF1-318 C O1*	*7.87*
946542	*AF1-318 E O1*	*36.85*
274857	*BIG SKY ;U1*	*1.81*

274858	*BIG SKY ;U2*	*1.81*
274877	*BISHOP HL;1U*	*1.47*
274878	*BISHOP HL;2U*	*1.47*
294401	*BSHIL;1U E*	*5.87*
294410	*BSHIL;2U E*	*5.87*
274848	*CAMPGROVE;RU*	*2.19*
274890	*CAYUG;1U E*	*9.19*
274891	*CAYUG;2U E*	*9.19*
274863	*CAYUGA RI;1U*	*2.3*
274864	*CAYUGA RI;2U*	*2.3*
274849	*CRESCENT ;1U*	*0.72*
274859	*EASYR;U1 E*	*7.22*
274860	*EASYR;U2 E*	*7.22*
274856	*ECOGROVE ;U1*	*1.52*
274871	*GR RIDGE ;2U*	*3.08*
274847	*GR RIDGE ;BU*	*2.42*
274855	*GSG-6 ;RU*	*1.7*
290051	*GSG-6; E*	*6.8*
275149	*KELLYCK ;1E*	*11.46*
274888	*KELLYCK ;1U*	*2.86*
990901	*L-005 E*	*8.76*
274872	*LEE DEKAL;1U*	*3.76*
290108	*LEEDK;1U E*	*15.65*
274850	*MENDOTA H;RU*	*0.4*
274879	*MINONK ;1U*	*3.11*
293061	*N-015 E*	*9.7*
293513	*O-009 C1*	*1.52*
293514	*O-009 C2*	*0.77*
293515	*O-009 C3*	*0.85*
293516	*O-009 E1*	*6.08*
293517	*O-009 E2*	*3.09*
293518	*O-009 E3*	*3.4*
276156	*O-029 C*	*0.82*
276157	*O-029 C*	*0.89*
276158	*O-029 C*	*1.62*
293715	*O-029 E*	*6.5*
293716	*O-029 E*	*3.57*
293717	*O-029 E*	*3.28*
293771	*O-035 E*	*4.37*
293644	*O22 E1*	*6.45*
293645	*O22 E2*	*12.52*
290021	*O50 E*	*12.43*
294392	*P-010 E*	*12.32*
294763	*P-046 E*	*6.1*
274881	*PILOT HIL;1E*	*11.46*

274887	*PILOT HIL;1U*	*2.86*
274851	*PROVIDENC;RU*	*1.09*
290261	*S-027 E*	*11.08*
290265	*S-028 E*	*11.08*
247929	*S-071 E*	*5.06*
295110	*SUBLETTE C*	*0.24*
247556	*T-127 C*	*1.44*
247943	*T-127 E*	*5.76*
247521	*T-131 C*	*1.87*
247925	*T-131 E*	*7.46*
274861	*TOP CROP ;1U*	*1.61*
274862	*TOP CROP ;2U*	*3.13*
274853	*TWINGROVE;U1*	*2.77*
274854	*TWINGROVE;U2*	*2.77*
247607	*V1-011 C*	*0.65*
247959	*V1-011 E*	*4.33*
247543	*V3-007 C*	*1.43*
274882	*W4-005 E*	*15.17*
295108	*WESTBROOK C*	*0.56*
917501	*Z2-087 C*	*1.93*
917502	*Z2-087 E*	*12.89*
918051	*AA1-018 C OP*	*1.54*
930041	*AB1-006 C*	*1.87*
930042	*AB1-006 E*	*12.53*
924041	*AB2-047 C O1*	*4.83*
924042	*AB2-047 E O1*	*32.3*
924261	*AB2-070 C O1*	*3.49*
924262	*AB2-070 E O1*	*23.34*
925301	*AB2-191*	*0.65*
925581	*AC1-033 C*	*1.93*
925582	*AC1-033 E*	*12.89*
925771	*AC1-053 C*	*3.48*
925772	*AC1-053 E*	*23.26*
926821	*AC1-168 C O1*	*1.54*
926822	*AC1-168 E O1*	*10.33*
926841	*AC1-171 C O1*	*1.48*
926842	*AC1-171 E O1*	*9.89*
926861	*AC1-173 C*	*0.63*
926862	*AC1-173 E*	*4.18*
927201	*AC1-214 C O1*	*2.81*
927202	*AC1-214 E O1*	*8.93*

Appendix 3

(MISO NIPS - CE) The 17GREEN_ACRE-GREENACRE; T 345 kV line (from bus 255104 to bus 270771 ckt 1) loads from 82.93% to 96.55% (**DC power flow**) of its emergency rating (1195 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 137.35 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.07*
934432	*AD1-067 E*	*0.29*
934721	*AD1-100 C*	*10.15*
934722	*AD1-100 E*	*47.39*
936291	*AD2-038 C O1*	*1.63*
936292	*AD2-038 E O1*	*7.62*
936371	*AD2-047 C O1*	*2.37*
936372	*AD2-047 E O1*	*11.57*
937001	*AD2-134 C*	*1.36*
937002	*AD2-134 E*	*5.42*
938851	*AE1-113 C*	*4.18*
938852	*AE1-113 E*	*14.82*
938861	*AE1-114 C O1*	*2.04*
938862	*AE1-114 E O1*	*6.97*
939321	*AE1-163 C O1*	*3.02*
939322	*AE1-163 E O1*	*18.57*
939401	*AE1-172 C O1*	*2.7*
939402	*AE1-172 E O1*	*12.67*
939631	*AE1-193 C*	*8.66*
939632	*AE1-193 E*	*57.94*
939641	*AE1-194 C*	*8.66*
939642	*AE1-194 E*	*57.94*
939651	*AE1-195 C*	*8.66*
939652	*AE1-195 E*	*57.94*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*14.82*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*11.31*
940752	*AE2-062 E*	*0.09*
941561	*AE2-153 C O1*	*2.48*
941562	*AE2-153 E O1*	*11.6*

941731	*AE2-173 O1*	*3.29*
942111	*AE2-223 C*	*1.03*
942112	*AE2-223 E*	*6.86*
942421	*AE2-255 C O1*	*1.58*
942422	*AE2-255 E O1*	*4.75*
942651	*AE2-281 C O1*	*0.43*
942652	*AE2-281 E O1*	*2.65*
943801	*AF1-048 C*	*2.49*
943802	*AF1-048 E*	*1.66*
943921	*AF1-060*	*0.79*
945351	*AF1-200 FTIR*	*137.35*
946161	*AF1-281 C*	*0.22*
946162	*AF1-281 E*	*1.25*
946321	*AF1-296 C O1*	*2.03*
946322	*AF1-296 E O1*	*9.5*
946501	*AF1-314 C*	*2.27*
946502	*AF1-314 E*	*10.64*
946541	*AF1-318 C O1*	*2.97*
946542	*AF1-318 E O1*	*13.91*
274857	*BIG SKY ;U1*	*0.71*
274858	*BIG SKY ;U2*	*0.71*
274877	*BISHOP HL;1U*	*0.55*
274878	*BISHOP HL;2U*	*0.55*
294401	*BSHIL;1U E*	*2.21*
294410	*BSHIL;2U E*	*2.21*
274848	*CAMPGROVE;RU*	*0.82*
274890	*CAYUG;1U E*	*3.45*
274891	*CAYUG;2U E*	*3.45*
274863	*CAYUGA RI;1U*	*0.86*
274864	*CAYUGA RI;2U*	*0.86*
274849	*CRESCENT ;1U*	*0.27*
274859	*EASYR;U1 E*	*2.85*
274860	*EASYR;U2 E*	*2.85*
274856	*ECOGROVE ;U1*	*0.61*
274871	*GR RIDGE ;2U*	*1.28*
274847	*GR RIDGE ;BU*	*1.*
274855	*GSG-6 ;RU*	*0.68*
290051	*GSG-6; E*	*2.73*
275149	*KELLYCK ;1E*	*4.87*
274888	*KELLYCK ;1U*	*1.22*
990901	*L-005 E*	*3.26*
274872	*LEE DEKAL;1U*	*1.52*
290108	*LEEDK;1U E*	*6.33*
274850	*MENDOTA H;RU*	*0.16*
274879	*MINONK ;1U*	*1.26*

293061	*N-015 E*	*4.02*
293513	*O-009 C1*	*0.59*
293514	*O-009 C2*	*0.3*
293515	*O-009 C3*	*0.33*
293516	*O-009 E1*	*2.35*
293517	*O-009 E2*	*1.19*
293518	*O-009 E3*	*1.32*
276156	*O-029 C*	*0.32*
276157	*O-029 C*	*0.34*
276158	*O-029 C*	*0.63*
293715	*O-029 E*	*2.51*
293716	*O-029 E*	*1.38*
293717	*O-029 E*	*1.27*
293771	*O-035 E*	*1.65*
293644	*O22 E1*	*2.83*
293645	*O22 E2*	*5.5*
290021	*O50 E*	*5.06*
294392	*P-010 E*	*5.1*
294763	*P-046 E*	*2.43*
274881	*PILOT HIL;1E*	*4.87*
274887	*PILOT HIL;1U*	*1.22*
274851	*PROVIDENC;RU*	*0.41*
290261	*S-027 E*	*3.52*
290265	*S-028 E*	*3.52*
295110	*SUBLETTE C*	*0.1*
274861	*TOP CROP ;1U*	*0.71*
274862	*TOP CROP ;2U*	*1.37*
274853	*TWINGROVE;U1*	*0.88*
274854	*TWINGROVE;U2*	*0.88*
295108	*WESTBROOK C*	*0.22*
917501	*Z2-087 C*	*0.68*
917502	*Z2-087 E*	*4.56*
918051	*AA1-018 C OP*	*0.62*
924041	*AB2-047 C O1*	*1.71*
924042	*AB2-047 E O1*	*11.43*
925301	*AB2-191*	*0.26*
925581	*AC1-033 C*	*0.72*
925582	*AC1-033 E*	*4.85*
926821	*AC1-168 C O1*	*0.59*
926822	*AC1-168 E O1*	*3.97*
926841	*AC1-171 C O1*	*0.53*
926842	*AC1-171 E O1*	*3.55*
927201	*AC1-214 C O1*	*1.06*
927202	*AC1-214 E O1*	*3.36*

Appendix 4

(CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 101.45% to 115.88% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 619.01 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'
TRIP BRANCH FROM BUS 274750 TO BUS 255112 CKT 1 / CRETE;BP 345 17STJOHN 345
TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1 / UPNOR;RP 345 05OLIVE 345
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.28*
934432	*AD1-067 E*	*1.17*
934721	*AD1-100 C*	*39.74*
934722	*AD1-100 E*	*185.46*
935141	*AD1-148*	*7.39*
936291	*AD2-038 C O1*	*6.15*
936292	*AD2-038 E O1*	*28.79*
936371	*AD2-047 C O1*	*8.37*
936372	*AD2-047 E O1*	*40.86*
936971	*AD2-131 C*	*1.3*
936972	*AD2-131 E*	*6.54*
937001	*AD2-134 C*	*5.47*
937002	*AD2-134 E*	*21.83*
937211	*AD2-159 C*	*5.15*
937212	*AD2-159 E*	*24.09*
938851	*AE1-113 C*	*15.77*
938852	*AE1-113 E*	*55.93*
938861	*AE1-114 C O1*	*8.12*
938862	*AE1-114 E O1*	*27.7*
939321	*AE1-163 C O1*	*11.41*
939322	*AE1-163 E O1*	*70.12*
939401	*AE1-172 C O1*	*10.89*
939402	*AE1-172 E O1*	*51.08*
939631	*AE1-193 C*	*16.44*
939632	*AE1-193 E*	*110.04*
939641	*AE1-194 C*	*16.44*
939642	*AE1-194 E*	*110.04*
939651	*AE1-195 C*	*16.44*
939652	*AE1-195 E*	*110.04*

939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*28.14*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*45.56*
940752	*AE2-062 E*	*0.32*
941561	*AE2-153 C O1*	*9.05*
941562	*AE2-153 E O1*	*42.35*
941731	*AE2-173 O1*	*13.28*
942111	*AE2-223 C*	*4.14*
942112	*AE2-223 E*	*27.73*
942421	*AE2-255 C O1*	*5.98*
942422	*AE2-255 E O1*	*17.93*
942651	*AE2-281 C O1*	*1.63*
942652	*AE2-281 E O1*	*10.02*
943801	*AF1-048 C*	*9.91*
943802	*AF1-048 E*	*6.61*
943921	*AF1-060*	*3.13*
944222	*AF1-090 E O1*	*18.54*
945351	*AF1-200 FTIR*	*619.01*
945871	*AF1-252 O1*	*8.77*
946161	*AF1-281 C*	*0.88*
946162	*AF1-281 E*	*4.99*
946321	*AF1-296 C O1*	*8.04*
946322	*AF1-296 E O1*	*37.63*
946501	*AF1-314 C*	*9.04*
946502	*AF1-314 E*	*42.31*
946541	*AF1-318 C O1*	*11.62*
946542	*AF1-318 E O1*	*54.42*
274857	*BIG SKY ;U1*	*2.83*
274858	*BIG SKY ;U2*	*2.83*
274877	*BISHOP HL;1U*	*2.16*
274878	*BISHOP HL;2U*	*2.16*
294401	*BSHIL;1U E*	*8.65*
294410	*BSHIL;2U E*	*8.65*
274848	*CAMPGROVE;RU*	*3.19*
274890	*CAYUG;1U E*	*13.9*
274891	*CAYUG;2U E*	*13.9*
274863	*CAYUGA RI;1U*	*3.47*
274864	*CAYUGA RI;2U*	*3.47*
274849	*CRESCENT ;1U*	*1.06*
274859	*EASYR;U1 E*	*11.32*
274860	*EASYR;U2 E*	*11.32*
274856	*ECOGROVE ;U1*	*2.42*
274871	*GR RIDGE ;2U*	*5.1*
274847	*GR RIDGE ;BU*	*4.02*

274855	*GSG-6 ;RU*	*2.75*
290051	*GSG-6; E*	*11.01*
275149	*KELLYCK ;1E*	*17.19*
274888	*KELLYCK ;1U*	*4.3*
990901	*L-005 E*	*12.78*
274872	*LEE DEKAL;1U*	*6.14*
290108	*LEEDK;1U E*	*25.59*
274850	*MENDOTA H;RU*	*0.65*
274879	*MINONK ;1U*	*4.77*
293061	*N-015 E*	*16.07*
293513	*O-009 C1*	*2.33*
293514	*O-009 C2*	*1.18*
293515	*O-009 C3*	*1.31*
293516	*O-009 E1*	*9.32*
293517	*O-009 E2*	*4.73*
293518	*O-009 E3*	*5.21*
276156	*O-029 C*	*1.26*
276157	*O-029 C*	*1.36*
276158	*O-029 C*	*2.49*
293715	*O-029 E*	*9.96*
293716	*O-029 E*	*5.46*
293717	*O-029 E*	*5.02*
293771	*O-035 E*	*6.44*
293644	*O22 E1*	*9.81*
293645	*O22 E2*	*19.05*
290021	*O50 E*	*19.08*
294392	*P-010 E*	*20.4*
294763	*P-046 E*	*9.67*
274881	*PILOT HIL;1E*	*17.19*
274887	*PILOT HIL;1U*	*4.3*
274851	*PROVIDENC;RU*	*1.61*
290261	*S-027 E*	*14.21*
290265	*S-028 E*	*14.21*
295110	*SUBLETTE C*	*0.4*
295111	*SUBLETTE E*	*2.87*
274861	*TOP CROP ;1U*	*2.45*
274862	*TOP CROP ;2U*	*4.76*
274853	*TWINGROVE;U1*	*3.55*
274854	*TWINGROVE;U2*	*3.55*
276153	*W2-048 E*	*4.7*
274882	*W4-005 E*	*17.65*
295108	*WESTBROOK C*	*0.9*
295109	*WESTBROOK E*	*5.87*
909052	*X2-022 E*	*14.14*
916211	*Z1-072 E*	*9.77*

916221	*Z1-073 E*	*11.39*
276168	*Z1-106 E1*	*3.32*
276167	*Z1-106 E2*	*3.32*
276169	*Z1-107 E*	*6.35*
276170	*Z1-108 E*	*6.45*
917501	*Z2-087 C*	*2.76*
917502	*Z2-087 E*	*18.45*
918051	*AA1-018 C OP*	*2.34*
918052	*AA1-018 E OP*	*15.66*
920272	*AA2-123 E*	*6.34*
924041	*AB2-047 C O1*	*6.91*
924042	*AB2-047 E O1*	*46.22*
924261	*AB2-070 C O1*	*4.03*
924262	*AB2-070 E O1*	*26.96*
925301	*AB2-191*	*1.06*
925302	*AB2-191 E*	*2.92*
925581	*AC1-033 C*	*2.84*
925582	*AC1-033 E*	*19.*
925771	*AC1-053 C*	*3.99*
925772	*AC1-053 E*	*26.73*
LTF	*AC1-131*	*2.48*
926821	*AC1-168 C O1*	*2.32*
926822	*AC1-168 E O1*	*15.6*
926841	*AC1-171 C O1*	*2.07*
926842	*AC1-171 E O1*	*13.83*
927201	*AC1-214 C O1*	*4.14*
927202	*AC1-214 E O1*	*13.18*

Appendix 5

(CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 90.16% to 105.45% (**DC power flow**) of its emergency rating (1441 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 201.12 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206
05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.1*
934432	*AD1-067 E*	*0.42*
934721	*AD1-100 C*	*15.25*
934722	*AD1-100 E*	*71.18*
935141	*AD1-148*	*2.67*
936291	*AD2-038 C O1*	*2.45*
936292	*AD2-038 E O1*	*11.47*
936371	*AD2-047 C O1*	*3.9*
936372	*AD2-047 E O1*	*19.04*
936971	*AD2-131 C*	*0.47*
936972	*AD2-131 E*	*2.35*
937001	*AD2-134 C*	*1.97*
937002	*AD2-134 E*	*7.87*
937211	*AD2-159 C*	*1.87*
937212	*AD2-159 E*	*8.73*
938851	*AE1-113 C*	*5.96*
938852	*AE1-113 E*	*21.13*
938861	*AE1-114 C O1*	*2.96*
938862	*AE1-114 E O1*	*10.09*
939321	*AE1-163 C O1*	*4.55*
939322	*AE1-163 E O1*	*27.93*
939401	*AE1-172 C O1*	*4.06*
939402	*AE1-172 E O1*	*19.05*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*16.99*
940752	*AE2-062 E*	*0.12*
941561	*AE2-153 C O1*	*3.71*
941562	*AE2-153 E O1*	*17.39*
941731	*AE2-173 O1*	*4.87*
942111	*AE2-223 C*	*1.52*
942112	*AE2-223 E*	*10.17*

942421	*AE2-255 C O1*	*2.26*
942422	*AE2-255 E O1*	*6.77*
942651	*AE2-281 C O1*	*0.65*
942652	*AE2-281 E O1*	*3.99*
943801	*AF1-048 C*	*3.62*
943802	*AF1-048 E*	*2.41*
943921	*AF1-060*	*1.14*
944221	*AF1-090 C O1*	*1.42*
944222	*AF1-090 E O1*	*6.63*
945351	*AF1-200 FTIR*	*201.12*
945871	*AF1-252 O1*	*3.14*
945881	*AF1-253 O1*	*2.17*
946161	*AF1-281 C*	*0.32*
946162	*AF1-281 E*	*1.82*
946321	*AF1-296 C O1*	*2.93*
946322	*AF1-296 E O1*	*13.73*
946501	*AF1-314 C*	*3.29*
946502	*AF1-314 E*	*15.42*
946541	*AF1-318 C O1*	*4.3*
946542	*AF1-318 E O1*	*20.12*
274857	*BIG SKY ;U1*	*1.03*
274858	*BIG SKY ;U2*	*1.03*
274877	*BISHOP HL;1U*	*0.8*
274878	*BISHOP HL;2U*	*0.8*
294401	*BSHIL;1U E*	*3.19*
294410	*BSHIL;2U E*	*3.19*
274848	*CAMPGROVE;RU*	*1.18*
274890	*CAYUG;1U E*	*5.16*
274891	*CAYUG;2U E*	*5.16*
274863	*CAYUGA RI;1U*	*1.29*
274864	*CAYUGA RI;2U*	*1.29*
274849	*CRESCENT ;1U*	*0.39*
274859	*EASYR;U1 E*	*4.12*
274860	*EASYR;U2 E*	*4.12*
274856	*ECOGROVE ;U1*	*0.88*
274871	*GR RIDGE ;2U*	*1.84*
274847	*GR RIDGE ;BU*	*1.45*
274855	*GSG-6 ;RU*	*0.99*
290051	*GSG-6; E*	*3.97*
956141	*J1101*	*1.33*
953201	*J715 C*	*0.77*
953202	*J715 E*	*4.19*
954741	*J928 C*	*0.81*
954742	*J928 E*	*4.37*
275149	*KELLYCK ;1E*	*8.01*

274888	*KELLYCK ;1U*	*2.*
990901	*L-005 E*	*4.71*
274872	*LEE DEKAL;1U*	*2.21*
290108	*LEEDK;1U E*	*9.2*
274850	*MENDOTA H;RU*	*0.24*
274879	*MINONK ;1U*	*1.8*
293061	*N-015 E*	*5.78*
293513	*O-009 C1*	*0.85*
293514	*O-009 C2*	*0.43*
293515	*O-009 C3*	*0.48*
293516	*O-009 E1*	*3.4*
293517	*O-009 E2*	*1.73*
293518	*O-009 E3*	*1.9*
276156	*O-029 C*	*0.46*
276157	*O-029 C*	*0.5*
276158	*O-029 C*	*0.91*
293715	*O-029 E*	*3.64*
293716	*O-029 E*	*1.99*
293717	*O-029 E*	*1.83*
293771	*O-035 E*	*2.38*
293644	*O22 E1*	*3.6*
293645	*O22 E2*	*6.99*
290021	*O50 E*	*7.21*
294392	*P-010 E*	*7.34*
294763	*P-046 E*	*3.52*
274881	*PILOT HIL;1E*	*8.01*
274887	*PILOT HIL;1U*	*2.*
274851	*PROVIDENC;RU*	*0.59*
290261	*S-027 E*	*5.18*
290265	*S-028 E*	*5.18*
295110	*SUBLETTE C*	*0.14*
274861	*TOP CROP ;1U*	*0.9*
274862	*TOP CROP ;2U*	*1.75*
274853	*TWINGROVE;U1*	*1.3*
274854	*TWINGROVE;U2*	*1.3*
274882	*W4-005 E*	*6.4*
295108	*WESTBROOK C*	*0.33*
917501	*Z2-087 C*	*1.01*
917502	*Z2-087 E*	*6.76*
918051	*AA1-018 C OP*	*0.98*
924041	*AB2-047 C O1*	*2.53*
924042	*AB2-047 E O1*	*16.95*
924261	*AB2-070 C O1*	*1.46*
924262	*AB2-070 E O1*	*9.77*
925301	*AB2-191*	*0.38*

925581	*AC1-033 C*	*1.05*
925582	*AC1-033 E*	*7.*
925771	*AC1-053 C*	*1.45*
925772	*AC1-053 E*	*9.68*
926821	*AC1-168 C O1*	*0.85*
926822	*AC1-168 E O1*	*5.73*
926841	*AC1-171 C O1*	*0.77*
926842	*AC1-171 E O1*	*5.12*
927201	*AC1-214 C O1*	*1.53*
927202	*AC1-214 E O1*	*4.86*

Appendix 6

(CE - CE) The E FRANKFO; R-UNIV PK N;RP 345 kV line (from bus 270729 to bus 274804 ckt 1) loads from 83.2% to 96.91% (**DC power flow**) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 168.42 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.08*
934432	*AD1-067 E*	*0.35*
934721	*AD1-100 C*	*12.32*
934722	*AD1-100 E*	*57.51*
935141	*AD1-148*	*2.21*
936291	*AD2-038 C O1*	*2.1*
936292	*AD2-038 E O1*	*9.85*
936371	*AD2-047 C O1*	*2.86*
936372	*AD2-047 E O1*	*13.98*
937001	*AD2-134 C*	*1.66*
937002	*AD2-134 E*	*6.64*
937211	*AD2-159 C*	*1.54*
937212	*AD2-159 E*	*7.2*
938851	*AE1-113 C*	*5.08*
938852	*AE1-113 E*	*18.03*
938861	*AE1-114 C O1*	*2.5*
938862	*AE1-114 E O1*	*8.53*
939321	*AE1-163 C O1*	*3.9*
939322	*AE1-163 E O1*	*23.98*
939401	*AE1-172 C O1*	*3.27*
939402	*AE1-172 E O1*	*15.32*
939631	*AE1-193 C*	*3.14*
939632	*AE1-193 E*	*21.03*
939641	*AE1-194 C*	*3.14*
939642	*AE1-194 E*	*21.03*
939651	*AE1-195 C*	*3.14*
939652	*AE1-195 E*	*21.03*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*5.38*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*13.67*

940752	*AE2-062 E*	*0.1*
941561	*AE2-153 C O1*	*3.04*
941562	*AE2-153 E O1*	*14.21*
941731	*AE2-173 O1*	*3.99*
942111	*AE2-223 C*	*1.24*
942112	*AE2-223 E*	*8.32*
942421	*AE2-255 C O1*	*1.93*
942422	*AE2-255 E O1*	*5.78*
942651	*AE2-281 C O1*	*0.56*
942652	*AE2-281 E O1*	*3.43*
943801	*AF1-048 C*	*3.06*
943802	*AF1-048 E*	*2.04*
943921	*AF1-060*	*0.96*
945351	*AF1-200 FTIR*	*168.42*
946161	*AF1-281 C*	*0.27*
946162	*AF1-281 E*	*1.53*
946321	*AF1-296 C O1*	*2.48*
946322	*AF1-296 E O1*	*11.61*
946501	*AF1-314 C*	*2.79*
946502	*AF1-314 E*	*13.04*
946541	*AF1-318 C O1*	*3.65*
946542	*AF1-318 E O1*	*17.08*
274857	*BIG SKY ;U1*	*0.87*
274858	*BIG SKY ;U2*	*0.87*
274877	*BISHOP HL;1U*	*0.68*
274878	*BISHOP HL;2U*	*0.68*
294401	*BSHIL;1U E*	*2.7*
294410	*BSHIL;2U E*	*2.7*
274848	*CAMPGROVE;RU*	*1.*
274890	*CAYUG;1U E*	*4.17*
274891	*CAYUG;2U E*	*4.17*
274863	*CAYUGA RI;1U*	*1.04*
274864	*CAYUGA RI;2U*	*1.04*
274849	*CRESCENT ;1U*	*0.33*
274859	*EASYR;U1 E*	*3.49*
274860	*EASYR;U2 E*	*3.49*
274856	*ECOGROVE ;U1*	*0.75*
274871	*GR RIDGE ;2U*	*1.58*
274847	*GR RIDGE ;BU*	*1.25*
274855	*GSG-6 ;RU*	*0.84*
290051	*GSG-6; E*	*3.35*
275149	*KELLYCK ;1E*	*5.88*
274888	*KELLYCK ;1U*	*1.47*
990901	*L-005 E*	*3.99*
274872	*LEE DEKAL;1U*	*1.86*

290108	*LEEDK;1U E*	*7.76*
274850	*MENDOTA H;RU*	*0.2*
274879	*MINONK ;1U*	*1.54*
293061	*N-015 E*	*4.99*
293513	*O-009 C1*	*0.72*
293514	*O-009 C2*	*0.36*
293515	*O-009 C3*	*0.4*
293516	*O-009 E1*	*2.88*
293517	*O-009 E2*	*1.46*
293518	*O-009 E3*	*1.61*
276156	*O-029 C*	*0.39*
276157	*O-029 C*	*0.42*
276158	*O-029 C*	*0.77*
293715	*O-029 E*	*3.08*
293716	*O-029 E*	*1.69*
293717	*O-029 E*	*1.55*
293771	*O-035 E*	*2.02*
293644	*O22 E1*	*3.11*
293645	*O22 E2*	*6.04*
290021	*O50 E*	*6.15*
294392	*P-010 E*	*6.34*
294763	*P-046 E*	*2.98*
274881	*PILOT HIL;1E*	*5.88*
274887	*PILOT HIL;1U*	*1.47*
274851	*PROVIDENC;RU*	*0.5*
290261	*S-027 E*	*4.26*
290265	*S-028 E*	*4.26*
295110	*SUBLETTE C*	*0.12*
274861	*TOP CROP ;1U*	*0.78*
274862	*TOP CROP ;2U*	*1.51*
274853	*TWINGROVE;U1*	*1.06*
274854	*TWINGROVE;U2*	*1.06*
274882	*W4-005 E*	*5.27*
295108	*WESTBROOK C*	*0.27*
917501	*Z2-087 C*	*0.83*
917502	*Z2-087 E*	*5.54*
918051	*AA1-018 C OP*	*0.84*
924041	*AB2-047 C O1*	*2.07*
924042	*AB2-047 E O1*	*13.87*
924261	*AB2-070 C O1*	*1.2*
924262	*AB2-070 E O1*	*8.06*
925301	*AB2-191*	*0.32*
925581	*AC1-033 C*	*0.89*
925582	*AC1-033 E*	*5.93*
925771	*AC1-053 C*	*1.19*

925772	*AC1-053 E*	*7.99*
926821	*AC1-168 C O1*	*0.73*
926822	*AC1-168 E O1*	*4.88*
926841	*AC1-171 C O1*	*0.65*
926842	*AC1-171 E O1*	*4.33*
927201	*AC1-214 C O1*	*1.3*
927202	*AC1-214 E O1*	*4.12*

Appendix 7

(MISO AMIL - AEP) The J1180 TAP-05SULLIVAN 345 kV line (from bus 956820 to bus 247712 ckt 1) loads from 89.64% to 95.38% (**DC power flow**) of its normal rating (1466 MVA) for the single line contingency outage of 'AEP_P1-2_#286'. This project contributes approximately 84.44 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#286'
OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.06*
934432	*AD1-067 E*	*0.25*
934721	*AD1-100 C*	*7.01*
934722	*AD1-100 E*	*32.69*
935141	*AD1-148*	*5.86*
936291	*AD2-038 C O1*	*1.52*
936292	*AD2-038 E O1*	*7.11*
936371	*AD2-047 C O1*	*1.41*
936372	*AD2-047 E O1*	*6.91*
936971	*AD2-131 C*	*1.46*
936972	*AD2-131 E*	*7.34*
937001	*AD2-134 C*	*1.15*
937002	*AD2-134 E*	*4.59*
937211	*AD2-159 C*	*3.87*
937212	*AD2-159 E*	*18.1*
938851	*AE1-113 C*	*3.72*
938852	*AE1-113 E*	*13.17*
938861	*AE1-114 C O1*	*1.95*
938862	*AE1-114 E O1*	*6.66*
939321	*AE1-163 C O1*	*2.82*
939322	*AE1-163 E O1*	*17.31*
939401	*AE1-172 C O1*	*2.84*
939402	*AE1-172 E O1*	*13.31*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*11.88*
940752	*AE2-062 E*	*0.05*
941343	*AE2-130 BAT*	*29.7*
941561	*AE2-153 C O1*	*1.49*
941562	*AE2-153 E O1*	*6.98*
941731	*AE2-173 O1*	*5.11*
942111	*AE2-223 C*	*1.59*

942112	*AE2-223 E*	*10.67*
942421	*AE2-255 C O1*	*1.41*
942422	*AE2-255 E O1*	*4.22*
942602	*AE2-276 BAT*	*13.04*
942651	*AE2-281 C O1*	*0.4*
942652	*AE2-281 E O1*	*2.47*
943801	*AF1-048 C*	*2.*
943802	*AF1-048 E*	*1.33*
943921	*AF1-060*	*0.72*
944202	*AF1-088 FTWR*	*208.71*
944221	*AF1-090 C O1*	*5.37*
944222	*AF1-090 E O1*	*25.16*
945351	*AF1-200 FTIR*	*84.44*
945871	*AF1-252 O1*	*11.91*
945881	*AF1-253 O1*	*8.24*
946161	*AF1-281 C*	*0.22*
946162	*AF1-281 E*	*1.26*
946321	*AF1-296 C O1*	*2.49*
946322	*AF1-296 E O1*	*11.68*
946501	*AF1-314 C*	*2.08*
946502	*AF1-314 E*	*9.74*
946541	*AF1-318 C O1*	*3.67*
946542	*AF1-318 E O1*	*17.2*
274857	*BIG SKY ;U1*	*0.7*
274858	*BIG SKY ;U2*	*0.7*
274877	*BISHOP HL;1U*	*0.7*
274878	*BISHOP HL;2U*	*0.7*
294401	*BSHIL;1U E*	*2.81*
294410	*BSHIL;2U E*	*2.81*
274848	*CAMPGROVE;RU*	*1.09*
274890	*CAYUG;1U E*	*4.19*
274891	*CAYUG;2U E*	*4.19*
274863	*CAYUGA RI;1U*	*1.05*
274864	*CAYUGA RI;2U*	*1.05*
274849	*CRESCENT ;1U*	*0.34*
274859	*EASYR;U1 E*	*2.8*
274860	*EASYR;U2 E*	*2.8*
274856	*ECOGROVE ;U1*	*0.56*
274871	*GR RIDGE ;2U*	*0.89*
274847	*GR RIDGE ;BU*	*0.7*
274855	*GSG-6 ;RU*	*0.58*
290051	*GSG-6; E*	*2.32*
955401	*J1022 C*	*2.38*
955402	*J1022 E*	*12.86*
956281	*J1115 C*	*2.78*

956282	J1115 E	15.06
954761	J468 C	5.
954762	J468 E	28.32
954721	J750 C	2.04
954722	J750 E	11.02
952871	J757 C	3.36
952872	J757 E	18.17
953741	J826 C	1.58
953742	J826 E	8.57
953851	J845 C	1.67
953852	J845 E	9.04
953881	J848 C	5.1
953882	J848 E	27.59
275149	KELLYCK ;1E	2.91
274888	KELLYCK ;1U	0.73
990901	L-005 E	4.35
274872	LEE DEKAL;1U	1.23
290108	LEEDK;1U E	5.13
274850	MENDOTA H;RU	0.14
274879	MINONK ;1U	1.12
293061	N-015 E	2.8
293513	O-009 C1	0.65
293514	O-009 C2	0.33
293515	O-009 C3	0.36
293516	O-009 E1	2.59
293517	O-009 E2	1.31
293518	O-009 E3	1.45
276156	O-029 C	0.35
276157	O-029 C	0.38
276158	O-029 C	0.69
293715	O-029 E	2.77
293716	O-029 E	1.52
293717	O-029 E	1.39
293771	O-035 E	2.07
293644	O22 E1	2.06
293645	O22 E2	4.01
290021	O50 E	4.49
294392	P-010 E	3.56
294763	P-046 E	2.23
274881	PILOT HIL;1E	2.91
274887	PILOT HIL;1U	0.73
274851	PROVIDENC;RU	0.52
290261	S-027 E	8.08
290265	S-028 E	8.08
295110	SUBLETTE C	0.08

274861	*TOP CROP ;1U*	*0.52*
274862	*TOP CROP ;2U*	*1.*
274853	*TWINGROVE;U1*	*2.02*
274854	*TWINGROVE;U2*	*2.02*
274882	*W4-005 E*	*13.26*
295108	*WESTBROOK C*	*0.19*
917501	*Z2-087 C*	*1.06*
917502	*Z2-087 E*	*7.1*
918051	*AA1-018 C OP*	*0.5*
924041	*AB2-047 C O1*	*2.66*
924042	*AB2-047 E O1*	*17.78*
924261	*AB2-070 C O1*	*3.02*
924262	*AB2-070 E O1*	*20.24*
925301	*AB2-191*	*0.22*
925581	*AC1-033 C*	*0.92*
925582	*AC1-033 E*	*6.18*
925771	*AC1-053 C*	*3.05*
925772	*AC1-053 E*	*20.43*
926821	*AC1-168 C O1*	*0.67*
926822	*AC1-168 E O1*	*4.51*
926841	*AC1-171 C O1*	*0.84*
926842	*AC1-171 E O1*	*5.58*
927201	*AC1-214 C O1*	*1.33*
927202	*AC1-214 E O1*	*4.23*

Appendix 8

(CE - CE) The PLANO ; B-PLANO ;3M 345 kV line (from bus 270846 to bus 275207 ckt 1) loads from 59.75% to 100.2% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT5-6__'. This project contributes approximately 459.31 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT5-6__'
TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345
TRIP BRANCH FROM BUS 270847 TO BUS 270733 CKT 1 / PLANO ; R 345 ELEC JUNC;3R 345
TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO ;4M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO ;4M 345 PLANO ; R 345
TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO ;4M 345 PLANO ;4C 33
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.09*
934432	*AD1-067 E*	*0.4*
934721	*AD1-100 C*	*6.06*
934722	*AD1-100 E*	*28.29*
936371	*AD2-047 C O1*	*1.6*
936372	*AD2-047 E O1*	*7.8*
937001	*AD2-134 C*	*1.85*
937002	*AD2-134 E*	*7.4*
938851	*AE1-113 C*	*2.89*
938852	*AE1-113 E*	*10.25*
938861	*AE1-114 C O1*	*2.3*
938862	*AE1-114 E O1*	*7.85*
940752	*AE2-062 E*	*0.06*
941561	*AE2-153 C O1*	*2.1*
941562	*AE2-153 E O1*	*9.85*
942421	*AE2-255 C O1*	*1.09*
942422	*AE2-255 E O1*	*3.28*
943801	*AF1-048 C*	*2.71*
943802	*AF1-048 E*	*1.81*
943921	*AF1-060*	*0.88*
945351	*AF1-200 FTIR*	*459.31*
946161	*AF1-281 C*	*0.25*

946162	*AF1-281 E*	*1.41*
946321	*AF1-296 C O1*	*2.15*
946322	*AF1-296 E O1*	*10.07*
946501	*AF1-314 C*	*2.53*
946502	*AF1-314 E*	*11.85*
946541	*AF1-318 C O1*	*2.79*
946542	*AF1-318 E O1*	*13.06*
274871	*GR RIDGE ;2U*	*2.01*
274847	*GR RIDGE ;BU*	*1.58*
274855	*GSG-6 ;RU*	*0.93*
290051	*GSG-6; E*	*3.74*
274872	*LEE DEKAL;1U*	*2.16*
290108	*LEEDK;1U E*	*9.02*
274850	*MENDOTA H;RU*	*0.22*
293061	*N-015 E*	*6.32*
294392	*P-010 E*	*8.02*
295110	*SUBLETTE C*	*0.13*
295111	*SUBLETTE E*	*0.97*
295108	*WESTBROOK C*	*0.31*
295109	*WESTBROOK E*	*1.99*
916211	*Z1-072 E*	*2.33*
916221	*Z1-073 E*	*3.86*
276168	*Z1-106 E1*	*0.97*
276167	*Z1-106 E2*	*0.97*
276169	*Z1-107 E*	*1.27*
276170	*Z1-108 E*	*1.73*
920272	*AA2-123 E*	*1.73*
925301	*AB2-191*	*0.36*
925302	*AB2-191 E*	*0.99*
925581	*AC1-033 C*	*0.68*
925582	*AC1-033 E*	*4.52*
926821	*AC1-168 C O1*	*0.63*
926822	*AC1-168 E O1*	*4.2*
927201	*AC1-214 C O1*	*0.99*
927202	*AC1-214 E O1*	*3.15*

Appendix 9

(CE - CE) The PLANO ; R-PLANO ;4M 345 kV line (from bus 270847 to bus 275208 ckt 1) loads from 57.01% to 100.91% (AC power flow) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_167-45-BT8-12_'. This project contributes approximately 495.71 MW to the thermal violation.

CONTINGENCY 'COMED_P4_167-45-BT8-12_'
TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765
TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345
TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33
TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138
TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.07*
934432	*AD1-067 E*	*0.28*
934721	*AD1-100 C*	*6.52*
934722	*AD1-100 E*	*30.42*
936371	*AD2-047 C O1*	*1.65*
936372	*AD2-047 E O1*	*8.08*
937001	*AD2-134 C*	*1.3*
937002	*AD2-134 E*	*5.17*
938861	*AE1-114 C O1*	*1.93*
938862	*AE1-114 E O1*	*6.57*
940752	*AE2-062 E*	*0.06*
941561	*AE2-153 C O1*	*2.23*
941562	*AE2-153 E O1*	*10.45*
943801	*AF1-048 C*	*2.49*
943802	*AF1-048 E*	*1.66*
943921	*AF1-060*	*0.76*
945351	*AF1-200 FTIR*	*495.71*
946161	*AF1-281 C*	*0.21*

946162	*AF1-281 E*	*1.17*
946321	*AF1-296 C O1*	*1.78*
946322	*AF1-296 E O1*	*8.32*
946501	*AF1-314 C*	*2.18*
946502	*AF1-314 E*	*10.21*
946541	*AF1-318 C O1*	*2.64*
946542	*AF1-318 E O1*	*12.36*
274871	*GR RIDGE ;2U*	*2.13*
274847	*GR RIDGE ;BU*	*1.68*
293061	*N-015 E*	*6.72*
294392	*P-010 E*	*8.54*
916211	*Z1-072 E*	*2.15*
916221	*Z1-073 E*	*2.7*
276168	*Z1-106 E1*	*0.91*
276167	*Z1-106 E2*	*0.91*
276169	*Z1-107 E*	*1.17*
276170	*Z1-108 E*	*1.65*
920272	*AA2-123 E*	*1.6*
925302	*AB2-191 E*	*0.69*
925581	*AC1-033 C*	*0.61*
925582	*AC1-033 E*	*4.08*
926821	*AC1-168 C O1*	*0.61*
926822	*AC1-168 E O1*	*4.11*
927201	*AC1-214 C O1*	*0.91*
927202	*AC1-214 E O1*	*2.9*

Appendix 10

(CE - CE) The LASCO STA; B-MAZON ; B 138 kV line (from bus 271908 to bus 271986 ckt 1) loads from 96.2% to 117.1% (AC power flow) of its load dump rating (230 MVA) for the tower line contingency outage of 'COMED_P7_345-L0103__R-S_+_345-L0104__B-S'. This project contributes approximately 48.07 MW to the thermal violation.

CONTINGENCY 'COMED_P7_345-L0103__R-S_+_345-L0104__B-S'
 TRIP BRANCH FROM BUS 270803 TO BUS 270671 CKT 1 / LASCO STA; R 345 BRAIDWOOD; R 345
 TRIP BRANCH FROM BUS 270802 TO BUS 270670 CKT 1 / LASCO STA; B 345 BRAIDWOOD; B 345
 END

Bus Number	*Bus Name*	*Full Contribution*
945351	*AF1-200 FTIR*	*48.07*
274871	*GR RIDGE ;2U*	*2.69*
274847	*GR RIDGE ;BU*	*2.12*
293061	*N-015 E*	*8.47*
294392	*P-010 E*	*10.76*

Appendix 11

(AEP - OVEC) The 05JEFRSO-06CLIFTY 345 kV line (from bus 242865 to bus 248000 ckt Z1) loads from 106.65% to 113.63% (**DC power flow**) of its normal rating (2354 MVA) for the single line contingency outage of 'AEP_P1-2_#709'. This project contributes approximately 155.1 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#709'
OPEN BRANCH FROM BUS 242924 TO BUS 243208 CKT 1 / 242924 05HANGR 765 243208 05JEFRSO 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
243859	*05FR-11G C*	*1.*
243862	*05FR-12G C*	*0.99*
247901	*05FR-12G E*	*3.93*
243864	*05FR-21G C*	*1.05*
247902	*05FR-21G E*	*4.2*
243866	*05FR-22G C*	*1.01*
243870	*05FR-3G C*	*2.04*
247904	*05FR-3G E*	*8.15*
243873	*05FR-4G C*	*1.58*
247905	*05FR-4G E*	*6.38*
246909	*05MDL-1G C*	*2.1*
247906	*05MDL-1G E*	*8.38*
246910	*05MDL-2G C*	*1.04*
247907	*05MDL-2G E*	*4.2*
246976	*05MDL-3G C*	*1.06*
247912	*05MDL-3G E*	*4.2*
246979	*05MDL-4G C*	*1.03*
247913	*05MDL-4G E*	*4.2*
933281	*AC2-140 C*	*3.89*
933282	*AC2-140 E*	*0.2*
934431	*AD1-067 C*	*0.08*
934432	*AD1-067 E*	*0.33*
934721	*AD1-100 C*	*11.46*
934722	*AD1-100 E*	*53.5*
935141	*AD1-148*	*3.55*
936291	*AD2-038 C O1*	*1.94*
936292	*AD2-038 E O1*	*9.07*
936371	*AD2-047 C O1*	*2.6*
936372	*AD2-047 E O1*	*12.68*
936971	*AD2-131 C*	*0.73*
936972	*AD2-131 E*	*3.67*

937001	*AD2-134 C*	*1.57*
937002	*AD2-134 E*	*6.27*
937211	*AD2-159 C*	*2.4*
937212	*AD2-159 E*	*11.24*
938851	*AE1-113 C*	*4.86*
938852	*AE1-113 E*	*17.22*
938861	*AE1-114 C O1*	*2.41*
938862	*AE1-114 E O1*	*8.21*
939321	*AE1-163 C O1*	*3.6*
939322	*AE1-163 E O1*	*22.09*
939401	*AE1-172 C O1*	*3.39*
939402	*AE1-172 E O1*	*15.9*
939631	*AE1-193 C*	*5.02*
939632	*AE1-193 E*	*33.61*
939641	*AE1-194 C*	*5.02*
939642	*AE1-194 E*	*33.61*
939651	*AE1-195 C*	*5.02*
939652	*AE1-195 E*	*33.61*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*8.59*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*14.18*
940752	*AE2-062 E*	*0.09*
941341	*AE2-130 C*	*< 0.01*
941342	*AE2-130 E*	*61.75*
941561	*AE2-153 C O1*	*2.69*
941562	*AE2-153 E O1*	*12.59*
941571	*AE2-154 C*	*3.42*
941572	*AE2-154 E*	*22.86*
941731	*AE2-173 O1*	*4.66*
942111	*AE2-223 C*	*1.46*
942112	*AE2-223 E*	*9.74*
942421	*AE2-255 C O1*	*1.84*
942422	*AE2-255 E O1*	*5.52*
942601	*AE2-276*	*8.2*
942651	*AE2-281 C O1*	*0.51*
942652	*AE2-281 E O1*	*3.16*
942893	*AE2-308 BAT*	*4.74*
943021	*AE2-325 C*	*2.75*
943022	*AE2-325 E*	*1.83*
943772	*AF1-045 BAT*	*5.35*
943781	*AF1-046 C*	*2.33*
943782	*AF1-046 E*	*1.55*
943801	*AF1-048 C*	*2.85*
943802	*AF1-048 E*	*1.9*

943921	*AF1-060*	*0.92*
944201	*AF1-088 FTIR*	*131.26*
944221	*AF1-090 C O1*	*2.47*
944222	*AF1-090 E O1*	*11.55*
944241	*AF1-092 C O1*	*< 0.01*
944242	*AF1-092 E O1*	*8.54*
944931	*AF1-158 C O1*	*< 0.01*
944932	*AF1-158 E O1*	*14.27*
944961	*AF1-161 C*	*2.2*
944962	*AF1-161 E*	*2.2*
945111	*AF1-176 C O1*	*4.2*
945112	*AF1-176 E O1*	*6.29*
945351	*AF1-200 FTIR*	*155.1*
945391	*AF1-204 C O1*	*5.03*
945392	*AF1-204 E O1*	*15.1*
945421	*AF1-207 C*	*3.61*
945422	*AF1-207 E*	*15.5*
945683	*AF1-233 BAT*	*3.51*
945871	*AF1-252 O1*	*5.47*
945881	*AF1-253 O1*	*3.78*
946161	*AF1-281 C*	*0.26*
946162	*AF1-281 E*	*1.49*
946321	*AF1-296 C O1*	*2.51*
946322	*AF1-296 E O1*	*11.77*
946501	*AF1-314 C*	*2.66*
946502	*AF1-314 E*	*12.44*
946541	*AF1-318 C O1*	*3.81*
946542	*AF1-318 E O1*	*17.82*
274857	*BIG SKY ;U1*	*0.84*
274858	*BIG SKY ;U2*	*0.84*
274877	*BISHOP HL;1U*	*0.71*
274878	*BISHOP HL;2U*	*0.71*
294401	*BSHIL;1U E*	*2.82*
294410	*BSHIL;2U E*	*2.82*
274848	*CAMPGROVE;RU*	*1.06*
274890	*CAYUG;1U E*	*4.51*
274891	*CAYUG;2U E*	*4.51*
274863	*CAYUGA RI;1U*	*1.13*
274864	*CAYUGA RI;2U*	*1.13*
274849	*CRESCENT ;1U*	*0.35*
274859	*EASYR;U1 E*	*3.37*
274860	*EASYR;U2 E*	*3.37*
274856	*ECOGROVE ;U1*	*0.71*
274871	*GR RIDGE ;2U*	*1.44*
274847	*GR RIDGE ;BU*	*1.13*

274855	*GSG-6 ;RU*	*0.79*
290051	*GSG-6; E*	*3.17*
275149	*KELLYCK ;1E*	*5.33*
274888	*KELLYCK ;1U*	*1.33*
990901	*L-005 E*	*4.24*
274872	*LEE DEKAL;1U*	*1.75*
290108	*LEEDK;1U E*	*7.28*
LTF	*LGE-0012019*	*8.08*
274850	*MENDOTA H;RU*	*0.19*
274879	*MINONK ;1U*	*1.47*
293061	*N-015 E*	*4.53*
293513	*O-009 C1*	*0.72*
293514	*O-009 C2*	*0.36*
293515	*O-009 C3*	*0.4*
293516	*O-009 E1*	*2.87*
293517	*O-009 E2*	*1.46*
293518	*O-009 E3*	*1.6*
276156	*O-029 C*	*0.39*
276157	*O-029 C*	*0.42*
276158	*O-029 C*	*0.77*
293715	*O-029 E*	*3.07*
293716	*O-029 E*	*1.68*
293717	*O-029 E*	*1.54*
293771	*O-035 E*	*2.11*
293644	*O22 E1*	*3.03*
293645	*O22 E2*	*5.89*
290021	*O50 E*	*5.88*
294392	*P-010 E*	*5.75*
294763	*P-046 E*	*2.84*
274881	*PILOT HIL;1E*	*5.33*
274887	*PILOT HIL;1U*	*1.33*
274851	*PROVIDENC;RU*	*0.53*
290261	*S-027 E*	*5.81*
290265	*S-028 E*	*5.81*
295110	*SUBLETTE C*	*0.11*
247556	*T-127 C*	*1.05*
247943	*T-127 E*	*4.2*
274861	*TOP CROP ;1U*	*0.76*
274862	*TOP CROP ;2U*	*1.47*
274853	*TWINGROVE;U1*	*1.45*
274854	*TWINGROVE;U2*	*1.45*
274882	*W4-005 E*	*8.24*
295108	*WESTBROOK C*	*0.26*
917501	*Z2-087 C*	*0.97*
917502	*Z2-087 E*	*6.48*

918051	*AA1-018 C OP*	*0.72*
930041	*AB1-006 C*	*1.36*
930042	*AB1-006 E*	*9.13*
924041	*AB2-047 C O1*	*2.43*
924042	*AB2-047 E O1*	*16.23*
924261	*AB2-070 C O1*	*1.9*
924262	*AB2-070 E O1*	*12.68*
925301	*AB2-191*	*0.3*
925581	*AC1-033 C*	*0.93*
925582	*AC1-033 E*	*6.21*
925771	*AC1-053 C*	*1.89*
925772	*AC1-053 E*	*12.66*
926821	*AC1-168 C O1*	*0.74*
926822	*AC1-168 E O1*	*4.96*
926841	*AC1-171 C O1*	*0.73*
926842	*AC1-171 E O1*	*4.89*
927201	*AC1-214 C O1*	*1.35*
927202	*AC1-214 E O1*	*4.31*

Appendix 12

(AEP - AEP) The 05ALLEN-05RPMONE 345 kV line (from bus 243211 to bus 242933 ckt 1) loads from 122.49% to 137.46% (**DC power flow**) of its normal rating (897 MVA) for the single line contingency outage of 'AEP_P1-2_#7441'. This project contributes approximately 121.29 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#7441'
OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
247536	*05BLUFF P WF*	*0.63*
243859	*05FR-11G C*	*0.53*
243862	*05FR-12G C*	*0.52*
247901	*05FR-12G E*	*2.08*
243864	*05FR-21G C*	*0.56*
247902	*05FR-21G E*	*2.22*
243866	*05FR-22G C*	*0.53*
243870	*05FR-3G C*	*1.08*
247904	*05FR-3G E*	*4.3*
243873	*05FR-4G C*	*0.83*
247905	*05FR-4G E*	*3.37*
243795	*05HDWTR1G C*	*0.66*
247963	*05HDWTR1G E*	*4.4*
246909	*05MDL-1G C*	*1.12*
247906	*05MDL-1G E*	*4.49*
246910	*05MDL-2G C*	*0.56*
247907	*05MDL-2G E*	*2.25*
246976	*05MDL-3G C*	*0.57*
247912	*05MDL-3G E*	*2.25*
246979	*05MDL-4G C*	*0.55*
247913	*05MDL-4G E*	*2.25*
246953	*05TIMB G C*	*1.11*
247911	*05TIMB G E*	*4.46*
246991	*05WLD G1 C*	*0.34*
247255	*05WLD G2 C*	*0.36*
247958	*05WLD G2 E*	*4.7*
933281	*AC2-140 C*	*3.14*
933282	*AC2-140 E*	*0.17*
933591	*AC2-176 C O1*	*0.25*
933592	*AC2-176 E O1*	*3.23*
934431	*AD1-067 C*	*0.06*

934432	*AD1-067 E*	*0.26*
934721	*AD1-100 C*	*8.9*
934722	*AD1-100 E*	*41.51*
935141	*AD1-148*	*2.43*
936291	*AD2-038 C O1*	*1.5*
936292	*AD2-038 E O1*	*7.02*
936371	*AD2-047 C O1*	*2.04*
936372	*AD2-047 E O1*	*9.95*
936722	*AD2-091 BAT*	*6.78*
936752	*AD2-096 BAT*	*3.1*
936971	*AD2-131 C*	*0.48*
936972	*AD2-131 E*	*2.43*
937001	*AD2-134 C*	*1.23*
937002	*AD2-134 E*	*4.91*
937211	*AD2-159 C*	*1.65*
937212	*AD2-159 E*	*7.73*
938851	*AE1-113 C*	*3.76*
938852	*AE1-113 E*	*13.33*
938861	*AE1-114 C O1*	*1.89*
938862	*AE1-114 E O1*	*6.43*
939321	*AE1-163 C O1*	*2.78*
939322	*AE1-163 E O1*	*17.09*
939401	*AE1-172 C O1*	*2.56*
939402	*AE1-172 E O1*	*12.*
939631	*AE1-193 C*	*4.03*
939632	*AE1-193 E*	*26.98*
939641	*AE1-194 C*	*4.03*
939642	*AE1-194 E*	*26.98*
939651	*AE1-195 C*	*4.03*
939652	*AE1-195 E*	*26.98*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*6.9*
939781	*AE1-209 C O1*	*0.75*
939782	*AE1-209 E O1*	*5.02*
939791	*AE1-210 C O1*	*0.75*
939792	*AE1-210 E O1*	*5.02*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*10.7*
940752	*AE2-062 E*	*0.07*
941561	*AE2-153 C O1*	*2.11*
941562	*AE2-153 E O1*	*9.86*
941571	*AE2-154 C*	*1.83*
941572	*AE2-154 E*	*12.24*
941691	*AE2-169*	*2.63*
941721	*AE2-172*	*2.9*

941731	*AE2-173 O1*	*3.41*
942042	*AE2-216 BAT*	*7.46*
942111	*AE2-223 C*	*1.07*
942112	*AE2-223 E*	*7.13*
942421	*AE2-255 C O1*	*1.42*
942422	*AE2-255 E O1*	*4.27*
942651	*AE2-281 C O1*	*0.4*
942652	*AE2-281 E O1*	*2.44*
943021	*AE2-325 C*	*2.65*
943022	*AE2-325 E*	*1.76*
943781	*AF1-046 C*	*3.46*
943782	*AF1-046 E*	*2.31*
943791	*AF1-047 C*	*1.24*
943792	*AF1-047 E*	*0.82*
943801	*AF1-048 C*	*2.23*
943802	*AF1-048 E*	*1.49*
943921	*AF1-060*	*0.72*
944221	*AF1-090 C O1*	*1.6*
944222	*AF1-090 E O1*	*7.49*
944241	*AF1-092 C O1*	*< 0.01*
944242	*AF1-092 E O1*	*12.58*
944831	*AF1-148 C O1*	*< 0.01*
944832	*AF1-148 E O1*	*15.89*
944931	*AF1-158 C O1*	*< 0.01*
944932	*AF1-158 E O1*	*12.5*
944961	*AF1-161 C*	*2.11*
944962	*AF1-161 E*	*2.11*
945111	*AF1-176 C O1*	*4.36*
945112	*AF1-176 E O1*	*6.53*
945351	*AF1-200 FTIR*	*121.29*
945371	*AF1-202 C O1*	*2.32*
945372	*AF1-202 E O1*	*11.34*
945391	*AF1-204 C O1*	*2.89*
945392	*AF1-204 E O1*	*8.68*
945421	*AF1-207 C*	*1.95*
945422	*AF1-207 E*	*8.37*
945871	*AF1-252 O1*	*3.55*
945881	*AF1-253 O1*	*2.46*
946161	*AF1-281 C*	*0.21*
946162	*AF1-281 E*	*1.17*
946203	*AF1-285 BAT*	*2.49*
946321	*AF1-296 C O1*	*1.97*
946322	*AF1-296 E O1*	*9.23*
946501	*AF1-314 C*	*2.08*
946502	*AF1-314 E*	*9.75*

946541	*AF1-318 C O1*	*2.89*
946542	*AF1-318 E O1*	*13.54*
274857	*BIG SKY ;U1*	*0.66*
274858	*BIG SKY ;U2*	*0.66*
274877	*BISHOP HL;1U*	*0.54*
274878	*BISHOP HL;2U*	*0.54*
294401	*BSHIL;1U E*	*2.16*
294410	*BSHIL;2U E*	*2.16*
274848	*CAMPGROVE;RU*	*0.81*
274890	*CAYUG;1U E*	*3.37*
274891	*CAYUG;2U E*	*3.37*
274863	*CAYUGA RI;1U*	*0.84*
274864	*CAYUGA RI;2U*	*0.84*
274849	*CRESCENT ;1U*	*0.26*
274859	*EASYR;U1 E*	*2.64*
274860	*EASYR;U2 E*	*2.64*
274856	*ECOGROVE ;U1*	*0.56*
274871	*GR RIDGE ;2U*	*1.12*
274847	*GR RIDGE ;BU*	*0.88*
274855	*GSG-6 ;RU*	*0.62*
290051	*GSG-6; E*	*2.48*
275149	*KELLYCK ;1E*	*4.19*
274888	*KELLYCK ;1U*	*1.05*
990901	*L-005 E*	*3.22*
274872	*LEE DEKAL;1U*	*1.37*
290108	*LEEDK;1U E*	*5.7*
274850	*MENDOTA H;RU*	*0.15*
274879	*MINONK ;1U*	*1.14*
293061	*N-015 E*	*3.53*
293513	*O-009 C1*	*0.56*
293514	*O-009 C2*	*0.28*
293515	*O-009 C3*	*0.31*
293516	*O-009 E1*	*2.23*
293517	*O-009 E2*	*1.13*
293518	*O-009 E3*	*1.25*
276156	*O-029 C*	*0.3*
276157	*O-029 C*	*0.33*
276158	*O-029 C*	*0.6*
293715	*O-029 E*	*2.38*
293716	*O-029 E*	*1.31*
293717	*O-029 E*	*1.2*
293771	*O-035 E*	*1.61*
293644	*O22 E1*	*2.36*
293645	*O22 E2*	*4.59*
290021	*O50 E*	*4.55*

294392	*P-010 E*	*4.48*
294763	*P-046 E*	*2.23*
274881	*PILOT HIL;1E*	*4.19*
274887	*PILOT HIL;1U*	*1.05*
274851	*PROVIDENC;RU*	*0.4*
290261	*S-027 E*	*4.11*
290265	*S-028 E*	*4.11*
247929	*S-071 E*	*2.52*
295110	*SUBLETTE C*	*0.09*
247556	*T-127 C*	*0.56*
247943	*T-127 E*	*2.25*
247521	*T-131 C*	*1.29*
247925	*T-131 E*	*5.16*
274861	*TOP CROP ;1U*	*0.59*
274862	*TOP CROP ;2U*	*1.15*
274853	*TWINGROVE;U1*	*1.03*
274854	*TWINGROVE;U2*	*1.03*
247543	*V3-007 C*	*0.66*
274882	*W4-005 E*	*5.66*
295108	*WESTBROOK C*	*0.2*
917501	*Z2-087 C*	*0.71*
917502	*Z2-087 E*	*4.74*
918051	*AA1-018 C OP*	*0.56*
930041	*AB1-006 C*	*0.73*
930042	*AB1-006 E*	*4.89*
924041	*AB2-047 C O1*	*1.78*
924042	*AB2-047 E O1*	*11.88*
924261	*AB2-070 C O1*	*1.3*
924262	*AB2-070 E O1*	*8.71*
925301	*AB2-191*	*0.24*
925581	*AC1-033 C*	*0.71*
925582	*AC1-033 E*	*4.74*
925771	*AC1-053 C*	*1.3*
925772	*AC1-053 E*	*8.69*
926821	*AC1-168 C O1*	*0.56*
926822	*AC1-168 E O1*	*3.79*
926841	*AC1-171 C O1*	*0.55*
926842	*AC1-171 E O1*	*3.65*
926861	*AC1-173 C*	*0.43*
926862	*AC1-173 E*	*2.9*
927201	*AC1-214 C O1*	*1.03*
927202	*AC1-214 E O1*	*3.28*

Appendix 13

(MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 104.71% to 118.37% (**DC power flow**) of its emergency rating (1310 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 151.62 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.08*
934432	*AD1-067 E*	*0.32*
934721	*AD1-100 C*	*11.07*
934722	*AD1-100 E*	*51.67*
935141	*AD1-148*	*1.98*
936291	*AD2-038 C O1*	*1.79*
936292	*AD2-038 E O1*	*8.37*
936371	*AD2-047 C O1*	*2.41*
936372	*AD2-047 E O1*	*11.77*
937001	*AD2-134 C*	*1.5*
937002	*AD2-134 E*	*5.98*
937211	*AD2-159 C*	*1.38*
937212	*AD2-159 E*	*6.45*
938851	*AE1-113 C*	*4.67*
938852	*AE1-113 E*	*16.54*
938861	*AE1-114 C O1*	*2.26*
938862	*AE1-114 E O1*	*7.71*
939321	*AE1-163 C O1*	*3.32*
939322	*AE1-163 E O1*	*20.39*
939401	*AE1-172 C O1*	*2.93*
939402	*AE1-172 E O1*	*13.74*
939631	*AE1-193 C*	*15.02*
939632	*AE1-193 E*	*100.53*
939641	*AE1-194 C*	*15.02*
939642	*AE1-194 E*	*100.53*
939651	*AE1-195 C*	*15.02*
939652	*AE1-195 E*	*100.53*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*25.71*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*12.25*

940752	*AE2-062 E*	*0.1*
941561	*AE2-153 C O1*	*2.71*
941562	*AE2-153 E O1*	*12.71*
941731	*AE2-173 O1*	*3.57*
942111	*AE2-223 C*	*1.11*
942112	*AE2-223 E*	*7.46*
942421	*AE2-255 C O1*	*1.77*
942422	*AE2-255 E O1*	*5.3*
942651	*AE2-281 C O1*	*0.47*
942652	*AE2-281 E O1*	*2.91*
943801	*AF1-048 C*	*2.76*
943802	*AF1-048 E*	*1.84*
943921	*AF1-060*	*0.87*
945351	*AF1-200 FTIR*	*151.62*
946161	*AF1-281 C*	*0.24*
946162	*AF1-281 E*	*1.39*
946321	*AF1-296 C O1*	*2.24*
946322	*AF1-296 E O1*	*10.5*
946501	*AF1-314 C*	*2.52*
946502	*AF1-314 E*	*11.78*
946541	*AF1-318 C O1*	*3.28*
946542	*AF1-318 E O1*	*15.36*
274857	*BIG SKY ;U1*	*0.79*
274858	*BIG SKY ;U2*	*0.79*
274877	*BISHOP HL;1U*	*0.61*
274878	*BISHOP HL;2U*	*0.61*
294401	*BSHIL;1U E*	*2.44*
294410	*BSHIL;2U E*	*2.44*
274848	*CAMPGROVE;RU*	*0.9*
274890	*CAYUG;1U E*	*3.74*
274891	*CAYUG;2U E*	*3.74*
274863	*CAYUGA RI;1U*	*0.93*
274864	*CAYUGA RI;2U*	*0.93*
274849	*CRESCENT ;1U*	*0.3*
274859	*EASYR;U1 E*	*3.15*
274860	*EASYR;U2 E*	*3.15*
274856	*ECOGROVE ;U1*	*0.67*
274871	*GR RIDGE ;2U*	*1.43*
274847	*GR RIDGE ;BU*	*1.12*
274855	*GSG-6 ;RU*	*0.75*
290051	*GSG-6; E*	*3.02*
275149	*KELLYCK ;1E*	*4.95*
274888	*KELLYCK ;1U*	*1.24*
990901	*L-005 E*	*3.61*
274872	*LEE DEKAL;1U*	*1.68*

290108	*LEEDK;1U E*	*6.99*
274850	*MENDOTA H;RU*	*0.18*
274879	*MINONK ;1U*	*1.41*
293061	*N-015 E*	*4.49*
293513	*O-009 C1*	*0.65*
293514	*O-009 C2*	*0.33*
293515	*O-009 C3*	*0.36*
293516	*O-009 E1*	*2.6*
293517	*O-009 E2*	*1.32*
293518	*O-009 E3*	*1.45*
276156	*O-029 C*	*0.35*
276157	*O-029 C*	*0.38*
276158	*O-029 C*	*0.69*
293715	*O-029 E*	*2.78*
293716	*O-029 E*	*1.52*
293717	*O-029 E*	*1.4*
293771	*O-035 E*	*1.82*
293644	*O22 E1*	*3.29*
293645	*O22 E2*	*6.39*
290021	*O50 E*	*5.64*
294392	*P-010 E*	*5.71*
294763	*P-046 E*	*2.69*
274881	*PILOT HIL;1E*	*4.95*
274887	*PILOT HIL;1U*	*1.24*
274851	*PROVIDENC;RU*	*0.45*
290261	*S-027 E*	*3.81*
290265	*S-028 E*	*3.81*
295110	*SUBLETTE C*	*0.11*
274861	*TOP CROP ;1U*	*0.82*
274862	*TOP CROP ;2U*	*1.6*
274853	*TWINGROVE;U1*	*0.95*
274854	*TWINGROVE;U2*	*0.95*
274882	*W4-005 E*	*4.73*
295108	*WESTBROOK C*	*0.25*
917501	*Z2-087 C*	*0.74*
917502	*Z2-087 E*	*4.96*
918051	*AA1-018 C OP*	*0.67*
924041	*AB2-047 C O1*	*1.86*
924042	*AB2-047 E O1*	*12.43*
924261	*AB2-070 C O1*	*1.08*
924262	*AB2-070 E O1*	*7.23*
925301	*AB2-191*	*0.29*
925581	*AC1-033 C*	*0.8*
925582	*AC1-033 E*	*5.36*
925771	*AC1-053 C*	*1.07*

925772	*AC1-053 E*	*7.17*
926821	*AC1-168 C O1*	*0.66*
926822	*AC1-168 E O1*	*4.4*
926841	*AC1-171 C O1*	*0.59*
926842	*AC1-171 E O1*	*3.92*
927201	*AC1-214 C O1*	*1.17*
927202	*AC1-214 E O1*	*3.72*

Appendix 14

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 117.43% to 135.47% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 241.81 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.12*
934432	*AD1-067 E*	*0.51*
934721	*AD1-100 C*	*18.*
934722	*AD1-100 E*	*83.98*
935141	*AD1-148*	*3.42*
936291	*AD2-038 C O1*	*2.9*
936292	*AD2-038 E O1*	*13.59*
936371	*AD2-047 C O1*	*4.36*
936372	*AD2-047 E O1*	*21.3*
936971	*AD2-131 C*	*0.61*
936972	*AD2-131 E*	*3.08*
937001	*AD2-134 C*	*2.39*
937002	*AD2-134 E*	*9.56*
937211	*AD2-159 C*	*2.37*
937212	*AD2-159 E*	*11.09*
938851	*AE1-113 C*	*7.33*
938852	*AE1-113 E*	*25.99*
938861	*AE1-114 C O1*	*3.61*
938862	*AE1-114 E O1*	*12.3*
939321	*AE1-163 C O1*	*5.39*
939322	*AE1-163 E O1*	*33.1*
939401	*AE1-172 C O1*	*4.84*
939402	*AE1-172 E O1*	*22.7*
939631	*AE1-193 C*	*8.33*
939632	*AE1-193 E*	*55.77*
939641	*AE1-194 C*	*8.33*
939642	*AE1-194 E*	*55.77*
939651	*AE1-195 C*	*8.33*
939652	*AE1-195 E*	*55.77*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*14.26*

940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*20.25*
940752	*AE2-062 E*	*0.15*
941561	*AE2-153 C O1*	*4.37*
941562	*AE2-153 E O1*	*20.46*
941731	*AE2-173 O1*	*5.93*
942111	*AE2-223 C*	*1.85*
942112	*AE2-223 E*	*12.39*
942421	*AE2-255 C O1*	*2.78*
942422	*AE2-255 E O1*	*8.33*
942651	*AE2-281 C O1*	*0.77*
942652	*AE2-281 E O1*	*4.73*
943801	*AF1-048 C*	*4.39*
943802	*AF1-048 E*	*2.93*
943921	*AF1-060*	*1.39*
944221	*AF1-090 C O1*	*1.88*
944222	*AF1-090 E O1*	*8.82*
945351	*AF1-200 FTIR*	*241.81*
945871	*AF1-252 O1*	*4.17*
945881	*AF1-253 O1*	*2.89*
946161	*AF1-281 C*	*0.39*
946162	*AF1-281 E*	*2.22*
946321	*AF1-296 C O1*	*3.6*
946322	*AF1-296 E O1*	*16.86*
946501	*AF1-314 C*	*4.01*
946502	*AF1-314 E*	*18.79*
946541	*AF1-318 C O1*	*5.28*
946542	*AF1-318 E O1*	*24.74*
274857	*BIG SKY ;U1*	*1.26*
274858	*BIG SKY ;U2*	*1.26*
274877	*BISHOP HL;1U*	*0.98*
274878	*BISHOP HL;2U*	*0.98*
294401	*BSHIL;1U E*	*3.92*
294410	*BSHIL;2U E*	*3.92*
274848	*CAMPGROVE;RU*	*1.45*
274890	*CAYUG;1U E*	*6.19*
274891	*CAYUG;2U E*	*6.19*
274863	*CAYUGA RI;1U*	*1.55*
274864	*CAYUGA RI;2U*	*1.55*
274849	*CRESCENT ;1U*	*0.48*
274859	*EASYR;U1 E*	*5.03*
274860	*EASYR;U2 E*	*5.03*
274856	*ECOGROVE ;U1*	*1.07*
274871	*GR RIDGE ;2U*	*2.23*
274847	*GR RIDGE ;BU*	*1.76*

274855	*GSG-6 ;RU*	*1.21*
290051	*GSG-6; E*	*4.82*
275149	*KELLYCK ;1E*	*8.97*
274888	*KELLYCK ;1U*	*2.24*
990901	*L-005 E*	*5.81*
274872	*LEE DEKAL;1U*	*2.68*
290108	*LEEDK;1U E*	*11.16*
274850	*MENDOTA H;RU*	*0.29*
274879	*MINONK ;1U*	*2.22*
293061	*N-015 E*	*7.03*
293513	*O-009 C1*	*1.04*
293514	*O-009 C2*	*0.53*
293515	*O-009 C3*	*0.58*
293516	*O-009 E1*	*4.16*
293517	*O-009 E2*	*2.12*
293518	*O-009 E3*	*2.33*
276156	*O-029 C*	*0.56*
276157	*O-029 C*	*0.61*
276158	*O-029 C*	*1.11*
293715	*O-029 E*	*4.45*
293716	*O-029 E*	*2.44*
293717	*O-029 E*	*2.24*
293771	*O-035 E*	*2.92*
293644	*O22 E1*	*4.77*
293645	*O22 E2*	*9.26*
290021	*O50 E*	*8.87*
294392	*P-010 E*	*8.92*
294763	*P-046 E*	*4.29*
274881	*PILOT HIL;1E*	*8.97*
274887	*PILOT HIL;1U*	*2.24*
274851	*PROVIDENC;RU*	*0.73*
290261	*S-027 E*	*6.45*
290265	*S-028 E*	*6.45*
295110	*SUBLETTE C*	*0.17*
274861	*TOP CROP ;1U*	*1.19*
274862	*TOP CROP ;2U*	*2.32*
274853	*TWINGROVE;U1*	*1.61*
274854	*TWINGROVE;U2*	*1.61*
274882	*W4-005 E*	*8.13*
295108	*WESTBROOK C*	*0.4*
917501	*Z2-087 C*	*1.23*
917502	*Z2-087 E*	*8.24*
918051	*AA1-018 C OP*	*1.12*
924041	*AB2-047 C O1*	*3.09*
924042	*AB2-047 E O1*	*20.65*

924261	*AB2-070 C O1*	*1.86*
924262	*AB2-070 E O1*	*12.44*
925301	*AB2-191*	*0.46*
925581	*AC1-033 C*	*1.29*
925582	*AC1-033 E*	*8.61*
925771	*AC1-053 C*	*1.84*
925772	*AC1-053 E*	*12.35*
926821	*AC1-168 C O1*	*1.05*
926822	*AC1-168 E O1*	*7.04*
926841	*AC1-171 C O1*	*0.95*
926842	*AC1-171 E O1*	*6.35*
927201	*AC1-214 C O1*	*1.88*
927202	*AC1-214 E O1*	*5.98*

Appendix 15

(CE - CE) The BRAIDWOOD; B-AD1-100 TAP 345 kV line (from bus 270670 to bus 934730 ckt 1) loads from 122.39% to 138.2% (AC power flow) of its emergency rating (1341 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004_AR-S-B'. This project contributes approximately 148.05 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L2004_AR-S-B'
TRIP BRANCH FROM BUS 941560 TO BUS 270711 CKT 1 / AE2-153 TAP 345 DAVIS; R 345
END

Bus Number	*Bus Name*	*Full Contribution*
936973	*AD2-131 BAT*	*2.9*
939631	*AE1-193 C*	*2.91*
939632	*AE1-193 E*	*19.47*
939641	*AE1-194 C*	*2.91*
939642	*AE1-194 E*	*19.47*
939651	*AE1-195 C*	*2.91*
939652	*AE1-195 E*	*19.47*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*4.98*
941561	*AE2-153 C O1*	*10.57*
941562	*AE2-153 E O1*	*49.5*
941732	*AE2-173 BAT*	*6.61*
945351	*AF1-200 FTIR*	*148.05*
945872	*AF1-252 BAT*	*3.35*
945882	*AF1-253 BAT*	*2.32*
274871	*GR RIDGE ;2U*	*3.01*
274847	*GR RIDGE ;BU*	*2.37*
293061	*N-015 E*	*9.47*
294392	*P-010 E*	*12.03*
LTF	*AC1-056*	*3.97*
926821	*AC1-168 C O1*	*0.41*
926822	*AC1-168 E O1*	*2.78*

Appendix 16

(CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 114.64% to 132.41% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 215.4 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3__'
TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765
TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.11*
934432	*AD1-067 E*	*0.45*
934721	*AD1-100 C*	*15.33*
934722	*AD1-100 E*	*71.56*
935141	*AD1-148*	*2.73*
936291	*AD2-038 C O1*	*2.49*
936292	*AD2-038 E O1*	*11.67*
936371	*AD2-047 C O1*	*3.19*
936372	*AD2-047 E O1*	*15.59*
936971	*AD2-131 C*	*0.48*
936972	*AD2-131 E*	*2.41*
937001	*AD2-134 C*	*2.11*
937002	*AD2-134 E*	*8.42*
937211	*AD2-159 C*	*1.9*
937212	*AD2-159 E*	*8.9*
938851	*AE1-113 C*	*6.57*
938852	*AE1-113 E*	*23.3*
938861	*AE1-114 C O1*	*3.18*
938862	*AE1-114 E O1*	*10.84*
939321	*AE1-163 C O1*	*4.62*
939322	*AE1-163 E O1*	*28.41*
939401	*AE1-172 C O1*	*4.04*
939402	*AE1-172 E O1*	*18.94*
939683	*AE1-198 BAT*	*44.92*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*16.9*
940752	*AE2-062 E*	*0.14*
941561	*AE2-153 C O1*	*3.78*
941562	*AE2-153 E O1*	*17.7*

941731	*AE2-173 O1*	*4.94*
942111	*AE2-223 C*	*1.54*
942112	*AE2-223 E*	*10.31*
942421	*AE2-255 C O1*	*2.49*
942422	*AE2-255 E O1*	*7.47*
942651	*AE2-281 C O1*	*0.66*
942652	*AE2-281 E O1*	*4.06*
943801	*AF1-048 C*	*3.89*
943802	*AF1-048 E*	*2.59*
943921	*AF1-060*	*1.23*
944221	*AF1-090 C O1*	*0.23*
944222	*AF1-090 E O1*	*1.07*
945351	*AF1-200 FTIR*	*215.4*
945871	*AF1-252 O1*	*3.21*
945881	*AF1-253 O1*	*2.22*
946161	*AF1-281 C*	*0.34*
946162	*AF1-281 E*	*1.95*
946321	*AF1-296 C O1*	*3.15*
946322	*AF1-296 E O1*	*14.75*
946501	*AF1-314 C*	*3.54*
946502	*AF1-314 E*	*16.57*
946541	*AF1-318 C O1*	*4.6*
946542	*AF1-318 E O1*	*21.54*
274857	*BIG SKY ;U1*	*1.11*
274858	*BIG SKY ;U2*	*1.11*
274877	*BISHOP HL;1U*	*0.86*
274878	*BISHOP HL;2U*	*0.86*
294401	*BSHIL;1U E*	*3.42*
294410	*BSHIL;2U E*	*3.42*
274848	*CAMPGROVE;RU*	*1.27*
274890	*CAYUG;1U E*	*5.16*
274891	*CAYUG;2U E*	*5.16*
274863	*CAYUGA RI;1U*	*1.29*
274864	*CAYUGA RI;2U*	*1.29*
274849	*CRESCENT ;1U*	*0.42*
274859	*EASYR;U1 E*	*4.43*
274860	*EASYR;U2 E*	*4.43*
274856	*ECOGROVE ;U1*	*0.95*
274871	*GR RIDGE ;2U*	*2.02*
274847	*GR RIDGE ;BU*	*1.59*
274855	*GSG-6 ;RU*	*1.06*
290051	*GSG-6; E*	*4.25*
956141	*J1101*	*1.44*
953201	*J715 C*	*1.03*
953202	*J715 E*	*5.56*

954702	*J844 E*	*8.4*
954511	*J926 C*	*0.84*
954512	*J926 E*	*4.56*
954741	*J928 C*	*0.87*
954742	*J928 E*	*4.73*
954981	*J974 C*	*2.43*
954982	*J974 E*	*13.16*
275149	*KELLYCK ;1E*	*6.56*
274888	*KELLYCK ;1U*	*1.64*
990901	*L-005 E*	*5.06*
274872	*LEE DEKAL;1U*	*2.36*
290108	*LEEDK;1U E*	*9.84*
274850	*MENDOTA H;RU*	*0.25*
274879	*MINONK ;1U*	*1.99*
293061	*N-015 E*	*6.37*
293513	*O-009 C1*	*0.91*
293514	*O-009 C2*	*0.46*
293515	*O-009 C3*	*0.51*
293516	*O-009 E1*	*3.65*
293517	*O-009 E2*	*1.86*
293518	*O-009 E3*	*2.04*
276156	*O-029 C*	*0.49*
276157	*O-029 C*	*0.53*
276158	*O-029 C*	*0.98*
293715	*O-029 E*	*3.91*
293716	*O-029 E*	*2.14*
293717	*O-029 E*	*1.97*
293771	*O-035 E*	*2.55*
293644	*O22 E1*	*4.75*
293645	*O22 E2*	*9.22*
290021	*O50 E*	*7.95*
294392	*P-010 E*	*8.09*
294763	*P-046 E*	*3.79*
274881	*PILOT HIL;1E*	*6.56*
274887	*PILOT HIL;1U*	*1.64*
274851	*PROVIDENC;RU*	*0.64*
295110	*SUBLETTE C*	*0.15*
295111	*SUBLETTE E*	*1.11*
274861	*TOP CROP ;1U*	*1.19*
274862	*TOP CROP ;2U*	*2.3*
295108	*WESTBROOK C*	*0.35*
295109	*WESTBROOK E*	*2.26*
916211	*Z1-072 E*	*3.87*
916221	*Z1-073 E*	*4.39*
276168	*Z1-106 E1*	*1.29*

276167	*Z1-106 E2*	*1.29*
276169	*Z1-107 E*	*2.46*
276170	*Z1-108 E*	*2.54*
918051	*AA1-018 C OP*	*0.93*
918052	*AA1-018 E OP*	*6.2*
920272	*AA2-123 E*	*2.49*
924041	*AB2-047 C O1*	*2.57*
924042	*AB2-047 E O1*	*17.18*
924261	*AB2-070 C O1*	*1.49*
924262	*AB2-070 E O1*	*9.97*
925301	*AB2-191*	*0.41*
925302	*AB2-191 E*	*1.13*
925581	*AC1-033 C*	*1.12*
925582	*AC1-033 E*	*7.52*
925771	*AC1-053 C*	*1.48*
925772	*AC1-053 E*	*9.88*
926821	*AC1-168 C O1*	*0.92*
926822	*AC1-168 E O1*	*6.18*
926841	*AC1-171 C O1*	*0.82*
926842	*AC1-171 E O1*	*5.49*
927201	*AC1-214 C O1*	*1.64*
927202	*AC1-214 E O1*	*5.22*

Appendix 17

(CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 101.91% to 118.68% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 137.35 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.07*
934432	*AD1-067 E*	*0.29*
934721	*AD1-100 C*	*10.15*
934722	*AD1-100 E*	*47.39*
936291	*AD2-038 C O1*	*1.63*
936292	*AD2-038 E O1*	*7.62*
936371	*AD2-047 C O1*	*2.37*
936372	*AD2-047 E O1*	*11.57*
937001	*AD2-134 C*	*1.36*
937002	*AD2-134 E*	*5.42*
938851	*AE1-113 C*	*4.18*
938852	*AE1-113 E*	*14.82*
938861	*AE1-114 C O1*	*2.04*
938862	*AE1-114 E O1*	*6.97*
939321	*AE1-163 C O1*	*3.02*
939322	*AE1-163 E O1*	*18.57*
939401	*AE1-172 C O1*	*2.7*
939402	*AE1-172 E O1*	*12.67*
939631	*AE1-193 C*	*8.66*
939632	*AE1-193 E*	*57.94*
939641	*AE1-194 C*	*8.66*
939642	*AE1-194 E*	*57.94*
939651	*AE1-195 C*	*8.66*
939652	*AE1-195 E*	*57.94*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*14.82*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*11.31*
940752	*AE2-062 E*	*0.09*
941561	*AE2-153 C O1*	*2.48*
941562	*AE2-153 E O1*	*11.6*

941731	*AE2-173 O1*	*3.29*
942111	*AE2-223 C*	*1.03*
942112	*AE2-223 E*	*6.86*
942421	*AE2-255 C O1*	*1.58*
942422	*AE2-255 E O1*	*4.75*
942651	*AE2-281 C O1*	*0.43*
942652	*AE2-281 E O1*	*2.65*
943801	*AF1-048 C*	*2.49*
943802	*AF1-048 E*	*1.66*
943921	*AF1-060*	*0.79*
945351	*AF1-200 FTIR*	*137.35*
946161	*AF1-281 C*	*0.22*
946162	*AF1-281 E*	*1.25*
946321	*AF1-296 C O1*	*2.03*
946322	*AF1-296 E O1*	*9.5*
946501	*AF1-314 C*	*2.27*
946502	*AF1-314 E*	*10.64*
946541	*AF1-318 C O1*	*2.97*
946542	*AF1-318 E O1*	*13.91*
274857	*BIG SKY ;U1*	*0.71*
274858	*BIG SKY ;U2*	*0.71*
274877	*BISHOP HL;1U*	*0.55*
274878	*BISHOP HL;2U*	*0.55*
294401	*BSHIL;1U E*	*2.21*
294410	*BSHIL;2U E*	*2.21*
274848	*CAMPGROVE;RU*	*0.82*
274890	*CAYUG;1U E*	*3.45*
274891	*CAYUG;2U E*	*3.45*
274863	*CAYUGA RI;1U*	*0.86*
274864	*CAYUGA RI;2U*	*0.86*
274849	*CRESCENT ;1U*	*0.27*
274859	*EASYR;U1 E*	*2.85*
274860	*EASYR;U2 E*	*2.85*
274856	*ECOGROVE ;U1*	*0.61*
274871	*GR RIDGE ;2U*	*1.28*
274847	*GR RIDGE ;BU*	*1.*
274855	*GSG-6 ;RU*	*0.68*
290051	*GSG-6; E*	*2.73*
275149	*KELLYCK ;1E*	*4.87*
274888	*KELLYCK ;1U*	*1.22*
990901	*L-005 E*	*3.26*
274872	*LEE DEKAL;1U*	*1.52*
290108	*LEEDK;1U E*	*6.33*
274850	*MENDOTA H;RU*	*0.16*
274879	*MINONK ;1U*	*1.26*

293061	*N-015 E*	*4.02*
293513	*O-009 C1*	*0.59*
293514	*O-009 C2*	*0.3*
293515	*O-009 C3*	*0.33*
293516	*O-009 E1*	*2.35*
293517	*O-009 E2*	*1.19*
293518	*O-009 E3*	*1.32*
276156	*O-029 C*	*0.32*
276157	*O-029 C*	*0.34*
276158	*O-029 C*	*0.63*
293715	*O-029 E*	*2.51*
293716	*O-029 E*	*1.38*
293717	*O-029 E*	*1.27*
293771	*O-035 E*	*1.65*
293644	*O22 E1*	*2.83*
293645	*O22 E2*	*5.5*
290021	*O50 E*	*5.06*
294392	*P-010 E*	*5.1*
294763	*P-046 E*	*2.43*
274881	*PILOT HIL;1E*	*4.87*
274887	*PILOT HIL;1U*	*1.22*
274851	*PROVIDENC;RU*	*0.41*
290261	*S-027 E*	*3.52*
290265	*S-028 E*	*3.52*
295110	*SUBLETTE C*	*0.1*
274861	*TOP CROP ;1U*	*0.71*
274862	*TOP CROP ;2U*	*1.37*
274853	*TWINGROVE;U1*	*0.88*
274854	*TWINGROVE;U2*	*0.88*
295108	*WESTBROOK C*	*0.22*
917501	*Z2-087 C*	*0.68*
917502	*Z2-087 E*	*4.56*
918051	*AA1-018 C OP*	*0.62*
924041	*AB2-047 C O1*	*1.71*
924042	*AB2-047 E O1*	*11.43*
925301	*AB2-191*	*0.26*
925581	*AC1-033 C*	*0.72*
925582	*AC1-033 E*	*4.85*
926821	*AC1-168 C O1*	*0.59*
926822	*AC1-168 E O1*	*3.97*
926841	*AC1-171 C O1*	*0.53*
926842	*AC1-171 E O1*	*3.55*
927201	*AC1-214 C O1*	*1.06*
927202	*AC1-214 E O1*	*3.36*

Appendix 18

(CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 104.66% to 118.33% (**DC power flow**) of its emergency rating (1310 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 151.62 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206
05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.08*
934432	*AD1-067 E*	*0.32*
934721	*AD1-100 C*	*11.07*
934722	*AD1-100 E*	*51.67*
935141	*AD1-148*	*1.98*
936291	*AD2-038 C O1*	*1.79*
936292	*AD2-038 E O1*	*8.37*
936371	*AD2-047 C O1*	*2.41*
936372	*AD2-047 E O1*	*11.77*
937001	*AD2-134 C*	*1.5*
937002	*AD2-134 E*	*5.98*
937211	*AD2-159 C*	*1.38*
937212	*AD2-159 E*	*6.45*
938851	*AE1-113 C*	*4.67*
938852	*AE1-113 E*	*16.54*
938861	*AE1-114 C O1*	*2.26*
938862	*AE1-114 E O1*	*7.71*
939321	*AE1-163 C O1*	*3.32*
939322	*AE1-163 E O1*	*20.39*
939401	*AE1-172 C O1*	*2.93*
939402	*AE1-172 E O1*	*13.74*
939631	*AE1-193 C*	*15.02*
939632	*AE1-193 E*	*100.53*
939641	*AE1-194 C*	*15.02*
939642	*AE1-194 E*	*100.53*
939651	*AE1-195 C*	*15.02*
939652	*AE1-195 E*	*100.53*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*25.71*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*12.25*

940752	*AE2-062 E*	*0.1*
941561	*AE2-153 C O1*	*2.71*
941562	*AE2-153 E O1*	*12.71*
941731	*AE2-173 O1*	*3.57*
942111	*AE2-223 C*	*1.11*
942112	*AE2-223 E*	*7.46*
942421	*AE2-255 C O1*	*1.77*
942422	*AE2-255 E O1*	*5.3*
942651	*AE2-281 C O1*	*0.47*
942652	*AE2-281 E O1*	*2.91*
943801	*AF1-048 C*	*2.76*
943802	*AF1-048 E*	*1.84*
943921	*AF1-060*	*0.87*
945351	*AF1-200 FTIR*	*151.62*
946161	*AF1-281 C*	*0.24*
946162	*AF1-281 E*	*1.39*
946321	*AF1-296 C O1*	*2.24*
946322	*AF1-296 E O1*	*10.5*
946501	*AF1-314 C*	*2.52*
946502	*AF1-314 E*	*11.78*
946541	*AF1-318 C O1*	*3.28*
946542	*AF1-318 E O1*	*15.36*
274857	*BIG SKY ;U1*	*0.79*
274858	*BIG SKY ;U2*	*0.79*
274877	*BISHOP HL;1U*	*0.61*
274878	*BISHOP HL;2U*	*0.61*
294401	*BSHIL;1U E*	*2.44*
294410	*BSHIL;2U E*	*2.44*
274848	*CAMPGROVE;RU*	*0.9*
274890	*CAYUG;1U E*	*3.74*
274891	*CAYUG;2U E*	*3.74*
274863	*CAYUGA RI;1U*	*0.93*
274864	*CAYUGA RI;2U*	*0.93*
274849	*CRESCENT ;1U*	*0.3*
274859	*EASYR;U1 E*	*3.15*
274860	*EASYR;U2 E*	*3.15*
274856	*ECOGROVE ;U1*	*0.67*
274871	*GR RIDGE ;2U*	*1.43*
274847	*GR RIDGE ;BU*	*1.12*
274855	*GSG-6 ;RU*	*0.75*
290051	*GSG-6; E*	*3.02*
275149	*KELLYCK ;1E*	*4.95*
274888	*KELLYCK ;1U*	*1.24*
990901	*L-005 E*	*3.61*
274872	*LEE DEKAL;1U*	*1.68*

290108	*LEEDK;1U E*	*6.99*
274850	*MENDOTA H;RU*	*0.18*
274879	*MINONK ;1U*	*1.41*
293061	*N-015 E*	*4.49*
293513	*O-009 C1*	*0.65*
293514	*O-009 C2*	*0.33*
293515	*O-009 C3*	*0.36*
293516	*O-009 E1*	*2.6*
293517	*O-009 E2*	*1.32*
293518	*O-009 E3*	*1.45*
276156	*O-029 C*	*0.35*
276157	*O-029 C*	*0.38*
276158	*O-029 C*	*0.69*
293715	*O-029 E*	*2.78*
293716	*O-029 E*	*1.52*
293717	*O-029 E*	*1.4*
293771	*O-035 E*	*1.82*
293644	*O22 E1*	*3.29*
293645	*O22 E2*	*6.39*
290021	*O50 E*	*5.64*
294392	*P-010 E*	*5.71*
294763	*P-046 E*	*2.69*
274881	*PILOT HIL;1E*	*4.95*
274887	*PILOT HIL;1U*	*1.24*
274851	*PROVIDENC;RU*	*0.45*
290261	*S-027 E*	*3.81*
290265	*S-028 E*	*3.81*
295110	*SUBLETTE C*	*0.11*
274861	*TOP CROP ;1U*	*0.82*
274862	*TOP CROP ;2U*	*1.6*
274853	*TWINGROVE;U1*	*0.95*
274854	*TWINGROVE;U2*	*0.95*
274882	*W4-005 E*	*4.73*
295108	*WESTBROOK C*	*0.25*
917501	*Z2-087 C*	*0.74*
917502	*Z2-087 E*	*4.96*
918051	*AA1-018 C OP*	*0.67*
924041	*AB2-047 C O1*	*1.86*
924042	*AB2-047 E O1*	*12.43*
924261	*AB2-070 C O1*	*1.08*
924262	*AB2-070 E O1*	*7.23*
925301	*AB2-191*	*0.29*
925581	*AC1-033 C*	*0.8*
925582	*AC1-033 E*	*5.36*
925771	*AC1-053 C*	*1.07*

925772	*AC1-053 E*	*7.17*
926821	*AC1-168 C O1*	*0.66*
926822	*AC1-168 E O1*	*4.4*
926841	*AC1-171 C O1*	*0.59*
926842	*AC1-171 E O1*	*3.92*
927201	*AC1-214 C O1*	*1.17*
927202	*AC1-214 E O1*	*3.72*

Appendix 19

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 140.76% to 157.06% (**DC 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 253.09 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*
934431	*AD1-067 C*	*0.13*
934432	*AD1-067 E*	*0.53*
934721	*AD1-100 C*	*23.02*
934722	*AD1-100 E*	*107.42*
936291	*AD2-038 C O1*	*3.03*
936292	*AD2-038 E O1*	*14.19*
936371	*AD2-047 C O1*	*4.47*
936372	*AD2-047 E O1*	*21.84*
937001	*AD2-134 C*	*2.49*
937002	*AD2-134 E*	*9.92*
937211	*AD2-159 C*	*2.73*
937212	*AD2-159 E*	*12.77*
938851	*AE1-113 C*	*7.61*
938852	*AE1-113 E*	*26.99*
938861	*AE1-114 C O1*	*3.75*
938862	*AE1-114 E O1*	*12.79*
939321	*AE1-163 C O1*	*5.63*
939322	*AE1-163 E O1*	*34.55*
939401	*AE1-172 C O1*	*6.28*
939402	*AE1-172 E O1*	*29.48*
939631	*AE1-193 C*	*5.89*
939632	*AE1-193 E*	*39.4*
939641	*AE1-194 C*	*5.89*
939642	*AE1-194 E*	*39.4*
939651	*AE1-195 C*	*5.89*

939652	*AE1-195 E*	*39.4*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*10.08*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*26.3*
940752	*AE2-062 E*	*0.16*
941561	*AE2-153 C O1*	*4.74*
941562	*AE2-153 E O1*	*22.17*
941731	*AE2-173 O1*	*7.13*
942111	*AE2-223 C*	*2.22*
942112	*AE2-223 E*	*14.88*
942421	*AE2-255 C O1*	*2.88*
942422	*AE2-255 E O1*	*8.65*
942651	*AE2-281 C O1*	*0.8*
942652	*AE2-281 E O1*	*4.94*
943801	*AF1-048 C*	*4.55*
943802	*AF1-048 E*	*3.03*
943921	*AF1-060*	*1.44*
945351	*AF1-200 FTIR*	*253.09*
946161	*AF1-281 C*	*0.41*
946162	*AF1-281 E*	*2.3*
946321	*AF1-296 C O1*	*3.76*
946322	*AF1-296 E O1*	*17.58*
946501	*AF1-314 C*	*4.17*
946502	*AF1-314 E*	*19.5*
946541	*AF1-318 C O1*	*5.6*
946542	*AF1-318 E O1*	*26.23*
274857	*BIG SKY ;U1*	*1.31*
274858	*BIG SKY ;U2*	*1.31*
274877	*BISHOP HL;1U*	*1.03*
274878	*BISHOP HL;2U*	*1.03*
294401	*BSHIL;1U E*	*4.14*
294410	*BSHIL;2U E*	*4.14*
274848	*CAMPGROVE;RU*	*1.53*
274890	*CAYUG;1U E*	*7.84*
274891	*CAYUG;2U E*	*7.84*
274863	*CAYUGA RI;1U*	*1.96*
274864	*CAYUGA RI;2U*	*1.96*
274849	*CRESCENT ;1U*	*0.51*
274859	*EASYR;U1 E*	*5.23*
274860	*EASYR;U2 E*	*5.23*
274856	*ECOGROVE ;U1*	*1.11*
274871	*GR RIDGE ;2U*	*2.4*
274847	*GR RIDGE ;BU*	*1.89*
274855	*GSG-6 ;RU*	*1.25*

290051	*GSG-6; E*	*5.01*
275149	*KELLYCK ;1E*	*9.19*
274888	*KELLYCK ;1U*	*2.3*
990901	*L-005 E*	*6.14*
274872	*LEE DEKAL;1U*	*2.78*
290108	*LEEDK;1U E*	*11.59*
274850	*MENDOTA H;RU*	*0.3*
274879	*MINONK ;1U*	*2.3*
293061	*N-015 E*	*7.57*
293513	*O-009 C1*	*1.09*
293514	*O-009 C2*	*0.55*
293515	*O-009 C3*	*0.61*
293516	*O-009 E1*	*4.35*
293517	*O-009 E2*	*2.21*
293518	*O-009 E3*	*2.43*
276156	*O-029 C*	*0.59*
276157	*O-029 C*	*0.64*
276158	*O-029 C*	*1.16*
293715	*O-029 E*	*4.65*
293716	*O-029 E*	*2.55*
293717	*O-029 E*	*2.34*
293771	*O-035 E*	*3.09*
293644	*O22 E1*	*4.87*
293645	*O22 E2*	*9.46*
290021	*O50 E*	*9.21*
294392	*P-010 E*	*9.62*
294763	*P-046 E*	*4.46*
274881	*PILOT HIL;1E*	*9.19*
274887	*PILOT HIL;1U*	*2.3*
274851	*PROVIDENC;RU*	*0.77*
290261	*S-027 E*	*7.58*
290265	*S-028 E*	*7.58*
295110	*SUBLETTE C*	*0.18*
295111	*SUBLETTE E*	*1.3*
274861	*TOP CROP ;1U*	*1.22*
274862	*TOP CROP ;2U*	*2.37*
274853	*TWINGROVE;U1*	*1.9*
274854	*TWINGROVE;U2*	*1.9*
274882	*W4-005 E*	*9.35*
295108	*WESTBROOK C*	*0.41*
295109	*WESTBROOK E*	*2.67*
916211	*Z1-072 E*	*4.69*
916221	*Z1-073 E*	*5.18*
276168	*Z1-106 E1*	*1.51*
276167	*Z1-106 E2*	*1.51*

276169	*Z1-107 E*	*3.08*
276170	*Z1-108 E*	*2.96*
917501	*Z2-087 C*	*1.48*
917502	*Z2-087 E*	*9.9*
918051	*AA1-018 C OP*	*1.17*
918052	*AA1-018 E OP*	*7.81*
920272	*AA2-123 E*	*2.91*
924041	*AB2-047 C O1*	*3.71*
924042	*AB2-047 E O1*	*24.8*
924261	*AB2-070 C O1*	*2.13*
924262	*AB2-070 E O1*	*14.24*
925301	*AB2-191*	*0.48*
925302	*AB2-191 E*	*1.33*
925581	*AC1-033 C*	*1.36*
925582	*AC1-033 E*	*9.09*
925771	*AC1-053 C*	*2.11*
925772	*AC1-053 E*	*14.1*
926821	*AC1-168 C O1*	*1.11*
926822	*AC1-168 E O1*	*7.48*
926841	*AC1-171 C O1*	*1.01*
926842	*AC1-171 E O1*	*6.75*
927201	*AC1-214 C O1*	*1.99*
927202	*AC1-214 E O1*	*6.32*

Appendix 20

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 144.0% to 161.16% (**DC 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 258.44 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*
934431	*AD1-067 C*	*0.13*
934432	*AD1-067 E*	*0.54*
934721	*AD1-100 C*	*23.48*
934722	*AD1-100 E*	*109.56*
935141	*AD1-148*	*3.97*
936291	*AD2-038 C O1*	*3.1*
936292	*AD2-038 E O1*	*14.5*
936371	*AD2-047 C O1*	*4.57*
936372	*AD2-047 E O1*	*22.3*
937001	*AD2-134 C*	*2.54*
937002	*AD2-134 E*	*10.13*
937211	*AD2-159 C*	*2.78*
937212	*AD2-159 E*	*13.03*
938851	*AE1-113 C*	*7.77*
938852	*AE1-113 E*	*27.57*
938861	*AE1-114 C O1*	*3.83*
938862	*AE1-114 E O1*	*13.06*
939321	*AE1-163 C O1*	*5.75*
939322	*AE1-163 E O1*	*35.3*
939401	*AE1-172 C O1*	*6.41*
939402	*AE1-172 E O1*	*30.07*
939631	*AE1-193 C*	*6.01*
939632	*AE1-193 E*	*40.24*
939641	*AE1-194 C*	*6.01*
939642	*AE1-194 E*	*40.24*

939651	*AE1-195 C*	*6.01*
939652	*AE1-195 E*	*40.24*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*10.29*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*26.82*
940752	*AE2-062 E*	*0.16*
941561	*AE2-153 C O1*	*4.83*
941562	*AE2-153 E O1*	*22.63*
941731	*AE2-173 O1*	*7.27*
942111	*AE2-223 C*	*2.27*
942112	*AE2-223 E*	*15.18*
942421	*AE2-255 C O1*	*2.95*
942422	*AE2-255 E O1*	*8.84*
942651	*AE2-281 C O1*	*0.82*
942652	*AE2-281 E O1*	*5.04*
943801	*AF1-048 C*	*4.65*
943802	*AF1-048 E*	*3.1*
943921	*AF1-060*	*1.47*
945351	*AF1-200 FTIR*	*258.45*
946161	*AF1-281 C*	*0.42*
946162	*AF1-281 E*	*2.35*
946321	*AF1-296 C O1*	*3.84*
946322	*AF1-296 E O1*	*17.96*
946501	*AF1-314 C*	*4.25*
946502	*AF1-314 E*	*19.92*
946541	*AF1-318 C O1*	*5.72*
946542	*AF1-318 E O1*	*26.78*
274857	*BIG SKY ;U1*	*1.33*
274858	*BIG SKY ;U2*	*1.33*
274877	*BISHOP HL;1U*	*1.06*
274878	*BISHOP HL;2U*	*1.06*
294401	*BSHIL;1U E*	*4.22*
294410	*BSHIL;2U E*	*4.22*
274848	*CAMPGROVE;RU*	*1.57*
274890	*CAYUG;1U E*	*7.99*
274891	*CAYUG;2U E*	*7.99*
274863	*CAYUGA RI;1U*	*2.*
274864	*CAYUGA RI;2U*	*2.*
274849	*CRESCENT ;1U*	*0.52*
274859	*EASYR;U1 E*	*5.34*
274860	*EASYR;U2 E*	*5.34*
274856	*ECOGROVE ;U1*	*1.14*
274871	*GR RIDGE ;2U*	*2.46*
274847	*GR RIDGE ;BU*	*1.93*

274855	*GSG-6 ;RU*	*1.28*
290051	*GSG-6; E*	*5.11*
275149	*KELLYCK ;1E*	*9.38*
274888	*KELLYCK ;1U*	*2.35*
990901	*L-005 E*	*6.27*
274872	*LEE DEKAL;1U*	*2.84*
290108	*LEEDK;1U E*	*11.83*
274850	*MENDOTA H;RU*	*0.3*
274879	*MINONK ;1U*	*2.35*
293061	*N-015 E*	*7.73*
293513	*O-009 C1*	*1.11*
293514	*O-009 C2*	*0.56*
293515	*O-009 C3*	*0.62*
293516	*O-009 E1*	*4.44*
293517	*O-009 E2*	*2.26*
293518	*O-009 E3*	*2.48*
276156	*O-029 C*	*0.6*
276157	*O-029 C*	*0.65*
276158	*O-029 C*	*1.19*
293715	*O-029 E*	*4.75*
293716	*O-029 E*	*2.6*
293717	*O-029 E*	*2.39*
293771	*O-035 E*	*3.16*
293644	*O22 E1*	*4.98*
293645	*O22 E2*	*9.66*
290021	*O50 E*	*9.4*
294392	*P-010 E*	*9.82*
294763	*P-046 E*	*4.55*
274881	*PILOT HIL;1E*	*9.38*
274887	*PILOT HIL;1U*	*2.35*
274851	*PROVIDENC;RU*	*0.79*
290261	*S-027 E*	*7.74*
290265	*S-028 E*	*7.74*
295110	*SUBLETTE C*	*0.18*
295111	*SUBLETTE E*	*1.33*
274861	*TOP CROP ;1U*	*1.24*
274862	*TOP CROP ;2U*	*2.42*
274853	*TWINGROVE;U1*	*1.93*
274854	*TWINGROVE;U2*	*1.93*
276153	*W2-048 E*	*2.53*
274882	*W4-005 E*	*9.55*
295108	*WESTBROOK C*	*0.42*
295109	*WESTBROOK E*	*2.73*
909052	*X2-022 E*	*7.6*
916211	*Z1-072 E*	*4.79*

916221	*Z1-073 E*	*5.29*
276168	*Z1-106 E1*	*1.54*
276167	*Z1-106 E2*	*1.54*
276169	*Z1-107 E*	*3.15*
276170	*Z1-108 E*	*3.03*
917501	*Z2-087 C*	*1.51*
917502	*Z2-087 E*	*10.1*
918051	*AA1-018 C OP*	*1.19*
918052	*AA1-018 E OP*	*7.98*
920272	*AA2-123 E*	*2.97*
924041	*AB2-047 C O1*	*3.78*
924042	*AB2-047 E O1*	*25.31*
924261	*AB2-070 C O1*	*2.17*
924262	*AB2-070 E O1*	*14.53*
925301	*AB2-191*	*0.49*
925302	*AB2-191 E*	*1.36*
925581	*AC1-033 C*	*1.39*
925582	*AC1-033 E*	*9.28*
925771	*AC1-053 C*	*2.15*
925772	*AC1-053 E*	*14.39*
926821	*AC1-168 C O1*	*1.14*
926822	*AC1-168 E O1*	*7.64*
926841	*AC1-171 C O1*	*1.03*
926842	*AC1-171 E O1*	*6.89*
927201	*AC1-214 C O1*	*2.03*
927202	*AC1-214 E O1*	*6.46*

Appendix 21

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 141.58% to 155.27% (**DC power flow**) of its emergency rating (1557 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 212.0 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.11*
934432	*AD1-067 E*	*0.45*
934721	*AD1-100 C*	*15.36*
934722	*AD1-100 E*	*71.69*
935141	*AD1-148*	*2.74*
936291	*AD2-038 C O1*	*2.49*
936292	*AD2-038 E O1*	*11.67*
936371	*AD2-047 C O1*	*3.19*
936372	*AD2-047 E O1*	*15.59*
936971	*AD2-131 C*	*0.48*
936972	*AD2-131 E*	*2.42*
937001	*AD2-134 C*	*2.1*
937002	*AD2-134 E*	*8.37*
937211	*AD2-159 C*	*1.9*
937212	*AD2-159 E*	*8.91*
938851	*AE1-113 C*	*6.57*
938852	*AE1-113 E*	*23.29*
938861	*AE1-114 C O1*	*3.16*
938862	*AE1-114 E O1*	*10.79*
939321	*AE1-163 C O1*	*4.63*
939322	*AE1-163 E O1*	*28.42*
939401	*AE1-172 C O1*	*4.05*
939402	*AE1-172 E O1*	*18.99*
939631	*AE1-193 C*	*25.76*
939632	*AE1-193 E*	*172.36*
939641	*AE1-194 C*	*25.76*
939642	*AE1-194 E*	*172.36*
939651	*AE1-195 C*	*25.76*
939652	*AE1-195 E*	*172.36*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*44.08*

940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*16.94*
940752	*AE2-062 E*	*0.14*
941561	*AE2-153 C O1*	*3.78*
941562	*AE2-153 E O1*	*17.68*
941731	*AE2-173 O1*	*4.95*
942111	*AE2-223 C*	*1.54*
942112	*AE2-223 E*	*10.33*
942421	*AE2-255 C O1*	*2.49*
942422	*AE2-255 E O1*	*7.46*
942651	*AE2-281 C O1*	*0.66*
942652	*AE2-281 E O1*	*4.06*
943801	*AF1-048 C*	*3.87*
943802	*AF1-048 E*	*2.58*
943921	*AF1-060*	*1.22*
944221	*AF1-090 C O1*	*1.45*
944222	*AF1-090 E O1*	*6.79*
945351	*AF1-200 FTIR*	*212.*
945871	*AF1-252 O1*	*3.21*
945881	*AF1-253 O1*	*2.22*
946161	*AF1-281 C*	*0.34*
946162	*AF1-281 E*	*1.94*
946321	*AF1-296 C O1*	*3.14*
946322	*AF1-296 E O1*	*14.69*
946501	*AF1-314 C*	*3.52*
946502	*AF1-314 E*	*16.49*
946541	*AF1-318 C O1*	*4.59*
946542	*AF1-318 E O1*	*21.5*
274857	*BIG SKY ;U1*	*1.1*
274858	*BIG SKY ;U2*	*1.1*
274877	*BISHOP HL;1U*	*0.85*
274878	*BISHOP HL;2U*	*0.85*
294401	*BSHIL;1U E*	*3.42*
294410	*BSHIL;2U E*	*3.42*
274848	*CAMPGROVE;RU*	*1.26*
274890	*CAYUG;1U E*	*5.17*
274891	*CAYUG;2U E*	*5.17*
274863	*CAYUGA RI;1U*	*1.29*
274864	*CAYUGA RI;2U*	*1.29*
274849	*CRESCENT ;1U*	*0.42*
274859	*EASYR;U1 E*	*4.41*
274860	*EASYR;U2 E*	*4.41*
274856	*ECOGROVE ;U1*	*0.94*
274871	*GR RIDGE ;2U*	*2.01*
274847	*GR RIDGE ;BU*	*1.58*

274855	*GSG-6 ;RU*	*1.06*
290051	*GSG-6; E*	*4.23*
275149	*KELLYCK ;1E*	*6.56*
274888	*KELLYCK ;1U*	*1.64*
990901	*L-005 E*	*5.05*
274872	*LEE DEKAL;1U*	*2.35*
290108	*LEEDK;1U E*	*9.78*
274850	*MENDOTA H;RU*	*0.25*
274879	*MINONK ;1U*	*1.99*
293061	*N-015 E*	*6.34*
293513	*O-009 C1*	*0.91*
293514	*O-009 C2*	*0.46*
293515	*O-009 C3*	*0.51*
293516	*O-009 E1*	*3.64*
293517	*O-009 E2*	*1.85*
293518	*O-009 E3*	*2.04*
276156	*O-029 C*	*0.49*
276157	*O-029 C*	*0.53*
276158	*O-029 C*	*0.97*
293715	*O-029 E*	*3.89*
293716	*O-029 E*	*2.13*
293717	*O-029 E*	*1.96*
293771	*O-035 E*	*2.55*
293644	*O22 E1*	*4.75*
293645	*O22 E2*	*9.22*
290021	*O50 E*	*7.95*
294392	*P-010 E*	*8.05*
294763	*P-046 E*	*3.77*
274881	*PILOT HIL;1E*	*6.56*
274887	*PILOT HIL;1U*	*1.64*
274851	*PROVIDENC;RU*	*0.64*
290261	*S-027 E*	*5.28*
290265	*S-028 E*	*5.28*
295110	*SUBLETTE C*	*0.15*
274861	*TOP CROP ;1U*	*1.19*
274862	*TOP CROP ;2U*	*2.31*
274853	*TWINGROVE;U1*	*1.32*
274854	*TWINGROVE;U2*	*1.32*
274882	*W4-005 E*	*6.53*
295108	*WESTBROOK C*	*0.35*
917501	*Z2-087 C*	*1.03*
917502	*Z2-087 E*	*6.87*
918051	*AA1-018 C OP*	*0.93*
924041	*AB2-047 C O1*	*2.57*
924042	*AB2-047 E O1*	*17.22*

924261	*AB2-070 C O1*	*1.49*
924262	*AB2-070 E O1*	*9.98*
925301	*AB2-191*	*0.41*
925581	*AC1-033 C*	*1.12*
925582	*AC1-033 E*	*7.5*
925771	*AC1-053 C*	*1.48*
925772	*AC1-053 E*	*9.9*
926821	*AC1-168 C O1*	*0.92*
926822	*AC1-168 E O1*	*6.17*
926841	*AC1-171 C O1*	*0.82*
926842	*AC1-171 E O1*	*5.49*
927201	*AC1-214 C O1*	*1.64*
927202	*AC1-214 E O1*	*5.2*

Appendix 22

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 119.19% to 138.95% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 168.42 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.08*
934432	*AD1-067 E*	*0.35*
934721	*AD1-100 C*	*12.32*
934722	*AD1-100 E*	*57.51*
935141	*AD1-148*	*2.21*
936291	*AD2-038 C O1*	*2.1*
936292	*AD2-038 E O1*	*9.85*
936371	*AD2-047 C O1*	*2.86*
936372	*AD2-047 E O1*	*13.98*
937001	*AD2-134 C*	*1.66*
937002	*AD2-134 E*	*6.64*
937211	*AD2-159 C*	*1.54*
937212	*AD2-159 E*	*7.2*
938851	*AE1-113 C*	*5.08*
938852	*AE1-113 E*	*18.03*
938861	*AE1-114 C O1*	*2.5*
938862	*AE1-114 E O1*	*8.53*
939321	*AE1-163 C O1*	*3.9*
939322	*AE1-163 E O1*	*23.98*
939401	*AE1-172 C O1*	*3.27*
939402	*AE1-172 E O1*	*15.32*
939631	*AE1-193 C*	*3.14*
939632	*AE1-193 E*	*21.03*
939641	*AE1-194 C*	*3.14*
939642	*AE1-194 E*	*21.03*
939651	*AE1-195 C*	*3.14*
939652	*AE1-195 E*	*21.03*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*5.38*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*13.67*

940752	*AE2-062 E*	*0.1*
941561	*AE2-153 C O1*	*3.04*
941562	*AE2-153 E O1*	*14.21*
941731	*AE2-173 O1*	*3.99*
942111	*AE2-223 C*	*1.24*
942112	*AE2-223 E*	*8.32*
942421	*AE2-255 C O1*	*1.93*
942422	*AE2-255 E O1*	*5.78*
942651	*AE2-281 C O1*	*0.56*
942652	*AE2-281 E O1*	*3.43*
943801	*AF1-048 C*	*3.06*
943802	*AF1-048 E*	*2.04*
943921	*AF1-060*	*0.96*
945351	*AF1-200 FTIR*	*168.42*
946161	*AF1-281 C*	*0.27*
946162	*AF1-281 E*	*1.53*
946321	*AF1-296 C O1*	*2.48*
946322	*AF1-296 E O1*	*11.61*
946501	*AF1-314 C*	*2.79*
946502	*AF1-314 E*	*13.04*
946541	*AF1-318 C O1*	*3.65*
946542	*AF1-318 E O1*	*17.08*
274857	*BIG SKY ;U1*	*0.87*
274858	*BIG SKY ;U2*	*0.87*
274877	*BISHOP HL;1U*	*0.68*
274878	*BISHOP HL;2U*	*0.68*
294401	*BSHIL;1U E*	*2.7*
294410	*BSHIL;2U E*	*2.7*
274848	*CAMPGROVE;RU*	*1.*
274890	*CAYUG;1U E*	*4.17*
274891	*CAYUG;2U E*	*4.17*
274863	*CAYUGA RI;1U*	*1.04*
274864	*CAYUGA RI;2U*	*1.04*
274849	*CRESCENT ;1U*	*0.33*
274859	*EASYR;U1 E*	*3.49*
274860	*EASYR;U2 E*	*3.49*
274856	*ECOGROVE ;U1*	*0.75*
274871	*GR RIDGE ;2U*	*1.58*
274847	*GR RIDGE ;BU*	*1.25*
274855	*GSG-6 ;RU*	*0.84*
290051	*GSG-6; E*	*3.35*
275149	*KELLYCK ;1E*	*5.88*
274888	*KELLYCK ;1U*	*1.47*
990901	*L-005 E*	*3.99*
274872	*LEE DEKAL;1U*	*1.86*

290108	*LEEDK;1U E*	*7.76*
274850	*MENDOTA H;RU*	*0.2*
274879	*MINONK ;1U*	*1.54*
293061	*N-015 E*	*4.99*
293513	*O-009 C1*	*0.72*
293514	*O-009 C2*	*0.36*
293515	*O-009 C3*	*0.4*
293516	*O-009 E1*	*2.88*
293517	*O-009 E2*	*1.46*
293518	*O-009 E3*	*1.61*
276156	*O-029 C*	*0.39*
276157	*O-029 C*	*0.42*
276158	*O-029 C*	*0.77*
293715	*O-029 E*	*3.08*
293716	*O-029 E*	*1.69*
293717	*O-029 E*	*1.55*
293771	*O-035 E*	*2.02*
293644	*O22 E1*	*3.11*
293645	*O22 E2*	*6.04*
290021	*O50 E*	*6.15*
294392	*P-010 E*	*6.34*
294763	*P-046 E*	*2.98*
274881	*PILOT HIL;1E*	*5.88*
274887	*PILOT HIL;1U*	*1.47*
274851	*PROVIDENC;RU*	*0.5*
290261	*S-027 E*	*4.26*
290265	*S-028 E*	*4.26*
295110	*SUBLETTE C*	*0.12*
274861	*TOP CROP ;1U*	*0.78*
274862	*TOP CROP ;2U*	*1.51*
274853	*TWINGROVE;U1*	*1.06*
274854	*TWINGROVE;U2*	*1.06*
274882	*W4-005 E*	*5.27*
295108	*WESTBROOK C*	*0.27*
917501	*Z2-087 C*	*0.83*
917502	*Z2-087 E*	*5.54*
918051	*AA1-018 C OP*	*0.84*
924041	*AB2-047 C O1*	*2.07*
924042	*AB2-047 E O1*	*13.87*
924261	*AB2-070 C O1*	*1.2*
924262	*AB2-070 E O1*	*8.06*
925301	*AB2-191*	*0.32*
925581	*AC1-033 C*	*0.89*
925582	*AC1-033 E*	*5.93*
925771	*AC1-053 C*	*1.19*

925772	*AC1-053 E*	*7.99*
926821	*AC1-168 C O1*	*0.73*
926822	*AC1-168 E O1*	*4.88*
926841	*AC1-171 C O1*	*0.65*
926842	*AC1-171 E O1*	*4.33*
927201	*AC1-214 C O1*	*1.3*
927202	*AC1-214 E O1*	*4.12*

Appendix 23

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 133.59% to 155.34% (**DC 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 253.09 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*
934431	*AD1-067 C*	*0.13*
934432	*AD1-067 E*	*0.53*
934721	*AD1-100 C*	*23.02*
934722	*AD1-100 E*	*107.42*
936291	*AD2-038 C O1*	*3.03*
936292	*AD2-038 E O1*	*14.19*
936371	*AD2-047 C O1*	*4.47*
936372	*AD2-047 E O1*	*21.84*
937001	*AD2-134 C*	*2.49*
937002	*AD2-134 E*	*9.92*
937211	*AD2-159 C*	*2.73*
937212	*AD2-159 E*	*12.77*
938851	*AE1-113 C*	*7.61*
938852	*AE1-113 E*	*26.99*
938861	*AE1-114 C O1*	*3.75*
938862	*AE1-114 E O1*	*12.79*
939321	*AE1-163 C O1*	*5.63*
939322	*AE1-163 E O1*	*34.55*
939401	*AE1-172 C O1*	*6.28*
939402	*AE1-172 E O1*	*29.48*
939631	*AE1-193 C*	*5.89*
939632	*AE1-193 E*	*39.4*
939641	*AE1-194 C*	*5.89*
939642	*AE1-194 E*	*39.4*
939651	*AE1-195 C*	*5.89*

939652	*AE1-195 E*	*39.4*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*10.08*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*26.3*
940752	*AE2-062 E*	*0.16*
941561	*AE2-153 C O1*	*4.74*
941562	*AE2-153 E O1*	*22.17*
941731	*AE2-173 O1*	*7.13*
942111	*AE2-223 C*	*2.22*
942112	*AE2-223 E*	*14.88*
942421	*AE2-255 C O1*	*2.88*
942422	*AE2-255 E O1*	*8.65*
942651	*AE2-281 C O1*	*0.8*
942652	*AE2-281 E O1*	*4.94*
943801	*AF1-048 C*	*4.55*
943802	*AF1-048 E*	*3.03*
943921	*AF1-060*	*1.44*
945351	*AF1-200 FTIR*	*253.09*
946161	*AF1-281 C*	*0.41*
946162	*AF1-281 E*	*2.3*
946321	*AF1-296 C O1*	*3.76*
946322	*AF1-296 E O1*	*17.58*
946501	*AF1-314 C*	*4.17*
946502	*AF1-314 E*	*19.5*
946541	*AF1-318 C O1*	*5.6*
946542	*AF1-318 E O1*	*26.23*
274857	*BIG SKY ;U1*	*1.31*
274858	*BIG SKY ;U2*	*1.31*
274877	*BISHOP HL;1U*	*1.03*
274878	*BISHOP HL;2U*	*1.03*
294401	*BSHIL;1U E*	*4.14*
294410	*BSHIL;2U E*	*4.14*
274848	*CAMPGROVE;RU*	*1.53*
274890	*CAYUG;1U E*	*7.84*
274891	*CAYUG;2U E*	*7.84*
274863	*CAYUGA RI;1U*	*1.96*
274864	*CAYUGA RI;2U*	*1.96*
274849	*CRESCENT ;1U*	*0.51*
274859	*EASYR;U1 E*	*5.23*
274860	*EASYR;U2 E*	*5.23*
274856	*ECOGROVE ;U1*	*1.11*
274871	*GR RIDGE ;2U*	*2.4*
274847	*GR RIDGE ;BU*	*1.89*
274855	*GSG-6 ;RU*	*1.25*

290051	*GSG-6; E*	*5.01*
275149	*KELLYCK ;1E*	*9.19*
274888	*KELLYCK ;1U*	*2.3*
990901	*L-005 E*	*6.14*
274872	*LEE DEKAL;1U*	*2.78*
290108	*LEEDK;1U E*	*11.59*
274850	*MENDOTA H;RU*	*0.3*
274879	*MINONK ;1U*	*2.3*
293061	*N-015 E*	*7.57*
293513	*O-009 C1*	*1.09*
293514	*O-009 C2*	*0.55*
293515	*O-009 C3*	*0.61*
293516	*O-009 E1*	*4.35*
293517	*O-009 E2*	*2.21*
293518	*O-009 E3*	*2.43*
276156	*O-029 C*	*0.59*
276157	*O-029 C*	*0.64*
276158	*O-029 C*	*1.16*
293715	*O-029 E*	*4.65*
293716	*O-029 E*	*2.55*
293717	*O-029 E*	*2.34*
293771	*O-035 E*	*3.09*
293644	*O22 E1*	*4.87*
293645	*O22 E2*	*9.46*
290021	*O50 E*	*9.21*
294392	*P-010 E*	*9.62*
294763	*P-046 E*	*4.46*
274881	*PILOT HIL;1E*	*9.19*
274887	*PILOT HIL;1U*	*2.3*
274851	*PROVIDENC;RU*	*0.77*
290261	*S-027 E*	*7.58*
290265	*S-028 E*	*7.58*
295110	*SUBLETTE C*	*0.18*
295111	*SUBLETTE E*	*1.3*
274861	*TOP CROP ;1U*	*1.22*
274862	*TOP CROP ;2U*	*2.37*
274853	*TWINGROVE;U1*	*1.9*
274854	*TWINGROVE;U2*	*1.9*
274882	*W4-005 E*	*9.35*
295108	*WESTBROOK C*	*0.41*
295109	*WESTBROOK E*	*2.67*
916211	*Z1-072 E*	*4.69*
916221	*Z1-073 E*	*5.18*
276168	*Z1-106 E1*	*1.51*
276167	*Z1-106 E2*	*1.51*

276169	*Z1-107 E*	*3.08*
276170	*Z1-108 E*	*2.96*
917501	*Z2-087 C*	*1.48*
917502	*Z2-087 E*	*9.9*
918051	*AA1-018 C OP*	*1.17*
918052	*AA1-018 E OP*	*7.81*
920272	*AA2-123 E*	*2.91*
924041	*AB2-047 C O1*	*3.71*
924042	*AB2-047 E O1*	*24.8*
924261	*AB2-070 C O1*	*2.13*
924262	*AB2-070 E O1*	*14.24*
925301	*AB2-191*	*0.48*
925302	*AB2-191 E*	*1.33*
925581	*AC1-033 C*	*1.36*
925582	*AC1-033 E*	*9.09*
925771	*AC1-053 C*	*2.11*
925772	*AC1-053 E*	*14.1*
926821	*AC1-168 C O1*	*1.11*
926822	*AC1-168 E O1*	*7.48*
926841	*AC1-171 C O1*	*1.01*
926842	*AC1-171 E O1*	*6.75*
927201	*AC1-214 C O1*	*1.99*
927202	*AC1-214 E O1*	*6.32*

Appendix 24

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 137.35% to 159.56% (**DC 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 258.44 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*
934431	*AD1-067 C*	*0.13*
934432	*AD1-067 E*	*0.54*
934721	*AD1-100 C*	*23.48*
934722	*AD1-100 E*	*109.56*
935141	*AD1-148*	*3.97*
936291	*AD2-038 C O1*	*3.1*
936292	*AD2-038 E O1*	*14.5*
936371	*AD2-047 C O1*	*4.57*
936372	*AD2-047 E O1*	*22.3*
937001	*AD2-134 C*	*2.54*
937002	*AD2-134 E*	*10.13*
937211	*AD2-159 C*	*2.78*
937212	*AD2-159 E*	*13.03*
938851	*AE1-113 C*	*7.77*
938852	*AE1-113 E*	*27.57*
938861	*AE1-114 C O1*	*3.83*
938862	*AE1-114 E O1*	*13.06*
939321	*AE1-163 C O1*	*5.75*
939322	*AE1-163 E O1*	*35.3*
939401	*AE1-172 C O1*	*6.41*
939402	*AE1-172 E O1*	*30.07*
939631	*AE1-193 C*	*6.01*
939632	*AE1-193 E*	*40.24*
939641	*AE1-194 C*	*6.01*
939642	*AE1-194 E*	*40.24*

939651	*AE1-195 C*	*6.01*
939652	*AE1-195 E*	*40.24*
939681	*AE1-198 C*	*< 0.01*
939682	*AE1-198 E*	*10.29*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*26.82*
940752	*AE2-062 E*	*0.16*
941561	*AE2-153 C O1*	*4.83*
941562	*AE2-153 E O1*	*22.63*
941731	*AE2-173 O1*	*7.27*
942111	*AE2-223 C*	*2.27*
942112	*AE2-223 E*	*15.18*
942421	*AE2-255 C O1*	*2.95*
942422	*AE2-255 E O1*	*8.84*
942651	*AE2-281 C O1*	*0.82*
942652	*AE2-281 E O1*	*5.04*
943801	*AF1-048 C*	*4.65*
943802	*AF1-048 E*	*3.1*
943921	*AF1-060*	*1.47*
945351	*AF1-200 FTIR*	*258.45*
946161	*AF1-281 C*	*0.42*
946162	*AF1-281 E*	*2.35*
946321	*AF1-296 C O1*	*3.84*
946322	*AF1-296 E O1*	*17.96*
946501	*AF1-314 C*	*4.25*
946502	*AF1-314 E*	*19.92*
946541	*AF1-318 C O1*	*5.72*
946542	*AF1-318 E O1*	*26.78*
274857	*BIG SKY ;U1*	*1.33*
274858	*BIG SKY ;U2*	*1.33*
274877	*BISHOP HL;1U*	*1.06*
274878	*BISHOP HL;2U*	*1.06*
294401	*BSHIL;1U E*	*4.22*
294410	*BSHIL;2U E*	*4.22*
274848	*CAMPGROVE;RU*	*1.57*
274890	*CAYUG;1U E*	*7.99*
274891	*CAYUG;2U E*	*7.99*
274863	*CAYUGA RI;1U*	*2.*
274864	*CAYUGA RI;2U*	*2.*
274849	*CRESCENT ;1U*	*0.52*
274859	*EASYR;U1 E*	*5.34*
274860	*EASYR;U2 E*	*5.34*
274856	*ECOGROVE ;U1*	*1.14*
274871	*GR RIDGE ;2U*	*2.46*
274847	*GR RIDGE ;BU*	*1.93*

274855	*GSG-6 ;RU*	*1.28*
290051	*GSG-6; E*	*5.11*
275149	*KELLYCK ;1E*	*9.38*
274888	*KELLYCK ;1U*	*2.35*
990901	*L-005 E*	*6.27*
274872	*LEE DEKAL;1U*	*2.84*
290108	*LEEDK;1U E*	*11.83*
274850	*MENDOTA H;RU*	*0.3*
274879	*MINONK ;1U*	*2.35*
293061	*N-015 E*	*7.73*
293513	*O-009 C1*	*1.11*
293514	*O-009 C2*	*0.56*
293515	*O-009 C3*	*0.62*
293516	*O-009 E1*	*4.44*
293517	*O-009 E2*	*2.26*
293518	*O-009 E3*	*2.48*
276156	*O-029 C*	*0.6*
276157	*O-029 C*	*0.65*
276158	*O-029 C*	*1.19*
293715	*O-029 E*	*4.75*
293716	*O-029 E*	*2.6*
293717	*O-029 E*	*2.39*
293771	*O-035 E*	*3.16*
293644	*O22 E1*	*4.98*
293645	*O22 E2*	*9.66*
290021	*O50 E*	*9.4*
294392	*P-010 E*	*9.82*
294763	*P-046 E*	*4.55*
274881	*PILOT HIL;1E*	*9.38*
274887	*PILOT HIL;1U*	*2.35*
274851	*PROVIDENC;RU*	*0.79*
290261	*S-027 E*	*7.74*
290265	*S-028 E*	*7.74*
295110	*SUBLETTE C*	*0.18*
295111	*SUBLETTE E*	*1.33*
274861	*TOP CROP ;1U*	*1.24*
274862	*TOP CROP ;2U*	*2.42*
274853	*TWINGROVE;U1*	*1.93*
274854	*TWINGROVE;U2*	*1.93*
276153	*W2-048 E*	*2.53*
274882	*W4-005 E*	*9.55*
295108	*WESTBROOK C*	*0.42*
295109	*WESTBROOK E*	*2.73*
909052	*X2-022 E*	*7.6*
916211	*Z1-072 E*	*4.79*

916221	*Z1-073 E*	*5.29*
276168	*Z1-106 E1*	*1.54*
276167	*Z1-106 E2*	*1.54*
276169	*Z1-107 E*	*3.15*
276170	*Z1-108 E*	*3.03*
917501	*Z2-087 C*	*1.51*
917502	*Z2-087 E*	*10.1*
918051	*AA1-018 C OP*	*1.19*
918052	*AA1-018 E OP*	*7.98*
920272	*AA2-123 E*	*2.97*
924041	*AB2-047 C O1*	*3.78*
924042	*AB2-047 E O1*	*25.31*
924261	*AB2-070 C O1*	*2.17*
924262	*AB2-070 E O1*	*14.53*
925301	*AB2-191*	*0.49*
925302	*AB2-191 E*	*1.36*
925581	*AC1-033 C*	*1.39*
925582	*AC1-033 E*	*9.28*
925771	*AC1-053 C*	*2.15*
925772	*AC1-053 E*	*14.39*
926821	*AC1-168 C O1*	*1.14*
926822	*AC1-168 E O1*	*7.64*
926841	*AC1-171 C O1*	*1.03*
926842	*AC1-171 E O1*	*6.89*
927201	*AC1-214 C O1*	*2.03*
927202	*AC1-214 E O1*	*6.46*

Appendix 25

(CE - CE) The AD1-100 TAP-WILTON ; B 345 kV line (from bus 934720 to bus 270926 ckt 1) loads from 125.83% to 136.34% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_765-L11216__-S'. This project contributes approximately 141.0 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_765-L11216__-S'
TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765
END

Bus Number	*Bus Name*	*Full Contribution*
934431	*AD1-067 C*	*0.05*
934432	*AD1-067 E*	*0.22*
934721	*AD1-100 C*	*36.88*
934722	*AD1-100 E*	*172.1*
935141	*AD1-148*	*4.23*
936371	*AD2-047 C O1*	*3.52*
936372	*AD2-047 E O1*	*17.2*
936971	*AD2-131 C*	*0.67*
936972	*AD2-131 E*	*3.38*
937001	*AD2-134 C*	*1.05*
937002	*AD2-134 E*	*4.19*
937211	*AD2-159 C*	*3.09*
937212	*AD2-159 E*	*14.46*
938851	*AE1-113 C*	*2.65*
938852	*AE1-113 E*	*9.41*
938861	*AE1-114 C O1*	*1.56*
938862	*AE1-114 E O1*	*5.32*
939401	*AE1-172 C O1*	*10.18*
939402	*AE1-172 E O1*	*47.77*
940101	*AE1-252 C O1*	*< 0.01*
940102	*AE1-252 E O1*	*42.61*
941561	*AE2-153 C O1*	*4.55*
941562	*AE2-153 E O1*	*21.29*
941731	*AE2-173 O1*	*9.*
942111	*AE2-223 C*	*2.81*
942112	*AE2-223 E*	*18.78*
942421	*AE2-255 C O1*	*1.01*
942422	*AE2-255 E O1*	*3.02*
943801	*AF1-048 C*	*1.75*
943802	*AF1-048 E*	*1.17*
943921	*AF1-060*	*0.59*

944221	*AF1-090 C O1*	*2.04*
944222	*AF1-090 E O1*	*9.55*
945351	*AF1-200 FTIR*	*141.*
945871	*AF1-252 O1*	*4.52*
945881	*AF1-253 O1*	*3.13*
946161	*AF1-281 C*	*0.17*
946162	*AF1-281 E*	*0.97*
946321	*AF1-296 C O1*	*1.7*
946322	*AF1-296 E O1*	*7.94*
946501	*AF1-314 C*	*1.69*
946502	*AF1-314 E*	*7.92*
946541	*AF1-318 C O1*	*3.25*
946542	*AF1-318 E O1*	*15.23*
274857	*BIG SKY ;U1*	*0.55*
274858	*BIG SKY ;U2*	*0.55*
274877	*BISHOP HL;1U*	*0.55*
274878	*BISHOP HL;2U*	*0.55*
294401	*BSHIL;1U E*	*2.19*
294410	*BSHIL;2U E*	*2.19*
274848	*CAMPGROVE;RU*	*0.83*
274890	*CAYUG;1U E*	*11.82*
274891	*CAYUG;2U E*	*11.82*
274863	*CAYUGA RI;1U*	*2.96*
274864	*CAYUGA RI;2U*	*2.96*
274849	*CRESCENT ;1U*	*0.28*
274859	*EASYR;U1 E*	*2.19*
274860	*EASYR;U2 E*	*2.19*
274856	*ECOGROVE ;U1*	*0.45*
274871	*GR RIDGE ;2U*	*1.84*
274847	*GR RIDGE ;BU*	*1.45*
274855	*GSG-6 ;RU*	*0.53*
290051	*GSG-6; E*	*2.11*
955401	*J1022 C*	*1.3*
955402	*J1022 E*	*7.05*
956281	*J1115 C*	*2.38*
956282	*J1115 E*	*12.89*
954721	*J750 C*	*0.98*
954722	*J750 E*	*5.29*
952651	*J756 C*	*1.76*
952652	*J756 E*	*9.54*
953741	*J826 C*	*0.87*
953742	*J826 E*	*4.7*
275149	*KELLYCK ;1E*	*7.24*
274888	*KELLYCK ;1U*	*1.81*
990901	*L-005 E*	*3.3*

274872	*LEE DEKAL;1U*	*1.17*
290108	*LEEDK;1U E*	*4.87*
274850	*MENDOTA H;RU*	*0.13*
274879	*MINONK ;1U*	*0.8*
293061	*N-015 E*	*5.79*
293513	*O-009 C1*	*0.5*
293514	*O-009 C2*	*0.25*
293515	*O-009 C3*	*0.28*
293516	*O-009 E1*	*1.99*
293517	*O-009 E2*	*1.01*
293518	*O-009 E3*	*1.11*
276156	*O-029 C*	*0.27*
276157	*O-029 C*	*0.29*
276158	*O-029 C*	*0.53*
293715	*O-029 E*	*2.12*
293716	*O-029 E*	*1.16*
293717	*O-029 E*	*1.07*
293771	*O-035 E*	*1.7*
290021	*O50 E*	*3.21*
294392	*P-010 E*	*7.35*
294763	*P-046 E*	*1.81*
274881	*PILOT HIL;1E*	*7.24*
274887	*PILOT HIL;1U*	*1.81*
274851	*PROVIDENC;RU*	*0.43*
290261	*S-027 E*	*9.1*
290265	*S-028 E*	*9.1*
295110	*SUBLETTE C*	*0.08*
274853	*TWINGROVE;U1*	*2.27*
274854	*TWINGROVE;U2*	*2.27*
274882	*W4-005 E*	*10.6*
295108	*WESTBROOK C*	*0.17*
917501	*Z2-087 C*	*1.87*
917502	*Z2-087 E*	*12.5*
924041	*AB2-047 C O1*	*4.68*
924042	*AB2-047 E O1*	*31.31*
924261	*AB2-070 C O1*	*2.36*
924262	*AB2-070 E O1*	*15.78*
925301	*AB2-191*	*0.2*
925581	*AC1-033 C*	*0.72*
925582	*AC1-033 E*	*4.82*
925771	*AC1-053 C*	*2.32*
925772	*AC1-053 E*	*15.53*
926821	*AC1-168 C O1*	*0.68*
926822	*AC1-168 E O1*	*4.55*
926841	*AC1-171 C O1*	*0.58*

926842	*AC1-171 E O1*	*3.86*
927201	*AC1-214 C O1*	*1.1*
927202	*AC1-214 E O1*	*3.49*

Attachment 1: Single Line Diagram