

Queue Project AB2-013
System Impact Study Report

Network Impacts

The Queue Project AB2-013 was evaluated as a 150.0 MW transfer from the Edwards 3 Plant (in Ameren) to PJM. Project AB2-013 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB2-013 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Analysis - 2020

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 - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 151.23% to 151.77% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 19.01 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1	/ 243206 05DUMONT 765 920251 X1-020 TAP 765 1
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.

2. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 110.67% to 112.03% (AC power flow) of its normal rating (1409

MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 19.26 MW to the thermal violation.

CONTINGENCY '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 114.58% to 115.09% (AC power flow) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 15.59 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1 / 243206 05DUMONT 765 920251 X1-020 TAP 765 1
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.

4. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 128.69% to 128.78% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT5-6__'. This project contributes approximately 19.64 MW to the thermal violation.

CONTINGENCY '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 6 for a table containing the generators having contribution to this flowgate.

5. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 138.03% to 138.12% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT2-3__'. This project contributes approximately 20.05 MW to the thermal violation.

CONTINGENCY '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 7 for a table containing the generators having contribution to this flowgate.

6. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 139.61% to 140.04% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 16.92 MW to the thermal violation.

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

7. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 139.54% to 139.97% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 16.92 MW to the thermal violation.

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CONTINGENCY '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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8. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 139.32% to 139.75% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 16.86 MW to the thermal violation.

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CONTINGENCY '2978_C2_05DUMONT 765-B_A'  
OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1      / 243206 05DUMONT 765 920251 X1-020 TAP 765 1  
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1      / 243206 05DUMONT 765 270644 WILTON ; 765 1  
END
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9. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 118.8% to 120.01% (AC power flow) of its emergency rating (1399 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 16.89 MW to the thermal violation.

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CONTINGENCY '695_B2'  
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1      / 243206 05DUMONT 765 270644 WILTO; 765 1
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END

10. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 122.41% to 123.0% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 13.1 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1 / 243206 05DUMONT 765 920251 X1-020 TAP 765 1
OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTON ; 765 1
END

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

11. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 121.7% to 122.29% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 13.16 MW to the thermal violation.

CONTINGENCY '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 - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 121.68% to 122.27% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 13.16 MW to the thermal violation.

CONTINGENCY '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 UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 105.65% to 107.0% (AC power flow) of its normal rating (971 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 13.14 MW to the thermal violation.

CONTINGENCY '695_B2'

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

14. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 112.08% to 112.18% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT5-6__'. This project contributes approximately 19.64 MW to the thermal violation.

CONTINGENCY '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 10 for a table containing the generators having contribution to this flowgate.

15. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 114.5% to 114.6% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT2-3__'. This project contributes approximately 20.05 MW to the thermal violation.

CONTINGENCY '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 11 for a table containing the generators having contribution to this flowgate.

16. (CE - CE) The AB1-122 TAP-KENDALL ;BU 345 kV line (from bus 930760 to bus 274702 ckt 1) loads from 113.07% to 115.27% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L1202__B-S_A'. This project contributes approximately 32.5 MW to the thermal violation.

CONTINGENCY '345-L1202__B-S_A'

TRIP BRANCH FROM BUS 270716 TO BUS 930770 CKT 1	/ DRESDEN ; B 345 AB1-122 TAP
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END

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

17. (CE - CE) The AB1-122 TAP-KENDALL ;BU 345 kV line (from bus 930760 to bus 274702 ckt 1) loads from 106.26% to 108.11% (AC power flow) of its emergency rating (1768 MVA) for the line fault with failed breaker contingency outage of '012-45-BT4-5__A'. This project contributes approximately 32.42 MW to the thermal violation.

CONTINGENCY '012-45-BT4-5__A'

TRIP BRANCH FROM BUS 270716 TO BUS 930770 CKT 1 / DRESDEN ; B 345 AB1-122 TAP
TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1 / DRESD; B 345 ELWOO; B 345
TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1 / ELWOO; B 345 ELWOO; R 345
END

18. (CE - CE) The AB1-122 TAP-DRESDEN ; B 345 kV line (from bus 930770 to bus 270716 ckt 1) loads from 120.09% to 122.41% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L93505_B-S_A'. This project contributes approximately 35.19 MW to the thermal violation.

CONTINGENCY '345-L93505_B-S_A'

TRIP BRANCH FROM BUS 274702 TO BUS 930760 CKT 1 / KENDA;BU 345 AB1-122 TAP
TRIP BRANCH FROM BUS 274702 TO BUS 274703 CKT 1 / KENDA;BU 345 KENDA;RU 345
END

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

19. (CE - CE) The AB1-122 TAP-DRESDEN ; B 345 kV line (from bus 930770 to bus 270716 ckt 1) loads from 119.54% to 121.11% (AC power flow) of its emergency rating (1768 MVA) for the tower line contingency outage of '345-L10805_B-S_+_345-L10806_R-S'. This project contributes approximately 27.68 MW to the thermal violation.

CONTINGENCY '345-L10805_B-S_+_345-L10806_R-S'

TRIP BRANCH FROM BUS 270810 TO BUS 274702 CKT 1 / LOCKP; B 345 KENDA;BU 345
TRIP BRANCH FROM BUS 274703 TO BUS 270811 CKT 1 / KENDA;RU 345 LOCKP; R 345
END

20. (CE - CE) The AB1-122 TAP-DRESDEN ; B 345 kV line (from bus 930770 to bus 270716 ckt 1) loads from 115.13% to 117.1% (AC power flow) of its emergency rating (1768 MVA) for the line fault with failed breaker contingency outage of '935-45-BT1-9__A'. This project contributes approximately 35.15 MW to the thermal violation.

CONTINGENCY '935-45-BT1-9__A'

TRIP BRANCH FROM BUS 274702 TO BUS 274703 CKT 1 / KENDALL ;BU 345 KENDALL ;RU 345
TRIP BRANCH FROM BUS 274703 TO BUS 274708 TO BUS 274709 CKT 1 / KENDALL ;RU 345 KENDALL ;3C 18 KENDALL ;3S 13.8
TRIP BRANCH FROM BUS 274703 TO BUS 274710 TO BUS 274711 CKT 1 / KENDALL ;RU 345 KENDALL ;4C 18 KENDALL ;4S 13.8
REMOVE UNIT C3 FROM BUS 274708 / KENDALL ;3C 18
REMOVE UNIT S3 FROM BUS 274709 / KENDALL ;3S 13.8
REMOVE UNIT C4 FROM BUS 274710 / KENDALL ;4C 18
REMOVE UNIT S4 FROM BUS 274711 / KENDALL ;4S 13.8
TRIP BRANCH FROM BUS 274702 TO BUS 930760 CKT 1 / KENDALL ;BU 345 AB1-122 TAP
END

21. (CE - CE) The AB1-122 TAP-DRESDEN ; B 345 kV line (from bus 930770 to bus 270716 ckt 1) loads from 114.22% to 116.19% (AC power flow) of its emergency rating (1768 MVA)

for the line fault with failed breaker contingency outage of '935-45-BT6-9__A'. This project contributes approximately 35.17 MW to the thermal violation.

CONTINGENCY '935-45-BT6-9__A'

TRIP BRANCH FROM BUS 270810 TO BUS 274702 CKT 1

/ LOCKPORT ; B 345 KENDALL ;BU 345

TRIP BRANCH FROM BUS 274702 TO BUS 274703 CKT 1

/ KENDALL ;BU 345 KENDALL ;RU 345

TRIP BRANCH FROM BUS 274702 TO BUS 930760 CKT 1

/ KENDALL ;BU 345 AB1-122 TAP

END

Steady-State Voltage Requirements

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

None

Short Circuit

(Summary of impacted circuit breakers)

To be determined

Affected System Analysis & Mitigation

External PJM Impacts:

MISO Impacts to be determined by MISO when this transmission service request enters MISO's OASIS.

Delivery of Energy Portion of Interconnection Request

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

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

Not Applicable

Light Load Analysis - 2020

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)

To be determined

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. To relieve the Stillwell – Dumont 345 kV line overloads:

- (N4058) Sag study results from Z1-043 & Z1-070 Facilities Studies: 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 \$1.613M. 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, AB2-013 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, AB2-013 LTF could receive cost allocation.

- Additional AEP-end upgrade: Rebuild 8.6 miles of the AEP owned line and upgrade necessary Dumont terminal equipment (wavetrap) at a cost of \$20M. PJM Network Upgrade N4790. New AEP-end ratings to be 1409/2045 MVA (SN/SE). Limited by Dumont risers.
- 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 \$2M. The new AEP-end ratings to be 1690/2278 MVA SN/SE (limited by the conductor). PJM Network Upgrade N5064.
- MISO end – ratings are 1409/1779 MVA. MISO end upgrade: Rebuild NIPSCO portion of line (2.87 miles) at a cost of \$6.5M and upgrade Stillwell substation equipment at a cost of \$1.5M. Total cost is \$8.0M. New expected MISO end ratings will be 1869/2240 MVA SN/SE.

Total cost of required upgrades needed: \$30 M

The cost allocation is as follows:

30			
Queue	MW contribution	Percentage of Cost	\$ cost (\$30 M)
J351	145.7	15.91%	4.772
AB1-086	66.4	7.25%	2.175
AB1-089	77.0	8.41%	2.522
AB1-090	77.0	8.41%	2.522
AB1-091	91.5	9.99%	2.997
AB1-121 MTX	267.1	29.16%	8.749
AB1-122	172.2	18.80%	5.640
AB2-013 LTF	19.0	2.07%	0.622

2. To relieve the Burnham – Munster 345 kV line overload:

The ComEd-end ALDR is 1572 MVA and no upgrade is needed on the ComEd-end.

MISO: MISO end ratings are 1195/1195 MVA (SN/SE). Replace Munster switches and circuit breaker. Cost estimate is \$1.5M. New MISO end ratings to be 1201/1441 MVA (SN/SE).

This upgrade is driven by a prior queue. Per PJM cost allocation rules, AB2-013 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, AB2-013 LTF could receive cost allocation.

3. To relieve the WILTON ; B-WILTON ;3M 345 kV line & WILTON ; R-WILTON ;4M 345 kV line (which are also the Wilton 765/345 kV transformers):

Upgrade : Build out the Wilton 765kV bus thereby allowing for 765kV L11216 (currently on Bus 6) to be relocated to Bus 8. Along with this line relocation, installation of 2-765kV BT CB's (6-8 & 8-2). Cost estimate is \$11M. Time estimate is 24-30 months. This will eliminate the stuck breaker contingencies '112-65-BT2-3__' and '112-65-BT5-6__'. No other contingency updates needed. PJM NUN N5145.

The cost allocation is as follows:

11			
Queue	MW contribution	Percentage of Cost	\$ cost (\$ 11 M)
AA2-035	102.4	10.57%	1.1627
AA2-039	20.4	2.11%	0.2316
AB1-086	97.0	10.01%	1.1014
AB1-089	80.5	8.31%	0.9140
AB1-090	80.5	8.31%	0.9140
AB1-091	82.8	8.55%	0.9401
AB1-121 MTX	279.4	28.84%	3.1724
AB1-122	180.3	18.61%	2.0472
J501	25.4	2.62%	0.2884
AB2-013 LTF	20.1	2.07%	0.2282

4. To relieve the Crete – St John 345 kV line overloads:
 - a. ComEd-end: SSTE is 1483 MVA and the ALDR rating on Crete end is 1925MVA and not sufficient. ComEd upgrade is to reconductor the line to achieve ratings of 1837 SSTE, SLD of 2360 MVA (ALDR of 2714 MVA). Preliminary estimate for the upgrade is \$18M with an estimated construction timeline of 24-30 months. PJM Network Upgrade N5253.

The cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	\$ cost (\$18 M)
AB1-122	158.5	79.09%	14.2365
J501	25.0	12.48%	2.2455
AB2-013 LTF	16.9	8.43%	1.5180

- b. MISO-end: SE rating of St John end line is 1508 MVA and not sufficient. MISO end upgrade is to upgrade St John substation conductor and switches. \$1M cost estimate. New MISO end SE rating will be 1900 MVA. This upgrade is driven and needed for a prior queue. Per PJM cost allocation rules, the AB2-013 presently does not receive any cost allocation for this upgrade. As changes to the PJM Interconnection Process occur (such as PJM or MISO projects withdrawing from the queue), the driver queue project can change and AB2-013 could receive cost allocation towards this upgrade going forward.
- c. MISO-end: Additional MISO-end upgrades: Upgrade to 4000 A switch(es) and to bundled 1590 AL substation conductor. \$3M. New MISO-end ratings to be 1961/2390 MVA SN/SE. This upgrade is driven and needed for a prior queue. Per PJM cost allocation rules, the AB2-013 presently does not receive any cost allocation for this upgrade. As changes to the PJM Interconnection Process occur (such as PJM or MISO projects withdrawing from the queue), the driver queue project can change and AB2-013 could receive cost allocation towards this upgrade going forward.

5. To relieve the University Park - Olive 345 kV line overloads:

ComEd:

the SLTE is 1091 MVA and sufficient. The ALDR is 1423 MVA and sufficient. No ComEd-end upgrade needed.

AEP:

A sag check will be required for the ACSR/PE ~ 1414 ~ 62/19 ~ Conductor Section 1 to determine if the line section can be operated above its emergency rating of 971 MVA. The results could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 40.61 mile section of line would need to be

rebuilt. Estimated Cost: \$162,440 (2016 dollars). If deemed necessary to rebuild the entire 40.61 miles of the section of the line, Estimated Cost: \$81,220,000. Schedule: (1) Sag Study: 6 to 12 months. (2) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement.

New AEP end ratings to be 971/1304 MVA SN/SE.
N4057

This upgrade is driven and needed for a prior queue.

Per PJM cost allocation rules, the AB2-013 presently does not receive any cost allocation for this upgrade.

As changes to the PJM Interconnection Process occur (such as PJM or MISO projects withdrawing from the queue), the driver queue project can change and AB2-013 could receive cost allocation towards this upgrade going forward.

AEP:

Rebuild/Reconductor 40.61 miles of the AEP owned section of the Olive - University Park (CE) 345 kV ACSR/PE 1414 62/19 line section 1. Estimated Cost to reconductor/rebuild AEP section of line: \$81.2 Million. The Olive switches to Line Riser will have to be replaced; Estimated Cost: \$1.4 Million.

New AEP end ratings to be 1342/1342 MVA SN/SE

The cost allocation is as follows:

Queue	MW contribution	Percentage of Cost	82.6
			\$ cost (\$82.6 M)
AB1-122	13.5	50.75%	41.921
AB2-013	13.1	49.25%	40.679

6. To relieve the AB1-122 TAP-KENDALL ;BU 345 kV line overloads:

The SSTE is 1215 MVA and the ALDR is 1477 MVA.

2020 baseline upgrade B2732.1 (loop Tazewell – Kendall into Dresden) resolves these overloads.

AB2-013 LTF has no cost responsibility.

7. To relieve the AB1-122 TAP-DRESDEN ; B 345 kV line overloads:

8.

SLTE is 1479 MVA; ALDR is 2033 MVA.

The upgrade is to re-conductor the line and replace a 345 kV breaker at an estimated cost of \$7 million (assuming the AB1-122 tap is less than 2 miles from Kendall). The time required to install this reinforcement is 2 – 3 years. The expected new ComEd SLTE rating would be 2058 MVA. The expected new ComEd ALDR rating would be 2397 MVA.

The cost allocation is as follows:

7			
Queue	MW contribution	Percentage of Cost	\$ cost (\$7 M)
AB1-122	390.7	91.74%	6.4215
AB2-013 LTF	35.2	8.26%	0.5785

Light Load Load Flow Analysis Reinforcements

New System Reinforcements

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

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)

None

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. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Appendix 3

(MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 151.23% to 151.77% (AC power flow) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 19.01 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1

/ 243206 05DUMONT 765 920251 X1-020 TAP 765 1

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>
274832	ANNAWAN ; 1U	12.79
294401	BSHIL;1U E	10.07
294410	BSHIL;2U E	10.07
274890	CAYUG;1U E	15.43
274891	CAYUG;2U E	15.43
274849	CRESCENT ;1U	6.94
274859	EASYR;U1 E	12.88
274860	EASYR;U2 E	12.88
290051	GSG-6; E	12.23
998100	J351	435.73
998251	J485	2.6
998391	J504	2.67
998401	J505	7.76
998431	J514	1.57
998451	J523	2.72
998531	J531	11.01
275149	KEMPTON ;1E	23.06
990901	L-005 E	14.79
290108	LEEDK;1U E	28.4
274850	MENDOTA H;RU	7.03
275148	MILKS GRV;1E	23.06
293061	N-015 E	18.08
293516	O-009 E1	10.65
293517	O-009 E2	5.41
293518	O-009 E3	5.96
293715	O-029 E	11.39
293716	O-029 E	6.25
293717	O-029 E	5.74
293771	O-035 E	7.54
293644	O22 E1	12.19
293645	O22 E2	23.67

290021	O50 E	22.71
294392	P-010 E	22.96
294763	P-046 E	10.99
274830	PWR VTREC;1U	7.14
274831	PWR VTREC;2U	7.14
274724	RIVER EC ;11	6.48
274723	RIVER EC ;12	6.53
274722	S-055 E	13.17
884780	S-058 C	53.56
884782	S-058 C1	53.56
884781	S-058 E	155.18
884783	S-058 E1	155.18
274793	SE CHICAG;0U	1.53
274794	SE CHICAG;1U	1.53
274795	SE CHICAG;2U	1.53
274788	SE CHICAG;5U	1.55
274789	SE CHICAG;6U	1.55
274790	SE CHICAG;7U	1.55
274791	SE CHICAG;8U	1.55
274792	SE CHICAG;9U	1.53
295111	SUBLETTE E	3.18
890570	U3-026 C1	37.65
890571	U3-026 C2	37.65
920173	W3-046 E	28.13
295109	WESTBROOK E	6.55
274687	WILL CNTY;4U	80.22
910541	X3-005 C	0.13
910542	X3-005 E	1.01
920462	Y2-103	52.66
920472	Y3-013 1	4.39
920482	Y3-013 2	4.39
920492	Y3-013 3	4.39
701221	Y4-023 C	0.4
701222	Y4-023 E	1.58
701231	Y4-024 C	0.42
701232	Y4-024 E	1.66
701621	Y4-063	1.65
701631	Y4-064	5.54
701641	Y4-065	56.32
701682	Y4-069 E	6.97
701721	Y4-073	10.35
701761	Y4-077	10.43
701951	Y4-096	15.66
702031	Y4-104	2.31
702041	Y4-105	11.12

<i>LTF</i>	<i>Z1-043</i>	<i>33.53</i>
916502	<i>Z1-106 E1</i>	<i>1.48</i>
916504	<i>Z1-106 E2</i>	<i>1.48</i>
916512	<i>Z1-107 E</i>	<i>3.08</i>
916522	<i>Z1-108 E</i>	<i>2.91</i>
<i>LTF</i>	<i>Z1-112</i>	<i>11.31</i>
916651	<i>Z1-127 1</i>	<i>2.23</i>
916652	<i>Z1-127 2</i>	<i>1.03</i>
920782	<i>Z2-081</i>	<i>1.88</i>
<i>LTF</i>	<i>AA1-001</i>	<i>4.1</i>
920932	<i>AA1-018 C</i>	<i>2.85</i>
920933	<i>AA1-018 E</i>	<i>19.09</i>
<i>LTF</i>	<i>AA1-071</i>	<i>7.54</i>
918972	<i>AA1-116 E</i>	<i>3.29</i>
918982	<i>AA1-117 E</i>	<i>3.29</i>
921632	<i>AA1-146</i>	<i>20.62</i>
921682	<i>AA2-030</i>	<i>20.62</i>
921692	<i>AA2-035</i>	<i>154.09</i>
921702	<i>AA2-039 C</i>	<i>2.45</i>
921703	<i>AA2-039 E</i>	<i>16.42</i>
922053	<i>AA2-107 E</i>	<i>2.87</i>
922183	<i>AA2-123 E</i>	<i>2.86</i>
922972	<i>AB1-086 C</i>	<i>19.41</i>
923002	<i>AB1-089 C</i>	<i>77.01</i>
923012	<i>AB1-090 C</i>	<i>77.01</i>
923022	<i>AB1-091 C OP</i>	<i>91.53</i>
930751	<i>AB1-121</i>	<i>137.08</i>
930752	<i>AB1-121 E</i>	<i>130.01</i>
930761	<i>AB1-122 1</i>	<i>86.09</i>
930762	<i>AB1-122 2</i>	<i>86.09</i>
923363	<i>AB1-146 E</i>	<i>0.28</i>
923562	<i>AB1-172</i>	<i>0.96</i>
<i>LTF</i>	<i>AB2-013</i>	<i>19.01</i>
924471	<i>AB2-096</i>	<i>49.6</i>
925161	<i>AB2-173 C</i>	<i>3.68</i>
925301	<i>AB2-191 C</i>	<i>1.48</i>
925302	<i>AB2-191 E</i>	<i>1.31</i>

Appendix 4

(CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 114.58% to 115.09% (AC power flow) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 15.59 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1

/ 243206 05DUMONT 765 920251 X1-020 TAP 765 1

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>
274832	ANNAWAN ; 1U	10.52
294401	BSHIL;1U E	8.27
294410	BSHIL;2U E	8.27
274890	CAYUG;1U E	13.13
274891	CAYUG;2U E	13.13
274849	CRESCENT ;1U	5.71
274859	EASYR;U1 E	10.71
274860	EASYR;U2 E	10.71
274826	FISK ;BP	3.09
290051	GSG-6; E	10.21
998251	J485	2.56
998391	J504	2.63
998401	J505	7.48
998431	J514	1.55
998451	J523	2.68
998531	J531	10.84
275149	KEMPTON ;1E	21.43
274881	KEMPTON ;1U	1.1
990901	L-005 E	12.11
290108	LEEDK;1U E	23.78
274850	MENDOTA H;RU	5.88
275148	MILKS GRV;1E	21.43
274880	MILKS GRV;1U	1.1
293061	N-015 E	15.07
293516	O-009 E1	8.81
293517	O-009 E2	4.47
293518	O-009 E3	4.93
293715	O-029 E	9.42
293716	O-029 E	5.16
293717	O-029 E	4.75
293771	O-035 E	6.2

293644	O22 E1	9.33
293645	O22 E2	18.11
290021	O50 E	18.9
294392	P-010 E	19.14
294763	P-046 E	9.16
274830	PWR VTREC;1U	5.97
274831	PWR VTREC;2U	5.97
274723	RIVER EC ;12	5.77
274722	S-055 E	11.04
884780	S-058 C	46.38
884782	S-058 C1	46.38
884781	S-058 E	134.36
884783	S-058 E1	134.36
274793	SE CHICAG;0U	1.28
274794	SE CHICAG;1U	1.28
274795	SE CHICAG;2U	1.28
274792	SE CHICAG;9U	1.28
295111	SUBLETTE E	2.66
890570	U3-026 C1	32.6
890571	U3-026 C2	32.6
920173	W3-046 E	23.2
295109	WESTBROOK E	5.47
274687	WILL CNTY;4U	64.76
910541	X3-005 C	0.11
910542	X3-005 E	0.91
920462	Y2-103	44.16
920472	Y3-013 1	3.68
920482	Y3-013 2	3.68
920492	Y3-013 3	3.68
701221	Y4-023 C	0.39
701222	Y4-023 E	1.57
701231	Y4-024 C	0.41
701232	Y4-024 E	1.65
701621	Y4-063	1.59
701631	Y4-064	5.47
701641	Y4-065	54.22
701682	Y4-069 E	6.75
701721	Y4-073	10.25
701761	Y4-077	10.31
701951	Y4-096	15.47
702031	Y4-104	2.26
702041	Y4-105	10.95
LTF	Z1-043	27.62
916502	Z1-106 E1	1.24
916504	Z1-106 E2	1.24

916512	Z1-107 E	2.62
916522	Z1-108 E	2.44
LTF	Z1-112	9.16
916651	Z1-127 1	1.81
916652	Z1-127 2	0.89
920782	Z2-081	1.56
920932	AA1-018 C	2.55
920933	AA1-018 E	17.07
LTF	AA1-071	6.11
918972	AA1-116 E	3.06
918982	AA1-117 E	3.06
921632	AA1-146	17.09
921682	AA2-030	17.09
921692	AA2-035	130.32
921702	AA2-039 C	2.02
921703	AA2-039 E	13.49
922053	AA2-107 E	2.41
922183	AA2-123 E	2.4
922972	AB1-086 C	6.13
923002	AB1-089 C	64.33
923012	AB1-090 C	64.33
923022	AB1-091 C OP	94.16
930751	AB1-121	114.37
930752	AB1-121 E	108.47
930761	AB1-122 1	72.38
930762	AB1-122 2	72.33
923363	AB1-146 E	0.23
923562	AB1-172	0.81
LTF	AB2-013	15.59
924471	AB2-096	41.49
925161	AB2-173 C	3.05
925301	AB2-191 C	1.24
925302	AB2-191 E	1.1

Appendix 6

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 128.69% to 128.78% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT5-6__'. This project contributes approximately 19.64 MW to the thermal violation.

CONTINGENCY '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>
274890	CAYUG;1U E	23.88
274891	CAYUG;2U E	23.88
274863	CAYUGA RI;1U	1.23
274864	CAYUGA RI;2U	1.23
274659	DRESDEN ;3U	30.19
290051	GSG-6; E	12.26
998251	J485	2.72
998272	J488 E	7.61
998282	J489 E	7.61
998301	J493	7.66
998311	J495	10.2
998391	J504	2.82
998401	J505	7.93
998431	J514	1.66
998451	J523	2.85
998521	J530	12.9
998531	J531	11.55
275149	KEMPTON ;1E	20.39
290108	LEEDK;1U E	28.41
274770	LINCOLN ;1U	4.78
274771	LINCOLN ;2U	4.78
274772	LINCOLN ;3U	4.78
274773	LINCOLN ;4U	4.78
274774	LINCOLN ;5U	4.78
274775	LINCOLN ;6U	4.78
274776	LINCOLN ;7U	4.78
274777	LINCOLN ;8U	4.78
274850	MENDOTA H;RU	7.05
275148	MILKS GRV;1E	20.39

293061	N-015 E	17.39
293644	O22 E1	12.2
293645	O22 E2	23.69
290021	O50 E	23.05
294392	P-010 E	22.08
274830	PWR VTREC;1U	7.17
274831	PWR VTREC;2U	7.17
296308	R-030 C1	5.6
296271	R-030 C2	5.6
296125	R-030 C3	5.67
296309	R-030 E1	22.42
296272	R-030 E2	22.42
296128	R-030 E3	22.69
274722	S-055 E	13.19
884780	S-058 C	52.05
884782	S-058 C1	52.05
884781	S-058 E	150.78
884783	S-058 E1	150.78
295111	SUBLETTE E	3.19
274853	TWINGROVE;U1	23.08
274854	TWINGROVE;U2	23.08
890570	U3-026 C1	36.58
890571	U3-026 C2	36.58
295109	WESTBROOK E	6.56
274687	WILL CNTY;4U	78.8
910542	X3-005 E	0.87
920462	Y2-103	52.77
920472	Y3-013 1	4.4
920482	Y3-013 2	4.4
920492	Y3-013 3	4.4
701031	Y4-004 C	0.99
701032	Y4-004 E	3.96
701221	Y4-023 C	0.41
701222	Y4-023 E	1.65
701231	Y4-024 C	0.43
701232	Y4-024 E	1.74
701401	Y4-041 C	1.51
701402	Y4-041 E	6.03
701542	Y4-055 E	10.06
701621	Y4-063	1.69
701631	Y4-064	5.78
701641	Y4-065	57.59
701651	Y4-066	2.56
701682	Y4-069 E	7.19
701691	Y4-070	3.21

701721	Y4-073	10.86
701761	Y4-077	10.98
701941	Y4-095	4.55
701951	Y4-096	16.52
701992	Y4-100 E	7.52
702002	Y4-101 E	7.52
702021	Y4-103	10.06
702031	Y4-104	2.42
702041	Y4-105	11.64
702051	Y4-106	0.97
LTF	Z1-043	34.47
916502	Z1-106 E1	1.48
916504	Z1-106 E2	1.48
916512	Z1-107 E	3.
916522	Z1-108 E	2.92
LTF	Z1-112	11.44
916651	Z1-127 1	1.97
916652	Z1-127 2	0.97
920782	Z2-081	1.86
920792	Z2-087 C	4.38
920793	Z2-087 E	29.32
LTF	AA1-001	4.1
920932	AA1-018 C	2.93
920933	AA1-018 E	19.58
LTF	AA1-071	7.63
918972	AA1-116 E	2.91
918982	AA1-117 E	2.91
921692	AA2-035	153.98
922053	AA2-107 E	2.87
922183	AA2-123 E	2.87
922972	AB1-086 C	92.84
923002	AB1-089 C	77.37
923012	AB1-090 C	77.37
923022	AB1-091 C OP	79.74
930751	AB1-121	109.9
930752	AB1-121 E	104.23
930761	AB1-122 1	86.73
930762	AB1-122 2	86.68
923363	AB1-146 E	0.28
923562	AB1-172	0.93
LTF	AB2-013	19.64
924041	AB2-047 C OP	5.4
924042	AB2-047 E OP	36.15
924471	AB2-096	49.79
925301	AB2-191 C	1.48

925302	<i>AB2-191 E</i>	<i>1.32</i>
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Appendix 7

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 138.03% to 138.12% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT2-3__'. This project contributes approximately 20.05 MW to the thermal violation.

CONTINGENCY '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>
274890	CAYUG;1U E	24.33
274891	CAYUG;2U E	24.33
274863	CAYUGA RI;1U	1.25
274864	CAYUGA RI;2U	1.25
274659	DRESDEN ;3U	30.83
290051	GSG-6; E	12.52
933999	J233	32.25
998201	J432	4.95
998211	J460	10.11
998251	J485	2.77
998272	J488 E	7.77
998282	J489 E	7.77
998301	J493	7.82
998311	J495	10.42
998391	J504	2.88
998401	J505	8.1
998421	J510	16.37
998431	J514	1.69
998451	J523	2.91
998471	J525	2.52
998481	J526	15.26
998521	J530	13.17
998531	J531	11.79
275149	KEMPTON ;1E	20.83
290108	LEEDK;1U E	29.02
274770	LINCOLN ;1U	4.91
274771	LINCOLN ;2U	4.91
274772	LINCOLN ;3U	4.91
274773	LINCOLN ;4U	4.91

274774	LINCOLN ;5U	4.91
274775	LINCOLN ;6U	4.91
274776	LINCOLN ;7U	4.91
274777	LINCOLN ;8U	4.91
274850	MENDOTA H;RU	7.2
275148	MILKS GRV;1E	20.83
293061	N-015 E	17.76
293644	O22 E1	12.46
293645	O22 E2	24.19
290021	O50 E	23.54
294392	P-010 E	22.55
274830	PWR VTREC;1U	7.32
274831	PWR VTREC;2U	7.32
296308	R-030 C1	5.71
296271	R-030 C2	5.71
296125	R-030 C3	5.78
296309	R-030 E1	22.85
296272	R-030 E2	22.85
296128	R-030 E3	23.12
274722	S-055 E	13.47
884780	S-058 C	53.16
884782	S-058 C1	53.16
884781	S-058 E	154.02
884783	S-058 E1	154.02
295111	SUBLETTE E	3.26
274853	TWINGROVE;U1	23.53
274854	TWINGROVE;U2	23.53
890570	U3-026 C1	37.36
890571	U3-026 C2	37.36
295109	WESTBROOK E	6.7
274687	WILL CNTY;4U	80.48
910542	X3-005 E	0.89
920462	Y2-103	53.9
920472	Y3-013 1	4.49
920482	Y3-013 2	4.49
920492	Y3-013 3	4.49
701031	Y4-004 C	1.01
701032	Y4-004 E	4.05
701091	Y4-010 C	2.03
701092	Y4-010 E	8.13
701221	Y4-023 C	0.42
701222	Y4-023 E	1.69
701231	Y4-024 C	0.44
701232	Y4-024 E	1.78
701401	Y4-041 C	1.54

701402	Y4-041 E	6.15
701542	Y4-055 E	10.28
701621	Y4-063	1.73
701631	Y4-064	5.9
701641	Y4-065	58.83
701651	Y4-066	2.61
701682	Y4-069 E	7.34
701691	Y4-070	3.27
701721	Y4-073	11.09
701761	Y4-077	11.21
701801	Y4-081	5.03
701941	Y4-095	4.64
701951	Y4-096	16.87
701992	Y4-100 E	7.68
702002	Y4-101 E	7.68
702011	Y4-102	8.54
702021	Y4-103	10.27
702031	Y4-104	2.47
702041	Y4-105	11.89
702051	Y4-106	0.99
LTF	Z1-043	35.2
916502	Z1-106 E1	1.51
916504	Z1-106 E2	1.51
916512	Z1-107 E	3.07
916522	Z1-108 E	2.98
LTF	Z1-112	11.68
916651	Z1-127 1	2.01
916652	Z1-127 2	0.99
920782	Z2-081	1.9
920792	Z2-087 C	4.47
920793	Z2-087 E	29.88
LTF	AA1-001	4.18
920932	AA1-018 C	2.99
920933	AA1-018 E	20.01
LTF	AA1-071	7.79
918972	AA1-116 E	2.98
918982	AA1-117 E	2.98
921692	AA2-035	157.27
922053	AA2-107 E	2.93
922183	AA2-123 E	2.93
922972	AB1-086 C	94.63
923002	AB1-089 C	79.02
923012	AB1-090 C	79.02
923022	AB1-091 C OP	81.48
930751	AB1-121	112.24

930752	<i>AB1-121 E</i>	<i>106.45</i>
930761	<i>AB1-122 1</i>	<i>88.59</i>
930762	<i>AB1-122 2</i>	<i>88.53</i>
923363	<i>AB1-146 E</i>	<i>0.29</i>
923562	<i>AB1-172</i>	<i>0.95</i>
<i>LTF</i>	<i>AB2-013</i>	<i>20.05</i>
924041	<i>AB2-047 C OP</i>	<i>5.51</i>
924042	<i>AB2-047 E OP</i>	<i>36.85</i>
924471	<i>AB2-096</i>	<i>50.86</i>
925301	<i>AB2-191 C</i>	<i>1.51</i>
925302	<i>AB2-191 E</i>	<i>1.34</i>

Appendix 8

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 139.61% to 140.04% (AC power flow) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 16.92 MW to the thermal violation.

CONTINGENCY '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	

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
274654	BRAIDWOOD;1U	38.43
274655	BRAIDWOOD;2U	37.37
274751	CRETE EC ;1U	7.78
274752	CRETE EC ;2U	7.78
274753	CRETE EC ;3U	7.78
274754	CRETE EC ;4U	7.78
274859	EASYR;U1 E	1.86
274860	EASYR;U2 E	1.86
274871	GR RIDGE ;2U	1.12
274847	GR RIDGE ;BU	0.88
290051	GSG-6; E	11.
933999	J233	31.98
998201	J432	4.98
998211	J460	10.17
998251	J485	2.78
998272	J488 E	7.82
998282	J489 E	7.81
998301	J493	7.86
998311	J495	10.43
998391	J504	2.85
998401	J505	8.2
998421	J510	16.47
998431	J514	1.67
998451	J523	2.91
998471	J525	2.53
998481	J526	15.35
998521	J530	12.89
998531	J531	11.74
274675	JOLIET 29;7U	15.23

274676	JOLIET 29;8U	15.24
275149	KEMPTON ;1E	18.06
274660	LASCO STA;1U	35.08
274661	LASCO STA;2U	35.14
290108	LEEDK;1U E	25.6
274850	MENDOTA H;RU	6.33
275148	MILKS GRV;1E	18.06
293061	N-015 E	17.11
293644	O22 E1	12.5
293645	O22 E2	24.26
290021	O50 E	20.67
294392	P-010 E	21.73
294763	P-046 E	9.9
274830	PWR VTREC;1U	6.46
274831	PWR VTREC;2U	6.46
274722	S-055 E	11.99
884780	S-058 C	46.27
884782	S-058 C1	46.27
884781	S-058 E	134.05
884783	S-058 E1	134.05
295111	SUBLETTE E	2.86
274861	TOP CROP ;1U	0.64
274862	TOP CROP ;2U	1.25
890570	U3-026 C1	32.52
890571	U3-026 C2	32.52
920173	W3-046 E	25.58
295109	WESTBROOK E	5.89
274687	WILL CNTY;4U	75.06
920462	Y2-103	47.95
920472	Y3-013 1	4.
920482	Y3-013 2	4.
920492	Y3-013 3	4.
701031	Y4-004 C	1.02
701032	Y4-004 E	4.08
701091	Y4-010 C	2.04
701092	Y4-010 E	8.18
701221	Y4-023 C	0.42
701222	Y4-023 E	1.7
701231	Y4-024 C	0.45
701232	Y4-024 E	1.79
701401	Y4-041 C	1.55
701402	Y4-041 E	6.19
701542	Y4-055 E	10.34
701621	Y4-063	1.74
701631	Y4-064	5.93

701641	Y4-065	59.32
701651	Y4-066	2.63
701682	Y4-069 E	7.37
701691	Y4-070	3.29
701721	Y4-073	11.08
701761	Y4-077	11.15
701801	Y4-081	5.06
701941	Y4-095	4.61
701951	Y4-096	16.72
701992	Y4-100 E	7.73
702002	Y4-101 E	7.73
702021	Y4-103	10.33
702031	Y4-104	2.45
702041	Y4-105	11.87
702051	Y4-106	0.99
LTF	Z1-043	29.71
916502	Z1-106 E1	1.34
916504	Z1-106 E2	1.34
916512	Z1-107 E	2.58
916522	Z1-108 E	2.64
LTF	Z1-112	9.79
920782	Z2-081	1.73
920932	AA1-018 C	2.42
920933	AA1-018 E	16.2
LTF	AA1-071	6.52
918972	AA1-116 E	2.58
918982	AA1-117 E	2.58
921692	AA2-035	139.34
922053	AA2-107 E	2.59
922183	AA2-123 E	2.59
923002	AB1-089 C	69.53
923012	AB1-090 C	69.53
923022	AB1-091 C OP	70.64
930751	AB1-121	123.59
930752	AB1-121 E	117.21
930761	AB1-122 1	78.48
930762	AB1-122 2	78.6
923363	AB1-146 E	0.25
923562	AB1-172	0.8
LTF	AB2-013	16.92
924471	AB2-096	44.86
925301	AB2-191 C	1.33
925302	AB2-191 E	1.18

Appendix 9

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 122.41% to 123.0% (AC power flow) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 13.1 MW to the thermal violation.

CONTINGENCY '2978_C2_05DUMONT 765-B_A'

OPEN BRANCH FROM BUS 243206 TO BUS 920251 CKT 1

/ 243206 05DUMONT 765 920251 X1-020 TAP 765 1

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>
274832	ANNAWAN ; 1U	8.82
294401	BSHIL;1U E	6.94
294410	BSHIL;2U E	6.94
274890	CAYUG;1U E	9.99
274891	CAYUG;2U E	9.99
274849	CRESCENT ;1U	4.8
274859	EASYR;U1 E	8.98
274860	EASYR;U2 E	8.98
290051	GSG-6; E	8.56
998401	J505	6.07
275149	KEMPTON ;1E	15.73
990901	L-005 E	10.14
290108	LEEDK;1U E	19.92
274850	MENDOTA H;RU	4.92
275148	MILKS GRV;1E	15.73
293061	N-015 E	13.13
293516	O-009 E1	7.38
293517	O-009 E2	3.75
293518	O-009 E3	4.13
293715	O-029 E	7.89
293716	O-029 E	4.33
293717	O-029 E	3.98
293771	O-035 E	5.21
293644	O22 E1	7.99
293645	O22 E2	15.51
290021	O50 E	15.92
294392	P-010 E	16.67
294763	P-046 E	7.68
274830	PWR VTREC;1U	5.02
274831	PWR VTREC;2U	5.02
274722	S-055 E	9.28

884780	S-058 C	36.26
884782	S-058 C1	36.26
884781	S-058 E	105.05
884783	S-058 E1	105.05
295111	SUBLETTE E	2.23
890570	U3-026 C1	25.49
890571	U3-026 C2	25.49
291984	U4-033	1.7
274802	UNIV PARK;5U	1.58
274803	UNIV PARK;6U	1.58
274814	UNIV PK N;0U	1.34
274805	UNIV PK N;1U	1.34
274806	UNIV PK N;2U	1.34
274807	UNIV PK N;3U	1.34
274808	UNIV PK N;4U	1.34
274809	UNIV PK N;5U	1.34
274810	UNIV PK N;6U	1.34
274811	UNIV PK N;7U	1.34
274812	UNIV PK N;8U	1.34
274813	UNIV PK N;9U	1.34
274815	UNIV PK N;XU	1.34
274816	UNIV PK N;YU	1.34
920173	W3-046 E	19.6
295109	WESTBROOK E	4.58
274687	WILL CNTY;4U	53.81
910542	X3-005 E	0.52
920462	Y2-103	37.14
920472	Y3-013 1	3.09
920482	Y3-013 2	3.09
920492	Y3-013 3	3.09
701621	Y4-063	1.29
701641	Y4-065	44.06
701682	Y4-069 E	5.45
LTF	Z1-043	23.25
916502	Z1-106 E1	1.04
916504	Z1-106 E2	1.04
916512	Z1-107 E	2.25
916522	Z1-108 E	2.05
LTF	Z1-112	7.66
916651	Z1-127 1	1.42
916652	Z1-127 2	0.96
920782	Z2-081	1.34
920932	AA1-018 C	2.18
920933	AA1-018 E	14.61
LTF	AA1-071	5.11

921222	AA1-078	0.94
918972	AA1-116 E	2.25
918982	AA1-117 E	2.25
921632	AA1-146	14.32
921682	AA2-030	14.32
921692	AA2-035	108.05
921702	AA2-039 C	1.69
921703	AA2-039 E	11.32
922053	AA2-107 E	2.02
922183	AA2-123 E	2.01
922972	AB1-086 C	14.86
923002	AB1-089 C	53.97
923012	AB1-090 C	53.97
923022	AB1-091 C OP	60.73
930751	AB1-121	95.94
930752	AB1-121 E	91.
930761	AB1-122 1	60.79
930762	AB1-122 2	60.79
923363	AB1-146 E	0.2
923562	AB1-172	0.7
LTF	AB2-013	13.1
924471	AB2-096	34.83
925161	AB2-173 C	2.55
925301	AB2-191 C	1.04
925302	AB2-191 E	0.92

Appendix 10

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 112.08% to 112.18% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT5-6__'. This project contributes approximately 19.64 MW to the thermal violation.

CONTINGENCY '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>
274890	CAYUG;1U E	23.88
274891	CAYUG;2U E	23.88
274863	CAYUGA RI;1U	1.23
274864	CAYUGA RI;2U	1.23
274659	DRESDEN ;3U	30.19
290051	GSG-6; E	12.26
275149	KEMPTON ;1E	20.39
290108	LEEDK;1U E	28.41
274770	LINCOLN ;1U	4.78
274771	LINCOLN ;2U	4.78
274772	LINCOLN ;3U	4.78
274773	LINCOLN ;4U	4.78
274774	LINCOLN ;5U	4.78
274775	LINCOLN ;6U	4.78
274776	LINCOLN ;7U	4.78
274777	LINCOLN ;8U	4.78
274850	MENDOTA H;RU	7.05
275148	MILKS GRV;1E	20.39
293061	N-015 E	17.39
293644	O22 E1	12.2
293645	O22 E2	23.69
290021	O50 E	23.05
294392	P-010 E	22.08
274830	PWR VTREC;1U	7.17
274831	PWR VTREC;2U	7.17
296308	R-030 C1	5.6
296271	R-030 C2	5.6
296125	R-030 C3	5.67
296309	R-030 E1	22.42

296272	R-030 E2	22.42
296128	R-030 E3	22.69
274722	S-055 E	13.19
884780	S-058 C	52.05
884782	S-058 C1	52.05
884781	S-058 E	150.78
884783	S-058 E1	150.78
295111	SUBLETTE E	3.19
274853	TWINGROVE;U1	23.08
274854	TWINGROVE;U2	23.08
890570	U3-026 C1	36.58
890571	U3-026 C2	36.58
295109	WESTBROOK E	6.56
274687	WILL CNTY;4U	78.8
910542	X3-005 E	0.87
920462	Y2-103	52.77
920472	Y3-013 1	4.4
920482	Y3-013 2	4.4
920492	Y3-013 3	4.4
LTF	Z1-043	34.47
916502	Z1-106 E1	1.48
916504	Z1-106 E2	1.48
916512	Z1-107 E	3.
916522	Z1-108 E	2.92
LTF	Z1-112	11.44
916651	Z1-127 1	1.97
916652	Z1-127 2	0.97
920782	Z2-081	1.86
920792	Z2-087 C	4.38
920793	Z2-087 E	29.32
920932	AA1-018 C	2.93
920933	AA1-018 E	19.58
LTF	AA1-071	7.63
918972	AA1-116 E	2.91
918982	AA1-117 E	2.91
921692	AA2-035	153.98
922053	AA2-107 E	2.87
922183	AA2-123 E	2.87
922972	AB1-086 C	92.84
923002	AB1-089 C	77.37
923012	AB1-090 C	77.37
923022	AB1-091 C OP	79.74
930751	AB1-121	109.9
930752	AB1-121 E	104.23
930761	AB1-122 1	86.73

930762	<i>AB1-122 2</i>	<i>86.68</i>
923363	<i>AB1-146 E</i>	<i>0.28</i>
923562	<i>AB1-172</i>	<i>0.93</i>
<i>LTF</i>	<i>AB2-013</i>	<i>19.64</i>
924041	<i>AB2-047 C OP</i>	<i>5.4</i>
924042	<i>AB2-047 E OP</i>	<i>36.15</i>
924471	<i>AB2-096</i>	<i>49.79</i>
925301	<i>AB2-191 C</i>	<i>1.48</i>
925302	<i>AB2-191 E</i>	<i>1.32</i>

Appendix 11

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 114.5% to 114.6% (AC power flow) of its emergency rating (1601 MVA) for the line fault with failed breaker contingency outage of '112-65-BT2-3__'. This project contributes approximately 20.05 MW to the thermal violation.

CONTINGENCY '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>
274890	CAYUG;1U E	24.33
274891	CAYUG;2U E	24.33
274863	CAYUGA RI;1U	1.25
274864	CAYUGA RI;2U	1.25
274659	DRESDEN ;3U	30.83
290051	GSG-6; E	12.52
275149	KEMPTON ;1E	20.83
290108	LEEDK;1U E	29.02
274770	LINCOLN ;1U	4.91
274771	LINCOLN ;2U	4.91
274772	LINCOLN ;3U	4.91
274773	LINCOLN ;4U	4.91
274774	LINCOLN ;5U	4.91
274775	LINCOLN ;6U	4.91
274776	LINCOLN ;7U	4.91
274777	LINCOLN ;8U	4.91
274850	MENDOTA H;RU	7.2
275148	MILKS GRV;1E	20.83
293061	N-015 E	17.76
293644	O22 E1	12.46
293645	O22 E2	24.19
290021	O50 E	23.54
294392	P-010 E	22.55
274830	PWR VTREC;1U	7.32
274831	PWR VTREC;2U	7.32
296308	R-030 C1	5.71
296271	R-030 C2	5.71
296125	R-030 C3	5.78
296309	R-030 E1	22.85

296272	R-030 E2	22.85
296128	R-030 E3	23.12
274722	S-055 E	13.47
884780	S-058 C	53.16
884782	S-058 C1	53.16
884781	S-058 E	154.02
884783	S-058 E1	154.02
295111	SUBLETTE E	3.26
274853	TWINGROVE;U1	23.53
274854	TWINGROVE;U2	23.53
890570	U3-026 C1	37.36
890571	U3-026 C2	37.36
295109	WESTBROOK E	6.7
274687	WILL CNTY;4U	80.48
910542	X3-005 E	0.89
920462	Y2-103	53.9
920472	Y3-013 1	4.49
920482	Y3-013 2	4.49
920492	Y3-013 3	4.49
LTF	Z1-043	35.2
916502	Z1-106 E1	1.51
916504	Z1-106 E2	1.51
916512	Z1-107 E	3.07
916522	Z1-108 E	2.98
LTF	Z1-112	11.68
916651	Z1-127 1	2.01
916652	Z1-127 2	0.99
920782	Z2-081	1.9
920792	Z2-087 C	4.47
920793	Z2-087 E	29.88
920932	AA1-018 C	2.99
920933	AA1-018 E	20.01
LTF	AA1-071	7.79
918972	AA1-116 E	2.98
918982	AA1-117 E	2.98
921692	AA2-035	157.27
922053	AA2-107 E	2.93
922183	AA2-123 E	2.93
922972	AB1-086 C	94.63
923002	AB1-089 C	79.02
923012	AB1-090 C	79.02
923022	AB1-091 C OP	81.48
930751	AB1-121	112.24
930752	AB1-121 E	106.45
930761	AB1-122 1	88.59

930762	AB1-122 2	88.53
923363	AB1-146 E	0.29
923562	AB1-172	0.95
LTF	AB2-013	20.05
924041	AB2-047 C OP	5.51
924042	AB2-047 E OP	36.85
924471	AB2-096	50.86
925301	AB2-191 C	1.51
925302	AB2-191 E	1.34

Appendix 12

(LGEE - OVEC) The 7TRIMBLE-06CLIFTY 345 kV line (from bus 324114 to bus 248000 ckt 1) loads from 145.68% to 145.68% (**DC power flow**) of its emergency rating (1370 MVA) for the single line contingency outage of '363_B2_TOR1682'. This project contributes approximately 0.0 MW to the thermal violation.

CONTINGENCY '363_B2_TOR1682'

OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1

/ 243208 05JEFRSO 765 243209 05ROCKPT 765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
243442	05RKG1	20.42
243443	05RKG2	20.11
342900	1COOPER1 G	3.42
342903	1COOPER2 G	6.63
342910	1DALE 3G	9.69
342911	1DALE 4G	9.4
342918	1JKCT 1G	2.7
342921	1JKCT 2G	2.7
342924	1JKCT 3G	2.7
342927	1JKCT 4G	1.79
342930	1JKCT 5G	1.79
342933	1JKCT 6G	1.79
342936	1JKCT 7G	1.79
342939	1JKCT 9G	1.84
342942	1JKCT 10G	1.84
342945	1LAUREL 1G	1.93
900405	X3-028 E	150.6
LTF	Y2-006	16.67
LTF	Z1-046	19.52
LTF	AA1-001	5.69
LTF	AA1-004	15.82
922982	AB1-087 C OP	41.42
922992	AB1-088 C OP	41.42
LTF	AB2-005	10.66
924101	AB2-054	60.82
LTF	AB2-075	2.58
LTF	AB2-076	3.26

Appendix 13

(MISO AMIL - MISO AMIL) The 7NEWTON-7CASEY 345 kV line (from bus 347830 to bus 346809 ckt 1) loads from 102.59% to 102.59% (AC power flow) of its normal rating (1200 MVA) for non-contingency condition. This project contributes approximately 0.0 MW to the thermal violation.

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
<i>LTF</i>	<i>Y2-006</i>	<i>13.51</i>
<i>LTF</i>	<i>Z1-046</i>	<i>12.92</i>
<i>LTF</i>	<i>AA1-001</i>	<i>11.98</i>
<i>LTF</i>	<i>AA1-004</i>	<i>12.83</i>
<i>LTF</i>	<i>AB2-005</i>	<i>8.09</i>

Appendix 14

(CE - CE) The AB1-122 TAP-KENDALL ;BU 345 kV line (from bus 930760 to bus 274702 ckt 1) loads from 113.07% to 115.27% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L1202__B-S_A'. This project contributes approximately 32.5 MW to the thermal violation.

CONTINGENCY '345-L1202__B-S_A'

TRIP BRANCH FROM BUS 270716 TO BUS 930770 CKT 1

/ DRESDEN ; B 345 AB1-122 TAP

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
274832	ANNAWAN ; 1U	7.6
274877	BISHOP HL;1U	0.35
274878	BISHOP HL;2U	0.35
274848	CAMPGROVE;RU	0.54
274879	MINONK ;1U	4.04
274677	POWERTON ;5U	43.52
274678	POWERTON ;6U	43.41
274851	PROVIDENC;RU	0.24
274861	TOP CROP ;1U	0.42
274862	TOP CROP ;2U	0.81
701831	Y4-084	2.81
LTF	Z1-043	19.59
916211	Z1-072	0.16
920932	AA1-018 C	2.03
921702	AA2-039 C	1.66
930761	AB1-122 1	435.73
930762	AB1-122 2	446.06
LTF	AB2-013	32.5

Appendix 15

(CE - CE) The AB1-122 TAP-DRESDEN ; B 345 kV line (from bus 930770 to bus 270716 ckt 1) loads from 120.09% to 122.41% (AC power flow) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L93505_B-S_A'. This project contributes approximately 35.19 MW to the thermal violation.

CONTINGENCY '345-L93505_B-S_A'

TRIP BRANCH FROM BUS 274702 TO BUS 930760 CKT 1

/ KENDA;BU 345 AB1-122 TAP

TRIP BRANCH FROM BUS 274702 TO BUS 274703 CKT 1

/ KENDA;BU 345 KENDA;RU 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
274832	ANNAWAN ; 1U	7.81
274877	BISHOP HL;1U	0.36
274878	BISHOP HL;2U	0.36
274848	CAMPGROVE;RU	0.56
274879	MINONK ;1U	4.49
274677	POWERTON ;5U	47.77
274678	POWERTON ;6U	47.65
274851	PROVIDENC;RU	0.24
274861	TOP CROP ;1U	0.48
274862	TOP CROP ;2U	0.94
920272	X1-045	2.31
701831	Y4-084	2.96
LTF	Z1-043	19.1
916211	Z1-072	0.16
920932	AA1-018 C	2.3
921702	AA2-039 C	1.71
930761	AB1-122 1	487.08
930762	AB1-122 2	474.97
LTF	AB2-013	35.19