

Feasibility Study Report

For

***PJM Generation Interconnection Request
Queue Position AD2-141***

Wilton Center

May 31, 2019

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement.

Cost allocation rules can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.iv. of Schedule H to the Interconnection Service Agreement.

An Interconnection Customer entering the New Services Queue on or after October 1, 2012 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.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B-2 of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a \$10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 2.2.2. of Manual 14A for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

General

Queue AD2-141 project is a proposal to connect a 150 MW Energy, 26.25 MW Capacity, wind facility to be located in Warren and Benton Counties, IN (POI is in Will County, IL). It is proposed in the Interconnection Request (Attachment N) that the primary point of interconnection to be studied is the Wilton Center 345kV (PSSe bus nos. 270926). The secondary POI was selected as the Davis Creek 345kV bus (PSSe bus nos. 270710). This project will have a dedicated 55 mile attachment line (not shared with any other facility). For AD2-141, the Interconnection Customer is proposing (60) GE 2.5 WTGs and (6) 2.3 WTGs, (60) 2.5 MVA and (6) 2.3 MVA, 690 V/34.5 kV pad mount transformers, (3) collection feeders of up to 23 WTGs each, and a step up transformer.

Also stated in the Attachment N is the potential for a storage facility, but that will not be part of this queue position's analysis.

The IC has proposed a service date for this project of December 31, 2020.

Impacts on the MISO member transmission systems are not included in this analysis, but will be included in the System Impact Study Phase. Winter peak analysis will be performed in the System Impact Study phase.

This Generation Interconnection Feasibility Study provides analysis results to aid the IC in assessing the practicality and cost of incorporating the facility into the PJM system. This study was limited to load flow analyses of probable contingencies. If the IC elects to pursue a System Impact Study, a more comprehensive analysis will be performed.

Primary Point of Interconnection (Option-1)

The Interconnection Customer (IC) AD2-141 proposes to interconnect 150 MW windfarm to ComEd transmission system by connecting to 345kV bus at the Wilton Center TSS 112.

Attachment Facilities

The IC AD2-141 generator lead will interconnect to the 345kV Interconnection Substation. This interconnection would require one 345kV line MOD, a dead-end structure and revenue metering as shown in the one-line diagram.

The estimated cost for the attachment facilities is given below.

Scope of Work	Cost Estimate
Installation of one 345kV line MOD, one dead-end structure and one set of revenue metering (see notes below on cost estimate)	\$1.0M

Direct Connection Network Upgrades

The existing design of TSS 112 Wilton Center is such that it cannot be expanded to interconnect generator lead. Prior to AD2-141 queue position, a new 345kV Interconnection Substation would be built under two earlier queue positions AD2-137 and AD2-140, adjacent to Wilton Center TSS 112. It is proposed to interconnect developer's generator lead to the already built Interconnection Substation.

The scope of work includes installation of four 345kV circuit breakers at the Interconnection Substation (to be built by the AD2-137 and AD2-140 developers) to create a line position for IC's generator lead, as shown in the one-line diagram below.

It should be noted that if anyone or both of AD2-137 and AD2-140 projects drop out or do not build the Interconnection Substation, then the scope of work for AD2-141 developer would change.

The estimated cost for Direct Connection Network Upgrade is given below.

Scope of Work	Cost Estimate
Installation of four 345kV circuit breakers at the Interconnection Substation built by AD2-137 and AD2-140 and relay/protection work	\$10,000,000
Total Cost Estimate (see notes below on cost estimate)	\$10,000,000

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

Non-Direct Connection Cost Estimate

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. Per the PJM Tariff, Interconnection Customer will be responsible for paying all actual costs of ComEd's work.

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

Network Impacts for Primary POI

The Queue Project AD2-141 was evaluated as a 150.0 MW (Capacity 26.2 MW) injection at the Wilton Center; B 345 kV substation in the ComEd area. Project AD2-141 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-141 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None

Multiple Facility Contingency

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

None

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 109.84% to 109.92% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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

Please refer to Appendix 1 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 109.06% to 109.14% (**DC 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 13.85 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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.03% to 109.11% (**DC 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 13.91 MW to the thermal violation.

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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
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4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.03% to 109.1% (**DC 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 13.91 MW to the thermal violation.

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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
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5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 164.71% to 164.86% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 23.68 MW to the thermal violation.

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CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
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Please refer to Appendix 2 for a table containing the generators having contribution to this flowgate.

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 130.4% to 130.57% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.13 MW to the thermal violation.

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CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
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Please refer to Appendix 3 for a table containing the generators having contribution to this flowgate.

7. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 109.2% to 109.26% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.82 MW to the thermal violation.

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CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

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

8. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.69% to 108.76% (**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 18.72 MW to the thermal violation.

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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
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9. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.66% to 108.73% (**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 18.85 MW to the thermal violation.

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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
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10. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.64% to 108.71% (**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 18.85 MW to the thermal violation.

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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
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11. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 112.62% to 112.73% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.3 MW to the thermal violation.

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CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1      / 243206 05DUMONT 765 X1-020
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OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

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

12. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 111.29% to 111.41% (**DC 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 13.48 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

13. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.83% to 109.91% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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

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

14. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.06% to 109.14% (**DC 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 13.85 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

15. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.03% to 109.11% (**DC 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 13.91 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

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.03% to 109.1% (**DC 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 13.91 MW to the thermal violation.

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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
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17. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 147.94% to 149.09% (**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 43.36 MW to the thermal violation.

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

18. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 149.99% to 150.44% (**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 44.16 MW to the thermal violation.

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

19. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.77% to 126.84% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.58 MW to the thermal violation.

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CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
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Please refer to Appendix 9 for a table containing the generators having contribution to this flowgate.

20. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.29% to 126.36% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 18.48 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

21. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.25% to 126.32% (**DC 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 18.61 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

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.24% to 126.31% (**DC 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 18.62 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

23. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.82% to 133.94% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.36 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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

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

24. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.49 MW to the thermal violation.

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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
```

25. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.47 MW to the thermal violation.

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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
```

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.47 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
```

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.68% to 132.8% (**DC 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 15.45 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
```

28. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 147.94% to 149.09% (**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 43.36 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 11 for a table containing the generators having contribution to this flowgate.

29. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 149.99% to 150.43% (**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 44.16 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
```

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

Steady-State Voltage Requirements

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

To be determined

Short Circuit

(Summary of impacted circuit breakers)

No issues identified.

Affected System Analysis & Mitigation

MISO Impacts:

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

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 109.0% to 109.08% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.94 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 161.42% to 161.58% (**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 24.37 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 - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 129.46% to 129.63% (**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 21.28 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

4. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.56% to 108.63% (**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 18.93 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

5. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 111.28% to 111.4% (**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 13.47 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 - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.99% to 109.07% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.94 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

7. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.15% to 126.22% (**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 18.7 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

8. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.66% to 132.79% (**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 15.5 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

Light Load Analysis - 2021

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

System Reinforcements

Short Circuit

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

None.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

To be determined

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements

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

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.84% to 109.92% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

COMED:

SSTE rating is 1134 MVA. The post contingency load exceeds the SSTE rating therefore an upgrade is required. The upgrade will be to mitigate the sag on the line. A preliminary estimate for the upgrade is \$2.8 million with a construction estimated timeline of 30 months. Upon completion of this work the new line ratings will be 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD).

MISO:

The external (i.e. Non-PJM) Transmission Owner, MISO, will not evaluate this violation until the impact study phase.

2. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.06% to 109.14% (**DC 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 13.85 MW to the thermal violation.

Same as Contribution to Previously Identified #1

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.03% to 109.11% (**DC 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 13.91 MW to the thermal violation.

Same as Contribution to Previously Identified #1

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.03% to 109.1% (**DC 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 13.91 MW to the thermal violation.

Same as Contribution to Previously Identified #1

5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 164.71% to 164.86% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 23.68 MW to the thermal violation.

AEP / MISO:

- 1) (N4058) Sag study results: Stillwell - Dumont 345 kV line 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 \$1.613 million. New SE rating will be 1718 MVA limited by a Dumont wavetrapp and possibly the conductor. This upgrade is driven by a prior queue. Per PJM cost allocation rules, AC1-002 LTF presently does not receive cost allocation for this upgrade. Note: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, AC1-002 LTF could receive cost allocation.
- 2) Additional AEP-end upgrade: Rebuild 8.6 miles of the AEP owned line and upgrade necessary Dumont terminal equipment (wavetrapp) at a cost of \$20 million. PJM Network Upgrade N4790. New AEP-end ratings to be 1409/2045 MVA (SN/SE). Limited by Dumont risers.
- 3) Additional AEP-end upgrade: In addition to upgrading the Dumont risers, a different conductor (compared to the prior upgrade) will need to be selected to achieve the desired rating. The new conductor would be 1272 dual ACSR conductor. The additional cost for this work scope is \$2 million. The new AEP-end ratings to be 1690/2278 MVA SN/SE (limited by the conductor). PJM Network Upgrade N5064.
- 4) Additional AEP-end upgrade: AEP said it would cost \$4.8 million to string a second Stillwell- Dumont 345 kV line on the existing tower. The \$4.8 million is for 8.5 miles of the AEP portion. Would need a NIPSCO portion (2.87 miles) cost estimate.
- 5) MISO end – ratings are 1409/1779 MVA. MISO end upgrade: Rebuild NIPSCO portion of line (2.87 miles) at a cost of \$6.5 million and upgrade Stillwell substation equipment at a cost of \$1.5 million. Total cost is \$8.0 million. New expected MISO end ratings will be 1582/1898 MVA SN/SE.
- 6) Additional MISO-end upgrade: Reconductor 2.87 miles of transmission conductor to bundled 954 ACSS, replace substation conductor to bundled 2500 AL, and replace wavetrapp. \$12 million. New MISO-end ratings to be 2550/2923 MVA SN/SE.

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 130.4% to 130.57% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.13 MW to the thermal violation.

COMED:

ComEd L17703 SSTE rating is 1251 MVA. The post contingency flow exceeds the rating therefore an upgrade is required. Upgrades include line reconductoring and station conductor work at Burnham. A preliminary estimate for the upgrades is \$8.1 million with a preliminary construction timeline of 30 months. Upon completion the new ratings will be 1248/1441/1667/1982 MVA (SN/SLTE/SSTE/SLD)

7. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 109.2% to 109.26% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.82 MW to the thermal violation.

COMED:

ComEd 345kV L6607 SSTE rating is 1483 MVA. The post contingency flow for this event exceeds the rating therefore an upgrade is required. The upgrade will be to reconductor the line. A preliminary estimate for this upgrade is \$11.2 million with a preliminary construction timeline of 30-36 months. Upon completion of this upgrade the new ratings will be 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)

8. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.69% to 108.76% (**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 18.72 MW to the thermal violation.

Same as Contribution to Previously Identified #7

9. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.66% to 108.73% (**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 18.85 MW to the thermal violation.

Same as Contribution to Previously Identified #7

10. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.64% to 108.71% (**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 18.85 MW to the thermal violation.

Same as Contribution to Previously Identified #7

11. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 112.62% to 112.73% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.3 MW to the thermal violation.

AEP:

1. A sag study will be required on the 40.64 mile section line to mitigate the overload. Depending on the sag study results, cost for the upgrade is expected to be between \$1,62,560 (no remediations required just sag study) and \$81.28 million (complete line reconductor/rebuild required).

(A) Sag study: 6 to 12 months.

(B) Rebuild. The standard time required for construction differs from state to state. An Approximate construction would be 36 to 48 months after signing an interconnection agreement.

COMED:

ComEd SSTE is 1134 MVA. No upgrade is required.

12. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 111.29% to 111.41% (**DC 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 13.48 MW to the thermal violation.

AEP:

1. A sag study will be required on the 40.64 mile section line to mitigate the overload. Depending on the sag study results, cost for the upgrade is expected to be between \$1,62,560 (no remediations required just sag study) and \$81.28 million (complete line reconductor/rebuild required).

(A) Sag study: 6 to 12 months.

(B) Rebuild. The standard time required for construction differs from state to state. An Approximate construction would be 36 to 48 months after signing an interconnection agreement.

COMED:

ComEd SSTE is 1134 MVA. No upgrade is required.

13. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.83% to 109.91% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

Same as Contribution to Previously Identified #1

14. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.06% to 109.14% (**DC 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 13.85 MW to the thermal violation.

Same as Contribution to Previously Identified #1

15. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.03% to 109.11% (**DC 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 13.91 MW to the thermal violation.

Same as Contribution to Previously Identified #1

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.03% to 109.1% (**DC 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 13.91 MW to the thermal violation.

Same as Contribution to Previously Identified #1

17. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 147.94% to 149.09% (**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 43.36 MW to the thermal violation.

COMED:

ComEd post contingency facility overloaded by this event is Tr. 93 @ Station 112 Wilton Center. The upgrade will be to build out the 765kV ring bus at Wilton Center, installation of two 765 kV Bus Tie Circuit Breakers (BT 6-8 & 8-2) along with a relocation of 765kV L11216 from bus 6 to bus 8. Preliminary estimate for upgrade is \$12 million with an estimated construction time line of 30 months. Note, the rating for Tr. 93 at Wilton Center will remain current however with this upgrade the 112-65-BT5-6 contingency file will no longer include the Wilton Center Tr. 94 and will allow both transformers to remain in service eliminating the overload.

18. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 149.99% to 150.44% (**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 44.16 MW to the thermal violation.

Same as Contribution to Previously Identified #17

19. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.77% to 126.84% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.58 MW to the thermal violation.

Same as Contribution to Previously Identified #7

20. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.29% to 126.36% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 18.48 MW to the thermal violation.

Same as Contribution to Previously Identified #7

21. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.25% to 126.32% (**DC 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 18.61 MW to the thermal violation.

Same as Contribution to Previously Identified #7

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.24% to 126.31% (**DC 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 18.62 MW to the thermal violation.

Same as Contribution to Previously Identified #7

23. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.82% to 133.94% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.36 MW to the thermal violation.

AEP:

A sag study will be required on the 40.64 mile section line to mitigate the overload. Depending on the sag study results, cost for the upgrade is expected to be between \$1,62,560 (no remediations required just sag study) and \$81.28 million (complete line reconductor/rebuild required).

(A) Sag study: 6 to 12 months.

(B) Rebuild. The standard time required for construction differs from state to state. An Approximate construction would be 36 to 48 months after signing an interconnection agreement.

COMED:

ComEd 345kV L97008 SSTE rating is 1134 MVA. The post contingency flow exceeds the rating therefore an upgrade is required. The upgrade will be to mitigate the sag on the line. A preliminary estimate for this upgrade is \$ 22.6 million with a construction timeline of 30 months. Upon completion of the upgrade the ratings will be 1334/1334/1391/1523 MVA (SN/SLTE/SSTE/SLD).

24. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.49 MW to the thermal violation.

Same as Contribution to Previously Identified #23

25. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.47 MW to the thermal violation.

Same as Contribution to Previously Identified #23

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.69% to 132.82% (**DC 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 15.47 MW to the thermal violation.

Same as Contribution to Previously Identified #23

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.68% to 132.8% (**DC 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 15.45 MW to the thermal violation.

Same as Contribution to Previously Identified #23

28. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 147.94% to 149.09% (**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 43.36 MW to the thermal violation.

Same as Contribution to Previously Identified #17

29. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 149.99% to 150.43% (**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 44.16 MW to the thermal violation.

Same as Contribution to Previously Identified #17

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the Appendices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the Appendices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators.

It should be noted the project/generator MW contributions presented in the body of the report and appendices sections are full contributions, whereas the loading percentages reported in the body of the report, take into consideration the commercial probability of each project as well as the ramping impact of "Adder" contributions.

Appendix 1

(MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.84% to 109.92% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.63
932012	AC2-007 E	1.17
932881	AC2-115 1	1.78
932891	AC2-115 2	1.78
932921	AC2-116	0.62
933341	AC2-147 C	0.65
933342	AC2-147 E	1.06
933361	AC2-149 C	0.69
933362	AC2-149 E	1.13
933381	AC2-151 C	0.72
933382	AC2-151 E	1.18
933411	AC2-154 C	1.74
933412	AC2-154 E	2.84
933431	AC2-156 C	0.71
933432	AC2-156 E	1.16
933511	AC2-166 C	1.74
933512	AC2-166 E	1.92
933911	AD1-013 C O1	1.37
933912	AD1-013 E O1	2.19
933931	AD1-016 C	0.69
933932	AD1-016 E	1.13
934101	AD1-039 1	5.73
934111	AD1-039 2	6.14
934401	AD1-064 C O1	2.39
934402	AD1-064 E O1	11.21
934431	AD1-067 C	0.1
934432	AD1-067 E	0.41
LTF	AD1-092	8.28
LTF	AD1-093	14.36
LTF	AD1-094	2.76
934651	AD1-096 C	0.66
934652	AD1-096 E	1.08

934701	AD1-098 C O1	5.12
934702	AD1-098 E O1	3.73
934721	AD1-100 C	16.33
934722	AD1-100 E	76.48
934871	AD1-116 C	0.67
934872	AD1-116 E	1.1
934881	AD1-117 C	3.99
934882	AD1-117 E	2.66
934941	AD1-126 C	4.35
934942	AD1-126 E	2.9
934971	AD1-129 C	0.67
934972	AD1-129 E	0.45
935001	AD1-133 C O1	15.16
935002	AD1-133 E O1	10.11
936181	AD2-024 C O1	0.69
936182	AD2-024 E O1	1.13
936291	AD2-038 C O1	1.71
936292	AD2-038 E O1	11.45
936371	AD2-047 C O1	1.55
936372	AD2-047 E O1	16.74
936461	AD2-060	1.83
936511	AD2-066 C O1	6.21
936512	AD2-066 E O1	4.14
936781	AD2-101 C	3.08
936782	AD2-101 E	14.41
936791	AD2-102 C	8.97
936792	AD2-102 E	8.62
936961	AD2-130 C	1.19
936962	AD2-130 E	0.16
937001	AD2-134 C	2.03
937002	AD2-134 E	8.39
937031	AD2-137 C O1	2.43
937032	AD2-137 E O1	11.36
937051	AD2-140 C O1	2.43
937052	AD2-140 E O1	11.39
937061	AD2-141 C O1	2.42
937062	AD2-141 E O1	11.4
937071	AD2-142 C O1	4.87
937072	AD2-142 E O1	22.78
937121	AD2-148 C O1	2.42
937122	AD2-148 E O1	11.31
937131	AD2-149 C O1	2.42
937132	AD2-149 E O1	11.31
937141	AD2-150 C O1	2.42
937142	AD2-150 E O1	11.31

937181	AD2-155 C O1	2.42
937182	AD2-155 E O1	11.31
937311	AD2-172 C	1.83
937312	AD2-172 E	2.53
937321	AD2-175 C	11.26
937322	AD2-175 E	7.5
937331	AD2-176 C O1	5.48
937332	AD2-176 E O1	3.65
937401	AD2-194 C1	2.97
937411	AD2-194 C2	2.97
937402	AD2-194 E1	2.97
937412	AD2-194 E2	2.97
LTF	BLUEG	1.4
274654	BRAIDWOOD;1U	23.01
274655	BRAIDWOOD;2U	22.39
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.08
LTF	CARR	0.56
LTF	CATAWBA	0.19
LTF	CBM-S1	1.13
LTF	CBM-W1	39.86
LTF	CBM-W2	29.04
LTF	CELEVELAND	0.53
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	8.44
274751	CRETE EC ;1U	4.08
274752	CRETE EC ;2U	4.08
274753	CRETE EC ;3U	4.08
274754	CRETE EC ;4U	4.08
LTF	DEARBORN	2.3
274859	EASYR;U1 E	8.18
274860	EASYR;U2 E	8.18
LTF	ELMERSMITH	0.15
LTF	G-007	1.5
LTF	GIBSON	0.08
290051	GSG-6; E	7.77
LTF	HAMLET	0.74
275149	KEMPTON ;1E	12.81
274704	KENDALL ;1C	3.42
274705	KENDALL ;1S	2.28
274706	KENDALL ;2C	3.42
274707	KENDALL ;2S	2.28
274660	LASCO STA;1U	21.43
274661	LASCO STA;2U	21.47

290108	LEEDK;1U E	18.07
LTF	MEC	27.9
274850	MENDOTA H;RU	4.01
293061	N-015 E	11.68
293715	O-029 E	6.17
293716	O-029 E	3.38
293717	O-029 E	3.11
LTF	O-066	9.6
293644	O22 E1	8.57
293645	O22 E2	16.64
290021	O50 E	14.7
294392	P-010 E	14.84
294763	P-046 E	6.99
274888	PILOT HIL;1E	12.81
274830	PWR VTREC;1U	4.56
274831	PWR VTREC;2U	4.56
LTF	RENSSELAER	0.44
LTF	ROSETON	3.21
LTF	ROWAN	0.45
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.02
274861	TOP CROP ;1U	0.4
274862	TOP CROP ;2U	0.77
LTF	TRIMBLE	0.28
299993	U3-031C	3.68
903433	W3-046	18.
905471	W4-084	0.33
274874	WALNR;2U	1.77
294502	WALNR;2U E	7.1
LTF	WEC	5.99
295109	WESTBROOK E	4.16
274687	WILL CNTY;4U	52.58
914641	Y2-103	33.82
915011	Y3-013 1	2.82
915021	Y3-013 2	2.82
915031	Y3-013 3	2.82
LTF	Z1-043	21.13
916502	Z1-106 E1	0.94
916504	Z1-106 E2	0.94
916512	Z1-107 E	1.85
916522	Z1-108 E	1.86
918051	AA1-018 C	1.73
918052	AA1-018 E	11.59
918972	AA1-116 E	1.83
918982	AA1-117 E	1.83

919221	AA1-146	13.05
919581	AA2-030	13.05
919591	AA2-035	95.09
920112	AA2-107 E	1.83
920272	AA2-123 E	1.83
930481	AB1-089	49.08
930491	AB1-090	49.08
930501	AB1-091	50.78
930761	AB1-122 1	52.68
930771	AB1-122 2	56.45
931221	AB1-172	0.57
LTF	AB2-013	11.97
924471	AB2-096	31.64
925161	AB2-173	2.33
925301	AB2-191 C	0.94
925302	AB2-191 E	0.83
926311	AC1-109 1	1.42
926321	AC1-109 2	1.42
926331	AC1-110 1	1.42
926341	AC1-110 2	1.42
926351	AC1-111 1	0.57
926361	AC1-111 2	0.57
926371	AC1-111 3	0.57
926381	AC1-111 4	0.57
926391	AC1-111 5	0.57
926401	AC1-111 6	0.57
927511	AC1-113 1	0.89
927522	AC1-113 2	0.89
926431	AC1-114	1.78
927451	AC1-142A 1	3.2
927461	AC1-142A 2	3.2
926701	AC1-153 C1	57.26
926711	AC1-153 C2	61.36
926702	AC1-153 E1	2.29
926712	AC1-153 E2	2.45
926821	AC1-168 C	0.86
926822	AC1-168 E	5.76
927531	AC1-185 1	0.51
927541	AC1-185 2	0.51
927551	AC1-185 3	0.51
927561	AC1-185 4	0.51
927571	AC1-185 5	0.51
927581	AC1-185 6	0.51
927591	AC1-185 7	0.51
927601	AC1-185 8	0.51

<i>927091</i>	<i>AC1-204 1</i>	<i>55.28</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>55.2</i>

Appendix 2

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 164.71% to 164.86% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 23.68 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.98
932012	AC2-007 E	1.82
932881	AC2-115 1	2.78
932891	AC2-115 2	2.78
932921	AC2-116	0.97
932931	AC2-117	5.89
933341	AC2-147 C	1.02
933342	AC2-147 E	1.66
933361	AC2-149 C	1.08
933362	AC2-149 E	1.77
933381	AC2-151 C	1.13
933382	AC2-151 E	1.84
933411	AC2-154 C	3.05
933412	AC2-154 E	4.98
933431	AC2-156 C	1.11
933432	AC2-156 E	1.81
933511	AC2-166 C	2.72
933512	AC2-166 E	3.
933911	AD1-013 C O1	2.14
933912	AD1-013 E O1	3.43
933931	AD1-016 C	1.08
933932	AD1-016 E	1.77
934101	AD1-039 1	9.01
934111	AD1-039 2	9.36
934401	AD1-064 C O1	3.74
934402	AD1-064 E O1	17.49
934421	AD1-066	1.25
934431	AD1-067 C	0.15
934432	AD1-067 E	0.64
LTF	AD1-092	13.13
LTF	AD1-093	22.7
LTF	AD1-094	4.38

934651	AD1-096 C	1.04
934652	AD1-096 E	1.7
934701	AD1-098 C O1	8.02
934702	AD1-098 E O1	5.85
934721	AD1-100 C	26.69
934722	AD1-100 E	124.96
934871	AD1-116 C	1.1
934872	AD1-116 E	1.8
934881	AD1-117 C	6.27
934882	AD1-117 E	4.18
934941	AD1-126 C	6.81
934942	AD1-126 E	4.54
934971	AD1-129 C	1.05
934972	AD1-129 E	0.7
935001	AD1-133 C O1	24.44
935002	AD1-133 E O1	16.29
936181	AD2-024 C O1	1.08
936182	AD2-024 E O1	1.77
936291	AD2-038 C O1	2.73
936292	AD2-038 E O1	18.27
936371	AD2-047 C O1	2.73
936372	AD2-047 E O1	29.38
936461	AD2-060	3.21
936511	AD2-066 C O1	9.81
936512	AD2-066 E O1	6.54
936781	AD2-101 C	5.91
936782	AD2-101 E	27.66
936791	AD2-102 C	14.04
936792	AD2-102 E	13.49
936961	AD2-130 C	1.86
936962	AD2-130 E	0.25
937001	AD2-134 C	3.18
937002	AD2-134 E	13.16
937031	AD2-137 C O1	4.13
937032	AD2-137 E O1	19.34
937051	AD2-140 C O1	4.17
937052	AD2-140 E O1	19.51
937061	AD2-141 C O1	4.14
937062	AD2-141 E O1	19.54
937071	AD2-142 C O1	8.34
937072	AD2-142 E O1	39.03
937121	AD2-148 C O1	4.22
937122	AD2-148 E O1	19.75
937131	AD2-149 C O1	4.22
937132	AD2-149 E O1	19.75

937141	AD2-150 C O1	4.22
937142	AD2-150 E O1	19.75
937181	AD2-155 C O1	4.22
937182	AD2-155 E O1	19.75
937311	AD2-172 C	2.87
937312	AD2-172 E	3.97
937321	AD2-175 C	19.66
937322	AD2-175 E	13.1
937331	AD2-176 C O1	8.54
937332	AD2-176 E O1	5.69
937401	AD2-194 C1	4.54
937411	AD2-194 C2	4.53
937402	AD2-194 E1	4.54
937412	AD2-194 E2	4.53
937531	AD2-214 C	5.17
937532	AD2-214 E	2.43
274832	ANNAWAN ; 1U	12.73
LTF	BLUEG	0.15
LTF	CARR	0.91
LTF	CATAWBA	0.17
274890	CAYUG;1U E	16.05
274891	CAYUG;2U E	16.05
LTF	CBM-S1	4.13
LTF	CBM-W1	73.22
LTF	CBM-W2	62.78
LTF	CELEVELAND	0.46
LTF	CIN	3.09
LTF	CLIFTY	8.01
LTF	DEARBORN	3.83
274859	EASYR;U1 E	12.84
274860	EASYR;U2 E	12.84
LTF	G-007	2.36
290051	GSG-6; E	12.18
LTF	HAMLET	0.79
LTF	IPL	1.33
940531	J351	434.36
951131	J643	25.84
981291	J740 C	5.51
981292	J740 E	22.06
938961	J847	13.15
275149	KEMPTON ;1E	22.48
290108	LEEDK;1U E	28.29
LTF	MEC	45.53
274850	MENDOTA H;RU	6.29
293061	N-015 E	17.78

293516	O-009 E1	10.65
293517	O-009 E2	5.41
293518	O-009 E3	5.96
293715	O-029 E	11.38
293716	O-029 E	6.24
293717	O-029 E	5.74
LTF	O-066	15.17
293644	O22 E1	12.12
293645	O22 E2	23.53
290021	O50 E	22.63
294392	P-010 E	22.58
294763	P-046 E	10.95
274888	PILOT HIL;1E	22.48
274830	PWR VTREC;1U	7.11
274831	PWR VTREC;2U	7.11
LTF	RENSSELAER	0.71
LTF	ROSETON	5.17
LTF	ROWAN	0.47
274789	SE CHICAG;6U	1.39
274790	SE CHICAG;7U	1.39
274791	SE CHICAG;8U	1.39
295111	SUBLETTE E	3.17
LTF	TRIMBLE	0.06
299993	U3-031C	6.32
903433	W3-046	27.95
905471	W4-084	0.52
274874	WALNR;2U	2.79
294502	WALNR;2U E	11.15
LTF	WEC	9.34
295109	WESTBROOK E	6.52
274687	WILL CNTY;4U	79.77
910542	X3-005 E	1.01
914641	Y2-103	52.52
915011	Y3-013 1	4.38
915021	Y3-013 2	4.38
915031	Y3-013 3	4.38
LTF	Z1-043	33.46
916502	Z1-106 E1	1.47
916504	Z1-106 E2	1.47
916512	Z1-107 E	3.06
916522	Z1-108 E	2.9
918051	AA1-018 C	2.83
918052	AA1-018 E	18.97
918972	AA1-116 E	3.21
918982	AA1-117 E	3.21

919221	AA1-146	20.55
919581	AA2-030	20.55
919591	AA2-035	151.52
920112	AA2-107 E	2.86
920272	AA2-123 E	2.85
930481	AB1-089	76.71
930491	AB1-090	76.71
930501	AB1-091	89.49
930761	AB1-122 1	82.91
930771	AB1-122 2	86.1
931221	AB1-172	0.95
LTF	AB2-013	18.91
924471	AB2-096	49.4
925161	AB2-173	3.67
925301	AB2-191 C	1.47
925302	AB2-191 E	1.31
925881	AC1-067	200.82
926311	AC1-109 1	2.22
926321	AC1-109 2	2.22
926331	AC1-110 1	2.21
926341	AC1-110 2	2.21
926351	AC1-111 1	0.89
926361	AC1-111 2	0.89
926371	AC1-111 3	0.89
926381	AC1-111 4	0.89
926391	AC1-111 5	0.89
926401	AC1-111 6	0.89
927511	AC1-113 1	1.39
927522	AC1-113 2	1.39
926431	AC1-114	2.78
927451	AC1-142A 1	4.9
927461	AC1-142A 2	4.9
926701	AC1-153 C1	90.12
926711	AC1-153 C2	93.59
926702	AC1-153 E1	3.61
926712	AC1-153 E2	3.74
926821	AC1-168 C	1.35
926822	AC1-168 E	9.07
927531	AC1-185 1	0.8
927541	AC1-185 2	0.8
927551	AC1-185 3	0.8
927561	AC1-185 4	0.8
927571	AC1-185 5	0.8
927581	AC1-185 6	0.8
927591	AC1-185 7	0.8

<i>927601</i>	<i>AC1-185 8</i>	<i>0.8</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>84.36</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>84.34</i>
<i>927201</i>	<i>AC1-214 C</i>	<i>1.34</i>
<i>927202</i>	<i>AC1-214 E</i>	<i>3.57</i>

Appendix 3

(CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 130.4% to 130.57% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.13 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.82
932012	AC2-007 E	1.52
932881	AC2-115 1	2.32
932891	AC2-115 2	2.32
932921	AC2-116	0.81
932931	AC2-117	5.38
933341	AC2-147 C	0.85
933342	AC2-147 E	1.38
933361	AC2-149 C	0.91
933362	AC2-149 E	1.48
933381	AC2-151 C	0.95
933382	AC2-151 E	1.55
933411	AC2-154 C	2.88
933412	AC2-154 E	4.7
933431	AC2-156 C	0.94
933432	AC2-156 E	1.53
933511	AC2-166 C	2.28
933512	AC2-166 E	2.52
933911	AD1-013 C O1	1.79
933912	AD1-013 E O1	2.86
933931	AD1-016 C	0.91
933932	AD1-016 E	1.48
934101	AD1-039 1	7.58
934111	AD1-039 2	7.76
934401	AD1-064 C O1	3.13
934402	AD1-064 E O1	14.65
934431	AD1-067 C	0.13
934432	AD1-067 E	0.54
LTF	AD1-092	10.71
LTF	AD1-093	18.55
LTF	AD1-094	3.6
934651	AD1-096 C	0.87

934652	AD1-096 E	1.42
934701	AD1-098 C O1	6.7
934702	AD1-098 E O1	4.89
934721	AD1-100 C	22.49
934722	AD1-100 E	105.29
934871	AD1-116 C	0.99
934872	AD1-116 E	1.61
934881	AD1-117 C	5.21
934882	AD1-117 E	3.48
934941	AD1-126 C	5.71
934942	AD1-126 E	3.81
934971	AD1-129 C	0.88
934972	AD1-129 E	0.59
935001	AD1-133 C O1	20.35
935002	AD1-133 E O1	13.57
936181	AD2-024 C O1	0.91
936182	AD2-024 E O1	1.48
936291	AD2-038 C O1	2.35
936292	AD2-038 E O1	15.72
936371	AD2-047 C O1	2.58
936372	AD2-047 E O1	27.77
936461	AD2-060	3.04
936511	AD2-066 C O1	8.21
936512	AD2-066 E O1	5.47
936781	AD2-101 C	4.28
936782	AD2-101 E	20.04
936791	AD2-102 C	11.72
936792	AD2-102 E	11.26
936961	AD2-130 C	1.57
936962	AD2-130 E	0.21
937001	AD2-134 C	2.66
937002	AD2-134 E	11.
937031	AD2-137 C O1	3.66
937032	AD2-137 E O1	17.12
937051	AD2-140 C O1	3.72
937052	AD2-140 E O1	17.41
937061	AD2-141 C O1	3.7
937062	AD2-141 E O1	17.43
937071	AD2-142 C O1	7.44
937072	AD2-142 E O1	34.83
937121	AD2-148 C O1	3.43
937122	AD2-148 E O1	16.06
937131	AD2-149 C O1	3.43
937132	AD2-149 E O1	16.06
937141	AD2-150 C O1	3.43

937142	AD2-150 E O1	16.06
937181	AD2-155 C O1	3.43
937182	AD2-155 E O1	16.06
937311	AD2-172 C	2.4
937312	AD2-172 E	3.31
937321	AD2-175 C	15.98
937322	AD2-175 E	10.65
937331	AD2-176 C O1	7.16
937332	AD2-176 E O1	4.77
937401	AD2-194 C1	3.79
937411	AD2-194 C2	3.79
937402	AD2-194 E1	3.79
937412	AD2-194 E2	3.79
LTF	BLUEG	1.8
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.09
LTF	CARR	0.72
LTF	CATAWBA	0.24
274890	CAYUG;1U E	13.34
274891	CAYUG;2U E	13.34
LTF	CBM-S1	1.55
LTF	CBM-W1	48.42
LTF	CBM-W2	38.56
LTF	CELEVELAND	0.67
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	10.94
LTF	DEARBORN	2.84
274859	EASYR;U1 E	10.67
274860	EASYR;U2 E	10.67
LTF	ELMERSMITH	0.17
LTF	G-007	1.92
LTF	GIBSON	0.09
290051	GSG-6; E	10.18
LTF	HAMLET	0.94
275149	KEMPTON ;1E	21.23
290108	LEEDK;1U E	23.7
LTF	MEC	36.43
274850	MENDOTA H;RU	5.25
293061	N-015 E	14.96
293516	O-009 E1	0.89
293517	O-009 E2	0.45
293518	O-009 E3	0.5
293715	O-029 E	9.41
293716	O-029 E	5.16

293717	O-029 E	4.74
LTF	O-066	12.35
293644	O22 E1	9.27
293645	O22 E2	17.99
290021	O50 E	18.68
294392	P-010 E	19.
294763	P-046 E	9.13
274888	PILOT HIL;1E	21.23
274830	PWR VTREC;1U	5.96
274831	PWR VTREC;2U	5.96
LTF	RENSSELAER	0.57
274723	RIVER EC ;12	5.2
LTF	ROSETON	4.13
LTF	ROWAN	0.57
LTF	SANTEETLA	< 0.01
274794	SE CHICAG;1U	1.15
274795	SE CHICAG;2U	1.15
295111	SUBLETTE E	2.65
LTF	TRIMBLE	0.37
299993	U3-031C	5.65
903433	W3-046	22.98
905471	W4-084	0.44
274874	WALNR;2U	2.31
294502	WALNR;2U E	9.25
LTF	WEC	7.81
295109	WESTBROOK E	5.45
274687	WILL CNTY;4U	64.5
910541	X3-005 C	0.1
910542	X3-005 E	0.91
914641	Y2-103	44.12
915011	Y3-013 1	3.68
915021	Y3-013 2	3.68
915031	Y3-013 3	3.68
LTF	Z1-043	27.52
916502	Z1-106 E1	1.24
916504	Z1-106 E2	1.24
916512	Z1-107 E	2.61
916522	Z1-108 E	2.44
918051	AA1-018 C	2.54
918052	AA1-018 E	16.99
918972	AA1-116 E	3.03
918982	AA1-117 E	3.03
919221	AA1-146	17.02
919581	AA2-030	17.02
919591	AA2-035	129.81

920112	AA2-107 E	2.4
920272	AA2-123 E	2.39
930481	AB1-089	64.13
930491	AB1-090	64.13
930501	AB1-091	93.52
930761	AB1-122 1	69.73
930771	AB1-122 2	71.42
931221	AB1-172	0.81
LTF	AB2-013	15.45
924471	AB2-096	41.37
925161	AB2-173	3.04
925301	AB2-191 C	1.23
925302	AB2-191 E	1.09
925881	AC1-067	307.8
926311	AC1-109 1	1.88
926321	AC1-109 2	1.88
926331	AC1-110 1	1.86
926341	AC1-110 2	1.86
926351	AC1-111 1	0.75
926361	AC1-111 2	0.75
926371	AC1-111 3	0.75
926381	AC1-111 4	0.75
926391	AC1-111 5	0.75
926401	AC1-111 6	0.75
927511	AC1-113 1	1.16
927522	AC1-113 2	1.16
926431	AC1-114	2.32
927451	AC1-142A 1	4.12
927461	AC1-142A 2	4.12
926701	AC1-153 C1	75.79
926711	AC1-153 C2	77.63
926702	AC1-153 E1	3.03
926712	AC1-153 E2	3.1
926821	AC1-168 C	1.12
926822	AC1-168 E	7.48
927531	AC1-185 1	0.67
927541	AC1-185 2	0.67
927551	AC1-185 3	0.67
927561	AC1-185 4	0.67
927571	AC1-185 5	0.67
927581	AC1-185 6	0.67
927591	AC1-185 7	0.67
927601	AC1-185 8	0.67
927091	AC1-204 1	70.49
927101	AC1-204 2	70.54

Appendix 4

(CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 109.2% to 109.26% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.89
932012	AC2-007 E	1.66
932881	AC2-115 1	2.52
932891	AC2-115 2	2.52
932921	AC2-116	0.88
933341	AC2-147 C	0.92
933342	AC2-147 E	1.5
933361	AC2-149 C	0.98
933362	AC2-149 E	1.6
933381	AC2-151 C	1.03
933382	AC2-151 E	1.67
933411	AC2-154 C	2.34
933412	AC2-154 E	3.82
933431	AC2-156 C	1.01
933432	AC2-156 E	1.64
933511	AC2-166 C	2.46
933512	AC2-166 E	2.72
933911	AD1-013 C O1	1.94
933912	AD1-013 E O1	3.1
933931	AD1-016 C	0.98
933932	AD1-016 E	1.61
934101	AD1-039 1	8.1
934111	AD1-039 2	8.76
934401	AD1-064 C O1	3.4
934402	AD1-064 E O1	15.91
934431	AD1-067 C	0.14
934432	AD1-067 E	0.58
LTF	AD1-092	11.78
LTF	AD1-093	20.42
LTF	AD1-094	3.92
934651	AD1-096 C	0.94
934652	AD1-096 E	1.54
934701	AD1-098 C O1	7.26

934702	AD1-098 E O1	5.3
934721	AD1-100 C	22.76
934722	AD1-100 E	106.57
934871	AD1-116 C	0.94
934872	AD1-116 E	1.54
934881	AD1-117 C	5.67
934882	AD1-117 E	3.78
934941	AD1-126 C	6.17
934942	AD1-126 E	4.12
934971	AD1-129 C	0.96
934972	AD1-129 E	0.64
935001	AD1-133 C O1	21.36
935002	AD1-133 E O1	14.24
936181	AD2-024 C O1	0.98
936182	AD2-024 E O1	1.61
936291	AD2-038 C O1	2.41
936292	AD2-038 E O1	16.16
936371	AD2-047 C O1	2.09
936372	AD2-047 E O1	22.53
936461	AD2-060	2.46
936511	AD2-066 C O1	8.79
936512	AD2-066 E O1	5.86
936791	AD2-102 C	12.74
936792	AD2-102 E	12.24
936961	AD2-130 C	1.68
936962	AD2-130 E	0.22
937001	AD2-134 C	2.88
937002	AD2-134 E	11.91
937031	AD2-137 C O1	3.32
937032	AD2-137 E O1	15.53
937051	AD2-140 C O1	3.31
937052	AD2-140 E O1	15.51
937061	AD2-141 C O1	3.29
937062	AD2-141 E O1	15.53
937071	AD2-142 C O1	6.63
937072	AD2-142 E O1	31.02
937121	AD2-148 C O1	3.28
937122	AD2-148 E O1	15.36
937131	AD2-149 C O1	3.28
937132	AD2-149 E O1	15.36
937141	AD2-150 C O1	3.28
937142	AD2-150 E O1	15.36
937181	AD2-155 C O1	3.28
937182	AD2-155 E O1	15.36
937311	AD2-172 C	2.6

937312	AD2-172 E	3.6
937321	AD2-175 C	15.28
937322	AD2-175 E	10.19
937331	AD2-176 C O1	7.77
937332	AD2-176 E O1	5.18
937401	AD2-194 C1	4.24
937411	AD2-194 C2	4.23
937402	AD2-194 E1	4.24
937412	AD2-194 E2	4.23
LTF	BLUEG	1.96
274654	BRAIDWOOD;1U	33.28
274655	BRAIDWOOD;2U	32.37
LTF	CANNELTON	0.11
LTF	CARR	0.74
LTF	CATAWBA	0.24
LTF	CBM-S1	1.73
LTF	CBM-W1	53.69
LTF	CBM-W2	41.3
LTF	CELEVELAND	0.66
LTF	CHEOAH	< 0.01
LTF	CLIFTY	11.49
LTF	DEARBORN	2.95
274859	EASYR;U1 E	11.61
274860	EASYR;U2 E	11.61
LTF	ELMERSMITH	0.21
LTF	G-007	1.96
LTF	GIBSON	0.13
290051	GSG-6; E	11.03
LTF	HAMLET	0.93
274676	JOLIET 29;8U	13.75
275149	KEMPTON ;1E	17.24
274704	KENDALL ;1C	4.9
274705	KENDALL ;1S	3.27
274706	KENDALL ;2C	4.9
274707	KENDALL ;2S	3.27
274660	LASCO STA;1U	30.75
274661	LASCO STA;2U	30.8
290108	LEEDK;1U E	25.63
LTF	MEC	39.61
274850	MENDOTA H;RU	5.69
293061	N-015 E	16.7
293516	O-009 E1	0.57
293517	O-009 E2	0.29
293518	O-009 E3	0.32
293715	O-029 E	10.24

293716	O-029 E	5.61
293717	O-029 E	5.16
LTF	O-066	12.55
293644	O22 E1	12.52
293645	O22 E2	24.31
290021	O50 E	20.97
294392	P-010 E	21.21
294763	P-046 E	9.92
274888	PILOT HIL;1E	17.24
274830	PWR VTREC;1U	6.47
274831	PWR VTREC;2U	6.47
LTF	RENSSELAER	0.58
LTF	ROSETON	4.2
LTF	ROWAN	0.56
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.87
274861	TOP CROP ;1U	0.58
274862	TOP CROP ;2U	1.13
LTF	TRIMBLE	0.4
299993	U3-031C	5.01
903433	W3-046	25.68
905471	W4-084	0.47
274874	WALNR;2U	2.52
294502	WALNR;2U E	10.08
LTF	WEC	8.51
295109	WESTBROOK E	5.9
274687	WILL CNTY;4U	75.03
914641	Y2-103	48.04
915011	Y3-013 1	4.
915021	Y3-013 2	4.
915031	Y3-013 3	4.
LTF	Z1-043	30.
916502	Z1-106 E1	1.34
916504	Z1-106 E2	1.34
916512	Z1-107 E	2.57
916522	Z1-108 E	2.64
918051	AA1-018 C	2.42
918052	AA1-018 E	16.19
918972	AA1-116 E	2.46
918982	AA1-117 E	2.46
919221	AA1-146	18.54
919581	AA2-030	18.54
919591	AA2-035	133.8
920112	AA2-107 E	2.59
920272	AA2-123 E	2.59

930481	AB1-089	69.67
930491	AB1-090	69.67
930501	AB1-091	67.74
930761	AB1-122 1	74.55
930771	AB1-122 2	80.59
931221	AB1-172	0.8
LTF	AB2-013	17.02
924471	AB2-096	44.92
925161	AB2-173	3.31
925301	AB2-191 C	1.33
925302	AB2-191 E	1.18
926311	AC1-109 1	2.01
926321	AC1-109 2	2.01
926331	AC1-110 1	2.02
926341	AC1-110 2	2.02
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	1.26
927522	AC1-113 2	1.26
926431	AC1-114	2.52
927451	AC1-142A 1	4.57
927461	AC1-142A 2	4.57
926701	AC1-153 C1	81.04
926711	AC1-153 C2	87.6
926702	AC1-153 E1	3.24
926712	AC1-153 E2	3.5
926821	AC1-168 C	1.22
926822	AC1-168 E	8.19
927531	AC1-185 1	0.73
927541	AC1-185 2	0.73
927551	AC1-185 3	0.73
927561	AC1-185 4	0.73
927571	AC1-185 5	0.73
927581	AC1-185 6	0.73
927591	AC1-185 7	0.73
927601	AC1-185 8	0.73
927091	AC1-204 1	78.89
927101	AC1-204 2	78.75

Appendix 5

(CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 112.62% to 112.73% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.3 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.57
932012	AC2-007 E	1.05
932881	AC2-115 1	1.6
932891	AC2-115 2	1.6
932921	AC2-116	0.56
933341	AC2-147 C	0.59
933342	AC2-147 E	0.96
933361	AC2-149 C	0.63
933362	AC2-149 E	1.02
933381	AC2-151 C	0.65
933382	AC2-151 E	1.06
933411	AC2-154 C	1.7
933412	AC2-154 E	2.77
933431	AC2-156 C	0.64
933432	AC2-156 E	1.05
933511	AC2-166 C	1.57
933512	AC2-166 E	1.73
933911	AD1-013 C O1	1.24
933912	AD1-013 E O1	1.98
933931	AD1-016 C	0.63
933932	AD1-016 E	1.02
934101	AD1-039 1	5.19
934111	AD1-039 2	5.48
934401	AD1-064 C O1	2.16
934402	AD1-064 E O1	10.11
934421	AD1-066	0.71
934431	AD1-067 C	0.09
934432	AD1-067 E	0.37
LTF	AD1-092	7.48
LTF	AD1-093	12.96
LTF	AD1-094	2.5
934651	AD1-096 C	0.6
934652	AD1-096 E	0.98

934701	AD1-098 C O1	4.62
934702	AD1-098 E O1	3.37
934721	AD1-100 C	15.19
934722	AD1-100 E	71.09
934871	AD1-116 C	0.62
934872	AD1-116 E	1.02
934881	AD1-117 C	3.61
934882	AD1-117 E	2.4
934941	AD1-126 C	3.93
934942	AD1-126 E	2.62
934971	AD1-129 C	0.61
934972	AD1-129 E	0.41
935001	AD1-133 C O1	13.88
935002	AD1-133 E O1	9.25
936181	AD2-024 C O1	0.63
936182	AD2-024 E O1	1.02
936291	AD2-038 C O1	1.56
936292	AD2-038 E O1	10.42
936371	AD2-047 C O1	1.52
936372	AD2-047 E O1	16.36
936461	AD2-060	1.79
936511	AD2-066 C O1	5.63
936512	AD2-066 E O1	3.75
936781	AD2-101 C	3.17
936782	AD2-101 E	14.83
936791	AD2-102 C	8.1
936792	AD2-102 E	7.78
936961	AD2-130 C	1.08
936962	AD2-130 E	0.14
937001	AD2-134 C	1.84
937002	AD2-134 E	7.58
937031	AD2-137 C O1	2.32
937032	AD2-137 E O1	10.88
937051	AD2-140 C O1	2.34
937052	AD2-140 E O1	10.96
937061	AD2-141 C O1	2.33
937062	AD2-141 E O1	10.97
937071	AD2-142 C O1	4.68
937072	AD2-142 E O1	21.92
937121	AD2-148 C O1	2.34
937122	AD2-148 E O1	10.97
937131	AD2-149 C O1	2.34
937132	AD2-149 E O1	10.97
937141	AD2-150 C O1	2.34
937142	AD2-150 E O1	10.97

937181	AD2-155 C O1	2.34
937182	AD2-155 E O1	10.97
937311	AD2-172 C	1.66
937312	AD2-172 E	2.29
937321	AD2-175 C	10.92
937322	AD2-175 E	7.28
937331	AD2-176 C O1	4.94
937332	AD2-176 E O1	3.29
937401	AD2-194 C1	2.65
937411	AD2-194 C2	2.65
937402	AD2-194 E1	2.65
937412	AD2-194 E2	2.65
937531	AD2-214 C	2.96
937532	AD2-214 E	1.39
274832	ANNAWAN ; 1U	7.25
LTF	BLUEG	0.94
LTF	CANNELTON	< 0.01
LTF	CARR	0.5
LTF	CATAWBA	0.15
274890	CAYUG;1U E	9.
274891	CAYUG;2U E	9.
LTF	CBM-S1	1.4
LTF	CBM-W1	40.64
LTF	CBM-W2	28.81
LTF	CELEVELAND	0.4
LTF	CLIFTY	6.69
274751	CRETE EC ;1U	2.36
274752	CRETE EC ;2U	2.36
274753	CRETE EC ;3U	2.36
274754	CRETE EC ;4U	2.36
LTF	DEARBORN	2.24
274859	EASYR;U1 E	7.38
274860	EASYR;U2 E	7.38
LTF	G-007	1.32
290051	GSG-6; E	7.02
LTF	HAMLET	0.59
951131	J643	15.61
981291	J740 C	4.38
981292	J740 E	17.51
938961	J847	8.43
275149	KEMPTON ;1E	12.52
290108	LEEDK;1U E	16.33
LTF	MEC	25.44
274850	MENDOTA H;RU	3.62
293061	N-015 E	10.39

293516	O-009 E1	6.1
293517	O-009 E2	3.1
293518	O-009 E3	3.41
293715	O-029 E	6.52
293716	O-029 E	3.58
293717	O-029 E	3.29
LTF	O-066	8.49
293644	O22 E1	7.35
293645	O22 E2	14.27
290021	O50 E	13.15
294392	P-010 E	13.2
294763	P-046 E	6.31
274888	PILOT HIL;1E	12.52
274830	PWR VTREC;1U	4.11
274831	PWR VTREC;2U	4.11
LTF	RENSSELAER	0.4
LTF	ROSETON	2.87
LTF	ROWAN	0.35
295111	SUBLETTE E	1.83
LTF	TRIMBLE	0.19
299993	U3-031C	3.55
903433	W3-046	16.14
905471	W4-084	0.3
274874	WALNR;2U	1.6
294502	WALNR;2U E	6.41
LTF	WEC	5.4
295109	WESTBROOK E	3.76
274687	WILL CNTY;4U	46.97
910542	X3-005 E	0.52
914641	Y2-103	30.46
915011	Y3-013 1	2.54
915021	Y3-013 2	2.54
915031	Y3-013 3	2.54
LTF	Z1-043	19.09
916502	Z1-106 E1	0.85
916504	Z1-106 E2	0.85
916512	Z1-107 E	1.73
916522	Z1-108 E	1.68
918051	AA1-018 C	1.6
918052	AA1-018 E	10.71
918972	AA1-116 E	1.79
918982	AA1-117 E	1.79
919221	AA1-146	11.8
919581	AA2-030	11.8
919591	AA2-035	86.93

920112	AA2-107 E	1.65
920272	AA2-123 E	1.65
930481	AB1-089	44.29
930491	AB1-090	44.29
930501	AB1-091	50.09
930761	AB1-122 1	47.74
930771	AB1-122 2	50.37
931221	AB1-172	0.54
LTF	AB2-013	10.8
924471	AB2-096	28.55
925161	AB2-173	2.1
925301	AB2-191 C	0.85
925302	AB2-191 E	0.75
925881	AC1-067	103.88
926311	AC1-109 1	1.28
926321	AC1-109 2	1.28
926331	AC1-110 1	1.28
926341	AC1-110 2	1.28
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
927511	AC1-113 1	0.8
927522	AC1-113 2	0.8
926431	AC1-114	1.6
927451	AC1-142A 1	2.86
927461	AC1-142A 2	2.86
926701	AC1-153 C1	51.89
926711	AC1-153 C2	54.75
926702	AC1-153 E1	2.08
926712	AC1-153 E2	2.19
926821	AC1-168 C	0.77
926822	AC1-168 E	5.19
927531	AC1-185 1	0.46
927541	AC1-185 2	0.46
927551	AC1-185 3	0.46
927561	AC1-185 4	0.46
927571	AC1-185 5	0.46
927581	AC1-185 6	0.46
927591	AC1-185 7	0.46
927601	AC1-185 8	0.46
927091	AC1-204 1	49.33
927101	AC1-204 2	49.29

<i>927201</i>	<i>AC1-214 C</i>	<i>0.59</i>
<i>927202</i>	<i>AC1-214 E</i>	<i>1.57</i>

Appendix 6

(CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.83% to 109.91% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.82 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.63
932012	AC2-007 E	1.17
932881	AC2-115 1	1.78
932891	AC2-115 2	1.78
932921	AC2-116	0.62
933341	AC2-147 C	0.65
933342	AC2-147 E	1.06
933361	AC2-149 C	0.69
933362	AC2-149 E	1.13
933381	AC2-151 C	0.72
933382	AC2-151 E	1.18
933411	AC2-154 C	1.74
933412	AC2-154 E	2.84
933431	AC2-156 C	0.71
933432	AC2-156 E	1.16
933511	AC2-166 C	1.74
933512	AC2-166 E	1.92
933911	AD1-013 C O1	1.37
933912	AD1-013 E O1	2.19
933931	AD1-016 C	0.69
933932	AD1-016 E	1.13
934101	AD1-039 1	5.73
934111	AD1-039 2	6.14
934401	AD1-064 C O1	2.39
934402	AD1-064 E O1	11.21
934431	AD1-067 C	0.1
934432	AD1-067 E	0.41
LTF	AD1-092	8.28
LTF	AD1-093	14.36
LTF	AD1-094	2.76
934651	AD1-096 C	0.66
934652	AD1-096 E	1.08

934701	AD1-098 C O1	5.12
934702	AD1-098 E O1	3.73
934721	AD1-100 C	16.33
934722	AD1-100 E	76.48
934871	AD1-116 C	0.67
934872	AD1-116 E	1.1
934881	AD1-117 C	3.99
934882	AD1-117 E	2.66
934941	AD1-126 C	4.35
934942	AD1-126 E	2.9
934971	AD1-129 C	0.67
934972	AD1-129 E	0.45
935001	AD1-133 C O1	15.16
935002	AD1-133 E O1	10.11
936181	AD2-024 C O1	0.69
936182	AD2-024 E O1	1.13
936291	AD2-038 C O1	1.71
936292	AD2-038 E O1	11.45
936371	AD2-047 C O1	1.55
936372	AD2-047 E O1	16.74
936461	AD2-060	1.83
936511	AD2-066 C O1	6.21
936512	AD2-066 E O1	4.14
936781	AD2-101 C	3.08
936782	AD2-101 E	14.41
936791	AD2-102 C	8.97
936792	AD2-102 E	8.62
936961	AD2-130 C	1.19
936962	AD2-130 E	0.16
937001	AD2-134 C	2.03
937002	AD2-134 E	8.39
937031	AD2-137 C O1	2.43
937032	AD2-137 E O1	11.36
937051	AD2-140 C O1	2.43
937052	AD2-140 E O1	11.39
937061	AD2-141 C O1	2.42
937062	AD2-141 E O1	11.4
937071	AD2-142 C O1	4.87
937072	AD2-142 E O1	22.78
937121	AD2-148 C O1	2.42
937122	AD2-148 E O1	11.31
937131	AD2-149 C O1	2.42
937132	AD2-149 E O1	11.31
937141	AD2-150 C O1	2.42
937142	AD2-150 E O1	11.31

937181	AD2-155 C O1	2.42
937182	AD2-155 E O1	11.31
937311	AD2-172 C	1.83
937312	AD2-172 E	2.53
937321	AD2-175 C	11.26
937322	AD2-175 E	7.5
937331	AD2-176 C O1	5.48
937332	AD2-176 E O1	3.65
937401	AD2-194 C1	2.97
937411	AD2-194 C2	2.97
937402	AD2-194 E1	2.97
937412	AD2-194 E2	2.97
LTF	BLUEG	1.4
274654	BRAIDWOOD;1U	23.01
274655	BRAIDWOOD;2U	22.39
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.08
LTF	CARR	0.56
LTF	CATAWBA	0.19
LTF	CBM-S1	1.13
LTF	CBM-W1	39.86
LTF	CBM-W2	29.04
LTF	CELEVELAND	0.53
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	8.44
274751	CRETE EC ;1U	4.08
274752	CRETE EC ;2U	4.08
274753	CRETE EC ;3U	4.08
274754	CRETE EC ;4U	4.08
LTF	DEARBORN	2.3
274859	EASYR;U1 E	8.18
274860	EASYR;U2 E	8.18
LTF	ELMERSMITH	0.15
LTF	G-007	1.5
LTF	GIBSON	0.08
290051	GSG-6; E	7.77
LTF	HAMLET	0.74
275149	KEMPTON ;1E	12.81
274704	KENDALL ;1C	3.42
274705	KENDALL ;1S	2.28
274706	KENDALL ;2C	3.42
274707	KENDALL ;2S	2.28
274660	LASCO STA;1U	21.43
274661	LASCO STA;2U	21.47

290108	LEEDK;1U E	18.07
LTF	MEC	27.9
274850	MENDOTA H;RU	4.01
293061	N-015 E	11.68
293715	O-029 E	6.17
293716	O-029 E	3.38
293717	O-029 E	3.11
LTF	O-066	9.6
293644	O22 E1	8.57
293645	O22 E2	16.64
290021	O50 E	14.7
294392	P-010 E	14.84
294763	P-046 E	6.99
274888	PILOT HIL;1E	12.81
274830	PWR VTREC;1U	4.56
274831	PWR VTREC;2U	4.56
LTF	RENSSELAER	0.44
LTF	ROSETON	3.21
LTF	ROWAN	0.45
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.02
274861	TOP CROP ;1U	0.4
274862	TOP CROP ;2U	0.77
LTF	TRIMBLE	0.28
299993	U3-031C	3.68
903433	W3-046	18.
905471	W4-084	0.33
274874	WALNR;2U	1.77
294502	WALNR;2U E	7.1
LTF	WEC	5.99
295109	WESTBROOK E	4.16
274687	WILL CNTY;4U	52.58
914641	Y2-103	33.82
915011	Y3-013 1	2.82
915021	Y3-013 2	2.82
915031	Y3-013 3	2.82
LTF	Z1-043	21.13
916502	Z1-106 E1	0.94
916504	Z1-106 E2	0.94
916512	Z1-107 E	1.85
916522	Z1-108 E	1.86
918051	AA1-018 C	1.73
918052	AA1-018 E	11.59
918972	AA1-116 E	1.83
918982	AA1-117 E	1.83

919221	AA1-146	13.05
919581	AA2-030	13.05
919591	AA2-035	95.09
920112	AA2-107 E	1.83
920272	AA2-123 E	1.83
930481	AB1-089	49.08
930491	AB1-090	49.08
930501	AB1-091	50.78
930761	AB1-122 1	52.68
930771	AB1-122 2	56.45
931221	AB1-172	0.57
LTF	AB2-013	11.97
924471	AB2-096	31.64
925161	AB2-173	2.33
925301	AB2-191 C	0.94
925302	AB2-191 E	0.83
926311	AC1-109 1	1.42
926321	AC1-109 2	1.42
926331	AC1-110 1	1.42
926341	AC1-110 2	1.42
926351	AC1-111 1	0.57
926361	AC1-111 2	0.57
926371	AC1-111 3	0.57
926381	AC1-111 4	0.57
926391	AC1-111 5	0.57
926401	AC1-111 6	0.57
927511	AC1-113 1	0.89
927522	AC1-113 2	0.89
926431	AC1-114	1.78
927451	AC1-142A 1	3.2
927461	AC1-142A 2	3.2
926701	AC1-153 C1	57.26
926711	AC1-153 C2	61.36
926702	AC1-153 E1	2.29
926712	AC1-153 E2	2.45
926821	AC1-168 C	0.86
926822	AC1-168 E	5.76
927531	AC1-185 1	0.51
927541	AC1-185 2	0.51
927551	AC1-185 3	0.51
927561	AC1-185 4	0.51
927571	AC1-185 5	0.51
927581	AC1-185 6	0.51
927591	AC1-185 7	0.51
927601	AC1-185 8	0.51

<i>927091</i>	<i>AC1-204 1</i>	<i>55.28</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>55.2</i>

Appendix 7

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 147.94% to 149.09% (**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 43.36 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1

/ WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1

/ WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1

/ WILTO;4M 345 WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1

/ WILTO;4M 345 WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.03
932012	AC2-007 E	1.91
932881	AC2-115 1	2.92
932891	AC2-115 2	2.92
932921	AC2-116	1.02
933361	AC2-149 C	1.14
933362	AC2-149 E	1.86
933381	AC2-151 C	1.21
933382	AC2-151 E	1.97
933411	AC2-154 C	3.21
933412	AC2-154 E	5.23
933431	AC2-156 C	1.17
933432	AC2-156 E	1.91
933511	AC2-166 C	2.85
933512	AC2-166 E	3.15
933911	AD1-013 C O1	2.25
933912	AD1-013 E O1	3.6
933931	AD1-016 C	1.14
933932	AD1-016 E	1.85
934101	AD1-039 1	9.66
934111	AD1-039 2	9.84
934401	AD1-064 C O1	3.92
934402	AD1-064 E O1	18.38
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
LTF	AD1-092	13.89
LTF	AD1-093	23.99
LTF	AD1-094	4.66
934651	AD1-096 C	1.09
934652	AD1-096 E	1.78
934701	AD1-098 C O1	8.42
934702	AD1-098 E O1	6.15

934721	AD1-100 C	35.21
934722	AD1-100 E	164.82
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934941	AD1-126 C	7.16
934942	AD1-126 E	4.77
934971	AD1-129 C	1.1
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.67
935002	AD1-133 E O1	18.45
936181	AD2-024 C O1	1.14
936182	AD2-024 E O1	1.85
936291	AD2-038 C O1	2.89
936292	AD2-038 E O1	19.36
936371	AD2-047 C O1	2.87
936372	AD2-047 E O1	30.89
936461	AD2-060	3.38
936511	AD2-066 C O1	10.37
936512	AD2-066 E O1	6.92
936781	AD2-101 C	6.09
936782	AD2-101 E	28.49
936791	AD2-102 C	14.73
936792	AD2-102 E	14.15
936961	AD2-130 C	1.93
936962	AD2-130 E	0.26
937001	AD2-134 C	3.34
937002	AD2-134 E	13.82
937031	AD2-137 C O1	7.27
937032	AD2-137 E O1	34.02
937051	AD2-140 C O1	7.63
937052	AD2-140 E O1	35.73
937061	AD2-141 C O1	7.59
937062	AD2-141 E O1	35.77
937071	AD2-142 C O1	15.26
937072	AD2-142 E O1	71.46
937121	AD2-148 C O1	4.77
937122	AD2-148 E O1	22.34
937131	AD2-149 C O1	4.77
937132	AD2-149 E O1	22.34
937141	AD2-150 C O1	4.77
937142	AD2-150 E O1	22.34
937181	AD2-155 C O1	4.77
937182	AD2-155 E O1	22.34
937311	AD2-172 C	3.02
937312	AD2-172 E	4.16

937321	AD2-175 C	22.23
937322	AD2-175 E	14.82
937331	AD2-176 C O1	8.97
937332	AD2-176 E O1	5.98
937401	AD2-194 C1	4.8
937411	AD2-194 C2	4.8
937402	AD2-194 E1	4.8
937412	AD2-194 E2	4.8
LTF	BLUEG	2.6
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.94
LTF	CATAWBA	0.34
274890	CAYUG;1U E	20.65
274891	CAYUG;2U E	20.65
LTF	CBM-S1	2.
LTF	CBM-W1	74.76
LTF	CBM-W2	53.18
LTF	CELEVELAND	0.94
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	15.69
LTF	DEARBORN	2.77
LTF	ELMERSMITH	0.22
LTF	G-007	2.54
290051	GSG-6; E	12.79
LTF	HAMLET	1.31
275149	KEMPTON ;1E	23.64
290108	LEEDK;1U E	29.72
274770	LINCOLN ;1U	4.13
274771	LINCOLN ;2U	4.13
274772	LINCOLN ;3U	4.13
274773	LINCOLN ;4U	4.13
274774	LINCOLN ;5U	4.13
274775	LINCOLN ;6U	4.13
274776	LINCOLN ;7U	4.13
274777	LINCOLN ;8U	4.13
LTF	MEC	46.92
274850	MENDOTA H;RU	6.6
293061	N-015 E	19.2
LTF	O-066	16.29
293644	O22 E1	12.6
293645	O22 E2	24.46
290021	O50 E	23.83
294392	P-010 E	24.38

294763	P-046 E	11.49
274888	PILOT HIL;1E	23.64
274830	PWR VTREC;1U	7.47
274831	PWR VTREC;2U	7.47
296308	R-030 C1	5.
296271	R-030 C2	5.
296125	R-030 C3	5.06
296309	R-030 E1	20.01
296272	R-030 E2	20.01
296128	R-030 E3	20.26
LTF	RENSSELAER	0.74
LTF	ROSETON	5.35
LTF	ROWAN	0.8
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.33
LTF	TRIMBLE	0.53
299993	U3-031C	11.53
903433	W3-046	17.81
LTF	WEC	9.78
295109	WESTBROOK E	6.85
274687	WILL CNTY;4U	82.07
910542	X3-005 E	0.9
914641	Y2-103	55.09
915011	Y3-013 1	4.59
915021	Y3-013 2	4.59
915031	Y3-013 3	4.59
LTF	Z1-043	35.61
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.17
916522	Z1-108 E	3.05
917501	Z2-087 C	3.91
917502	Z2-087 E	26.18
918051	AA1-018 C	3.02
918052	AA1-018 E	20.2
918972	AA1-116 E	3.38
918982	AA1-117 E	3.38
919591	AA2-035	160.67
920112	AA2-107 E	3.
920272	AA2-123 E	2.99
930481	AB1-089	80.54
930491	AB1-090	80.54
930501	AB1-091	91.2
930761	AB1-122 1	88.88
930771	AB1-122 2	90.52

931221	AB1-172	0.98
LTF	AB2-013	19.99
924041	AB2-047 C O1	4.83
924042	AB2-047 E O1	32.3
924471	AB2-096	51.86
925301	AB2-191 C	1.55
925302	AB2-191 E	1.37
925881	AC1-067	167.77
926311	AC1-109 1	2.34
926321	AC1-109 2	2.34
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.92
927451	AC1-142A 1	5.14
927461	AC1-142A 2	5.14
926701	AC1-153 C1	96.61
926711	AC1-153 C2	98.39
926702	AC1-153 E1	3.86
926712	AC1-153 E2	3.94
927091	AC1-204 1	89.19
927101	AC1-204 2	89.19

Appendix 8

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 149.99% to 150.44% (**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 44.16 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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.05
932012	AC2-007 E	1.95
932881	AC2-115 1	2.98
932891	AC2-115 2	2.98
932921	AC2-116	1.04
932931	AC2-117	6.65
933341	AC2-147 C	1.09
933342	AC2-147 E	1.78
933361	AC2-149 C	1.16
933362	AC2-149 E	1.9
933381	AC2-151 C	1.23
933382	AC2-151 E	2.01
933411	AC2-154 C	3.27
933412	AC2-154 E	5.34
933431	AC2-156 C	1.19
933432	AC2-156 E	1.95
933511	AC2-166 C	2.91
933512	AC2-166 E	3.22
933911	AD1-013 C O1	2.3
933912	AD1-013 E O1	3.67
933931	AD1-016 C	1.16
933932	AD1-016 E	1.89
934101	AD1-039 1	9.87
934111	AD1-039 2	10.05
934401	AD1-064 C O1	4.01
934402	AD1-064 E O1	18.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
LTF	AD1-092	14.18
LTF	AD1-093	24.5
LTF	AD1-094	4.75
934651	AD1-096 C	1.12

934652	AD1-096 E	1.82
934701	AD1-098 C O1	8.6
934702	AD1-098 E O1	6.28
934721	AD1-100 C	35.9
934722	AD1-100 E	168.07
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934881	AD1-117 C	6.72
934882	AD1-117 E	4.48
934941	AD1-126 C	7.31
934942	AD1-126 E	4.87
934971	AD1-129 C	1.13
934972	AD1-129 E	0.75
935001	AD1-133 C O1	28.24
935002	AD1-133 E O1	18.83
936181	AD2-024 C O1	1.16
936182	AD2-024 E O1	1.89
936291	AD2-038 C O1	2.96
936292	AD2-038 E O1	19.78
936371	AD2-047 C O1	2.93
936372	AD2-047 E O1	31.53
936461	AD2-060	3.45
936511	AD2-066 C O1	10.59
936512	AD2-066 E O1	7.06
936781	AD2-101 C	6.21
936782	AD2-101 E	29.08
936791	AD2-102 C	15.05
936792	AD2-102 E	14.46
936961	AD2-130 C	1.97
936962	AD2-130 E	0.26
937001	AD2-134 C	3.42
937002	AD2-134 E	14.11
937031	AD2-137 C O1	7.4
937032	AD2-137 E O1	34.65
937051	AD2-140 C O1	7.77
937052	AD2-140 E O1	36.39
937061	AD2-141 C O1	7.73
937062	AD2-141 E O1	36.43
937071	AD2-142 C O1	15.54
937072	AD2-142 E O1	72.77
937121	AD2-148 C O1	4.87
937122	AD2-148 E O1	22.79
937131	AD2-149 C O1	4.87
937132	AD2-149 E O1	22.79
937141	AD2-150 C O1	4.87

937142	AD2-150 E O1	22.79
937181	AD2-155 C O1	4.87
937182	AD2-155 E O1	22.79
937311	AD2-172 C	3.08
937312	AD2-172 E	4.25
937321	AD2-175 C	22.68
937322	AD2-175 E	15.12
937331	AD2-176 C O1	9.16
937332	AD2-176 E O1	6.11
937401	AD2-194 C1	4.9
937411	AD2-194 C2	4.9
937402	AD2-194 E1	4.9
937412	AD2-194 E2	4.9
LTF	BLUEG	2.66
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.96
LTF	CATAWBA	0.35
274890	CAYUG;1U E	21.06
274891	CAYUG;2U E	21.06
LTF	CBM-S1	2.05
LTF	CBM-W1	76.35
LTF	CBM-W2	54.29
LTF	CELEVELAND	0.96
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	16.03
LTF	DEARBORN	2.83
274859	EASYR;U1 E	10.78
274860	EASYR;U2 E	10.78
LTF	ELMERSMITH	0.22
LTF	G-007	2.59
290051	GSG-6; E	13.07
LTF	HAMLET	1.34
275149	KEMPTON ;1E	24.13
290108	LEEDK;1U E	30.35
274770	LINCOLN ;1U	4.24
274771	LINCOLN ;2U	4.24
274772	LINCOLN ;3U	4.24
274773	LINCOLN ;4U	4.24
274774	LINCOLN ;5U	4.24
274775	LINCOLN ;6U	4.24
274776	LINCOLN ;7U	4.24
274777	LINCOLN ;8U	4.24
LTF	MEC	47.91

274850	MENDOTA H;RU	6.74
293061	N-015 E	19.6
LTF	O-066	16.64
293644	O22 E1	12.86
293645	O22 E2	24.97
290021	O50 E	24.34
294392	P-010 E	24.89
294763	P-046 E	11.73
274888	PILOT HIL;1E	24.13
274830	PWR VTREC;1U	7.63
274831	PWR VTREC;2U	7.63
296308	R-030 C1	5.1
296271	R-030 C2	5.1
296125	R-030 C3	5.17
296309	R-030 E1	20.42
296272	R-030 E2	20.42
296128	R-030 E3	20.66
LTF	RENSSELAER	0.76
LTF	ROSETON	5.46
LTF	ROWAN	0.81
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.4
LTF	TRIMBLE	0.55
299993	U3-031C	11.84
903433	W3-046	30.11
LTF	WEC	9.99
295109	WESTBROOK E	7.
274687	WILL CNTY;4U	83.82
910542	X3-005 E	0.92
914641	Y2-103	56.26
915011	Y3-013 1	4.69
915021	Y3-013 2	4.69
915031	Y3-013 3	4.69
LTF	Z1-043	36.36
916502	Z1-106 E1	1.58
916504	Z1-106 E2	1.58
916512	Z1-107 E	3.24
916522	Z1-108 E	3.11
917501	Z2-087 C	3.99
917502	Z2-087 E	26.7
918051	AA1-018 C	3.08
918052	AA1-018 E	20.64
918972	AA1-116 E	3.45
918982	AA1-117 E	3.45
919591	AA2-035	164.09

920112	AA2-107 E	3.07
920272	AA2-123 E	3.05
930481	AB1-089	82.25
930491	AB1-090	82.25
930501	AB1-091	93.12
930761	AB1-122 1	90.76
930771	AB1-122 2	92.45
931221	AB1-172	1.
LTF	AB2-013	20.42
924041	AB2-047 C O1	4.92
924042	AB2-047 E O1	32.95
924471	AB2-096	52.97
925301	AB2-191 C	1.58
925302	AB2-191 E	1.4
925881	AC1-067	171.5
926311	AC1-109 1	2.39
926321	AC1-109 2	2.39
926331	AC1-110 1	2.37
926341	AC1-110 2	2.37
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
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.98
927451	AC1-142A 1	5.25
927461	AC1-142A 2	5.25
926701	AC1-153 C1	98.66
926711	AC1-153 C2	100.49
926702	AC1-153 E1	3.95
926712	AC1-153 E2	4.02
927531	AC1-185 1	0.86
927541	AC1-185 2	0.86
927551	AC1-185 3	0.86
927561	AC1-185 4	0.86
927571	AC1-185 5	0.86
927581	AC1-185 6	0.86
927591	AC1-185 7	0.86
927601	AC1-185 8	0.86
927091	AC1-204 1	91.1
927101	AC1-204 2	91.1

Appendix 9

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.77% to 126.84% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.58 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.88
932012	AC2-007 E	1.64
932881	AC2-115 1	2.49
932891	AC2-115 2	2.49
932921	AC2-116	0.87
933341	AC2-147 C	0.91
933342	AC2-147 E	1.48
933361	AC2-149 C	0.97
933362	AC2-149 E	1.58
933381	AC2-151 C	1.01
933382	AC2-151 E	1.65
933411	AC2-154 C	2.31
933412	AC2-154 E	3.77
933431	AC2-156 C	1.
933432	AC2-156 E	1.62
933511	AC2-166 C	2.43
933512	AC2-166 E	2.69
933911	AD1-013 C O1	1.92
933912	AD1-013 E O1	3.06
933931	AD1-016 C	0.97
933932	AD1-016 E	1.59
934101	AD1-039 1	8.01
934111	AD1-039 2	8.66
934401	AD1-064 C O1	3.36
934402	AD1-064 E O1	15.71
934431	AD1-067 C	0.14
934432	AD1-067 E	0.57
LTF	AD1-092	11.61
LTF	AD1-093	20.14
LTF	AD1-094	3.87
934651	AD1-096 C	0.93
934652	AD1-096 E	1.52

934701	AD1-098 C O1	7.17
934702	AD1-098 E O1	5.23
934721	AD1-100 C	22.49
934722	AD1-100 E	105.27
934871	AD1-116 C	0.93
934872	AD1-116 E	1.52
934881	AD1-117 C	5.6
934882	AD1-117 E	3.73
934941	AD1-126 C	6.1
934942	AD1-126 E	4.06
934971	AD1-129 C	0.94
934972	AD1-129 E	0.63
935001	AD1-133 C O1	21.08
935002	AD1-133 E O1	14.05
936181	AD2-024 C O1	0.97
936182	AD2-024 E O1	1.59
936291	AD2-038 C O1	2.38
936292	AD2-038 E O1	15.95
936371	AD2-047 C O1	2.07
936372	AD2-047 E O1	22.24
936461	AD2-060	2.43
936511	AD2-066 C O1	8.68
936512	AD2-066 E O1	5.79
936791	AD2-102 C	12.58
936792	AD2-102 E	12.09
936961	AD2-130 C	1.66
936962	AD2-130 E	0.22
937001	AD2-134 C	2.85
937002	AD2-134 E	11.76
937031	AD2-137 C O1	3.28
937032	AD2-137 E O1	15.33
937051	AD2-140 C O1	3.27
937052	AD2-140 E O1	15.31
937061	AD2-141 C O1	3.25
937062	AD2-141 E O1	15.33
937071	AD2-142 C O1	6.54
937072	AD2-142 E O1	30.63
937121	AD2-148 C O1	3.24
937122	AD2-148 E O1	15.16
937131	AD2-149 C O1	3.24
937132	AD2-149 E O1	15.16
937141	AD2-150 C O1	3.24
937142	AD2-150 E O1	15.16
937181	AD2-155 C O1	3.24
937182	AD2-155 E O1	15.16

937311	AD2-172 C	2.57
937312	AD2-172 E	3.55
937321	AD2-175 C	15.09
937322	AD2-175 E	10.06
937331	AD2-176 C O1	7.68
937332	AD2-176 E O1	5.12
937401	AD2-194 C1	4.19
937411	AD2-194 C2	4.19
937402	AD2-194 E1	4.19
937412	AD2-194 E2	4.19
LTF	BLUEG	2.23
274654	BRAIDWOOD;1U	32.94
274655	BRAIDWOOD;2U	32.04
LTF	CALDERWOOD	0.08
LTF	CANNELTON	0.16
LTF	CARR	0.79
LTF	CATAWBA	0.29
LTF	CBM-S1	1.25
LTF	CBM-W1	51.91
LTF	CBM-W2	38.47
LTF	CELEVELAND	0.82
LTF	CHEOAH	0.08
LTF	CHILHOWEE	0.02
LTF	CLIFTY	12.63
274751	CRETE EC ;1U	7.
274752	CRETE EC ;2U	7.
274753	CRETE EC ;3U	7.
274754	CRETE EC ;4U	7.
LTF	DEARBORN	3.08
274859	EASYR;U1 E	11.46
274860	EASYR;U2 E	11.46
LTF	ELMERSMITH	0.35
LTF	G-007	2.12
LTF	GIBSON	0.22
290051	GSG-6; E	10.89
LTF	HAMLET	1.11
275149	KEMPTON ;1E	17.01
274704	KENDALL ;1C	4.85
274705	KENDALL ;1S	3.23
274706	KENDALL ;2C	4.85
274707	KENDALL ;2S	3.23
274660	LASCO STA;1U	30.41
274661	LASCO STA;2U	30.46
290108	LEEDK;1U E	25.32
LTF	MEC	38.88

274850	MENDOTA H;RU	5.62
293061	N-015 E	16.51
293516	O-009 E1	4.46
293517	O-009 E2	2.27
293518	O-009 E3	2.49
293715	O-029 E	10.1
293716	O-029 E	5.54
293717	O-029 E	5.09
LTF	O-066	13.61
293644	O22 E1	12.39
293645	O22 E2	24.06
290021	O50 E	20.72
294392	P-010 E	20.97
294763	P-046 E	9.8
274888	PILOT HIL;1E	17.01
274830	PWR VTREC;1U	6.39
274831	PWR VTREC;2U	6.39
LTF	RENSSELAER	0.63
LTF	ROSETON	4.53
LTF	ROWAN	0.68
LTF	SANTEETLA	0.03
295111	SUBLETTE E	2.83
274861	TOP CROP ;1U	0.58
274862	TOP CROP ;2U	1.12
LTF	TRIMBLE	0.45
299993	U3-031C	4.95
903433	W3-046	25.35
905471	W4-084	0.47
274874	WALNR;2U	2.49
294502	WALNR;2U E	9.94
LTF	WEC	8.4
295109	WESTBROOK E	5.83
274687	WILL CNTY;4U	74.22
914641	Y2-103	47.47
915011	Y3-013 1	3.96
915021	Y3-013 2	3.96
915031	Y3-013 3	3.96
LTF	Z1-043	29.59
916502	Z1-106 E1	1.32
916504	Z1-106 E2	1.32
916512	Z1-107 E	2.54
916522	Z1-108 E	2.61
918051	AA1-018 C	2.39
918052	AA1-018 E	15.99
918972	AA1-116 E	2.43

918982	AA1-117 E	2.43
919221	AA1-146	18.29
919581	AA2-030	18.29
919591	AA2-035	132.2
920112	AA2-107 E	2.56
920272	AA2-123 E	2.56
930481	AB1-089	68.8
930491	AB1-090	68.8
930501	AB1-091	66.87
930761	AB1-122 1	73.65
930771	AB1-122 2	79.68
931221	AB1-172	0.79
LTF	AB2-013	16.78
924471	AB2-096	44.37
925161	AB2-173	3.26
925301	AB2-191 C	1.32
925302	AB2-191 E	1.17
926311	AC1-109 1	1.99
926321	AC1-109 2	1.99
926331	AC1-110 1	1.99
926341	AC1-110 2	1.99
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	1.24
927522	AC1-113 2	1.24
926431	AC1-114	2.49
927451	AC1-142A 1	4.52
927461	AC1-142A 2	4.52
926701	AC1-153 C1	80.05
926711	AC1-153 C2	86.61
926702	AC1-153 E1	3.2
926712	AC1-153 E2	3.46
926821	AC1-168 C	1.2
926822	AC1-168 E	8.08
927531	AC1-185 1	0.72
927541	AC1-185 2	0.72
927551	AC1-185 3	0.72
927561	AC1-185 4	0.72
927571	AC1-185 5	0.72
927581	AC1-185 6	0.72
927591	AC1-185 7	0.72

<i>927601</i>	<i>AC1-185 8</i>	<i>0.72</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>78.02</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>77.87</i>

Appendix 10

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.82% to 133.94% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.36 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.69
932012	AC2-007 E	1.28
932881	AC2-115 1	1.94
932891	AC2-115 2	1.94
932921	AC2-116	0.68
932931	AC2-117	10.47
933341	AC2-147 C	0.71
933342	AC2-147 E	1.16
933361	AC2-149 C	0.76
933362	AC2-149 E	1.24
933381	AC2-151 C	0.81
933382	AC2-151 E	1.31
933411	AC2-154 C	2.05
933412	AC2-154 E	3.34
933431	AC2-156 C	0.78
933432	AC2-156 E	1.28
933511	AC2-166 C	1.9
933512	AC2-166 E	2.1
933911	AD1-013 C O1	1.5
933912	AD1-013 E O1	2.39
933931	AD1-016 C	0.76
933932	AD1-016 E	1.24
934101	AD1-039 1	6.33
934111	AD1-039 2	6.54
934401	AD1-064 C O1	2.62
934402	AD1-064 E O1	12.25
934431	AD1-067 C	0.11
934432	AD1-067 E	0.45
LTF	AD1-092	9.
LTF	AD1-093	15.6
LTF	AD1-094	3.03
934651	AD1-096 C	0.73
934652	AD1-096 E	1.18

934701	AD1-098 C O1	5.6
934702	AD1-098 E O1	4.09
934721	AD1-100 C	18.07
934722	AD1-100 E	84.58
934871	AD1-116 C	0.84
934872	AD1-116 E	1.38
934881	AD1-117 C	4.36
934882	AD1-117 E	2.91
934941	AD1-126 C	4.77
934942	AD1-126 E	3.18
934971	AD1-129 C	0.74
934972	AD1-129 E	0.49
935001	AD1-133 C O1	16.79
935002	AD1-133 E O1	11.19
936181	AD2-024 C O1	0.76
936182	AD2-024 E O1	1.24
936291	AD2-038 C O1	2.
936292	AD2-038 E O1	13.35
936371	AD2-047 C O1	1.83
936372	AD2-047 E O1	19.72
936461	AD2-060	2.16
936511	AD2-066 C O1	6.9
936512	AD2-066 E O1	4.6
936781	AD2-101 C	3.5
936782	AD2-101 E	16.39
936791	AD2-102 C	9.81
936792	AD2-102 E	9.42
936961	AD2-130 C	1.3
936962	AD2-130 E	0.17
937001	AD2-134 C	2.22
937002	AD2-134 E	9.19
937031	AD2-137 C O1	2.7
937032	AD2-137 E O1	12.62
937051	AD2-140 C O1	2.7
937052	AD2-140 E O1	12.66
937061	AD2-141 C O1	2.69
937062	AD2-141 E O1	12.67
937071	AD2-142 C O1	5.41
937072	AD2-142 E O1	25.31
937121	AD2-148 C O1	2.73
937122	AD2-148 E O1	12.77
937131	AD2-149 C O1	2.73
937132	AD2-149 E O1	12.77
937141	AD2-150 C O1	2.73
937142	AD2-150 E O1	12.77

937181	AD2-155 C O1	2.73
937182	AD2-155 E O1	12.77
937311	AD2-172 C	2.01
937312	AD2-172 E	2.77
937321	AD2-175 C	12.7
937322	AD2-175 E	8.47
937331	AD2-176 C O1	5.99
937332	AD2-176 E O1	3.99
937401	AD2-194 C1	3.21
937411	AD2-194 C2	3.21
937402	AD2-194 E1	3.21
937412	AD2-194 E2	3.21
937531	AD2-214 C	3.57
937532	AD2-214 E	1.68
274832	ANNAWAN ; 1U	5.44
LTF	BLUEG	1.48
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.07
LTF	CARR	0.62
LTF	CATAWBA	0.21
274890	CAYUG;1U E	10.71
274891	CAYUG;2U E	10.71
LTF	CBM-S1	1.28
LTF	CBM-W1	44.45
LTF	CBM-W2	32.09
LTF	CELEVELAND	0.58
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	9.14
LTF	DEARBORN	2.57
274859	EASYR;U1 E	8.93
274860	EASYR;U2 E	8.93
LTF	ELMERSMITH	0.13
LTF	G-007	1.65
LTF	GIBSON	0.06
290051	GSG-6; E	8.51
LTF	HAMLET	0.81
275149	KEMPTON ;1E	15.08
290108	LEEDK;1U E	19.79
LTF	MEC	30.47
274850	MENDOTA H;RU	4.39
293061	N-015 E	12.8
293516	O-009 E1	7.37
293517	O-009 E2	3.74
293518	O-009 E3	4.12

293715	O-029 E	7.88
293716	O-029 E	4.32
293717	O-029 E	3.97
LTF	O-066	10.57
293644	O22 E1	7.91
293645	O22 E2	15.35
290021	O50 E	15.77
294392	P-010 E	16.26
294763	P-046 E	7.64
274888	PILOT HIL;1E	15.08
274830	PWR VTREC;1U	4.98
274831	PWR VTREC;2U	4.98
LTF	RENSSELAER	0.49
LTF	ROSETON	3.54
LTF	ROWAN	0.49
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.21
LTF	TRIMBLE	0.3
299993	U3-031C	4.1
291984	U4-033	1.52
274814	UNIV PK N;0U	1.19
274806	UNIV PK N;2U	1.19
274807	UNIV PK N;3U	1.19
274808	UNIV PK N;4U	1.19
274809	UNIV PK N;5U	1.19
274810	UNIV PK N;6U	1.19
274811	UNIV PK N;7U	1.19
274812	UNIV PK N;8U	1.19
274813	UNIV PK N;9U	1.19
274815	UNIV PK N;XU	1.19
274816	UNIV PK N;YU	1.19
903433	W3-046	19.41
905471	W4-084	0.36
274874	WALNR;2U	1.93
294502	WALNR;2U E	7.74
LTF	WEC	6.54
295109	WESTBROOK E	4.55
274687	WILL CNTY;4U	53.33
910542	X3-005 E	0.52
914641	Y2-103	36.97
915011	Y3-013 1	3.08
915021	Y3-013 2	3.08
915031	Y3-013 3	3.08
LTF	Z1-043	23.15
916502	Z1-106 E1	1.03

916504	Z1-106 E2	1.04
916512	Z1-107 E	2.23
916522	Z1-108 E	2.04
918051	AA1-018 C	2.17
918052	AA1-018 E	14.5
918972	AA1-116 E	2.15
918982	AA1-117 E	2.15
919221	AA1-146	14.24
919581	AA2-030	14.24
919591	AA2-035	107.19
920112	AA2-107 E	2.
920272	AA2-123 E	2.
930481	AB1-089	53.65
930491	AB1-090	53.65
930501	AB1-091	58.45
930761	AB1-122 1	58.22
930771	AB1-122 2	60.21
931221	AB1-172	0.69
LTF	AB2-013	13.
924471	AB2-096	34.61
925161	AB2-173	2.54
925301	AB2-191 C	1.03
925302	AB2-191 E	0.91
925881	AC1-067	98.97
926311	AC1-109 1	1.57
926321	AC1-109 2	1.57
926331	AC1-110 1	1.55
926341	AC1-110 2	1.55
926351	AC1-111 1	0.63
926361	AC1-111 2	0.63
926371	AC1-111 3	0.63
926381	AC1-111 4	0.63
926391	AC1-111 5	0.63
926401	AC1-111 6	0.63
927511	AC1-113 1	0.97
927522	AC1-113 2	0.97
926431	AC1-114	1.94
927451	AC1-142A 1	3.49
927461	AC1-142A 2	3.48
926701	AC1-153 C1	63.28
926711	AC1-153 C2	65.45
926702	AC1-153 E1	2.53
926712	AC1-153 E2	2.62
926821	AC1-168 C	0.94
926822	AC1-168 E	6.31

927531	AC1-185 1	0.56
927541	AC1-185 2	0.56
927551	AC1-185 3	0.56
927561	AC1-185 4	0.56
927571	AC1-185 5	0.56
927581	AC1-185 6	0.56
927591	AC1-185 7	0.56
927601	AC1-185 8	0.56
927091	AC1-204 1	59.71
927101	AC1-204 2	59.76

Appendix 11

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 147.94% to 149.09% (**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 43.36 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1

/ WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1

/ WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1

/ WILTO;4M 345 WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1

/ WILTO;4M 345 WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.03
932012	AC2-007 E	1.91
932881	AC2-115 1	2.92
932891	AC2-115 2	2.92
932921	AC2-116	1.02
933361	AC2-149 C	1.14
933362	AC2-149 E	1.86
933381	AC2-151 C	1.21
933382	AC2-151 E	1.97
933411	AC2-154 C	3.21
933412	AC2-154 E	5.23
933431	AC2-156 C	1.17
933432	AC2-156 E	1.91
933511	AC2-166 C	2.85
933512	AC2-166 E	3.15
933911	AD1-013 C O1	2.25
933912	AD1-013 E O1	3.6
933931	AD1-016 C	1.14
933932	AD1-016 E	1.85
934101	AD1-039 1	9.66
934111	AD1-039 2	9.84
934401	AD1-064 C O1	3.92
934402	AD1-064 E O1	18.38
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
LTF	AD1-092	13.89
LTF	AD1-093	23.99
LTF	AD1-094	4.66
934651	AD1-096 C	1.09
934652	AD1-096 E	1.78
934701	AD1-098 C O1	8.42
934702	AD1-098 E O1	6.15

934721	AD1-100 C	35.21
934722	AD1-100 E	164.82
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934941	AD1-126 C	7.16
934942	AD1-126 E	4.77
934971	AD1-129 C	1.1
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.67
935002	AD1-133 E O1	18.45
936181	AD2-024 C O1	1.14
936182	AD2-024 E O1	1.85
936291	AD2-038 C O1	2.89
936292	AD2-038 E O1	19.36
936371	AD2-047 C O1	2.87
936372	AD2-047 E O1	30.89
936461	AD2-060	3.38
936511	AD2-066 C O1	10.37
936512	AD2-066 E O1	6.92
936781	AD2-101 C	6.09
936782	AD2-101 E	28.49
936791	AD2-102 C	14.73
936792	AD2-102 E	14.15
936961	AD2-130 C	1.93
936962	AD2-130 E	0.26
937001	AD2-134 C	3.34
937002	AD2-134 E	13.82
937031	AD2-137 C O1	7.27
937032	AD2-137 E O1	34.02
937051	AD2-140 C O1	7.63
937052	AD2-140 E O1	35.73
937061	AD2-141 C O1	7.59
937062	AD2-141 E O1	35.77
937071	AD2-142 C O1	15.26
937072	AD2-142 E O1	71.46
937121	AD2-148 C O1	4.77
937122	AD2-148 E O1	22.34
937131	AD2-149 C O1	4.77
937132	AD2-149 E O1	22.34
937141	AD2-150 C O1	4.77
937142	AD2-150 E O1	22.34
937181	AD2-155 C O1	4.77
937182	AD2-155 E O1	22.34
937311	AD2-172 C	3.02
937312	AD2-172 E	4.16

937321	AD2-175 C	22.23
937322	AD2-175 E	14.82
937331	AD2-176 C O1	8.97
937332	AD2-176 E O1	5.98
937401	AD2-194 C1	4.8
937411	AD2-194 C2	4.8
937402	AD2-194 E1	4.8
937412	AD2-194 E2	4.8
LTF	BLUEG	2.6
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.94
LTF	CATAWBA	0.34
274890	CAYUG;1U E	20.65
274891	CAYUG;2U E	20.65
LTF	CBM-S1	2.
LTF	CBM-W1	74.76
LTF	CBM-W2	53.18
LTF	CELEVELAND	0.94
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	15.69
LTF	DEARBORN	2.77
LTF	ELMERSMITH	0.22
LTF	G-007	2.54
290051	GSG-6; E	12.79
LTF	HAMLET	1.31
275149	KEMPTON ;1E	23.64
290108	LEEDK;1U E	29.72
274770	LINCOLN ;1U	4.13
274771	LINCOLN ;2U	4.13
274772	LINCOLN ;3U	4.13
274773	LINCOLN ;4U	4.13
274774	LINCOLN ;5U	4.13
274775	LINCOLN ;6U	4.13
274776	LINCOLN ;7U	4.13
274777	LINCOLN ;8U	4.13
LTF	MEC	46.92
274850	MENDOTA H;RU	6.6
293061	N-015 E	19.2
LTF	O-066	16.29
293644	O22 E1	12.6
293645	O22 E2	24.46
290021	O50 E	23.83
294392	P-010 E	24.38

294763	P-046 E	11.49
274888	PILOT HIL;1E	23.64
274830	PWR VTREC;1U	7.47
274831	PWR VTREC;2U	7.47
296308	R-030 C1	5.
296271	R-030 C2	5.
296125	R-030 C3	5.06
296309	R-030 E1	20.01
296272	R-030 E2	20.01
296128	R-030 E3	20.26
LTF	RENSSELAER	0.74
LTF	ROSETON	5.35
LTF	ROWAN	0.8
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.33
LTF	TRIMBLE	0.53
299993	U3-031C	11.53
903433	W3-046	17.81
LTF	WEC	9.78
295109	WESTBROOK E	6.85
274687	WILL CNTY;4U	82.07
910542	X3-005 E	0.9
914641	Y2-103	55.09
915011	Y3-013 1	4.59
915021	Y3-013 2	4.59
915031	Y3-013 3	4.59
LTF	Z1-043	35.61
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.17
916522	Z1-108 E	3.05
917501	Z2-087 C	3.91
917502	Z2-087 E	26.18
918051	AA1-018 C	3.02
918052	AA1-018 E	20.2
918972	AA1-116 E	3.38
918982	AA1-117 E	3.38
919591	AA2-035	160.67
920112	AA2-107 E	3.
920272	AA2-123 E	2.99
930481	AB1-089	80.54
930491	AB1-090	80.54
930501	AB1-091	91.2
930761	AB1-122 1	88.88
930771	AB1-122 2	90.52

931221	AB1-172	0.98
<i>LTF</i>	AB2-013	19.99
924041	AB2-047 C O1	4.83
924042	AB2-047 E O1	32.3
924471	AB2-096	51.86
925301	AB2-191 C	1.55
925302	AB2-191 E	1.37
925881	AC1-067	167.77
926311	AC1-109 1	2.34
926321	AC1-109 2	2.34
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.92
927451	AC1-142A 1	5.14
927461	AC1-142A 2	5.14
926701	AC1-153 C1	96.61
926711	AC1-153 C2	98.39
926702	AC1-153 E1	3.86
926712	AC1-153 E2	3.94
927091	AC1-204 1	89.19
927101	AC1-204 2	89.19

Appendix 12

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 149.99% to 150.43% (**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 44.16 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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.05
932012	AC2-007 E	1.95
932881	AC2-115 1	2.98
932891	AC2-115 2	2.98
932921	AC2-116	1.04
932931	AC2-117	6.65
933341	AC2-147 C	1.09
933342	AC2-147 E	1.78
933361	AC2-149 C	1.16
933362	AC2-149 E	1.9
933381	AC2-151 C	1.23
933382	AC2-151 E	2.01
933411	AC2-154 C	3.27
933412	AC2-154 E	5.34
933431	AC2-156 C	1.19
933432	AC2-156 E	1.95
933511	AC2-166 C	2.91
933512	AC2-166 E	3.22
933911	AD1-013 C O1	2.3
933912	AD1-013 E O1	3.67
933931	AD1-016 C	1.16
933932	AD1-016 E	1.89
934101	AD1-039 1	9.87
934111	AD1-039 2	10.05
934401	AD1-064 C O1	4.01
934402	AD1-064 E O1	18.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
LTF	AD1-092	14.18
LTF	AD1-093	24.5
LTF	AD1-094	4.75
934651	AD1-096 C	1.12

934652	AD1-096 E	1.82
934701	AD1-098 C O1	8.6
934702	AD1-098 E O1	6.28
934721	AD1-100 C	35.9
934722	AD1-100 E	168.07
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934881	AD1-117 C	6.72
934882	AD1-117 E	4.48
934941	AD1-126 C	7.31
934942	AD1-126 E	4.87
934971	AD1-129 C	1.13
934972	AD1-129 E	0.75
935001	AD1-133 C O1	28.24
935002	AD1-133 E O1	18.83
936181	AD2-024 C O1	1.16
936182	AD2-024 E O1	1.89
936291	AD2-038 C O1	2.96
936292	AD2-038 E O1	19.78
936371	AD2-047 C O1	2.93
936372	AD2-047 E O1	31.53
936461	AD2-060	3.45
936511	AD2-066 C O1	10.59
936512	AD2-066 E O1	7.06
936781	AD2-101 C	6.21
936782	AD2-101 E	29.08
936791	AD2-102 C	15.05
936792	AD2-102 E	14.46
936961	AD2-130 C	1.97
936962	AD2-130 E	0.26
937001	AD2-134 C	3.42
937002	AD2-134 E	14.11
937031	AD2-137 C O1	7.4
937032	AD2-137 E O1	34.65
937051	AD2-140 C O1	7.77
937052	AD2-140 E O1	36.39
937061	AD2-141 C O1	7.73
937062	AD2-141 E O1	36.43
937071	AD2-142 C O1	15.54
937072	AD2-142 E O1	72.77
937121	AD2-148 C O1	4.87
937122	AD2-148 E O1	22.79
937131	AD2-149 C O1	4.87
937132	AD2-149 E O1	22.79
937141	AD2-150 C O1	4.87

937142	AD2-150 E O1	22.79
937181	AD2-155 C O1	4.87
937182	AD2-155 E O1	22.79
937311	AD2-172 C	3.08
937312	AD2-172 E	4.25
937321	AD2-175 C	22.68
937322	AD2-175 E	15.12
937331	AD2-176 C O1	9.16
937332	AD2-176 E O1	6.11
937401	AD2-194 C1	4.9
937411	AD2-194 C2	4.9
937402	AD2-194 E1	4.9
937412	AD2-194 E2	4.9
LTF	BLUEG	2.66
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.96
LTF	CATAWBA	0.35
274890	CAYUG;1U E	21.06
274891	CAYUG;2U E	21.06
LTF	CBM-S1	2.05
LTF	CBM-W1	76.35
LTF	CBM-W2	54.29
LTF	CELEVELAND	0.96
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	16.03
LTF	DEARBORN	2.83
274859	EASYR;U1 E	10.78
274860	EASYR;U2 E	10.78
LTF	ELMERSMITH	0.22
LTF	G-007	2.59
290051	GSG-6; E	13.07
LTF	HAMLET	1.34
275149	KEMPTON ;1E	24.13
290108	LEEDK;1U E	30.35
274770	LINCOLN ;1U	4.24
274771	LINCOLN ;2U	4.24
274772	LINCOLN ;3U	4.24
274773	LINCOLN ;4U	4.24
274774	LINCOLN ;5U	4.24
274775	LINCOLN ;6U	4.24
274776	LINCOLN ;7U	4.24
274777	LINCOLN ;8U	4.24
LTF	MEC	47.91

274850	MENDOTA H;RU	6.74
293061	N-015 E	19.6
LTF	O-066	16.64
293644	O22 E1	12.86
293645	O22 E2	24.97
290021	O50 E	24.34
294392	P-010 E	24.89
294763	P-046 E	11.73
274888	PILOT HIL;1E	24.13
274830	PWR VTREC;1U	7.63
274831	PWR VTREC;2U	7.63
296308	R-030 C1	5.1
296271	R-030 C2	5.1
296125	R-030 C3	5.17
296309	R-030 E1	20.42
296272	R-030 E2	20.42
296128	R-030 E3	20.66
LTF	RENSSELAER	0.76
LTF	ROSETON	5.46
LTF	ROWAN	0.81
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.4
LTF	TRIMBLE	0.55
299993	U3-031C	11.84
903433	W3-046	30.11
LTF	WEC	9.99
295109	WESTBROOK E	7.
274687	WILL CNTY;4U	83.82
910542	X3-005 E	0.92
914641	Y2-103	56.26
915011	Y3-013 1	4.69
915021	Y3-013 2	4.69
915031	Y3-013 3	4.69
LTF	Z1-043	36.36
916502	Z1-106 E1	1.58
916504	Z1-106 E2	1.58
916512	Z1-107 E	3.24
916522	Z1-108 E	3.11
917501	Z2-087 C	3.99
917502	Z2-087 E	26.7
918051	AA1-018 C	3.08
918052	AA1-018 E	20.64
918972	AA1-116 E	3.45
918982	AA1-117 E	3.45
919591	AA2-035	164.09

920112	AA2-107 E	3.07
920272	AA2-123 E	3.05
930481	AB1-089	82.25
930491	AB1-090	82.25
930501	AB1-091	93.12
930761	AB1-122 1	90.76
930771	AB1-122 2	92.45
931221	AB1-172	1.
LTF	AB2-013	20.42
924041	AB2-047 C O1	4.92
924042	AB2-047 E O1	32.95
924471	AB2-096	52.97
925301	AB2-191 C	1.58
925302	AB2-191 E	1.4
925881	AC1-067	171.5
926311	AC1-109 1	2.39
926321	AC1-109 2	2.39
926331	AC1-110 1	2.37
926341	AC1-110 2	2.37
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
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.98
927451	AC1-142A 1	5.25
927461	AC1-142A 2	5.25
926701	AC1-153 C1	98.66
926711	AC1-153 C2	100.49
926702	AC1-153 E1	3.95
926712	AC1-153 E2	4.02
927531	AC1-185 1	0.86
927541	AC1-185 2	0.86
927551	AC1-185 3	0.86
927561	AC1-185 4	0.86
927571	AC1-185 5	0.86
927581	AC1-185 6	0.86
927591	AC1-185 7	0.86
927601	AC1-185 8	0.86
927091	AC1-204 1	91.1
927101	AC1-204 2	91.1

Secondary Point of Interconnection (Option-2)

The Interconnection Customer (IC) AD2-141 proposes to interconnect 150 MW windfarm to ComEd transmission system by connecting to 345kV bus at Davis Creek TSS 86.

Attachment Facilities

The AD2-141 generator lead will interconnect to the 345kV Interconnection Substation. This interconnection would require one 345kV line MOD, a dead-end structure and revenue metering as shown in the one-line diagram.

The estimated cost for the attachment facilities is given below.

Scope of Work	Cost Estimate
Installation of one 345kV line MOD, one dead-end structure and one set of revenue metering (see notes below on cost estimate)	\$1.0M

Direct Connection Network Upgrades

Prior to AD2-141 queue position, an earlier queue position AB1-091 would convert the existing 345kV ring bus at Davis Creek TSS 86 into breaker-and-a-half configuration. The IC AD2-141 generator lead would be interconnected at Davis Creek Substation by expanding this substation.

The scope of work includes installation of two 345kV circuit breakers at Davis Creek TSS 86, and relocate TR83 to create a line position for IC's generator lead, as shown in the one-line diagram below.

It should be noted that if AB1-091 project drops out, then AD2-141 developer becomes responsible to convert the existing 345kV ring bus at Davis Creek TSS 86 into breaker-and-a-half configuration and the scope of work would change.

The estimated cost for Direct Connection Network Upgrade is given below.

Scope of Work	Cost Estimate
Installation of two 345kV circuit breakers at Davis Creek TSS 86, relocation of TR83 lead and relay/protection work	\$6,000,000
Total Cost Estimate (see notes below on cost estimate)	\$6,000,000

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

Non-Direct Connection Cost Estimate

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

Network Impacts for Secondary POI

The Queue Project AD2-141 was evaluated as a 150.0 MW (Capacity 26.2 MW) injection at the Davis Creek; B 345kV substation in the ComEd area. Project AD2-141 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-141 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None

Multiple Facility Contingency

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

None

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 109.8% to 109.87% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.73 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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

Please refer to Appendix 1 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 109.02% to 109.1% (**DC 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 13.84 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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 108.99% to 109.06% (**DC 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 13.84 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
```

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 108.99% to 109.06% (**DC 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 13.84 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
```

5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 164.7% to 164.84% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 23.97 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

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

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 130.2% to 130.34% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 19.48 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

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

7. (CE - CE) The DAVIS CRK; B 345/138 kV transformer (from bus 270710 to bus 275174 ckt 1) loads from 111.92% to 120.2% (**DC power flow**) of its load dump rating (480 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_179-45-BT3-4__'. This project contributes approximately 39.77 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_179-45-BT3-4__'
TRIP BRANCH FROM BUS 270662 TO BUS 270674 CKT 1      / BLOOM ; B 345 BURNHAM ; B 345
TRIP BRANCH FROM BUS 275163 TO BUS 270674 CKT 1      / BURNHAM ;1M 138 BURNHAM ; B 345
TRIP BRANCH FROM BUS 275163 TO BUS 271122 CKT 1      / BURNHAM ;1M 138 BURNHAM ; B 138
TRIP BRANCH FROM BUS 275163 TO BUS 275263 CKT 1      / BURNHAM ;1M 138 BURNHAM ;1C 36.2
TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1      / BLOOM ; B 345 AD2-153 TAP 345
TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1 / BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5
END
```

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

8. (CE - CE) The DAVIS CRK; B 345/138 kV transformer (from bus 270710 to bus 275174 ckt 1) loads from 102.61% to 103.64% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of 'COMED_P1-2_345-L2004__R-S'. This project contributes approximately 4.94 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_345-L2004__R-S'
TRIP BRANCH FROM BUS 270671 TO BUS 270670 CKT 1      / BRAID; R 345 BRAID; B 345
TRIP BRANCH FROM BUS 270671 TO BUS 270711 CKT 1      / BRAID; R 345 DAVIS; R 345
END
```

9. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 109.14% to 109.22% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.64 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

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

10. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.64% to 108.71% (**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 18.73 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
```

11. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.6% to 108.68% (**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 18.73 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
```

12. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.59% to 108.66% (**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 18.73 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
```

13. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 112.59% to 112.7% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.31 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

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

14. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 111.26% to 111.38% (**DC 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 13.49 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
```

15. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.79% to 109.86% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.73 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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

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

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.02% to 109.1% (**DC 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 13.84 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

17. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.99% to 109.06% (**DC 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 13.84 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

18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.99% to 109.06% (**DC 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 13.84 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

19. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 147.34% to 147.6% (**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 27.11 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 8 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 149.77% to 150.02% (**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 27.66 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 9 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 126.73% to 126.8% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.4 MW to the thermal violation.

```
CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
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
```

Please refer to Appendix 10 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 126.24% to 126.32% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 18.49 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
```

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.2% to 126.28% (**DC 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 18.5 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
```

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.19% to 126.26% (**DC 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 18.5 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

25. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.74% to 133.85% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.49 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'
 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

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

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.62% to 132.74% (**DC 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 15.63 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

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.61% to 132.73% (**DC 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 15.64 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

28. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.61% to 132.73% (**DC 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 15.63 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	

29. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.59% to 132.71% (**DC 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 15.63 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	

30. (CE - CE) The DAVIS CRK;3M-DAVIS CRK; B 138 kV line (from bus 275174 to bus 271294 ckt 1) loads from 111.88% to 120.16% (**DC power flow**) of its load dump rating (480 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_179-45-BT3-4__'. This project contributes approximately 39.77 MW to the thermal violation.

CONTINGENCY 'COMED_P4_179-45-BT3-4__'	
TRIP BRANCH FROM BUS 270662 TO BUS 270674 CKT 1	/ BLOOM ; B 345 BURNHAM ; B 345
TRIP BRANCH FROM BUS 275163 TO BUS 270674 CKT 1	/ BURNHAM ;1M 138 BURNHAM ; B 345
TRIP BRANCH FROM BUS 275163 TO BUS 271122 CKT 1	/ BURNHAM ;1M 138 BURNHAM ; B 138
TRIP BRANCH FROM BUS 275163 TO BUS 275263 CKT 1	/ BURNHAM ;1M 138 BURNHAM ;1C 36.2
TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1	/ BLOOM ; B 345 AD2-153 TAP 345
TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1	/ BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5
END	

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

31. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 147.34% to 147.6% (**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 27.11 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 13 for a table containing the generators having contribution to this flowgate.

32. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 149.77% to 150.02% (**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 27.66 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 14 for a table containing the generators having contribution to this flowgate.

Steady-State Voltage Requirements

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

To be determined

Short Circuit

(Summary of impacted circuit breakers)

No issues identified

Affected System Analysis & Mitigation

MISO Impacts:

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

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 108.96% to 109.03% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.85 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 161.4% to 161.56% (**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 24.68 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. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 103.55% to 103.69% (**DC power flow**) of its normal rating (1409 MVA) for non-contingency condition. This project contributes approximately 14.88 MW to the thermal violation.

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 129.26% to 129.4% (**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 19.63 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

5. (CE - CE) The DAVIS CRK; B 345/138 kV transformer (from bus 270710 to bus 275174 ckt 1) loads from 111.52% to 119.81% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of 'COMED_P1-2_345-L17907TB-S_A'. This project contributes approximately 39.78 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L17907TB-S_A'

TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1 / BLOOM ; B 345 AD2-153 TAP 345

TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1 / BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5

END

6. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 108.5% to 108.57% (**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 18.75 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

7. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 111.25% to 111.37% (**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 13.49 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

8. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.95% to 109.02% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.85 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

9. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.1% to 126.18% (**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 18.51 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 - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.57% to 132.69% (**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 15.64 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

11. (CE - CE) The DAVIS CRK;3M-DAVIS CRK; B 138 kV line (from bus 275174 to bus 271294 ckt 1) loads from 111.5% to 119.79% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of 'COMED_P1-2_345-L17907TB-S_A'. This project contributes approximately 39.78 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L17907TB-S_A'
TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1 / BLOOM ; B 345 AD2-153 TAP 345
TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1 / BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5
END

12. (CE - CE) The AC1-067 TAP-BURNHAM ;1R 345 kV line (from bus 925880 to bus 270675 ckt 1) loads from 104.18% to 104.65% (**DC power flow**) of its emergency rating (1383 MVA) for the single line contingency outage of 'COMED_P2-1_086-CB_34___A'. This project contributes approximately 14.28 MW to the thermal violation.

CONTINGENCY 'COMED_P2-1_086-CB_34___A'
TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1 / BLOOM; B 345 AD2-153 TAP 345
END

13. (CE - CE) The AD1-100 TAP-AD2-140 TAP 345 kV line (from bus 934720 to bus 937050 ckt 1) loads from 139.87% to 141.24% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of 'COMED_P1-2_345-L8014_T_-S-B'. This project contributes approximately 27.5 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L8014_T_-S-B'
TRIP BRANCH FROM BUS 935000 TO BUS 270717 CKT 1 / AD1-133 TAP 345 DRESDEN ; R 345
END

14. (CE - CE) The AD1-100 TAP-AD2-140 TAP 345 kV line (from bus 934720 to bus 937050 ckt 1) loads from 118.61% to 120.44% (**DC power flow**) of its normal rating (1364 MVA) for non-contingency condition. This project contributes approximately 27.29 MW to the thermal violation.

15. (CE - CE) The AD2-140 TAP-WILTON ; B 345 kV line (from bus 937050 to bus 270926 ckt 1) loads from 145.83% to 147.3% (**DC power flow**) of its emergency rating (1528 MVA) for

the single line contingency outage of 'COMED_P1-2_345-L8014_T_-S-B'. This project contributes approximately 27.5 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_345-L8014_T_-S-B'
TRIP BRANCH FROM BUS 935000 TO BUS 270717 CKT 1 / AD1-133 TAP 345 DRESDEN ; R 345
END

16. (CE - CE) The AD2-140 TAP-WILTON ; B 345 kV line (from bus 937050 to bus 270926 ckt 1) loads from 125.58% to 127.4% (**DC power flow**) of its normal rating (1364 MVA) for non-contingency condition. This project contributes approximately 27.29 MW to the thermal violation.

Light Load Analysis - 2021

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the Appendices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the Appendices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators.

It should be noted the project/generator MW contributions presented in the body of the report and appendices sections are full contributions, whereas the loading percentages reported in the body of the report, take into consideration the commercial probability of each project as well as the ramping impact of "Adder" contributions.

Appendix 1

(MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 109.8% to 109.87% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.73 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.63
932012	AC2-007 E	1.17
932881	AC2-115 1	1.78
932891	AC2-115 2	1.78
932921	AC2-116	0.62
933341	AC2-147 C	0.65
933342	AC2-147 E	1.06
933361	AC2-149 C	0.69
933362	AC2-149 E	1.13
933381	AC2-151 C	0.72
933382	AC2-151 E	1.18
933411	AC2-154 C	1.74
933412	AC2-154 E	2.84
933431	AC2-156 C	0.71
933432	AC2-156 E	1.16
933511	AC2-166 C	1.74
933512	AC2-166 E	1.92
933911	AD1-013 C O1	1.37
933912	AD1-013 E O1	2.19
933931	AD1-016 C	0.69
933932	AD1-016 E	1.13
934101	AD1-039 1	5.73
934111	AD1-039 2	6.14
934401	AD1-064 C O1	2.39
934402	AD1-064 E O1	11.21
934431	AD1-067 C	0.1
934432	AD1-067 E	0.41
LTF	AD1-092	8.28
LTF	AD1-093	14.36
LTF	AD1-094	2.76
934651	AD1-096 C	0.66
934652	AD1-096 E	1.08
934701	AD1-098 C O1	5.12

934702	AD1-098 E O1	3.73
934721	AD1-100 C	16.33
934722	AD1-100 E	76.48
934871	AD1-116 C	0.67
934872	AD1-116 E	1.1
934881	AD1-117 C	3.99
934882	AD1-117 E	2.66
934941	AD1-126 C	4.35
934942	AD1-126 E	2.9
934971	AD1-129 C	0.67
934972	AD1-129 E	0.45
935001	AD1-133 C O1	15.16
935002	AD1-133 E O1	10.11
936181	AD2-024 C O2	0.69
936182	AD2-024 E O2	1.13
936291	AD2-038 C O2	1.7
936292	AD2-038 E O2	11.4
936371	AD2-047 C O2	1.48
936372	AD2-047 E O2	15.96
936461	AD2-060	1.83
936511	AD2-066 C O2	6.72
936512	AD2-066 E O2	4.48
936781	AD2-101 C	3.08
936782	AD2-101 E	14.41
936791	AD2-102 C	8.97
936792	AD2-102 E	8.62
936961	AD2-130 C	1.19
936962	AD2-130 E	0.16
937001	AD2-134 C	2.03
937002	AD2-134 E	8.39
937031	AD2-137 C O2	2.43
937032	AD2-137 E O2	11.39
937051	AD2-140 C O2	2.43
937052	AD2-140 E O2	11.36
937061	AD2-141 C O2	2.4
937062	AD2-141 E O2	11.33
937071	AD2-142 C O2	4.85
937072	AD2-142 E O2	22.73
937121	AD2-148 C O2	2.35
937122	AD2-148 E O2	11.01
937131	AD2-149 C O2	2.35
937132	AD2-149 E O2	11.01
937141	AD2-150 C O2	2.35
937142	AD2-150 E O2	11.01
937161	AD2-153 C O2	2.29

937162	AD2-153 E O2	10.73
937181	AD2-155 C O2	2.45
937182	AD2-155 E O2	11.49
937311	AD2-172 C	1.83
937312	AD2-172 E	2.53
937321	AD2-175 C	11.26
937322	AD2-175 E	7.5
937331	AD2-176 C O2	5.43
937332	AD2-176 E O2	3.62
937401	AD2-194 C1	2.97
937411	AD2-194 C2	2.97
937402	AD2-194 E1	2.97
937412	AD2-194 E2	2.97
LTF	BLUEG	1.4
274654	BRAIDWOOD;1U	23.01
274655	BRAIDWOOD;2U	22.39
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.08
LTF	CARR	0.56
LTF	CATAWBA	0.19
LTF	CBM-S1	1.13
LTF	CBM-W1	39.86
LTF	CBM-W2	29.04
LTF	CELEVELAND	0.53
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	8.44
274751	CRETE EC ;1U	4.08
274752	CRETE EC ;2U	4.08
274753	CRETE EC ;3U	4.08
274754	CRETE EC ;4U	4.08
LTF	DEARBORN	2.3
274859	EASYR;U1 E	8.18
274860	EASYR;U2 E	8.18
LTF	ELMERSMITH	0.15
LTF	G-007	1.5
LTF	GIBSON	0.08
290051	GSG-6; E	7.77
LTF	HAMLET	0.74
275149	KEMPTON ;1E	12.81
274704	KENDALL ;1C	3.42
274705	KENDALL ;1S	2.28
274706	KENDALL ;2C	3.42
274707	KENDALL ;2S	2.28
274660	LASCO STA;1U	21.43

274661	LASCO STA;2U	21.47
290108	LEEDK;1U E	18.07
LTF	MEC	27.9
274850	MENDOTA H;RU	4.01
293061	N-015 E	11.68
293715	O-029 E	2.99
293716	O-029 E	1.64
293717	O-029 E	1.51
LTF	O-066	9.6
293644	O22 E1	8.57
293645	O22 E2	16.64
290021	O50 E	14.7
294392	P-010 E	14.84
294763	P-046 E	6.99
274888	PILOT HIL;1E	12.81
274830	PWR VTREC;1U	4.56
274831	PWR VTREC;2U	4.56
LTF	RENSSELAER	0.44
LTF	ROSETON	3.21
LTF	ROWAN	0.45
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.02
274861	TOP CROP ;1U	0.4
274862	TOP CROP ;2U	0.77
LTF	TRIMBLE	0.28
299993	U3-031C	3.68
903433	W3-046	18.
905471	W4-084	0.33
274874	WALNR;2U	1.77
294502	WALNR;2U E	7.1
LTF	WEC	5.99
295109	WESTBROOK E	4.16
274687	WILL CNTY;4U	52.58
914641	Y2-103	33.82
915011	Y3-013 1	2.82
915021	Y3-013 2	2.82
915031	Y3-013 3	2.82
LTF	Z1-043	21.13
916502	Z1-106 E1	0.94
916504	Z1-106 E2	0.94
916512	Z1-107 E	1.85
916522	Z1-108 E	1.86
918051	AA1-018 C	1.73
918052	AA1-018 E	11.59
918972	AA1-116 E	1.83

918982	AA1-117 E	1.83
919221	AA1-146	13.05
919581	AA2-030	13.05
919591	AA2-035	95.09
920112	AA2-107 E	1.83
920272	AA2-123 E	1.83
930481	AB1-089	49.08
930491	AB1-090	49.08
930501	AB1-091	50.78
930761	AB1-122 1	52.68
930771	AB1-122 2	56.45
931221	AB1-172	0.57
LTF	AB2-013	11.97
924471	AB2-096	31.64
925161	AB2-173	2.33
925301	AB2-191 C	0.94
925302	AB2-191 E	0.83
926311	AC1-109 1	1.42
926321	AC1-109 2	1.42
926331	AC1-110 1	1.42
926341	AC1-110 2	1.42
926351	AC1-111 1	0.57
926361	AC1-111 2	0.57
926371	AC1-111 3	0.57
926381	AC1-111 4	0.57
926391	AC1-111 5	0.57
926401	AC1-111 6	0.57
927511	AC1-113 1	0.89
927522	AC1-113 2	0.89
926431	AC1-114	1.78
927451	AC1-142A 1	3.2
927461	AC1-142A 2	3.2
926701	AC1-153 C1	57.26
926711	AC1-153 C2	61.36
926702	AC1-153 E1	2.29
926712	AC1-153 E2	2.45
926821	AC1-168 C	0.86
926822	AC1-168 E	5.76
927531	AC1-185 1	0.51
927541	AC1-185 2	0.51
927551	AC1-185 3	0.51
927561	AC1-185 4	0.51
927571	AC1-185 5	0.51
927581	AC1-185 6	0.51
927591	AC1-185 7	0.51

<i>927601</i>	<i>AC1-185 8</i>	<i>0.51</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>55.28</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>55.2</i>

Appendix 2

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 164.7% to 164.84% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 23.97 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.98
932012	AC2-007 E	1.82
932881	AC2-115 1	2.78
932891	AC2-115 2	2.78
932921	AC2-116	0.97
932931	AC2-117	5.89
933341	AC2-147 C	1.02
933342	AC2-147 E	1.66
933361	AC2-149 C	1.08
933362	AC2-149 E	1.77
933381	AC2-151 C	1.13
933382	AC2-151 E	1.84
933411	AC2-154 C	3.05
933412	AC2-154 E	4.98
933431	AC2-156 C	1.11
933432	AC2-156 E	1.81
933511	AC2-166 C	2.72
933512	AC2-166 E	3.
933911	AD1-013 C O1	2.14
933912	AD1-013 E O1	3.43
933931	AD1-016 C	1.08
933932	AD1-016 E	1.77
934101	AD1-039 1	9.01
934111	AD1-039 2	9.36
934401	AD1-064 C O1	3.74
934402	AD1-064 E O1	17.49
934431	AD1-067 C	0.15
934432	AD1-067 E	0.64
LTF	AD1-092	13.13
LTF	AD1-093	22.7
LTF	AD1-094	4.38
934651	AD1-096 C	1.04

934652	AD1-096 E	1.7
934701	AD1-098 C O1	8.02
934702	AD1-098 E O1	5.85
934721	AD1-100 C	26.69
934722	AD1-100 E	124.96
934871	AD1-116 C	1.1
934872	AD1-116 E	1.8
934881	AD1-117 C	6.27
934882	AD1-117 E	4.18
934941	AD1-126 C	6.81
934942	AD1-126 E	4.54
934971	AD1-129 C	1.05
934972	AD1-129 E	0.7
935001	AD1-133 C O1	24.44
935002	AD1-133 E O1	16.29
936181	AD2-024 C O2	1.08
936182	AD2-024 E O2	1.77
936291	AD2-038 C O2	2.68
936292	AD2-038 E O2	17.91
936371	AD2-047 C O2	2.86
936372	AD2-047 E O2	30.8
936461	AD2-060	3.21
936511	AD2-066 C O2	10.34
936512	AD2-066 E O2	6.89
936781	AD2-101 C	5.91
936782	AD2-101 E	27.66
936791	AD2-102 C	14.04
936792	AD2-102 E	13.49
936961	AD2-130 C	1.86
936962	AD2-130 E	0.25
937001	AD2-134 C	3.18
937002	AD2-134 E	13.16
937031	AD2-137 C O2	4.17
937032	AD2-137 E O2	19.51
937051	AD2-140 C O2	4.13
937052	AD2-140 E O2	19.34
937061	AD2-141 C O2	4.19
937062	AD2-141 E O2	19.78
937071	AD2-142 C O2	8.26
937072	AD2-142 E O2	38.69
937121	AD2-148 C O2	3.88
937122	AD2-148 E O2	18.16
937131	AD2-149 C O2	3.88
937132	AD2-149 E O2	18.16
937141	AD2-150 C O2	3.88

937142	AD2-150 E O2	18.16
937161	AD2-153 C O2	4.47
937162	AD2-153 E O2	20.91
937181	AD2-155 C O2	4.13
937182	AD2-155 E O2	19.34
937311	AD2-172 C	2.87
937312	AD2-172 E	3.97
937321	AD2-175 C	19.66
937322	AD2-175 E	13.1
937331	AD2-176 C O2	8.47
937332	AD2-176 E O2	5.65
937401	AD2-194 C1	4.54
937411	AD2-194 C2	4.53
937402	AD2-194 E1	4.54
937412	AD2-194 E2	4.53
937531	AD2-214 C	5.17
937532	AD2-214 E	2.43
274832	ANNAWAN ; 1U	8.26
LTF	BLUEG	0.15
LTF	CARR	0.91
LTF	CATAWBA	0.17
274890	CAYUG;1U E	16.05
274891	CAYUG;2U E	16.05
LTF	CBM-S1	4.13
LTF	CBM-W1	73.22
LTF	CBM-W2	62.78
LTF	CELEVELAND	0.46
LTF	CIN	3.09
LTF	CLIFTY	8.01
LTF	DEARBORN	3.83
274859	EASYR;U1 E	12.84
274860	EASYR;U2 E	12.84
LTF	G-007	2.36
290051	GSG-6; E	12.18
LTF	HAMLET	0.79
LTF	IPL	1.33
940531	J351	434.36
951131	J643	25.84
981291	J740 C	5.51
981292	J740 E	22.06
938961	J847	13.15
275149	KEMPTON ;1E	22.48
290108	LEEDK;1U E	28.29
LTF	MEC	45.53
274850	MENDOTA H;RU	6.29

293061	N-015 E	17.78
293516	O-009 E1	10.65
293517	O-009 E2	5.41
293518	O-009 E3	5.96
293715	O-029 E	11.38
293716	O-029 E	6.24
293717	O-029 E	5.74
LTF	O-066	15.17
293644	O22 E1	12.12
293645	O22 E2	23.53
290021	O50 E	22.63
294392	P-010 E	22.58
294763	P-046 E	10.95
274888	PILOT HIL;1E	22.48
274830	PWR VTREC;1U	7.11
274831	PWR VTREC;2U	7.11
LTF	RENSSELAER	0.71
LTF	ROSETON	5.17
LTF	ROWAN	0.47
274789	SE CHICAG;6U	1.39
274790	SE CHICAG;7U	1.39
274791	SE CHICAG;8U	1.39
295111	SUBLETTE E	3.17
LTF	TRIMBLE	0.06
299993	U3-031C	6.32
903433	W3-046	27.95
905471	W4-084	0.52
274874	WALNR;2U	2.79
294502	WALNR;2U E	11.15
LTF	WEC	9.34
295109	WESTBROOK E	6.52
274687	WILL CNTY;4U	79.77
910542	X3-005 E	1.01
914641	Y2-103	52.52
915011	Y3-013 1	4.38
915021	Y3-013 2	4.38
915031	Y3-013 3	4.38
LTF	Z1-043	33.46
916502	Z1-106 E1	1.47
916504	Z1-106 E2	1.47
916512	Z1-107 E	3.06
916522	Z1-108 E	2.9
918051	AA1-018 C	2.83
918052	AA1-018 E	18.97
918972	AA1-116 E	3.21

918982	AA1-117 E	3.21
919221	AA1-146	20.55
919581	AA2-030	20.55
919591	AA2-035	151.52
920112	AA2-107 E	2.86
920272	AA2-123 E	2.85
930481	AB1-089	76.71
930491	AB1-090	76.71
930501	AB1-091	89.49
930761	AB1-122 1	82.91
930771	AB1-122 2	86.1
931221	AB1-172	0.95
LTF	AB2-013	18.91
924471	AB2-096	49.4
925161	AB2-173	3.67
925301	AB2-191 C	1.47
925302	AB2-191 E	1.31
925881	AC1-067	200.82
926311	AC1-109 1	2.22
926321	AC1-109 2	2.22
926331	AC1-110 1	2.21
926341	AC1-110 2	2.21
926351	AC1-111 1	0.89
926361	AC1-111 2	0.89
926371	AC1-111 3	0.89
926381	AC1-111 4	0.89
926391	AC1-111 5	0.89
926401	AC1-111 6	0.89
927511	AC1-113 1	1.39
927522	AC1-113 2	1.39
926431	AC1-114	2.78
927451	AC1-142A 1	4.9
927461	AC1-142A 2	4.9
926701	AC1-153 C1	90.12
926711	AC1-153 C2	93.59
926702	AC1-153 E1	3.61
926712	AC1-153 E2	3.74
926821	AC1-168 C	1.35
926822	AC1-168 E	9.07
927531	AC1-185 1	0.8
927541	AC1-185 2	0.8
927551	AC1-185 3	0.8
927561	AC1-185 4	0.8
927571	AC1-185 5	0.8
927581	AC1-185 6	0.8

927591	AC1-185 7	0.8
927601	AC1-185 8	0.8
927091	AC1-204 1	84.36
927101	AC1-204 2	84.34

Appendix 3

(CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 130.2% to 130.34% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 19.48 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.82
932012	AC2-007 E	1.52
932881	AC2-115 1	2.32
932891	AC2-115 2	2.32
932921	AC2-116	0.81
932931	AC2-117	5.38
933341	AC2-147 C	0.85
933342	AC2-147 E	1.38
933361	AC2-149 C	0.91
933362	AC2-149 E	1.48
933381	AC2-151 C	0.95
933382	AC2-151 E	1.55
933411	AC2-154 C	2.88
933412	AC2-154 E	4.7
933431	AC2-156 C	0.94
933432	AC2-156 E	1.53
933511	AC2-166 C	2.28
933512	AC2-166 E	2.52
933911	AD1-013 C O1	1.79
933912	AD1-013 E O1	2.86
933931	AD1-016 C	0.91
933932	AD1-016 E	1.48
934101	AD1-039 1	7.58
934111	AD1-039 2	7.76
934401	AD1-064 C O1	3.13
934402	AD1-064 E O1	14.65
934431	AD1-067 C	0.13
934432	AD1-067 E	0.54
LTF	AD1-092	10.71
LTF	AD1-093	18.55
LTF	AD1-094	3.6
934651	AD1-096 C	0.87

934652	AD1-096 E	1.42
934701	AD1-098 C O1	6.7
934702	AD1-098 E O1	4.89
934721	AD1-100 C	22.49
934722	AD1-100 E	105.29
934871	AD1-116 C	0.99
934872	AD1-116 E	1.61
934881	AD1-117 C	5.21
934882	AD1-117 E	3.48
934941	AD1-126 C	5.71
934942	AD1-126 E	3.81
934971	AD1-129 C	0.88
934972	AD1-129 E	0.59
935001	AD1-133 C O1	20.35
935002	AD1-133 E O1	13.57
936181	AD2-024 C O2	0.91
936182	AD2-024 E O2	1.48
936291	AD2-038 C O2	2.22
936292	AD2-038 E O2	14.88
936371	AD2-047 C O2	2.06
936372	AD2-047 E O2	22.16
936461	AD2-060	3.04
936511	AD2-066 C O2	8.71
936512	AD2-066 E O2	5.81
936781	AD2-101 C	4.28
936782	AD2-101 E	20.04
936791	AD2-102 C	11.72
936792	AD2-102 E	11.26
936961	AD2-130 C	1.57
936962	AD2-130 E	0.21
937001	AD2-134 C	2.66
937002	AD2-134 E	11.
937031	AD2-137 C O2	3.72
937032	AD2-137 E O2	17.41
937051	AD2-140 C O2	3.66
937052	AD2-140 E O2	17.12
937061	AD2-141 C O2	3.41
937062	AD2-141 E O2	16.08
937071	AD2-142 C O2	7.31
937072	AD2-142 E O2	34.24
937121	AD2-148 C O2	3.28
937122	AD2-148 E O2	15.36
937131	AD2-149 C O2	3.28
937132	AD2-149 E O2	15.36
937141	AD2-150 C O2	3.28

937142	AD2-150 E O2	15.36
937161	AD2-153 C O2	3.17
937162	AD2-153 E O2	14.86
937181	AD2-155 C O2	3.75
937182	AD2-155 E O2	17.56
937311	AD2-172 C	2.4
937312	AD2-172 E	3.31
937321	AD2-175 C	15.98
937322	AD2-175 E	10.65
937331	AD2-176 C O2	7.1
937332	AD2-176 E O2	4.73
937401	AD2-194 C1	3.79
937411	AD2-194 C2	3.79
937402	AD2-194 E1	3.79
937412	AD2-194 E2	3.79
LTF	BLUEG	1.8
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.09
LTF	CARR	0.72
LTF	CATAWBA	0.24
274890	CAYUG;1U E	13.34
274891	CAYUG;2U E	13.34
LTF	CBM-S1	1.55
LTF	CBM-W1	48.42
LTF	CBM-W2	38.56
LTF	CELEVELAND	0.67
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	10.94
LTF	DEARBORN	2.84
274859	EASYR;U1 E	10.67
274860	EASYR;U2 E	10.67
LTF	ELMERSMITH	0.17
LTF	G-007	1.92
LTF	GIBSON	0.09
290051	GSG-6; E	10.18
LTF	HAMLET	0.94
275149	KEMPTON ;1E	21.23
290108	LEEDK;1U E	23.7
LTF	MEC	36.43
274850	MENDOTA H;RU	5.25
293061	N-015 E	14.96
293715	O-029 E	6.15
293716	O-029 E	3.37
293717	O-029 E	3.1

<i>LTF</i>	<i>O-066</i>	<i>12.35</i>
<i>293644</i>	<i>O22 E1</i>	<i>9.27</i>
<i>293645</i>	<i>O22 E2</i>	<i>17.99</i>
<i>290021</i>	<i>O50 E</i>	<i>18.68</i>
<i>294392</i>	<i>P-010 E</i>	<i>19.</i>
<i>294763</i>	<i>P-046 E</i>	<i>9.13</i>
<i>274888</i>	<i>PILOT HIL;1E</i>	<i>21.23</i>
<i>274830</i>	<i>PWR VTREC;1U</i>	<i>5.96</i>
<i>274831</i>	<i>PWR VTREC;2U</i>	<i>5.96</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.57</i>
<i>274723</i>	<i>RIVER EC ;12</i>	<i>5.2</i>
<i>LTF</i>	<i>ROSETON</i>	<i>4.13</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.57</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>274794</i>	<i>SE CHICAG;1U</i>	<i>1.15</i>
<i>274795</i>	<i>SE CHICAG;2U</i>	<i>1.15</i>
<i>295111</i>	<i>SUBLETTE E</i>	<i>2.65</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.37</i>
<i>299993</i>	<i>U3-031C</i>	<i>5.65</i>
<i>903433</i>	<i>W3-046</i>	<i>22.98</i>
<i>905471</i>	<i>W4-084</i>	<i>0.44</i>
<i>274874</i>	<i>WALNR;2U</i>	<i>2.31</i>
<i>294502</i>	<i>WALNR;2U E</i>	<i>9.25</i>
<i>LTF</i>	<i>WEC</i>	<i>7.81</i>
<i>295109</i>	<i>WESTBROOK E</i>	<i>5.45</i>
<i>274687</i>	<i>WILL CNTY;4U</i>	<i>64.5</i>
<i>910541</i>	<i>X3-005 C</i>	<i>0.1</i>
<i>910542</i>	<i>X3-005 E</i>	<i>0.91</i>
<i>914641</i>	<i>Y2-103</i>	<i>44.12</i>
<i>915011</i>	<i>Y3-013 1</i>	<i>3.68</i>
<i>915021</i>	<i>Y3-013 2</i>	<i>3.68</i>
<i>915031</i>	<i>Y3-013 3</i>	<i>3.68</i>
<i>LTF</i>	<i>Z1-043</i>	<i>27.52</i>
<i>916502</i>	<i>Z1-106 E1</i>	<i>1.24</i>
<i>916504</i>	<i>Z1-106 E2</i>	<i>1.24</i>
<i>916512</i>	<i>Z1-107 E</i>	<i>2.61</i>
<i>916522</i>	<i>Z1-108 E</i>	<i>2.44</i>
<i>918051</i>	<i>AA1-018 C</i>	<i>2.54</i>
<i>918052</i>	<i>AA1-018 E</i>	<i>16.99</i>
<i>918972</i>	<i>AA1-116 E</i>	<i>3.03</i>
<i>918982</i>	<i>AA1-117 E</i>	<i>3.03</i>
<i>919221</i>	<i>AA1-146</i>	<i>17.02</i>
<i>919581</i>	<i>AA2-030</i>	<i>17.02</i>
<i>919591</i>	<i>AA2-035</i>	<i>129.81</i>
<i>920112</i>	<i>AA2-107 E</i>	<i>2.4</i>

920272	AA2-123 E	2.39
930481	AB1-089	64.13
930491	AB1-090	64.13
930501	AB1-091	93.52
930761	AB1-122 1	69.73
930771	AB1-122 2	71.42
931221	AB1-172	0.81
LTF	AB2-013	15.45
924471	AB2-096	41.37
925161	AB2-173	3.04
925301	AB2-191 C	1.23
925302	AB2-191 E	1.09
925881	AC1-067	307.8
926311	AC1-109 1	1.88
926321	AC1-109 2	1.88
926331	AC1-110 1	1.86
926341	AC1-110 2	1.86
926351	AC1-111 1	0.75
926361	AC1-111 2	0.75
926371	AC1-111 3	0.75
926381	AC1-111 4	0.75
926391	AC1-111 5	0.75
926401	AC1-111 6	0.75
927511	AC1-113 1	1.16
927522	AC1-113 2	1.16
926431	AC1-114	2.32
927451	AC1-142A 1	4.12
927461	AC1-142A 2	4.12
926701	AC1-153 C1	75.79
926711	AC1-153 C2	77.63
926702	AC1-153 E1	3.03
926712	AC1-153 E2	3.1
926821	AC1-168 C	1.12
926822	AC1-168 E	7.48
927531	AC1-185 1	0.67
927541	AC1-185 2	0.67
927551	AC1-185 3	0.67
927561	AC1-185 4	0.67
927571	AC1-185 5	0.67
927581	AC1-185 6	0.67
927591	AC1-185 7	0.67
927601	AC1-185 8	0.67
927091	AC1-204 1	70.49
927101	AC1-204 2	70.54

Appendix 4

(CE - CE) The DAVIS CRK; B 345/138 kV transformer (from bus 270710 to bus 275174 ckt 1) loads from 111.92% to 120.2% (**DC power flow**) of its load dump rating (480 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_179-45-BT3-4__'. This project contributes approximately 39.77 MW to the thermal violation.

CONTINGENCY 'COMED_P4_179-45-BT3-4__'

TRIP BRANCH FROM BUS 270662 TO BUS 270674 CKT 1 / BLOOM ; B 345 BURNHAM ; B 345
 TRIP BRANCH FROM BUS 275163 TO BUS 270674 CKT 1 / BURNHAM ;1M 138 BURNHAM ; B 345
 TRIP BRANCH FROM BUS 275163 TO BUS 271122 CKT 1 / BURNHAM ;1M 138 BURNHAM ; B 138
 TRIP BRANCH FROM BUS 275163 TO BUS 275263 CKT 1 / BURNHAM ;1M 138 BURNHAM ;1C 36.2
 TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1 / BLOOM ; B 345 AD2-153 TAP 345
 TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1 / BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934721	AD1-100 C	15.9
934722	AD1-100 E	74.42
936371	AD2-047 C O2	4.51
936372	AD2-047 E O2	48.5
936781	AD2-101 C	9.33
936782	AD2-101 E	43.67
937061	AD2-141 C O2	6.96
937062	AD2-141 E O2	32.81
937121	AD2-148 C O2	1.81
937122	AD2-148 E O2	8.49
937131	AD2-149 C O2	1.81
937132	AD2-149 E O2	8.49
937141	AD2-150 C O2	1.81
937142	AD2-150 E O2	8.49
937161	AD2-153 C O2	7.
937162	AD2-153 E O2	32.75
937321	AD2-175 C	32.61
937322	AD2-175 E	21.74
LTF	CBM-N	0.02
LTF	CBM-S1	0.6
LTF	CBM-S2	0.37
LTF	CBM-W2	5.24
LTF	CIN	0.67
LTF	CPL	0.09
LTF	DEARBORN	0.04
LTF	EDWARDS	0.09
LTF	G-007A	0.21
LTF	IPL	0.39
LTF	LGEE	0.09
LTF	NYISO	0.26

<i>LTF</i>	<i>TATANKA</i>	<i>0.12</i>
<i>LTF</i>	<i>VFT</i>	<i>0.57</i>
<i>918972</i>	<i>AA1-116 E</i>	<i>6.08</i>
<i>918982</i>	<i>AA1-117 E</i>	<i>6.08</i>

Appendix 5

(CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 109.14% to 109.22% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.64 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.89
932012	AC2-007 E	1.66
932881	AC2-115 1	2.52
932891	AC2-115 2	2.52
932921	AC2-116	0.88
933341	AC2-147 C	0.92
933342	AC2-147 E	1.5
933361	AC2-149 C	0.98
933362	AC2-149 E	1.6
933381	AC2-151 C	1.03
933382	AC2-151 E	1.67
933411	AC2-154 C	2.34
933412	AC2-154 E	3.82
933431	AC2-156 C	1.01
933432	AC2-156 E	1.64
933511	AC2-166 C	2.46
933512	AC2-166 E	2.72
933911	AD1-013 C O1	1.94
933912	AD1-013 E O1	3.1
933931	AD1-016 C	0.98
933932	AD1-016 E	1.61
934101	AD1-039 1	8.1
934111	AD1-039 2	8.76
934401	AD1-064 C O1	3.4
934402	AD1-064 E O1	15.91
934431	AD1-067 C	0.14
934432	AD1-067 E	0.58
LTF	AD1-092	11.78
LTF	AD1-093	20.42
LTF	AD1-094	3.92
934651	AD1-096 C	0.94
934652	AD1-096 E	1.54
934701	AD1-098 C O1	7.26

934702	AD1-098 E O1	5.3
934721	AD1-100 C	22.76
934722	AD1-100 E	106.57
934871	AD1-116 C	0.94
934872	AD1-116 E	1.54
934881	AD1-117 C	5.67
934882	AD1-117 E	3.78
934941	AD1-126 C	6.17
934942	AD1-126 E	4.12
934971	AD1-129 C	0.96
934972	AD1-129 E	0.64
935001	AD1-133 C O1	21.36
935002	AD1-133 E O1	14.24
936181	AD2-024 C O2	0.98
936182	AD2-024 E O2	1.61
936291	AD2-038 C O2	2.42
936292	AD2-038 E O2	16.18
936461	AD2-060	2.46
936511	AD2-066 C O2	9.57
936512	AD2-066 E O2	6.38
936791	AD2-102 C	12.74
936792	AD2-102 E	12.24
936961	AD2-130 C	1.68
936962	AD2-130 E	0.22
937001	AD2-134 C	2.88
937002	AD2-134 E	11.91
937031	AD2-137 C O2	3.31
937032	AD2-137 E O2	15.51
937051	AD2-140 C O2	3.32
937052	AD2-140 E O2	15.53
937061	AD2-141 C O2	3.26
937062	AD2-141 E O2	15.38
937071	AD2-142 C O2	6.63
937072	AD2-142 E O2	31.06
937121	AD2-148 C O2	3.27
937122	AD2-148 E O2	15.3
937131	AD2-149 C O2	3.27
937132	AD2-149 E O2	15.3
937141	AD2-150 C O2	3.27
937142	AD2-150 E O2	15.3
937181	AD2-155 C O2	3.37
937182	AD2-155 E O2	15.77
937311	AD2-172 C	2.6
937312	AD2-172 E	3.6
937321	AD2-175 C	15.28

937322	AD2-175 E	10.19
937331	AD2-176 C O2	7.71
937332	AD2-176 E O2	5.14
937401	AD2-194 C1	4.24
937411	AD2-194 C2	4.23
937402	AD2-194 E1	4.24
937412	AD2-194 E2	4.23
LTF	BLUEG	1.96
274654	BRAIDWOOD;1U	33.28
274655	BRAIDWOOD;2U	32.37
LTF	CANNELTON	0.11
LTF	CARR	0.74
LTF	CATAWBA	0.24
LTF	CBM-S1	1.73
LTF	CBM-W1	53.69
LTF	CBM-W2	41.3
LTF	CELEVELAND	0.66
LTF	CHEOAH	< 0.01
LTF	CLIFTY	11.49
LTF	DEARBORN	2.95
274859	EASYR;U1 E	11.61
274860	EASYR;U2 E	11.61
LTF	ELMERSMITH	0.21
LTF	G-007	1.96
LTF	GIBSON	0.13
290051	GSG-6; E	11.03
LTF	HAMLET	0.93
274676	JOLIET 29;8U	13.75
275149	KEMPTON ;1E	17.24
274704	KENDALL ;1C	4.9
274705	KENDALL ;1S	3.27
274706	KENDALL ;2C	4.9
274707	KENDALL ;2S	3.27
274660	LASCO STA;1U	30.75
274661	LASCO STA;2U	30.8
290108	LEEDK;1U E	25.63
LTF	MEC	39.61
274850	MENDOTA H;RU	5.69
293061	N-015 E	16.7
293516	O-009 E1	6.55
293517	O-009 E2	3.33
293518	O-009 E3	3.67
293715	O-029 E	10.24
293716	O-029 E	5.61
293717	O-029 E	5.16

<i>LTF</i>	<i>O-066</i>	<i>12.55</i>
<i>293644</i>	<i>O22 E1</i>	<i>12.52</i>
<i>293645</i>	<i>O22 E2</i>	<i>24.31</i>
<i>290021</i>	<i>O50 E</i>	<i>20.97</i>
<i>294392</i>	<i>P-010 E</i>	<i>21.21</i>
<i>294763</i>	<i>P-046 E</i>	<i>9.92</i>
<i>274888</i>	<i>PILOT HIL;1E</i>	<i>17.24</i>
<i>274830</i>	<i>PWR VTREC;1U</i>	<i>6.47</i>
<i>274831</i>	<i>PWR VTREC;2U</i>	<i>6.47</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.58</i>
<i>LTF</i>	<i>ROSETON</i>	<i>4.2</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.56</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>295111</i>	<i>SUBLETTE E</i>	<i>2.87</i>
<i>274861</i>	<i>TOP CROP ;1U</i>	<i>0.58</i>
<i>274862</i>	<i>TOP CROP ;2U</i>	<i>1.13</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.4</i>
<i>299993</i>	<i>U3-031C</i>	<i>5.01</i>
<i>903433</i>	<i>W3-046</i>	<i>25.68</i>
<i>905471</i>	<i>W4-084</i>	<i>0.47</i>
<i>274874</i>	<i>WALNR;2U</i>	<i>2.52</i>
<i>294502</i>	<i>WALNR;2U E</i>	<i>10.08</i>
<i>LTF</i>	<i>WEC</i>	<i>8.51</i>
<i>295109</i>	<i>WESTBROOK E</i>	<i>5.9</i>
<i>274687</i>	<i>WILL CNTY;4U</i>	<i>75.03</i>
<i>914641</i>	<i>Y2-103</i>	<i>48.04</i>
<i>915011</i>	<i>Y3-013 1</i>	<i>4.</i>
<i>915021</i>	<i>Y3-013 2</i>	<i>4.</i>
<i>915031</i>	<i>Y3-013 3</i>	<i>4.</i>
<i>LTF</i>	<i>Z1-043</i>	<i>30.</i>
<i>916502</i>	<i>Z1-106 E1</i>	<i>1.34</i>
<i>916504</i>	<i>Z1-106 E2</i>	<i>1.34</i>
<i>916512</i>	<i>Z1-107 E</i>	<i>2.57</i>
<i>916522</i>	<i>Z1-108 E</i>	<i>2.64</i>
<i>918051</i>	<i>AA1-018 C</i>	<i>2.42</i>
<i>918052</i>	<i>AA1-018 E</i>	<i>16.19</i>
<i>918972</i>	<i>AA1-116 E</i>	<i>2.46</i>
<i>918982</i>	<i>AA1-117 E</i>	<i>2.46</i>
<i>919221</i>	<i>AA1-146</i>	<i>18.54</i>
<i>919581</i>	<i>AA2-030</i>	<i>18.54</i>
<i>919591</i>	<i>AA2-035</i>	<i>133.8</i>
<i>920112</i>	<i>AA2-107 E</i>	<i>2.59</i>
<i>920272</i>	<i>AA2-123 E</i>	<i>2.59</i>
<i>930481</i>	<i>AB1-089</i>	<i>69.67</i>
<i>930491</i>	<i>AB1-090</i>	<i>69.67</i>

930501	AB1-091	67.74
930761	AB1-122 1	74.55
930771	AB1-122 2	80.59
931221	AB1-172	0.8
LTF	AB2-013	17.02
924471	AB2-096	44.92
925161	AB2-173	3.31
925301	AB2-191 C	1.33
925302	AB2-191 E	1.18
926311	AC1-109 1	2.01
926321	AC1-109 2	2.01
926331	AC1-110 1	2.02
926341	AC1-110 2	2.02
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	1.26
927522	AC1-113 2	1.26
926431	AC1-114	2.52
927451	AC1-142A 1	4.57
927461	AC1-142A 2	4.57
926701	AC1-153 C1	81.04
926711	AC1-153 C2	87.6
926702	AC1-153 E1	3.24
926712	AC1-153 E2	3.5
926821	AC1-168 C	1.22
926822	AC1-168 E	8.19
927531	AC1-185 1	0.73
927541	AC1-185 2	0.73
927551	AC1-185 3	0.73
927561	AC1-185 4	0.73
927571	AC1-185 5	0.73
927581	AC1-185 6	0.73
927591	AC1-185 7	0.73
927601	AC1-185 8	0.73
927091	AC1-204 1	78.89
927101	AC1-204 2	78.75

Appendix 6

(CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 112.59% to 112.7% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.31 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.57
932012	AC2-007 E	1.05
932881	AC2-115 1	1.6
932891	AC2-115 2	1.6
932921	AC2-116	0.56
933341	AC2-147 C	0.59
933342	AC2-147 E	0.96
933361	AC2-149 C	0.63
933362	AC2-149 E	1.02
933381	AC2-151 C	0.65
933382	AC2-151 E	1.06
933411	AC2-154 C	1.7
933412	AC2-154 E	2.77
933431	AC2-156 C	0.64
933432	AC2-156 E	1.05
933511	AC2-166 C	1.57
933512	AC2-166 E	1.73
933911	AD1-013 C O1	1.24
933912	AD1-013 E O1	1.98
933931	AD1-016 C	0.63
933932	AD1-016 E	1.02
934101	AD1-039 1	5.19
934111	AD1-039 2	5.48
934401	AD1-064 C O1	2.16
934402	AD1-064 E O1	10.11
934431	AD1-067 C	0.09
934432	AD1-067 E	0.37
LTF	AD1-092	7.48
LTF	AD1-093	12.96
LTF	AD1-094	2.5
934651	AD1-096 C	0.6
934652	AD1-096 E	0.98
934701	AD1-098 C O1	4.62

934702	AD1-098 E O1	3.37
934721	AD1-100 C	15.19
934722	AD1-100 E	71.09
934871	AD1-116 C	0.62
934872	AD1-116 E	1.02
934881	AD1-117 C	3.61
934882	AD1-117 E	2.4
934941	AD1-126 C	3.93
934942	AD1-126 E	2.62
934971	AD1-129 C	0.61
934972	AD1-129 E	0.41
935001	AD1-133 C O1	13.88
935002	AD1-133 E O1	9.25
936181	AD2-024 C O2	0.63
936182	AD2-024 E O2	1.02
936291	AD2-038 C O2	1.54
936292	AD2-038 E O2	10.29
936371	AD2-047 C O2	1.53
936372	AD2-047 E O2	16.48
936461	AD2-060	1.79
936511	AD2-066 C O2	6.01
936512	AD2-066 E O2	4.01
936781	AD2-101 C	3.17
936782	AD2-101 E	14.83
936791	AD2-102 C	8.1
936792	AD2-102 E	7.78
936961	AD2-130 C	1.08
936962	AD2-130 E	0.14
937001	AD2-134 C	1.84
937002	AD2-134 E	7.58
937031	AD2-137 C O2	2.34
937032	AD2-137 E O2	10.96
937051	AD2-140 C O2	2.32
937052	AD2-140 E O2	10.88
937061	AD2-141 C O2	2.33
937062	AD2-141 E O2	10.98
937071	AD2-142 C O2	4.65
937072	AD2-142 E O2	21.76
937121	AD2-148 C O2	2.2
937122	AD2-148 E O2	10.28
937131	AD2-149 C O2	2.2
937132	AD2-149 E O2	10.28
937141	AD2-150 C O2	2.2
937142	AD2-150 E O2	10.28
937161	AD2-153 C O2	2.38

937162	AD2-153 E O2	11.15
937181	AD2-155 C O2	2.33
937182	AD2-155 E O2	10.91
937311	AD2-172 C	1.66
937312	AD2-172 E	2.29
937321	AD2-175 C	10.92
937322	AD2-175 E	7.28
937331	AD2-176 C O2	4.9
937332	AD2-176 E O2	3.26
937401	AD2-194 C1	2.65
937411	AD2-194 C2	2.65
937402	AD2-194 E1	2.65
937412	AD2-194 E2	2.65
937531	AD2-214 C	2.96
937532	AD2-214 E	1.39
274832	ANNAWAN ; 1U	4.07
LTF	BLUEG	0.94
LTF	CANNELTON	< 0.01
LTF	CARR	0.5
LTF	CATAWBA	0.15
274890	CAYUG;1U E	9.
274891	CAYUG;2U E	9.
LTF	CBM-S1	1.4
LTF	CBM-W1	40.64
LTF	CBM-W2	28.81
LTF	CELEVELAND	0.4
LTF	CLIFTY	6.69
274751	CRETE EC ;1U	2.36
274752	CRETE EC ;2U	2.36
274753	CRETE EC ;3U	2.36
274754	CRETE EC ;4U	2.36
LTF	DEARBORN	2.24
274859	EASYR;U1 E	7.38
274860	EASYR;U2 E	7.38
LTF	G-007	1.32
290051	GSG-6; E	7.02
LTF	HAMLET	0.59
951131	J643	15.61
981291	J740 C	4.38
981292	J740 E	17.51
938961	J847	8.43
275149	KEMPTON ;1E	12.52
290108	LEEDK;1U E	16.33
LTF	MEC	25.44
274850	MENDOTA H;RU	3.62

293061	N-015 E	10.39
293516	O-009 E1	6.1
293517	O-009 E2	3.1
293518	O-009 E3	3.41
293715	O-029 E	6.52
293716	O-029 E	3.58
293717	O-029 E	3.29
LTF	O-066	8.49
293644	O22 E1	7.35
293645	O22 E2	14.27
290021	O50 E	13.15
294392	P-010 E	13.2
294763	P-046 E	6.31
274888	PILOT HIL;1E	12.52
274830	PWR VTREC;1U	4.11
274831	PWR VTREC;2U	4.11
LTF	RENSSELAER	0.4
LTF	ROSETON	2.87
LTF	ROWAN	0.35
295111	SUBLETTE E	1.83
LTF	TRIMBLE	0.19
299993	U3-031C	3.55
903433	W3-046	16.14
905471	W4-084	0.3
274874	WALNR;2U	1.6
294502	WALNR;2U E	6.41
LTF	WEC	5.4
295109	WESTBROOK E	3.76
274687	WILL CNTY;4U	46.97
910542	X3-005 E	0.52
914641	Y2-103	30.46
915011	Y3-013 1	2.54
915021	Y3-013 2	2.54
915031	Y3-013 3	2.54
LTF	Z1-043	19.09
916502	Z1-106 E1	0.85
916504	Z1-106 E2	0.85
916512	Z1-107 E	1.73
916522	Z1-108 E	1.68
918051	AA1-018 C	1.6
918052	AA1-018 E	10.71
918972	AA1-116 E	1.79
918982	AA1-117 E	1.79
919221	AA1-146	11.8
919581	AA2-030	11.8

919591	AA2-035	86.93
920112	AA2-107 E	1.65
920272	AA2-123 E	1.65
930481	AB1-089	44.29
930491	AB1-090	44.29
930501	AB1-091	50.09
930761	AB1-122 1	47.74
930771	AB1-122 2	50.37
931221	AB1-172	0.54
LTF	AB2-013	10.8
924471	AB2-096	28.55
925161	AB2-173	2.1
925301	AB2-191 C	0.85
925302	AB2-191 E	0.75
925881	AC1-067	103.88
926311	AC1-109 1	1.28
926321	AC1-109 2	1.28
926331	AC1-110 1	1.28
926341	AC1-110 2	1.28
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
927511	AC1-113 1	0.8
927522	AC1-113 2	0.8
926431	AC1-114	1.6
927451	AC1-142A 1	2.86
927461	AC1-142A 2	2.86
926701	AC1-153 C1	51.89
926711	AC1-153 C2	54.75
926702	AC1-153 E1	2.08
926712	AC1-153 E2	2.19
926821	AC1-168 C	0.77
926822	AC1-168 E	5.19
927531	AC1-185 1	0.46
927541	AC1-185 2	0.46
927551	AC1-185 3	0.46
927561	AC1-185 4	0.46
927571	AC1-185 5	0.46
927581	AC1-185 6	0.46
927591	AC1-185 7	0.46
927601	AC1-185 8	0.46
927091	AC1-204 1	49.33

927101	AC1-204 2	49.29
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Appendix 7

(CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 109.79% to 109.86% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.73 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.63
932012	AC2-007 E	1.17
932881	AC2-115 1	1.78
932891	AC2-115 2	1.78
932921	AC2-116	0.62
933341	AC2-147 C	0.65
933342	AC2-147 E	1.06
933361	AC2-149 C	0.69
933362	AC2-149 E	1.13
933381	AC2-151 C	0.72
933382	AC2-151 E	1.18
933411	AC2-154 C	1.74
933412	AC2-154 E	2.84
933431	AC2-156 C	0.71
933432	AC2-156 E	1.16
933511	AC2-166 C	1.74
933512	AC2-166 E	1.92
933911	AD1-013 C O1	1.37
933912	AD1-013 E O1	2.19
933931	AD1-016 C	0.69
933932	AD1-016 E	1.13
934101	AD1-039 1	5.73
934111	AD1-039 2	6.14
934401	AD1-064 C O1	2.39
934402	AD1-064 E O1	11.21
934431	AD1-067 C	0.1
934432	AD1-067 E	0.41
LTF	AD1-092	8.28
LTF	AD1-093	14.36
LTF	AD1-094	2.76
934651	AD1-096 C	0.66
934652	AD1-096 E	1.08

934701	AD1-098 C O1	5.12
934702	AD1-098 E O1	3.73
934721	AD1-100 C	16.33
934722	AD1-100 E	76.48
934871	AD1-116 C	0.67
934872	AD1-116 E	1.1
934881	AD1-117 C	3.99
934882	AD1-117 E	2.66
934941	AD1-126 C	4.35
934942	AD1-126 E	2.9
934971	AD1-129 C	0.67
934972	AD1-129 E	0.45
935001	AD1-133 C O1	15.16
935002	AD1-133 E O1	10.11
936181	AD2-024 C O2	0.69
936182	AD2-024 E O2	1.13
936291	AD2-038 C O2	1.7
936292	AD2-038 E O2	11.4
936371	AD2-047 C O2	1.48
936372	AD2-047 E O2	15.96
936461	AD2-060	1.83
936511	AD2-066 C O2	6.72
936512	AD2-066 E O2	4.48
936781	AD2-101 C	3.08
936782	AD2-101 E	14.41
936791	AD2-102 C	8.97
936792	AD2-102 E	8.62
936961	AD2-130 C	1.19
936962	AD2-130 E	0.16
937001	AD2-134 C	2.03
937002	AD2-134 E	8.39
937031	AD2-137 C O2	2.43
937032	AD2-137 E O2	11.39
937051	AD2-140 C O2	2.43
937052	AD2-140 E O2	11.36
937061	AD2-141 C O2	2.4
937062	AD2-141 E O2	11.33
937071	AD2-142 C O2	4.85
937072	AD2-142 E O2	22.73
937121	AD2-148 C O2	2.35
937122	AD2-148 E O2	11.01
937131	AD2-149 C O2	2.35
937132	AD2-149 E O2	11.01
937141	AD2-150 C O2	2.35
937142	AD2-150 E O2	11.01

937161	AD2-153 C O2	2.29
937162	AD2-153 E O2	10.73
937181	AD2-155 C O2	2.45
937182	AD2-155 E O2	11.49
937311	AD2-172 C	1.83
937312	AD2-172 E	2.53
937321	AD2-175 C	11.26
937322	AD2-175 E	7.5
937331	AD2-176 C O2	5.43
937332	AD2-176 E O2	3.62
937401	AD2-194 C1	2.97
937411	AD2-194 C2	2.97
937402	AD2-194 E1	2.97
937412	AD2-194 E2	2.97
LTF	BLUEG	1.4
274654	BRAIDWOOD;1U	23.01
274655	BRAIDWOOD;2U	22.39
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.08
LTF	CARR	0.56
LTF	CATAWBA	0.19
LTF	CBM-S1	1.13
LTF	CBM-W1	39.86
LTF	CBM-W2	29.04
LTF	CELEVELAND	0.53
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	8.44
274751	CRETE EC ;1U	4.08
274752	CRETE EC ;2U	4.08
274753	CRETE EC ;3U	4.08
274754	CRETE EC ;4U	4.08
LTF	DEARBORN	2.3
274859	EASYR;U1 E	8.18
274860	EASYR;U2 E	8.18
LTF	ELMERSMITH	0.15
LTF	G-007	1.5
LTF	GIBSON	0.08
290051	GSG-6; E	7.77
LTF	HAMLET	0.74
275149	KEMPTON ;1E	12.81
274704	KENDALL ;1C	3.42
274705	KENDALL ;1S	2.28
274706	KENDALL ;2C	3.42
274707	KENDALL ;2S	2.28

274660	LASCO STA;1U	21.43
274661	LASCO STA;2U	21.47
290108	LEEDK;1U E	18.07
LTF	MEC	27.9
274850	MENDOTA H;RU	4.01
293061	N-015 E	11.68
293715	O-029 E	2.99
293716	O-029 E	1.64
293717	O-029 E	1.51
LTF	O-066	9.6
293644	O22 E1	8.57
293645	O22 E2	16.64
290021	O50 E	14.7
294392	P-010 E	14.84
294763	P-046 E	6.99
274888	PILOT HIL;1E	12.81
274830	PWR VTREC;1U	4.56
274831	PWR VTREC;2U	4.56
LTF	RENSSELAER	0.44
LTF	ROSETON	3.21
LTF	ROWAN	0.45
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.02
274861	TOP CROP ;1U	0.4
274862	TOP CROP ;2U	0.77
LTF	TRIMBLE	0.28
299993	U3-031C	3.68
903433	W3-046	18.
905471	W4-084	0.33
274874	WALNR;2U	1.77
294502	WALNR;2U E	7.1
LTF	WEC	5.99
295109	WESTBROOK E	4.16
274687	WILL CNTY;4U	52.58
914641	Y2-103	33.82
915011	Y3-013 1	2.82
915021	Y3-013 2	2.82
915031	Y3-013 3	2.82
LTF	Z1-043	21.13
916502	Z1-106 E1	0.94
916504	Z1-106 E2	0.94
916512	Z1-107 E	1.85
916522	Z1-108 E	1.86
918051	AA1-018 C	1.73
918052	AA1-018 E	11.59

918972	AA1-116 E	1.83
918982	AA1-117 E	1.83
919221	AA1-146	13.05
919581	AA2-030	13.05
919591	AA2-035	95.09
920112	AA2-107 E	1.83
920272	AA2-123 E	1.83
930481	AB1-089	49.08
930491	AB1-090	49.08
930501	AB1-091	50.78
930761	AB1-122 1	52.68
930771	AB1-122 2	56.45
931221	AB1-172	0.57
LTF	AB2-013	11.97
924471	AB2-096	31.64
925161	AB2-173	2.33
925301	AB2-191 C	0.94
925302	AB2-191 E	0.83
926311	AC1-109 1	1.42
926321	AC1-109 2	1.42
926331	AC1-110 1	1.42
926341	AC1-110 2	1.42
926351	AC1-111 1	0.57
926361	AC1-111 2	0.57
926371	AC1-111 3	0.57
926381	AC1-111 4	0.57
926391	AC1-111 5	0.57
926401	AC1-111 6	0.57
927511	AC1-113 1	0.89
927522	AC1-113 2	0.89
926431	AC1-114	1.78
927451	AC1-142A 1	3.2
927461	AC1-142A 2	3.2
926701	AC1-153 C1	57.26
926711	AC1-153 C2	61.36
926702	AC1-153 E1	2.29
926712	AC1-153 E2	2.45
926821	AC1-168 C	0.86
926822	AC1-168 E	5.76
927531	AC1-185 1	0.51
927541	AC1-185 2	0.51
927551	AC1-185 3	0.51
927561	AC1-185 4	0.51
927571	AC1-185 5	0.51
927581	AC1-185 6	0.51

927591	AC1-185 7	0.51
927601	AC1-185 8	0.51
927091	AC1-204 1	55.28
927101	AC1-204 2	55.2

Appendix 8

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 147.34% to 147.6% (**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 27.11 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1	/ WILTO; 765 COLLI; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1	/ WILTO;4M 345 WILTO; 765
TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1	/ WILTO;4M 345 WILTO; R 345
TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1	/ WILTO;4M 345 WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.03
932012	AC2-007 E	1.91
932881	AC2-115 1	2.92
932891	AC2-115 2	2.92
932921	AC2-116	1.02
932931	AC2-117	6.51
933361	AC2-149 C	1.14
933362	AC2-149 E	1.86
933381	AC2-151 C	1.21
933382	AC2-151 E	1.97
933411	AC2-154 C	3.21
933412	AC2-154 E	5.23
933431	AC2-156 C	1.17
933432	AC2-156 E	1.91
933511	AC2-166 C	2.85
933512	AC2-166 E	3.15
933911	AD1-013 C O1	2.25
933912	AD1-013 E O1	3.6
933931	AD1-016 C	1.14
933932	AD1-016 E	1.85
934101	AD1-039 1	9.66
934111	AD1-039 2	9.84
934401	AD1-064 C O1	3.92
934402	AD1-064 E O1	18.37
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
LTF	AD1-092	13.89
LTF	AD1-093	23.99
LTF	AD1-094	4.66
934651	AD1-096 C	1.09
934652	AD1-096 E	1.78
934701	AD1-098 C O1	8.42

934702	AD1-098 E O1	6.15
934721	AD1-100 C	35.21
934722	AD1-100 E	164.82
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934881	AD1-117 C	0.61
934882	AD1-117 E	0.4
934941	AD1-126 C	7.16
934942	AD1-126 E	4.77
934971	AD1-129 C	1.1
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.67
935002	AD1-133 E O1	18.45
936181	AD2-024 C O2	1.14
936182	AD2-024 E O2	1.85
936291	AD2-038 C O2	2.85
936292	AD2-038 E O2	19.06
936371	AD2-047 C O2	2.93
936372	AD2-047 E O2	31.55
936461	AD2-060	3.38
936511	AD2-066 C O2	11.11
936512	AD2-066 E O2	7.41
936781	AD2-101 C	6.09
936782	AD2-101 E	28.49
936791	AD2-102 C	14.73
936792	AD2-102 E	14.15
936961	AD2-130 C	1.93
936962	AD2-130 E	0.26
937001	AD2-134 C	3.34
937002	AD2-134 E	13.82
937031	AD2-137 C O2	7.63
937032	AD2-137 E O2	35.73
937051	AD2-140 C O2	7.27
937052	AD2-140 E O2	34.02
937061	AD2-141 C O2	4.74
937062	AD2-141 E O2	22.37
937071	AD2-142 C O2	14.53
937072	AD2-142 E O2	68.03
937121	AD2-148 C O2	5.34
937122	AD2-148 E O2	24.98
937131	AD2-149 C O2	5.34
937132	AD2-149 E O2	24.98
937141	AD2-150 C O2	5.34
937142	AD2-150 E O2	24.98
937161	AD2-153 C O2	4.53

937162	AD2-153 E O2	21.21
937171	AD2-154 C O2	3.97
937172	AD2-154 E O2	18.59
937181	AD2-155 C O2	4.34
937182	AD2-155 E O2	20.33
937311	AD2-172 C	3.02
937312	AD2-172 E	4.16
937321	AD2-175 C	22.23
937322	AD2-175 E	14.82
937331	AD2-176 C O2	8.9
937332	AD2-176 E O2	5.93
937401	AD2-194 C1	4.8
937411	AD2-194 C2	4.8
937402	AD2-194 E1	4.8
937412	AD2-194 E2	4.8
LTF	BLUEG	2.6
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.94
LTF	CATAWBA	0.34
274890	CAYUG;1U E	20.65
274891	CAYUG;2U E	20.65
LTF	CBM-S1	2.
LTF	CBM-W1	74.76
LTF	CBM-W2	53.18
LTF	CELEVELAND	0.94
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	15.69
LTF	DEARBORN	2.77
LTF	ELMERSMITH	0.22
LTF	G-007	2.54
290051	GSG-6; E	12.79
LTF	HAMLET	1.31
275149	KEMPTON ;1E	23.64
290108	LEEDK;1U E	29.72
274770	LINCOLN ;1U	4.13
274771	LINCOLN ;2U	4.13
274772	LINCOLN ;3U	4.13
274773	LINCOLN ;4U	4.13
274774	LINCOLN ;5U	4.13
274775	LINCOLN ;6U	4.13
274776	LINCOLN ;7U	4.13
274777	LINCOLN ;8U	4.13
LTF	MEC	46.92

274850	MENDOTA H;RU	6.6
293061	N-015 E	19.2
LTF	O-066	16.29
293644	O22 E1	12.6
293645	O22 E2	24.46
290021	O50 E	23.83
294392	P-010 E	24.38
294763	P-046 E	11.49
274888	PILOT HIL;1E	23.64
274830	PWR VTREC;1U	7.47
274831	PWR VTREC;2U	7.47
296308	R-030 C1	5.
296271	R-030 C2	5.
296125	R-030 C3	5.06
296309	R-030 E1	20.01
296272	R-030 E2	20.01
296128	R-030 E3	20.26
LTF	RENSSELAER	0.74
LTF	ROSETON	5.35
LTF	ROWAN	0.8
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.33
LTF	TRIMBLE	0.53
299993	U3-031C	11.53
903433	W3-046	29.48
LTF	WEC	9.78
295109	WESTBROOK E	6.85
274687	WILL CNTY;4U	82.07
910542	X3-005 E	0.9
914641	Y2-103	55.09
915011	Y3-013 1	4.59
915021	Y3-013 2	4.59
915031	Y3-013 3	4.59
LTF	Z1-043	35.61
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.17
916522	Z1-108 E	3.05
917501	Z2-087 C	3.91
917502	Z2-087 E	26.18
918051	AA1-018 C	3.02
918052	AA1-018 E	20.2
918972	AA1-116 E	3.38
918982	AA1-117 E	3.38
919591	AA2-035	160.67

920112	AA2-107 E	3.
920272	AA2-123 E	2.99
930481	AB1-089	80.54
930491	AB1-090	80.54
930501	AB1-091	91.2
930761	AB1-122 1	88.88
930771	AB1-122 2	90.52
931221	AB1-172	0.98
LTF	AB2-013	19.99
924041	AB2-047 C O1	4.83
924042	AB2-047 E O1	32.3
924471	AB2-096	51.86
925301	AB2-191 C	1.55
925302	AB2-191 E	1.37
925881	AC1-067	167.77
926311	AC1-109 1	2.34
926321	AC1-109 2	2.34
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.92
927451	AC1-142A 1	5.14
927461	AC1-142A 2	5.14
926701	AC1-153 C1	96.61
926711	AC1-153 C2	98.39
926702	AC1-153 E1	3.86
926712	AC1-153 E2	3.94
927091	AC1-204 1	89.19
927101	AC1-204 2	89.19

Appendix 9

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 149.77% to 150.02% (**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 27.66 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1	/ WILTO; 765 COLLI; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1	/ WILTO;3M 345 WILTO; 765
TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1	/ WILTO;3M 345 WILTO; B 345
TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1	/ WILTO;3M 345 WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.05
932012	AC2-007 E	1.95
932881	AC2-115 1	2.98
932891	AC2-115 2	2.98
932921	AC2-116	1.04
932931	AC2-117	6.65
933341	AC2-147 C	1.09
933342	AC2-147 E	1.78
933361	AC2-149 C	1.16
933362	AC2-149 E	1.9
933381	AC2-151 C	1.23
933382	AC2-151 E	2.01
933411	AC2-154 C	3.27
933412	AC2-154 E	5.34
933431	AC2-156 C	1.19
933432	AC2-156 E	1.95
933511	AC2-166 C	2.91
933512	AC2-166 E	3.22
933911	AD1-013 C O1	2.3
933912	AD1-013 E O1	3.67
933931	AD1-016 C	1.16
933932	AD1-016 E	1.89
934101	AD1-039 1	9.87
934111	AD1-039 2	10.05
934401	AD1-064 C O1	4.01
934402	AD1-064 E O1	18.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
LTF	AD1-092	14.18
LTF	AD1-093	24.5
LTF	AD1-094	4.75
934651	AD1-096 C	1.12

934652	AD1-096 E	1.82
934701	AD1-098 C O1	8.6
934702	AD1-098 E O1	6.28
934721	AD1-100 C	35.9
934722	AD1-100 E	168.07
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934881	AD1-117 C	6.72
934882	AD1-117 E	4.48
934941	AD1-126 C	7.31
934942	AD1-126 E	4.87
934971	AD1-129 C	1.13
934972	AD1-129 E	0.75
935001	AD1-133 C O1	28.24
935002	AD1-133 E O1	18.83
936181	AD2-024 C O2	1.16
936182	AD2-024 E O2	1.89
936291	AD2-038 C O2	2.91
936292	AD2-038 E O2	19.46
936371	AD2-047 C O2	2.99
936372	AD2-047 E O2	32.2
936461	AD2-060	3.45
936511	AD2-066 C O2	11.34
936512	AD2-066 E O2	7.56
936781	AD2-101 C	6.21
936782	AD2-101 E	29.08
936791	AD2-102 C	15.05
936792	AD2-102 E	14.46
936961	AD2-130 C	1.97
936962	AD2-130 E	0.26
937001	AD2-134 C	3.42
937002	AD2-134 E	14.11
937031	AD2-137 C O2	7.77
937032	AD2-137 E O2	36.39
937051	AD2-140 C O2	7.4
937052	AD2-140 E O2	34.65
937061	AD2-141 C O2	4.84
937062	AD2-141 E O2	22.82
937071	AD2-142 C O2	14.8
937072	AD2-142 E O2	69.29
937121	AD2-148 C O2	5.44
937122	AD2-148 E O2	25.47
937131	AD2-149 C O2	5.44
937132	AD2-149 E O2	25.47
937141	AD2-150 C O2	5.44

937142	AD2-150 E O2	25.47
937161	AD2-153 C O2	4.62
937162	AD2-153 E O2	21.64
937171	AD2-154 C O2	4.05
937172	AD2-154 E O2	18.97
937181	AD2-155 C O2	4.43
937182	AD2-155 E O2	20.75
937311	AD2-172 C	3.08
937312	AD2-172 E	4.25
937321	AD2-175 C	22.68
937322	AD2-175 E	15.12
937331	AD2-176 C O2	9.09
937332	AD2-176 E O2	6.06
937401	AD2-194 C1	4.9
937411	AD2-194 C2	4.9
937402	AD2-194 E1	4.9
937412	AD2-194 E2	4.9
LTF	BLUEG	2.66
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.96
LTF	CATAWBA	0.35
274890	CAYUG;1U E	21.06
274891	CAYUG;2U E	21.06
LTF	CBM-S1	2.05
LTF	CBM-W1	76.35
LTF	CBM-W2	54.29
LTF	CELEVELAND	0.96
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	16.03
LTF	DEARBORN	2.83
LTF	ELMERSMITH	0.22
LTF	G-007	2.59
290051	GSG-6; E	13.07
LTF	HAMLET	1.34
275149	KEMPTON ;1E	24.13
290108	LEEDK;1U E	30.35
274770	LINCOLN ;1U	4.24
274771	LINCOLN ;2U	4.24
274772	LINCOLN ;3U	4.24
274773	LINCOLN ;4U	4.24
274774	LINCOLN ;5U	4.24
274775	LINCOLN ;6U	4.24
274776	LINCOLN ;7U	4.24

274777	LINCOLN ;8U	4.24
LTF	MEC	47.91
274850	MENDOTA H;RU	6.74
293061	N-015 E	19.6
LTF	O-066	16.64
293644	O22 E1	12.86
293645	O22 E2	24.97
290021	O50 E	24.34
294392	P-010 E	24.89
294763	P-046 E	11.73
274888	PILOT HIL;1E	24.13
274830	PWR VTREC;1U	7.63
274831	PWR VTREC;2U	7.63
296308	R-030 C1	5.1
296271	R-030 C2	5.1
296125	R-030 C3	5.17
296309	R-030 E1	20.42
296272	R-030 E2	20.42
296128	R-030 E3	20.66
LTF	RENSSELAER	0.76
LTF	ROSETON	5.46
LTF	ROWAN	0.81
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.4
LTF	TRIMBLE	0.55
299993	U3-031C	11.84
903433	W3-046	30.11
LTF	WEC	9.99
295109	WESTBROOK E	7.
274687	WILL CNTY;4U	83.82
910542	X3-005 E	0.92
914641	Y2-103	56.26
915011	Y3-013 1	4.69
915021	Y3-013 2	4.69
915031	Y3-013 3	4.69
LTF	Z1-043	36.36
916502	Z1-106 E1	1.58
916504	Z1-106 E2	1.58
916512	Z1-107 E	3.24
916522	Z1-108 E	3.11
917501	Z2-087 C	3.99
917502	Z2-087 E	26.7
918051	AA1-018 C	3.08
918052	AA1-018 E	20.64
918972	AA1-116 E	3.45

918982	AA1-117 E	3.45
919591	AA2-035	164.09
920112	AA2-107 E	3.07
920272	AA2-123 E	3.05
930481	AB1-089	82.25
930491	AB1-090	82.25
930501	AB1-091	93.12
930761	AB1-122 1	90.76
930771	AB1-122 2	92.45
931221	AB1-172	1.
LTF	AB2-013	20.42
924041	AB2-047 C O1	4.92
924042	AB2-047 E O1	32.95
924471	AB2-096	52.97
925301	AB2-191 C	1.58
925302	AB2-191 E	1.4
925881	AC1-067	171.5
926311	AC1-109 1	2.39
926321	AC1-109 2	2.39
926331	AC1-110 1	2.37
926341	AC1-110 2	2.37
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
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.98
927451	AC1-142A 1	5.25
927461	AC1-142A 2	5.25
926701	AC1-153 C1	98.66
926711	AC1-153 C2	100.49
926702	AC1-153 E1	3.95
926712	AC1-153 E2	4.02
927531	AC1-185 1	0.71
927541	AC1-185 2	0.71
927551	AC1-185 3	0.71
927561	AC1-185 4	0.71
927571	AC1-185 5	0.71
927581	AC1-185 6	0.71
927591	AC1-185 7	0.71
927601	AC1-185 8	0.71
927091	AC1-204 1	91.1

<i>927101</i>	<i>AC1-204 2</i>	<i>91.1</i>
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Appendix 10

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 126.73% to 126.8% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.4 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1

END

/ 243206 05DUMONT 765 X1-020

/ 243206 05DUMONT 765 270644 WILTON ; 765 1

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.88
932012	AC2-007 E	1.64
932881	AC2-115 1	2.49
932891	AC2-115 2	2.49
932921	AC2-116	0.87
933341	AC2-147 C	0.91
933342	AC2-147 E	1.48
933361	AC2-149 C	0.97
933362	AC2-149 E	1.58
933381	AC2-151 C	1.01
933382	AC2-151 E	1.65
933411	AC2-154 C	2.31
933412	AC2-154 E	3.77
933431	AC2-156 C	1.
933432	AC2-156 E	1.62
933511	AC2-166 C	2.43
933512	AC2-166 E	2.69
933911	AD1-013 C O1	1.92
933912	AD1-013 E O1	3.06
933931	AD1-016 C	0.97
933932	AD1-016 E	1.59
934101	AD1-039 1	8.01
934111	AD1-039 2	8.66
934401	AD1-064 C O1	3.36
934402	AD1-064 E O1	15.71
934431	AD1-067 C	0.14
934432	AD1-067 E	0.57
LTF	AD1-092	11.61
LTF	AD1-093	20.14
LTF	AD1-094	3.87
934651	AD1-096 C	0.93
934652	AD1-096 E	1.52

934701	AD1-098 C O1	7.17
934702	AD1-098 E O1	5.23
934721	AD1-100 C	22.49
934722	AD1-100 E	105.27
934871	AD1-116 C	0.93
934872	AD1-116 E	1.52
934881	AD1-117 C	5.6
934882	AD1-117 E	3.73
934941	AD1-126 C	6.1
934942	AD1-126 E	4.06
934971	AD1-129 C	0.94
934972	AD1-129 E	0.63
935001	AD1-133 C O1	21.08
935002	AD1-133 E O1	14.05
936181	AD2-024 C O2	0.97
936182	AD2-024 E O2	1.59
936291	AD2-038 C O2	2.39
936292	AD2-038 E O2	15.97
936461	AD2-060	2.43
936511	AD2-066 C O2	9.46
936512	AD2-066 E O2	6.3
936781	AD2-101 C	0.62
936782	AD2-101 E	2.89
936791	AD2-102 C	12.58
936792	AD2-102 E	12.09
936961	AD2-130 C	1.66
936962	AD2-130 E	0.22
937001	AD2-134 C	2.85
937002	AD2-134 E	11.76
937031	AD2-137 C O2	3.27
937032	AD2-137 E O2	15.31
937051	AD2-140 C O2	3.28
937052	AD2-140 E O2	15.33
937061	AD2-141 C O2	3.22
937062	AD2-141 E O2	15.18
937071	AD2-142 C O2	6.55
937072	AD2-142 E O2	30.67
937121	AD2-148 C O2	3.23
937122	AD2-148 E O2	15.11
937131	AD2-149 C O2	3.23
937132	AD2-149 E O2	15.11
937141	AD2-150 C O2	3.23
937142	AD2-150 E O2	15.11
937181	AD2-155 C O2	3.33
937182	AD2-155 E O2	15.58

937311	AD2-172 C	2.57
937312	AD2-172 E	3.55
937321	AD2-175 C	15.09
937322	AD2-175 E	10.06
937331	AD2-176 C O2	7.61
937332	AD2-176 E O2	5.07
937401	AD2-194 C1	4.19
937411	AD2-194 C2	4.19
937402	AD2-194 E1	4.19
937412	AD2-194 E2	4.19
LTF	BLUEG	2.23
274654	BRAIDWOOD;1U	32.94
274655	BRAIDWOOD;2U	32.04
LTF	CALDERWOOD	0.08
LTF	CANNELTON	0.16
LTF	CARR	0.79
LTF	CATAWBA	0.29
LTF	CBM-S1	1.25
LTF	CBM-W1	51.91
LTF	CBM-W2	38.47
LTF	CELEVELAND	0.82
LTF	CHEOAH	0.08
LTF	CHILHOWEE	0.02
LTF	CLIFTY	12.63
274751	CRETE EC ;1U	7.
274752	CRETE EC ;2U	7.
274753	CRETE EC ;3U	7.
274754	CRETE EC ;4U	7.
LTF	DEARBORN	3.08
274859	EASYR;U1 E	11.46
274860	EASYR;U2 E	11.46
LTF	ELMERSMITH	0.35
LTF	G-007	2.12
LTF	GIBSON	0.22
290051	GSG-6; E	10.89
LTF	HAMLET	1.11
275149	KEMPTON ;1E	17.01
274704	KENDALL ;1C	4.85
274705	KENDALL ;1S	3.23
274706	KENDALL ;2C	4.85
274707	KENDALL ;2S	3.23
274660	LASCO STA;1U	30.41
274661	LASCO STA;2U	30.46
290108	LEEDK;1U E	25.32
LTF	MEC	38.88

274850	MENDOTA H;RU	5.62
293061	N-015 E	16.51
293516	O-009 E1	9.45
293517	O-009 E2	4.8
293518	O-009 E3	5.28
293715	O-029 E	10.1
293716	O-029 E	5.54
293717	O-029 E	5.09
LTF	O-066	13.61
293644	O22 E1	12.39
293645	O22 E2	24.06
290021	O50 E	20.72
294392	P-010 E	20.97
294763	P-046 E	9.8
274888	PILOT HIL;1E	17.01
274830	PWR VTREC;1U	6.39
274831	PWR VTREC;2U	6.39
LTF	RENSSELAER	0.63
LTF	ROSETON	4.53
LTF	ROWAN	0.68
LTF	SANTEETLA	0.03
295111	SUBLETTE E	2.83
274861	TOP CROP ;1U	0.58
274862	TOP CROP ;2U	1.12
LTF	TRIMBLE	0.45
299993	U3-031C	4.95
903433	W3-046	25.35
905471	W4-084	0.47
274874	WALNR;2U	2.49
294502	WALNR;2U E	9.94
LTF	WEC	8.4
295109	WESTBROOK E	5.83
274687	WILL CNTY;4U	74.22
914641	Y2-103	47.47
915011	Y3-013 1	3.96
915021	Y3-013 2	3.96
915031	Y3-013 3	3.96
LTF	Z1-043	29.59
916502	Z1-106 E1	1.32
916504	Z1-106 E2	1.32
916512	Z1-107 E	2.54
916522	Z1-108 E	2.61
918051	AA1-018 C	2.39
918052	AA1-018 E	15.99
918972	AA1-116 E	2.43

918982	AA1-117 E	2.43
919221	AA1-146	18.29
919581	AA2-030	18.29
919591	AA2-035	132.2
920112	AA2-107 E	2.56
920272	AA2-123 E	2.56
930481	AB1-089	68.8
930491	AB1-090	68.8
930501	AB1-091	66.87
930761	AB1-122 1	73.65
930771	AB1-122 2	79.68
931221	AB1-172	0.79
LTF	AB2-013	16.78
924471	AB2-096	44.37
925161	AB2-173	3.26
925301	AB2-191 C	1.32
925302	AB2-191 E	1.17
926311	AC1-109 1	1.99
926321	AC1-109 2	1.99
926331	AC1-110 1	1.99
926341	AC1-110 2	1.99
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	1.24
927522	AC1-113 2	1.24
926431	AC1-114	2.49
927451	AC1-142A 1	4.52
927461	AC1-142A 2	4.52
926701	AC1-153 C1	80.05
926711	AC1-153 C2	86.61
926702	AC1-153 E1	3.2
926712	AC1-153 E2	3.46
926821	AC1-168 C	1.2
926822	AC1-168 E	8.08
927531	AC1-185 1	0.72
927541	AC1-185 2	0.72
927551	AC1-185 3	0.72
927561	AC1-185 4	0.72
927571	AC1-185 5	0.72
927581	AC1-185 6	0.72
927591	AC1-185 7	0.72

<i>927601</i>	<i>AC1-185 8</i>	<i>0.72</i>
<i>927091</i>	<i>AC1-204 1</i>	<i>78.02</i>
<i>927101</i>	<i>AC1-204 2</i>	<i>77.87</i>

Appendix 11

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.74% to 133.85% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.49 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#2978_05DUMONT 765'

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	0.69
932012	AC2-007 E	1.28
932881	AC2-115 1	1.94
932891	AC2-115 2	1.94
932921	AC2-116	0.68
932931	AC2-117	10.47
933341	AC2-147 C	0.71
933342	AC2-147 E	1.16
933361	AC2-149 C	0.76
933362	AC2-149 E	1.24
933381	AC2-151 C	0.81
933382	AC2-151 E	1.31
933411	AC2-154 C	2.05
933412	AC2-154 E	3.34
933431	AC2-156 C	0.78
933432	AC2-156 E	1.28
933511	AC2-166 C	1.9
933512	AC2-166 E	2.1
933911	AD1-013 C O1	1.5
933912	AD1-013 E O1	2.39
933931	AD1-016 C	0.76
933932	AD1-016 E	1.24
934101	AD1-039 1	6.33
934111	AD1-039 2	6.54
934401	AD1-064 C O1	2.62
934402	AD1-064 E O1	12.25
934431	AD1-067 C	0.11
934432	AD1-067 E	0.45
LTF	AD1-092	9.
LTF	AD1-093	15.6
LTF	AD1-094	3.03
934651	AD1-096 C	0.73
934652	AD1-096 E	1.18

934701	AD1-098 C O1	5.6
934702	AD1-098 E O1	4.09
934721	AD1-100 C	18.07
934722	AD1-100 E	84.58
934871	AD1-116 C	0.84
934872	AD1-116 E	1.38
934881	AD1-117 C	4.36
934882	AD1-117 E	2.91
934941	AD1-126 C	4.77
934942	AD1-126 E	3.18
934971	AD1-129 C	0.74
934972	AD1-129 E	0.49
935001	AD1-133 C O1	16.79
935002	AD1-133 E O1	11.19
936181	AD2-024 C O2	0.76
936182	AD2-024 E O2	1.24
936291	AD2-038 C O2	1.86
936292	AD2-038 E O2	12.48
936371	AD2-047 C O2	1.69
936372	AD2-047 E O2	18.15
936461	AD2-060	2.16
936511	AD2-066 C O2	7.42
936512	AD2-066 E O2	4.95
936781	AD2-101 C	3.5
936782	AD2-101 E	16.39
936791	AD2-102 C	9.81
936792	AD2-102 E	9.42
936961	AD2-130 C	1.3
936962	AD2-130 E	0.17
937001	AD2-134 C	2.22
937002	AD2-134 E	9.19
937031	AD2-137 C O2	2.7
937032	AD2-137 E O2	12.66
937051	AD2-140 C O2	2.7
937052	AD2-140 E O2	12.62
937061	AD2-141 C O2	2.71
937062	AD2-141 E O2	12.78
937071	AD2-142 C O2	5.39
937072	AD2-142 E O2	25.24
937121	AD2-148 C O2	2.6
937122	AD2-148 E O2	12.18
937131	AD2-149 C O2	2.6
937132	AD2-149 E O2	12.18
937141	AD2-150 C O2	2.6
937142	AD2-150 E O2	12.18

937161	AD2-153 C O2	2.61
937162	AD2-153 E O2	12.21
937181	AD2-155 C O2	2.83
937182	AD2-155 E O2	13.26
937311	AD2-172 C	2.01
937312	AD2-172 E	2.77
937321	AD2-175 C	12.7
937322	AD2-175 E	8.47
937331	AD2-176 C O2	5.94
937332	AD2-176 E O2	3.96
937401	AD2-194 C1	3.21
937411	AD2-194 C2	3.21
937402	AD2-194 E1	3.21
937412	AD2-194 E2	3.21
937531	AD2-214 C	1.66
937532	AD2-214 E	0.78
LTF	BLUEG	1.48
LTF	CALDERWOOD	0.02
LTF	CANNELTON	0.07
LTF	CARR	0.62
LTF	CATAWBA	0.21
274890	CAYUG;1U E	10.71
274891	CAYUG;2U E	10.71
LTF	CBM-S1	1.28
LTF	CBM-W1	44.45
LTF	CBM-W2	32.09
LTF	CELEVELAND	0.58
LTF	CHEOAH	0.03
LTF	CHILHOWEE	< 0.01
LTF	CLIFTY	9.14
LTF	DEARBORN	2.57
274859	EASYR;U1 E	8.93
274860	EASYR;U2 E	8.93
LTF	ELMERSMITH	0.13
LTF	G-007	1.65
LTF	GIBSON	0.06
290051	GSG-6; E	8.51
LTF	HAMLET	0.81
275149	KEMPTON ;1E	15.08
290108	LEEDK;1U E	19.79
LTF	MEC	30.47
274850	MENDOTA H;RU	4.39
293061	N-015 E	12.8
293516	O-009 E1	7.37
293517	O-009 E2	3.74

293518	O-009 E3	4.12
293715	O-029 E	7.88
293716	O-029 E	4.32
293717	O-029 E	3.97
LTF	O-066	10.57
293644	O22 E1	7.91
293645	O22 E2	15.35
290021	O50 E	15.77
294392	P-010 E	16.26
294763	P-046 E	7.64
274888	PILOT HIL;1E	15.08
274830	PWR VTREC;1U	4.98
274831	PWR VTREC;2U	4.98
LTF	RENSSELAER	0.49
LTF	ROSETON	3.54
LTF	ROWAN	0.49
LTF	SANTEETLA	< 0.01
295111	SUBLETTE E	2.21
LTF	TRIMBLE	0.3
299993	U3-031C	4.1
291984	U4-033	1.52
274814	UNIV PK N;0U	1.19
274806	UNIV PK N;2U	1.19
274807	UNIV PK N;3U	1.19
274808	UNIV PK N;4U	1.19
274809	UNIV PK N;5U	1.19
274810	UNIV PK N;6U	1.19
274811	UNIV PK N;7U	1.19
274812	UNIV PK N;8U	1.19
274813	UNIV PK N;9U	1.19
274815	UNIV PK N;XU	1.19
274816	UNIV PK N;YU	1.19
903433	W3-046	19.41
905471	W4-084	0.36
274874	WALNR;2U	1.93
294502	WALNR;2U E	7.74
LTF	WEC	6.54
295109	WESTBROOK E	4.55
274687	WILL CNTY;4U	53.33
910542	X3-005 E	0.52
914641	Y2-103	36.97
915011	Y3-013 1	3.08
915021	Y3-013 2	3.08
915031	Y3-013 3	3.08
LTF	Z1-043	23.15

916502	Z1-106 E1	1.03
916504	Z1-106 E2	1.04
916512	Z1-107 E	2.23
916522	Z1-108 E	2.04
918051	AA1-018 C	2.17
918052	AA1-018 E	14.5
918972	AA1-116 E	2.15
918982	AA1-117 E	2.15
919221	AA1-146	14.24
919581	AA2-030	14.24
919591	AA2-035	107.19
920112	AA2-107 E	2.
920272	AA2-123 E	2.
930481	AB1-089	53.65
930491	AB1-090	53.65
930501	AB1-091	58.45
930761	AB1-122 1	58.22
930771	AB1-122 2	60.21
931221	AB1-172	0.69
LTF	AB2-013	13.
924471	AB2-096	34.61
925161	AB2-173	2.54
925301	AB2-191 C	1.03
925302	AB2-191 E	0.91
925881	AC1-067	98.97
926311	AC1-109 1	1.57
926321	AC1-109 2	1.57
926331	AC1-110 1	1.55
926341	AC1-110 2	1.55
926351	AC1-111 1	0.63
926361	AC1-111 2	0.63
926371	AC1-111 3	0.63
926381	AC1-111 4	0.63
926391	AC1-111 5	0.63
926401	AC1-111 6	0.63
927511	AC1-113 1	0.97
927522	AC1-113 2	0.97
926431	AC1-114	1.94
927451	AC1-142A 1	3.49
927461	AC1-142A 2	3.48
926701	AC1-153 C1	63.28
926711	AC1-153 C2	65.45
926702	AC1-153 E1	2.53
926712	AC1-153 E2	2.62
926821	AC1-168 C	0.94

926822	AC1-168 E	6.31
927531	AC1-185 1	0.56
927541	AC1-185 2	0.56
927551	AC1-185 3	0.56
927561	AC1-185 4	0.56
927571	AC1-185 5	0.56
927581	AC1-185 6	0.56
927591	AC1-185 7	0.56
927601	AC1-185 8	0.56
927091	AC1-204 1	59.71
927101	AC1-204 2	59.76

Appendix 12

(CE - CE) The DAVIS CRK;3M-DAVIS CRK; B 138 kV line (from bus 275174 to bus 271294 ckt 1) loads from 111.88% to 120.16% (**DC power flow**) of its load dump rating (480 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_179-45-BT3-4__'. This project contributes approximately 39.77 MW to the thermal violation.

CONTINGENCY 'COMED_P4_179-45-BT3-4__'

TRIP BRANCH FROM BUS 270662 TO BUS 270674 CKT 1 / BLOOM ; B 345 BURNHAM ; B 345
 TRIP BRANCH FROM BUS 275163 TO BUS 270674 CKT 1 / BURNHAM ;1M 138 BURNHAM ; B 345
 TRIP BRANCH FROM BUS 275163 TO BUS 271122 CKT 1 / BURNHAM ;1M 138 BURNHAM ; B 138
 TRIP BRANCH FROM BUS 275163 TO BUS 275263 CKT 1 / BURNHAM ;1M 138 BURNHAM ;1C 36.2
 TRIP BRANCH FROM BUS 270662 TO BUS 937160 CKT 1 / BLOOM ; B 345 AD2-153 TAP 345
 TRIP BRANCH FROM BUS 270662 TO BUS 271098 TO BUS 275258 CKT 1 / BLOOM ; B 345 BLOOM ; B 138 BLOOM ;4C 34.5
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934721	AD1-100 C	15.9
934722	AD1-100 E	74.42
936371	AD2-047 C O2	4.51
936372	AD2-047 E O2	48.5
936781	AD2-101 C	9.33
936782	AD2-101 E	43.67
937061	AD2-141 C O2	6.96
937062	AD2-141 E O2	32.81
937121	AD2-148 C O2	1.81
937122	AD2-148 E O2	8.49
937131	AD2-149 C O2	1.81
937132	AD2-149 E O2	8.49
937141	AD2-150 C O2	1.81
937142	AD2-150 E O2	8.49
937161	AD2-153 C O2	7.
937162	AD2-153 E O2	32.75
937321	AD2-175 C	32.61
937322	AD2-175 E	21.74
LTF	CBM-N	0.02
LTF	CBM-S1	0.6
LTF	CBM-S2	0.37
LTF	CBM-W2	5.24
LTF	CIN	0.67
LTF	CPL	0.09
LTF	DEARBORN	0.04
LTF	EDWARDS	0.09
LTF	G-007A	0.21
LTF	IPL	0.39
LTF	LGEE	0.09
LTF	NYISO	0.26

<i>LTF</i>	<i>TATANKA</i>	<i>0.12</i>
<i>LTF</i>	<i>VFT</i>	<i>0.57</i>
<i>918972</i>	<i>AA1-116 E</i>	<i>6.08</i>
<i>918982</i>	<i>AA1-117 E</i>	<i>6.08</i>

Appendix 13

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 147.34% to 147.6% (**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 27.11 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1

/ WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1

/ WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1

/ WILTO;4M 345 WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1

/ WILTO;4M 345 WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.03
932012	AC2-007 E	1.91
932881	AC2-115 1	2.92
932891	AC2-115 2	2.92
932921	AC2-116	1.02
932931	AC2-117	6.51
933361	AC2-149 C	1.14
933362	AC2-149 E	1.86
933381	AC2-151 C	1.21
933382	AC2-151 E	1.97
933411	AC2-154 C	3.21
933412	AC2-154 E	5.23
933431	AC2-156 C	1.17
933432	AC2-156 E	1.91
933511	AC2-166 C	2.85
933512	AC2-166 E	3.15
933911	AD1-013 C O1	2.25
933912	AD1-013 E O1	3.6
933931	AD1-016 C	1.14
933932	AD1-016 E	1.85
934101	AD1-039 1	9.66
934111	AD1-039 2	9.84
934401	AD1-064 C O1	3.92
934402	AD1-064 E O1	18.37
934431	AD1-067 C	0.16
934432	AD1-067 E	0.68
LTF	AD1-092	13.89
LTF	AD1-093	23.99
LTF	AD1-094	4.66
934651	AD1-096 C	1.09
934652	AD1-096 E	1.78
934701	AD1-098 C O1	8.42

934702	AD1-098 E O1	6.15
934721	AD1-100 C	35.21
934722	AD1-100 E	164.82
934871	AD1-116 C	1.18
934872	AD1-116 E	1.92
934881	AD1-117 C	0.61
934882	AD1-117 E	0.4
934941	AD1-126 C	7.16
934942	AD1-126 E	4.77
934971	AD1-129 C	1.1
934972	AD1-129 E	0.74
935001	AD1-133 C O1	27.67
935002	AD1-133 E O1	18.45
936181	AD2-024 C O2	1.14
936182	AD2-024 E O2	1.85
936291	AD2-038 C O2	2.85
936292	AD2-038 E O2	19.06
936371	AD2-047 C O2	2.93
936372	AD2-047 E O2	31.55
936461	AD2-060	3.38
936511	AD2-066 C O2	11.11
936512	AD2-066 E O2	7.41
936781	AD2-101 C	6.09
936782	AD2-101 E	28.49
936791	AD2-102 C	14.73
936792	AD2-102 E	14.15
936961	AD2-130 C	1.93
936962	AD2-130 E	0.26
937001	AD2-134 C	3.34
937002	AD2-134 E	13.82
937031	AD2-137 C O2	7.63
937032	AD2-137 E O2	35.73
937051	AD2-140 C O2	7.27
937052	AD2-140 E O2	34.02
937061	AD2-141 C O2	4.74
937062	AD2-141 E O2	22.37
937071	AD2-142 C O2	14.53
937072	AD2-142 E O2	68.03
937121	AD2-148 C O2	5.34
937122	AD2-148 E O2	24.98
937131	AD2-149 C O2	5.34
937132	AD2-149 E O2	24.98
937141	AD2-150 C O2	5.34
937142	AD2-150 E O2	24.98
937161	AD2-153 C O2	4.53

937162	AD2-153 E O2	21.21
937171	AD2-154 C O2	3.97
937172	AD2-154 E O2	18.59
937181	AD2-155 C O2	4.34
937182	AD2-155 E O2	20.33
937311	AD2-172 C	3.02
937312	AD2-172 E	4.16
937321	AD2-175 C	22.23
937322	AD2-175 E	14.82
937331	AD2-176 C O2	8.9
937332	AD2-176 E O2	5.93
937401	AD2-194 C1	4.8
937411	AD2-194 C2	4.8
937402	AD2-194 E1	4.8
937412	AD2-194 E2	4.8
LTF	BLUEG	2.6
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.94
LTF	CATAWBA	0.34
274890	CAYUG;1U E	20.65
274891	CAYUG;2U E	20.65
LTF	CBM-S1	2.
LTF	CBM-W1	74.76
LTF	CBM-W2	53.18
LTF	CELEVELAND	0.94
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	15.69
LTF	DEARBORN	2.77
LTF	ELMERSMITH	0.22
LTF	G-007	2.54
290051	GSG-6; E	12.79
LTF	HAMLET	1.31
275149	KEMPTON ;1E	23.64
290108	LEEDK;1U E	29.72
274770	LINCOLN ;1U	4.13
274771	LINCOLN ;2U	4.13
274772	LINCOLN ;3U	4.13
274773	LINCOLN ;4U	4.13
274774	LINCOLN ;5U	4.13
274775	LINCOLN ;6U	4.13
274776	LINCOLN ;7U	4.13
274777	LINCOLN ;8U	4.13
LTF	MEC	46.92

274850	MENDOTA H;RU	6.6
293061	N-015 E	19.2
LTF	O-066	16.29
293644	O22 E1	12.6
293645	O22 E2	24.46
290021	O50 E	23.83
294392	P-010 E	24.38
294763	P-046 E	11.49
274888	PILOT HIL;1E	23.64
274830	PWR VTREC;1U	7.47
274831	PWR VTREC;2U	7.47
296308	R-030 C1	5.
296271	R-030 C2	5.
296125	R-030 C3	5.06
296309	R-030 E1	20.01
296272	R-030 E2	20.01
296128	R-030 E3	20.26
LTF	RENSSELAER	0.74
LTF	ROSETON	5.35
LTF	ROWAN	0.8
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.33
LTF	TRIMBLE	0.53
299993	U3-031C	11.53
903433	W3-046	29.48
LTF	WEC	9.78
295109	WESTBROOK E	6.85
274687	WILL CNTY;4U	82.07
910542	X3-005 E	0.9
914641	Y2-103	55.09
915011	Y3-013 1	4.59
915021	Y3-013 2	4.59
915031	Y3-013 3	4.59
LTF	Z1-043	35.61
916502	Z1-106 E1	1.55
916504	Z1-106 E2	1.55
916512	Z1-107 E	3.17
916522	Z1-108 E	3.05
917501	Z2-087 C	3.91
917502	Z2-087 E	26.18
918051	AA1-018 C	3.02
918052	AA1-018 E	20.2
918972	AA1-116 E	3.38
918982	AA1-117 E	3.38
919591	AA2-035	160.67

920112	AA2-107 E	3.
920272	AA2-123 E	2.99
930481	AB1-089	80.54
930491	AB1-090	80.54
930501	AB1-091	91.2
930761	AB1-122 1	88.88
930771	AB1-122 2	90.52
931221	AB1-172	0.98
LTF	AB2-013	19.99
924041	AB2-047 C O1	4.83
924042	AB2-047 E O1	32.3
924471	AB2-096	51.86
925301	AB2-191 C	1.55
925302	AB2-191 E	1.37
925881	AC1-067	167.77
926311	AC1-109 1	2.34
926321	AC1-109 2	2.34
926331	AC1-110 1	2.33
926341	AC1-110 2	2.33
926351	AC1-111 1	0.94
926361	AC1-111 2	0.94
926371	AC1-111 3	0.94
926381	AC1-111 4	0.94
926391	AC1-111 5	0.94
926401	AC1-111 6	0.94
927511	AC1-113 1	1.46
927522	AC1-113 2	1.46
926431	AC1-114	2.92
927451	AC1-142A 1	5.14
927461	AC1-142A 2	5.14
926701	AC1-153 C1	96.61
926711	AC1-153 C2	98.39
926702	AC1-153 E1	3.86
926712	AC1-153 E2	3.94
927091	AC1-204 1	89.19
927101	AC1-204 2	89.19

Appendix 14

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 149.77% to 150.02% (**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 27.66 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1

/ WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1

/ WILTO;3M 345 WILTO; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1

/ WILTO;3M 345 WILTO; B 345

TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1

/ WILTO;3M 345 WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932011	AC2-007 C	1.05
932012	AC2-007 E	1.95
932881	AC2-115 1	2.98
932891	AC2-115 2	2.98
932921	AC2-116	1.04
932931	AC2-117	6.65
933341	AC2-147 C	1.09
933342	AC2-147 E	1.78
933361	AC2-149 C	1.16
933362	AC2-149 E	1.9
933381	AC2-151 C	1.23
933382	AC2-151 E	2.01
933411	AC2-154 C	3.27
933412	AC2-154 E	5.34
933431	AC2-156 C	1.19
933432	AC2-156 E	1.95
933511	AC2-166 C	2.91
933512	AC2-166 E	3.22
933911	AD1-013 C O1	2.3
933912	AD1-013 E O1	3.67
933931	AD1-016 C	1.16
933932	AD1-016 E	1.89
934101	AD1-039 1	9.87
934111	AD1-039 2	10.05
934401	AD1-064 C O1	4.01
934402	AD1-064 E O1	18.77
934431	AD1-067 C	0.16
934432	AD1-067 E	0.69
LTF	AD1-092	14.18
LTF	AD1-093	24.5
LTF	AD1-094	4.75
934651	AD1-096 C	1.12

934652	AD1-096 E	1.82
934701	AD1-098 C O1	8.6
934702	AD1-098 E O1	6.28
934721	AD1-100 C	35.9
934722	AD1-100 E	168.07
934871	AD1-116 C	1.2
934872	AD1-116 E	1.96
934881	AD1-117 C	6.72
934882	AD1-117 E	4.48
934941	AD1-126 C	7.31
934942	AD1-126 E	4.87
934971	AD1-129 C	1.13
934972	AD1-129 E	0.75
935001	AD1-133 C O1	28.24
935002	AD1-133 E O1	18.83
936181	AD2-024 C O2	1.16
936182	AD2-024 E O2	1.89
936291	AD2-038 C O2	2.91
936292	AD2-038 E O2	19.46
936371	AD2-047 C O2	2.99
936372	AD2-047 E O2	32.2
936461	AD2-060	3.45
936511	AD2-066 C O2	11.34
936512	AD2-066 E O2	7.56
936781	AD2-101 C	6.21
936782	AD2-101 E	29.08
936791	AD2-102 C	15.05
936792	AD2-102 E	14.46
936961	AD2-130 C	1.97
936962	AD2-130 E	0.26
937001	AD2-134 C	3.42
937002	AD2-134 E	14.11
937031	AD2-137 C O2	7.77
937032	AD2-137 E O2	36.39
937051	AD2-140 C O2	7.4
937052	AD2-140 E O2	34.65
937061	AD2-141 C O2	4.84
937062	AD2-141 E O2	22.82
937071	AD2-142 C O2	14.8
937072	AD2-142 E O2	69.29
937121	AD2-148 C O2	5.44
937122	AD2-148 E O2	25.47
937131	AD2-149 C O2	5.44
937132	AD2-149 E O2	25.47
937141	AD2-150 C O2	5.44

937142	AD2-150 E O2	25.47
937161	AD2-153 C O2	4.62
937162	AD2-153 E O2	21.64
937171	AD2-154 C O2	4.05
937172	AD2-154 E O2	18.97
937181	AD2-155 C O2	4.43
937182	AD2-155 E O2	20.75
937311	AD2-172 C	3.08
937312	AD2-172 E	4.25
937321	AD2-175 C	22.68
937322	AD2-175 E	15.12
937331	AD2-176 C O2	9.09
937332	AD2-176 E O2	6.06
937401	AD2-194 C1	4.9
937411	AD2-194 C2	4.9
937402	AD2-194 E1	4.9
937412	AD2-194 E2	4.9
LTF	BLUEG	2.66
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.12
LTF	CARR	0.96
LTF	CATAWBA	0.35
274890	CAYUG;1U E	21.06
274891	CAYUG;2U E	21.06
LTF	CBM-S1	2.05
LTF	CBM-W1	76.35
LTF	CBM-W2	54.29
LTF	CELEVELAND	0.96
LTF	CHEOAH	0.05
LTF	CHILHOWEE	0.01
LTF	CLIFTY	16.03
LTF	DEARBORN	2.83
LTF	ELMERSMITH	0.22
LTF	G-007	2.59
290051	GSG-6; E	13.07
LTF	HAMLET	1.34
275149	KEMPTON ;1E	24.13
290108	LEEDK;1U E	30.35
274770	LINCOLN ;1U	4.24
274771	LINCOLN ;2U	4.24
274772	LINCOLN ;3U	4.24
274773	LINCOLN ;4U	4.24
274774	LINCOLN ;5U	4.24
274775	LINCOLN ;6U	4.24
274776	LINCOLN ;7U	4.24

274777	LINCOLN ;8U	4.24
LTF	MEC	47.91
274850	MENDOTA H;RU	6.74
293061	N-015 E	19.6
LTF	O-066	16.64
293644	O22 E1	12.86
293645	O22 E2	24.97
290021	O50 E	24.34
294392	P-010 E	24.89
294763	P-046 E	11.73
274888	PILOT HIL;1E	24.13
274830	PWR VTREC;1U	7.63
274831	PWR VTREC;2U	7.63
296308	R-030 C1	5.1
296271	R-030 C2	5.1
296125	R-030 C3	5.17
296309	R-030 E1	20.42
296272	R-030 E2	20.42
296128	R-030 E3	20.66
LTF	RENSSELAER	0.76
LTF	ROSETON	5.46
LTF	ROWAN	0.81
LTF	SANTEETLA	0.02
295111	SUBLETTE E	3.4
LTF	TRIMBLE	0.55
299993	U3-031C	11.84
903433	W3-046	30.11
LTF	WEC	9.99
295109	WESTBROOK E	7.
274687	WILL CNTY;4U	83.82
910542	X3-005 E	0.92
914641	Y2-103	56.26
915011	Y3-013 1	4.69
915021	Y3-013 2	4.69
915031	Y3-013 3	4.69
LTF	Z1-043	36.36
916502	Z1-106 E1	1.58
916504	Z1-106 E2	1.58
916512	Z1-107 E	3.24
916522	Z1-108 E	3.11
917501	Z2-087 C	3.99
917502	Z2-087 E	26.7
918051	AA1-018 C	3.08
918052	AA1-018 E	20.64
918972	AA1-116 E	3.45

918982	AA1-117 E	3.45
919591	AA2-035	164.09
920112	AA2-107 E	3.07
920272	AA2-123 E	3.05
930481	AB1-089	82.25
930491	AB1-090	82.25
930501	AB1-091	93.12
930761	AB1-122 1	90.76
930771	AB1-122 2	92.45
931221	AB1-172	1.
LTF	AB2-013	20.42
924041	AB2-047 C O1	4.92
924042	AB2-047 E O1	32.95
924471	AB2-096	52.97
925301	AB2-191 C	1.58
925302	AB2-191 E	1.4
925881	AC1-067	171.5
926311	AC1-109 1	2.39
926321	AC1-109 2	2.39
926331	AC1-110 1	2.37
926341	AC1-110 2	2.37
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
927511	AC1-113 1	1.49
927522	AC1-113 2	1.49
926431	AC1-114	2.98
927451	AC1-142A 1	5.25
927461	AC1-142A 2	5.25
926701	AC1-153 C1	98.66
926711	AC1-153 C2	100.49
926702	AC1-153 E1	3.95
926712	AC1-153 E2	4.02
927531	AC1-185 1	0.71
927541	AC1-185 2	0.71
927551	AC1-185 3	0.71
927561	AC1-185 4	0.71
927571	AC1-185 5	0.71
927581	AC1-185 6	0.71
927591	AC1-185 7	0.71
927601	AC1-185 8	0.71
927091	AC1-204 1	91.1

927101	AC1-204 2	91.1
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