Generation Interconnection
Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AB1-122

Kendall-Tazewell and Dresden-Mole Creek

July 2016

Network Impacts for Primary POI

The Queue Project AB1-122 was evaluated as a 1150.0 MW (Capacity 1150.0 MW) injection double tapping the Kendall-Tazewell 345kV and Dresden-Mole Creek 345kV lines in the COMED area. Project AB1-122 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB1-122 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2019

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

1. (CE - CE) The KENDALL ;BU-LOCKPORT ; B 345 kV line (from bus 274702 to bus 270810 ckt 1) loads from 94.59% to 107.94% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L10806_R-S'. This project contributes approximately 197.43 MW to the thermal violation.

```
CONTINGENCY '345-L10806_R-S'
 TRIP BRANCH FROM BUS 274703 TO BUS 270811 CKT 1            / KENDA;RU 345 LOCKP; R 345
 END
```

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

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

1. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.09% to 103.66% (**DC 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 98.42 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
```

2. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.09% to 103.66% (**DC 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 98.42 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
```

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

1. (AEP - AEP) The 05OLIVE-X2-052 TAP 345 kV line (from bus 243229 to bus 909144 ckt 2) loads from 100.13% to 102.93% (**DC 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 89.52 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 2 for a table containing the generators having contribution to this flowgate.

2. (MISO NIPS - AEP) The 17HIPLE-05COLNGW 345 kV line (from bus 255105 to bus 243214 ckt 1) loads from 104.19% to 104.44% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '7444_C2_05DUMONT 765-A2'. This project contributes approximately 81.89 MW to the thermal violation.

```
CONTINGENCY '7444_C2_05DUMONT 765-A2'
 OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1          / 243206 05DUMONT 765 246999 05SORENS 765 1
 OPEN BRANCH FROM BUS 243206 TO BUS 243219 CKT 2          / 243206 05DUMONT 765 243219 05DUMONT 345 2
 OPEN BRANCH FROM BUS 243219 TO BUS 909144 CKT 2          / 243219 05DUMONT 345 909144 X2-052 TAP 345 2
 END
```

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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.8% to 112.24% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 107.51 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.11% to 111.58% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 108.32 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
```

5. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.07% to 111.54% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 108.31 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
```

6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 140.0% to 145.42% (**DC 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 169.68 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 5 for a table containing the generators having contribution to this flowgate.

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.25% to 135.8% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 173.65 MW to the thermal violation.

```
CONTINGENCY '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
```

8. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.18% to 135.72% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 173.32 MW to the thermal violation.

```
CONTINGENCY '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
```

9. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 121.87% to 125.73% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 380.75 MW to the thermal violation.

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

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

10. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 120.37% to 124.24% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 381.24 MW to the thermal violation.

```
CONTINGENCY '345-L6607__B-S_+_345-L97008_R-S'
 TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1          / E FRA; B 345 CRETE;BP 345
 TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1          / UPNOR;RP 345 05OLIVE 345
 END
```

11. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.92% to 132.66% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 112.79 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 7 for a table containing the generators having contribution to this flowgate.

12. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.68% to 132.45% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 113.67 MW to the thermal violation.

```
CONTINGENCY '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 BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.37% to 132.1% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 112.73 MW to the thermal violation.

```
CONTINGENCY '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
```

14. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.53% to 122.77% (**DC 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 138.92 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 8 for a table containing the generators having contribution to this flowgate.

15. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.46% to 122.73% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 139.91 MW to the thermal violation.

```
CONTINGENCY '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
```

16. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.02% to 122.25% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 138.8 MW to the thermal violation.

```
CONTINGENCY '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
```

17. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 106.22% to 110.74% (**DC 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 97.44 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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.

18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.8% to 112.24% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 107.51 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 10 for a table containing the generators having contribution to this flowgate.

19. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.11% to 111.58% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 108.32 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
```

20. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.07% to 111.54% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 108.31 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
```

21. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 133.21% to 137.99% (**DC 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 169.95 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 11 for a table containing the generators having contribution to this flowgate.

22. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 136.78% to 141.66% (**DC 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 173.56 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 12 for a table containing the generators having contribution to this flowgate.

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.25% to 143.15% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 151.32 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
```

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

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.24% to 143.12% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 150.4 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 X1-020 TAP 765 1
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1          / 243206 05DUMONT 765 270644 WILTON ; 765 1
 END
```

25. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.18% to 143.08% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 151.28 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
```

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.31% to 138.76% (**DC 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 117.3 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 14 for a table containing the generators having contribution to this flowgate.

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.06% to 137.55% (**DC 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 118.23 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
```

28. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.03% to 137.51% (**DC 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 118.23 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
```

29. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 122.78% to 127.57% (**DC 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 169.95 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 15 for a table containing the generators having contribution to this flowgate.

30. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 125.33% to 130.21% (**DC 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 173.56 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 16 for a table containing the generators having contribution to this flowgate.

31. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 121.26% to 124.66% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 100.33 MW to the thermal violation.

```
CONTINGENCY '286_B2_TOR1687'
 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1          / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1
 OPEN BRANCH FROM BUS 348885 TO BUS 348887 CKT 1          / 348885 7BUNSONVILLE 345 348887 7SIDNEY 345 1
 OPEN BRANCH FROM BUS 348885 TO BUS 348886 CKT 1          / 348885 7BUNSONVILLE 345 348886 4BUNSONVILLE 138 1
 END
```

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

32. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 120.95% to 124.16% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '1363_B2'. This project contributes approximately 94.98 MW to the thermal violation.

```
CONTINGENCY '1363_B2'
 OPEN BRANCH FROM BUS 348885 TO BUS 348887 CKT 1          / 348885 7BUNSONVILLE 345 348887 7SIDNEY 345 1
 END
```

33. (MISO AMIL - AEP) The 7BUNSONVILLE-05EUGENE 345 kV line (from bus 348885 to bus 243221 ckt 1) loads from 120.21% to 125.02% (**DC power flow**) of its normal rating (822 MVA) for the single line contingency outage of '685_B2_TOR1686'. This project contributes approximately 87.8 MW to the thermal violation.

```
CONTINGENCY '685_B2_TOR1686'
 OPEN BRANCH FROM BUS 243213 TO BUS 346809 CKT 1          / 243213 05BREED 345 346809 7CASEY 345 1
 END
```

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

34. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 123.67% to 126.53% (**DC 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 89.52 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 19 for a table containing the generators having contribution to this flowgate.

35. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.83% to 116.89% (**DC power flow**) of its emergency rating (1409 MVA)

for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 95.78 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
```

36. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.82% to 116.88% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 95.78 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
```

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

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 - 2019

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)

Generator Deliverability

1. (CE - CE) The KENDALL ;BU-LOCKPORT ; B 345 kV line (from bus 274702 to bus 270810 ckt 1) loads from 94.59% to 107.94% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L10806_R-S'. This project contributes approximately 197.43 MW to the thermal violation.

Reinforcement: ComEd 345kV L10805 SSTE rating is 1568 MVA. Upgrade both the L10805 conductor and station conductor at TSS 108 for L10805. Upon completion of this upgrade the new SSTE rating will be 1837 MVA.
Cost: $17.9M
Time: 24-30 months

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

Multiple Facility Contingency

1. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.09% to 103.66% (**DC 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 98.42 MW to the thermal violation.

Comed
ComEd L6615 SLD is 1237 MVA. No upgrades. Note, rating of 971 MVA is a NIPSCO rating.

AEP
Reinforcement: Based on our record, Olive - Green Acres 345 kV line is a sag derated tie line and thus a sag check will be required for the entire 40.64 miles of ACSR/PE ~ 1414 ~ 62/19 Conductor section 1 to determine if the line can be operated above its emergency rating 971 MVA. If deemed necessary to rebuild the entire 40.64 miles of the section of the line,
Cost: $162,560-Sag study. $81,280,000-line rebuild
Time: 6-12 months-sag study. 24-36 months-Line rebuild

2. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.09% to 103.66% (**DC 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 98.42 MW to the thermal violation.

Same as Multiple Facility #1

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. (AEP - AEP) The 05OLIVE-X2-052 TAP 345 kV line (from bus 243229 to bus 909144 ckt 2) loads from 100.13% to 102.93% (**DC 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 89.52 MW to the thermal violation.

Reinforcement: A sag check will be required for the ACSR ~ 954 ~ 45/7 ~ RAIL Conductor Section 1 to determine if the line section can be operated above its emergency rating of 1409 MVA. The result could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 14 mile section of line would need to be rebuilt. If deemed necessary to rebuild section of line
Cost: $56,000-Sag study. $28,000,000-Line rebuild
Time: 6 to 12 months-sag study. 24 to 36 months-sag study

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

2. (MISO NIPS - AEP) The 17HIPLE-05COLNGW 345 kV line (from bus 255105 to bus 243214 ckt 1) loads from 104.19% to 104.44% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '7444_C2_05DUMONT 765-A2'. This project contributes approximately 81.89 MW to the thermal violation.

AEP

Reinforcement: A Sag Study will be required on the 33.46 mile section of line to mitigate the overload on the Collingwood - Hiple 345 kV line.
Cost: Depending on the sag study results, cost for this upgrade is expected to be between $133,840 (no remediations required just sag study) and $67 million (complete line rebuild required).
Time: 6 to 12 months-sag study. 24 to 36 months-line rebuild

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.8% to 112.24% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 107.51 MW to the thermal violation.

Comed
ComEd Transmission Planning Comments- ComEd facility is 345kV L6617 ALDR is 1423 MVA. No upgrades required.

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.11% to 111.58% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 108.32 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #3

5. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.07% to 111.54% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 108.31 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #3

6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 140.0% to 145.42% (**DC 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 169.68 MW to the thermal violation.

AEP

Reinforcement: A sag check will be required for the ACSR ~ 954 ~ 45/7 ~ RAIL Conductor Section 1 to determine if the line section can be operated above its emergency rating of 1409 MVA. The result could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 9 mile section of line would need to be rebuilt. Replace the Dumont Wavetrap (2500 A)
Cost: $40,000-sag study. $18,000,000-line rebuild. $300,000-Dumont Wave trap replacement
Time: 6 to 12 months-sag study. 24 to 36 months-line rebuild

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.25% to 135.8% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 173.65 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #6

8. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.18% to 135.72% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 173.32 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #6

9. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 121.87% to 125.73% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 380.75 MW to the thermal violation.

Comed
Reinforcement: ComEd 765kV L11215. SLD is 4802 MVA. The relay thermal for this line is 5466 MVA. Based on the contingency above, the overload exceeds the relay thermal rating therefore the upgrade will be a new 765kV line. Contingent upon procurement of a right of way assuming the current right of way containing L11215 does not have land.
Cost: $300M
Time: 36 months

AEP
Reinforcement: AEP rating of Dumont - Wilton Center 765 kV tie is S/N: 3555 MVA and S/E: 4105 MVA. The Dumont Wavetrap (2500A) will have to be replaced;
Cost: $500,000.
Time: 12-24 months

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

10. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 120.37% to 124.24% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 381.24 MW to the thermal violation.

Same as Contributed to Previous Identified Overloads #9

11. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.92% to 132.66% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 112.79 MW to the thermal violation.
Comed
ComEd Transmission Planning Comments- ComEd 345kV L17705 ALDR is 2033 MVA. No upgrades required.

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

12. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.68% to 132.45% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 113.67 MW to the thermal violation.

Same as Contributed to Previous Identified Overloads #11

13. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 127.37% to 132.1% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 112.73 MW to the thermal violation.

Same as Contributed to Previous Identified Overloads #11

14. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.53% to 122.77% (**DC 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 138.92 MW to the thermal violation.

Comed
ComEd 345kV L17703 ALDR is 2033 MVA. No upgrades required.

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

15. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.46% to 122.73% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 139.91 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #14

16. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 117.02% to 122.25% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 138.8 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #14

17. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 106.22% to 110.74% (**DC 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 97.44 MW to the thermal violation.

Comed
ComEd 345kV L6615 ALDR is 1464 MVA. No upgrades required.

AEP
Reinforcement: Olive - Green Acres 345 kV line is a sag derated tie line and thus a sag check will be required for the entire 40.64 miles of ACSR/PE ~ 1414 ~ 62/19 Conductor section 1 to determine if the line can be operated above its emergency rating 971 MVA. If deemed necessary to rebuild the entire 40.64 miles of the section of the line.
Cost: $162,560-sag study. $81,280,000 line rebuild
Time: 6-12months-sag study. 24-36 months line rebuild

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

18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.8% to 112.24% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 107.51 MW to the thermal violation.

Comed
The ComEd facility is 345kV L6617. The SLD rating of 1237 MVA (ALDR is 1423 MVA). No upgrade required.

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

19. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.11% to 111.58% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 108.32 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #18

20. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.07% to 111.54% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 108.31 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #18

21. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 133.21% to 137.99% (**DC 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 169.95 MW to the thermal violation.

Reinforcement: The limit is Tr. 93 @ TSS 112 Wilton Center. The SLD is 1601 MVA (ALDR is 1841 MVA). Upgrade required at TSS 112 Wilton Center. Relocate 765kV L11216 from Bus 6 to Bus 8. Build out the 765kV bus and install 2 new 765kV Bus Tie CB's (BT 6-8 & 8-2), upgrade Tr. 93 station conductor and upgrade Tr. 93 forward relay trip setting. Upon completion the new ratings will be 1248/1479/1982 MVA, SN/SE/SLD (ALDR of 2279 MVA).
Cost: $13M
Time: 24-30 months
Please refer to Appendix 10 for a table containing the generators having contribution to this flowgate.

22. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 136.78% to 141.66% (**DC 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 173.56 MW to the thermal violation.

Reinforcement: The limit is Tr. 94 @ TSS 112 Wilton Center.
The SLD is 1601 MVA (ALDR is 1841 MVA). Upgrade required at TSS 112 Wilton Center. Relocate 765kV L11216 from Bus 6 to Bus 8. Build out the 765kV bus and install 2 new 765kV Bus Tie CB's (BT 6-8 & 8-2) and upgrade Tr. 93 station conductor at TSS 112, Tr. 94 CT upgrades and Forward Relay Trip reviewed and upgraded. The new ratings would be 1248/1479/2221 MVA SN/SE/SLD (ALDR of 2390 MVA).

Cost: $13M
Time: 24-30 months.

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

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.25% to 143.15% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 151.32 MW to the thermal violation.

Comed
Reinforcement: The limiting element is 345kV L94507. ComEd SLD is 1674 MVA (ALDR for L94507 is 1925 MVA).Upgrade L94507 1414 kcmil paper expanded conductor to 2156 kcmil. Upon field completion, the ratings will be 1091/1399/2084 MVA SN/SE/SLD.
Cost: $17.2M
Time: 24-30 months.

NIPSCO (MISO) will have to evaluate this violation during the SIS phase.

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

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.24% to 143.12% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 150.4 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #23

25. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.18% to 143.08% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 151.28 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #23

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.31% to 138.76% (**DC 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 117.3 MW to the thermal violation.

Comed
The limiting element is 345kV L97008. ComEd SLD rating for L97008 is 1237 MVA (ALDR is 1423 MVA). The post contingency flow is below the line ALDR therefore no upgrade is required.

AEP
Reinforcement: A sag check will be required for the AEP owned section of the Olive - University Park (CE) 345 kV line to determine if the line section can be operated above its emergency rating of 971 MVA. The result 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. The Olive switches to Line Riser will have to be replaced. For Olive RCTL, an engineering study will need to be conducted to determine if the Relay Compliance Trip limits settings can be adjusted to mitigate the overload. New relay packages will be required if the settings cannot be adjusted
Cost: $162,440-sag study. $81,220,000- reconductor/rebuild AEP section of line. $1,400,000-Olive switches. :$600,000-Relays
Time: 6-12 months sag study. 24-36 months-line rebuild.

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

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.06% to 137.55% (**DC 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 118.23 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #26

28. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.03% to 137.51% (**DC 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 118.23 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #26

29. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 122.78% to 127.57% (**DC 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 169.95 MW to the thermal violation.

Reinforcement: The limit is Tr. 93 @ TSS 112 Wilton Center. The SLD is 1601 MVA (ALDR is 1841 MVA). Upgrade required at TSS 112 Wilton Center. Relocate 765kV L11216 from Bus 6 to Bus 8. Build out the 765kV bus and install 2 new 765kV Bus Tie CB's (BT 6-8 & 8-2), upgrade Tr. 93 station conductor and upgrade Tr. 93 forward relay trip setting. Upon completion the new ratings will be 1248/1479/1982 MVA, SN/SE/SLD (ALDR of 2279 MVA).
Cost: $13M
Time: 24-30 months

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

30. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 125.33% to 130.21% (**DC 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 173.56 MW to the thermal violation.

Reinforcement: The limit is Tr. 94 @ TSS 112 Wilton Center.
The SLD is 1601 MVA (ALDR is 1841 MVA). Upgrade required at TSS 112 Wilton Center. Relocate 765kV L11216 from Bus 6 to Bus 8. Build out the 765kV bus and install 2 new 765kV Bus Tie CB's (BT 6-8 & 8-2) and upgrade Tr. 93 station conductor at TSS 112. The new ratings would be 1248/1479/1867 MVA SN/SE/SLD (ALDR of 2147 MVA).
Cost: $12M
Time: 24-30 months.
Please refer to Appendix 15 for a table containing the generators having contribution to this flowgate.

31. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 121.26% to 124.66% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 100.33 MW to the thermal violation.

Reinforcement: AEP owns 0.6 mile section of line between Sullivan/Breed and West Casey 345 kV stations which will need to be rebuilt to increase AEP end ratings.
This is an AEP-AMIL tie line therefore, PJM is going to have to coordinate this upgrade with Ameren IL. Per our records, AMIL's portion of the conductor also needs to be reconductored/rebuilt to mitigate this overload. Ratings provided are based on the fact that AEP owned 3000A wavetrap at Sullivan will set new limits.
Cost: $2.0 million
Time: 24-36 months

AMIL (MISO) will have to evaluate this violation during the SIS phase.

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

32. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 120.95% to 124.16% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '1363_B2'. This project contributes approximately 94.98 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #31

33. (MISO AMIL - AEP) The 7BUNSONVILLE-05EUGENE 345 kV line (from bus 348885 to bus 243221 ckt 1) loads from 120.21% to 125.02% (**DC power flow**) of its normal rating (822 MVA) for the single line contingency outage of '685_B2_TOR1686'. This project contributes approximately 87.8 MW to the thermal violation.

AEP
Comments: This facility is an AEP-Ameren IL tie.
SN/SE ratings on this facility is 1692/1793 MVA. Therefore, under these ratings, this facility should not exceed its ratings for this IPP and under this event.

AMIL (MISO) will have to evaluate this violation during the SIS phase.

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

34. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 123.67% to 126.53% (**DC 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 89.52 MW to the thermal violation.

Reinforcement: A sag check will be required for the ACSR ~ 954 ~ 45/7 ~ RAIL Conductor Section 1 to determine if the line section can be operated above its emergency rating of 1409 MVA. The result could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 14 mile section of line would need to be rebuilt.. If deemed necessary to rebuild section of line,
Cost: $56,000 Sag Study. $28,000,000. Line rebuild
Time: 6-12 months sag study. 24-36 months for line rebuild

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

35. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.83% to 116.89% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 95.78 MW to the thermal violation.

Same as Contribution to Previously Identified Overloads #34

36. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.82% to 116.88% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 95.78 MW to the thermal violation.

Same as Contribution to Previously Identified Overloads #34

Network Impacts for Secondary POI

The Queue Project AB1-122 was evaluated as a 1150.0 MW (Capacity 1150.0 MW) injection at the Dresden 345kV substation in the COMED area. Project AB1-122 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB1-122 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2019

Generator Deliverability

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

1. (CE - CE) The DRESDEN ; B 345/138 kV transformer (from bus 270716 to bus 275179 ckt 1) loads from 88.01% to 101.95% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of '345-L1223_TR-S'. This project contributes approximately 61.63 MW to the thermal violation.

```
CONTINGENCY '345-L1223_TR-S'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 END
```

2. (CE - CE) The DRESDEN ; B 345/138 kV transformer (from bus 270716 to bus 275179 ckt 1) loads from 83.77% to 101.28% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of '345-L14321TB-N'. This project contributes approximately 77.39 MW to the thermal violation.

```
CONTINGENCY '345-L14321TB-N'
 TRIP BRANCH FROM BUS 270928 TO BUS 270730 CKT 1          / WOLFS; B 345 ELECT; B 345
 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1   / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5
 END
```

3. (CE - CE) The ELWOOD ; B-GOODINGS ;3B 345 kV line (from bus 270736 to bus 270766 ckt 1) loads from 86.56% to 100.19% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L11622_R-S'. This project contributes approximately 201.54 MW to the thermal violation.

```
CONTINGENCY '345-L11622_R-S'
```

```
TRIP BRANCH FROM BUS 270737 TO BUS 270767 CKT 1          / ELWOO; R 345 GOODI;1R 345
END
```

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

4. (CE - CE) The ELWOOD ; R-GOODINGS ;1R 345 kV line (from bus 270737 to bus 270767 ckt 1) loads from 87.57% to 101.09% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L11620_B-S'. This project contributes approximately 199.98 MW to the thermal violation.

```
CONTINGENCY '345-L11620_B-S'
 TRIP BRANCH FROM BUS 270736 TO BUS 270766 CKT 1          / ELWOO; B 345 GOODI;3B 345
 END
```

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

5. (CE - CE) The KENDALL ;BU-LOCKPORT ; B 345 kV line (from bus 274702 to bus 270810 ckt 1) loads from 96.0% to 100.5% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L10806_R-S'. This project contributes approximately 66.64 MW to the thermal violation.

```
CONTINGENCY '345-L10806_R-S'
 TRIP BRANCH FROM BUS 274703 TO BUS 270811 CKT 1          / KENDA;RU 345 LOCKP; R 345
 END
```

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

6. (CE - CE) The DRESDEN ;1M-DRESDEN ; R 138 kV line (from bus 275179 to bus 271337 ckt 1) loads from 87.96% to 101.9% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of '345-L1223_TR-S'. This project contributes approximately 61.63 MW to the thermal violation.

```
CONTINGENCY '345-L1223_TR-S'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 END
```

7. (CE - CE) The DRESDEN ;1M-DRESDEN ; R 138 kV line (from bus 275179 to bus 271337 ckt 1) loads from 83.73% to 101.24% (**DC power flow**) of its emergency rating (442 MVA) for

the single line contingency outage of '345-L14321TB-N'. This project contributes approximately 77.39 MW to the thermal violation.

```
CONTINGENCY '345-L14321TB-N'
 TRIP BRANCH FROM BUS 270928 TO BUS 270730 CKT 1              / WOLFS; B 345 ELECT; B 345
 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1   / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5
 END
```

Multiple Facility Contingency

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

1. (CE - CE) The BLUE ISL ;RT-BLUE ISL ; R 345 kV line (from bus 270667 to bus 270665 ckt 1) loads from 98.01% to 100.22% (**DC power flow**) of its emergency rating (1768 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 86.97 MW to the thermal violation.

```
CONTINGENCY '023-65-BT2-3__'
 TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1              / WILTO; 765 05DUMONT 765
 TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1              / COLLI; 765 PLANO; 765
 END
```

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

2. (CE - CE) The DRESDEN ; B 345/138 kV transformer (from bus 270716 to bus 275179 ckt 1) loads from 84.46% to 115.18% (**DC power flow**) of its emergency rating (520 MVA) for the line fault with failed breaker contingency outage of '012-45-BT5-6__'. This project contributes approximately 177.06 MW to the thermal violation.

```
CONTINGENCY '012-45-BT5-6__'
 TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1              / DRESD; B 345 ELWOO; B 345
 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1              / ELWOO; B 345 ELWOO; R 345
 TRIP BRANCH FROM BUS 270697 TO BUS 270716 CKT 1              / COLLI; R 345 DRESD; B 345
 END
```

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

3. (CE - CE) The DRESDEN ; B 345/138 kV transformer (from bus 270716 to bus 275179 ckt 1) loads from 92.67% to 107.81% (**DC power flow**) of its emergency rating (520 MVA) for the tower line contingency outage of '345-L1223_TR-S_+_345-L14321TB-N'. This project contributes approximately 78.71 MW to the thermal violation.

```
CONTINGENCY '345-L1223_TR-S_+_345-L14321TB-N'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 TRIP BRANCH FROM BUS 270928 TO BUS 270730 CKT 1          / WOLFS; B 345 ELECT; B 345
 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1   / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5
 END
```

4. (CE - CE) The DRESDEN ; B 345/138 kV transformer (from bus 270716 to bus 275179 ckt 1) loads from 92.09% to 107.24% (**DC power flow**) of its emergency rating (520 MVA) for the tower line contingency outage of '345-L1221__B-S_+_345-L1223_TR-S'. This project contributes approximately 78.75 MW to the thermal violation.

```
CONTINGENCY '345-L1221__B-S_+_345-L1223_TR-S'
 TRIP BRANCH FROM BUS 270716 TO BUS 270928 CKT 1          / DRESD; B 345 WOLFS; B 345
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 END
```

5. (CE - CE) The DRESDEN ; R-ELECT JCT;4R 345 kV line (from bus 270717 to bus 270731 ckt 1) loads from 91.2% to 100.24% (**DC power flow**) of its emergency rating (1768 MVA) for the line fault with failed breaker contingency outage of '900-45-BT4-5__'. This project contributes approximately 159.89 MW to the thermal violation.

```
CONTINGENCY '900-45-BT4-5__'
 TRIP BRANCH FROM BUS 270737 TO BUS 270767 CKT 1          / ELWOO; R 345 GOODI;1R 345
 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1          / ELWOO; B 345 ELWOO; R 345
 END
```

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

6. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.55% to 103.62% (**DC power flow**) of its emergency rating (1674 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 156.63 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
```

Please refer to Appendix 7 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 99.54% to 103.59% (**DC power flow**) of its emergency rating (1674 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 155.61 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 X1-020 TAP 765 1
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1          / 243206 05DUMONT 765 270644 WILTON ; 765 1
 END
```

8. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 99.49% to 103.56% (**DC power flow**) of its emergency rating (1674 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 156.59 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
```

9. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.18% to 103.88% (**DC 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 101.26 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
```

10. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 99.18% to 103.88% (**DC 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 101.26 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
```

11. (CE - CE) The DRESDEN ;1M-DRESDEN ; R 138 kV line (from bus 275179 to bus 271337 ckt 1) loads from 84.42% to 115.14% (**DC power flow**) of its emergency rating (520 MVA) for the line fault with failed breaker contingency outage of '012-45-BT5-6__'. This project contributes approximately 177.06 MW to the thermal violation.

```
CONTINGENCY '012-45-BT5-6__'
 TRIP BRANCH FROM BUS 270716 TO BUS 270736 CKT 1          / DRESD; B 345 ELWOO; B 345
 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1          / ELWOO; B 345 ELWOO; R 345
 TRIP BRANCH FROM BUS 270697 TO BUS 270716 CKT 1          / COLLI; R 345 DRESD; B 345
 END
```

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

12. (CE - CE) The DRESDEN ;1M-DRESDEN ; R 138 kV line (from bus 275179 to bus 271337 ckt 1) loads from 92.63% to 107.77% (**DC power flow**) of its emergency rating (520 MVA) for the tower line contingency outage of '345-L1223_TR-S_+_345-L14321TB-N'. This project contributes approximately 78.71 MW to the thermal violation.

```
CONTINGENCY '345-L1223_TR-S_+_345-L14321TB-N'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 TRIP BRANCH FROM BUS 270928 TO BUS 270730 CKT 1          / WOLFS; B 345 ELECT; B 345
 TRIP BRANCH FROM BUS 270928 TO BUS 272794 TO BUS 275334 CKT 1    / WOLFS; B 345 WOLFS; B 138 WOLFS;1C 34.5
 END
```

13. (CE - CE) The DRESDEN ;1M-DRESDEN ; R 138 kV line (from bus 275179 to bus 271337 ckt 1) loads from 92.05% to 107.2% (**DC power flow**) of its emergency rating (520 MVA) for the tower line contingency outage of '345-L1221__B-S_+_345-L1223_TR-S'. This project contributes approximately 78.75 MW to the thermal violation.

```
CONTINGENCY '345-L1221__B-S_+_345-L1223_TR-S'
```

```
TRIP BRANCH FROM BUS 270716 TO BUS 270928 CKT 1        / DRESD; B 345 WOLFS; B 345
TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1        / DRESD; R 345 ELECT;4R 345
TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1        / DRESD;3M 138 DRESD; R 345
TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1        / DRESD;3M 138 DRESD; B 138
TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1        / DRESD;3M 138 DRESD;3C 34.5
END
```

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

1. (AEP - AEP) The 05OLIVE-X2-052 TAP 345 kV line (from bus 243229 to bus 909144 ckt 2) loads from 100.2% to 103.05% (**DC 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 91.26 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1        / 243206 05DUMONT 765 907040 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.

2. (MISO NIPS - AEP) The 17HIPLE-05COLNGW 345 kV line (from bus 255105 to bus 243214 ckt 1) loads from 104.28% to 104.55% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '7444_C2_05DUMONT 765-A2'. This project contributes approximately 83.55 MW to the thermal violation.

```
CONTINGENCY '7444_C2_05DUMONT 765-A2'
 OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1        / 243206 05DUMONT 765 246999 05SORENS 765 1
 OPEN BRANCH FROM BUS 243206 TO BUS 243219 CKT 2        / 243206 05DUMONT 765 243219 05DUMONT 345 2
 OPEN BRANCH FROM BUS 243219 TO BUS 909144 CKT 2        / 243219 05DUMONT 345 909144 X2-052 TAP 345 2
 END
```

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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.83% to 112.38% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 110.17 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
```

```
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 11 for a table containing the generators having contribution to this flowgate.

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.14% to 111.73% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 111.05 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
```

5. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.1% to 111.69% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 111.03 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
```

6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 140.13% to 145.71% (**DC 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 174.55 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 12 for a table containing the generators having contribution to this flowgate.

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.27% to 135.98% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 178.62 MW to the thermal violation.

```
CONTINGENCY '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
```

8. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 130.09% to 135.81% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 178.94 MW to the thermal violation.

```
CONTINGENCY '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
```

9. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 121.9% to 125.92% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 397.42 MW to the thermal violation.

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

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

10. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 120.4% to 124.43% (**DC power flow**) of its emergency rating (4444 MVA) for the tower line contingency outage of '345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 397.91 MW to the thermal violation.

```
CONTINGENCY '345-L6607__B-S_+_345-L97008_R-S'
 TRIP BRANCH FROM BUS 270728 TO BUS 274750 CKT 1          / E FRA; B 345 CRETE;BP 345
 TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1          / UPNOR;RP 345 05OLIVE 345
 END
```

11. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 122.69% to 127.58% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 116.18 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 14 for a table containing the generators having contribution to this flowgate.

12. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 122.42% to 127.36% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 117.09 MW to the thermal violation.

```
CONTINGENCY '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 BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 122.09% to 126.98% (**DC power flow**) of its emergency rating (1069 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 116.21 MW to the thermal violation.

```
CONTINGENCY '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
```

14. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 122.93% to 128.34% (**DC 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 143.89 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
```

```
OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 15 for a table containing the generators having contribution to this flowgate.

15. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 122.88% to 128.32% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT2-3__'. This project contributes approximately 144.91 MW to the thermal violation.

```
CONTINGENCY '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
```

16. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 122.43% to 127.84% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of '023-65-BT4-5__'. This project contributes approximately 143.87 MW to the thermal violation.

```
CONTINGENCY '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
```

17. (CE - CE) The LORETTO ; B-WILTON ; B 345 kV line (from bus 270704 to bus 270926 ckt 1) loads from 103.71% to 105.47% (**DC power flow**) of its emergency rating (1280 MVA) for the single line contingency outage of '363_B2_TOR1682'. This project contributes approximately 22.56 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
```

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

18. (CE - CE) The DRESDEN ; R-ELWOOD ; R 345 kV line (from bus 270717 to bus 270737 ckt 1) loads from 106.74% to 121.01% (**DC power flow**) of its emergency rating (1768 MVA)

for the line fault with failed breaker contingency outage of '111-45-L1223T_'. This project contributes approximately 251.93 MW to the thermal violation.

```
CONTINGENCY '111-45-L1223T_'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 TRIP BRANCH FROM BUS 270731 TO BUS 274749 CKT 1          / ELECT;4R 345 AUROR;RP 345
 DISCONNECT BUS 275184                    / ELECT;4M 138
 END
```

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

19. (CE - CE) The DRESDEN ; R-ELWOOD ; R 345 kV line (from bus 270717 to bus 270737 ckt 1) loads from 100.93% to 117.97% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L1223_TR-S'. This project contributes approximately 251.93 MW to the thermal violation.

```
CONTINGENCY '345-L1223_TR-S'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 270717 CKT 1          / DRESD;3M 138 DRESD; R 345
 TRIP BRANCH FROM BUS 275180 TO BUS 271336 CKT 1          / DRESD;3M 138 DRESD; B 138
 TRIP BRANCH FROM BUS 275180 TO BUS 275280 CKT 1          / DRESD;3M 138 DRESD;3C 34.5
 END
```

20. (CE - CE) The DRESDEN ; R 345/138 kV transformer (from bus 270717 to bus 275180 ckt 1) loads from 124.5% to 137.76% (**DC power flow**) of its emergency rating (530 MVA) for the line fault with failed breaker contingency outage of '900-45-BT4-5__'. This project contributes approximately 70.25 MW to the thermal violation.

```
CONTINGENCY '900-45-BT4-5__'
 TRIP BRANCH FROM BUS 270737 TO BUS 270767 CKT 1          / ELWOO; R 345 GOODI;1R 345
 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1          / ELWOO; B 345 ELWOO; R 345
 END
```

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

21. (CE - CE) The DRESDEN ; R 345/138 kV transformer (from bus 270717 to bus 275180 ckt 1) loads from 103.45% to 118.14% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of '345-L1222__R-S'. This project contributes approximately 70.51 MW to the thermal violation.

```
CONTINGENCY '345-L1222__R-S'
 TRIP BRANCH FROM BUS 270717 TO BUS 270737 CKT 1          / DRESD; R 345 ELWOO; R 345
 END
```

22. (CE - CE) The DRESDEN ; R 345/138 kV transformer (from bus 270717 to bus 275180 ckt 1) loads from 104.28% to 117.58% (**DC power flow**) of its emergency rating (530 MVA) for the line fault with failed breaker contingency outage of '900-45-BT2-3__'. This project contributes approximately 70.48 MW to the thermal violation.

```
CONTINGENCY '900-45-BT2-3__'
 TRIP BRANCH FROM BUS 270717 TO BUS 270737 CKT 1          / DRESD; R 345 ELWOO; R 345
 TRIP BRANCH FROM BUS 270737 TO BUS 274757 CKT 1          / ELWOO; R 345 ELWOO;1P 345
 TRIP BRANCH FROM BUS 274757 TO BUS 274729 CKT 1          / ELWOO;1P 345 ELWOO;1P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274731 CKT 1          / ELWOO;1P 345 ELWOO;2P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274733 CKT 1          / ELWOO;1P 345 ELWOO;3P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274735 CKT 1          / ELWOO;1P 345 ELWOO;4P 18
 REMOVE UNIT 1 FROM BUS 274729                  / ELWOO;1P 18
 REMOVE UNIT 2 FROM BUS 274731                  / ELWOO;2P 18
 REMOVE UNIT 3 FROM BUS 274733                  / ELWOO;3P 18
 REMOVE UNIT 4 FROM BUS 274735                  / ELWOO;4P 18
 END
```

23. (CE - CE) The DRESDEN ; R 345/138 kV transformer (from bus 270717 to bus 275180 ckt 1) loads from 100.91% to 111.11% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of '111-L1223T__'. This project contributes approximately 48.98 MW to the thermal violation.

```
CONTINGENCY '111-L1223T__'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 END
```

24. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 106.31% to 110.96% (**DC 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 100.17 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 19 for a table containing the generators having contribution to this flowgate.

25. (CE - CE) The PONTIAC ; B-LORETTO ; B 345 kV line (from bus 270852 to bus 270704 ckt 1) loads from 102.62% to 104.45% (**DC power flow**) of its emergency rating (1241 MVA) for the single line contingency outage of '363_B2_TOR1682'. This project contributes approximately 22.67 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
```

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

26. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.83% to 112.38% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 110.17 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 21 for a table containing the generators having contribution to this flowgate.

27. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.14% to 111.73% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 111.05 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
```

28. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.1% to 111.69% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 111.03 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
```

29. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 133.27% to 138.27% (**DC 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 177.93 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 22 for a table containing the generators having contribution to this flowgate.

30. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 136.85% to 141.96% (**DC 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 181.68 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 23 for a table containing the generators having contribution to this flowgate.

31. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.22% to 143.24% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 154.78 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
```

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

32. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.22% to 143.2% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 153.77 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 X1-020 TAP 765 1
 OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1          / 243206 05DUMONT 765 270644 WILTON ; 765 1
 END
```

33. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 138.15% to 143.16% (**DC power flow**) of its emergency rating (1390 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 154.74 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
```

34. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 133.42% to 139.04% (**DC 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 121.2 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 25 for a table containing the generators having contribution to this flowgate.

35. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.16% to 137.83% (**DC 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 122.22 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
```

36. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 132.14% to 137.81% (**DC 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 122.21 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
```

37. (CE - CE) The DRESDEN ;3M-DRESDEN ; B 138 kV line (from bus 275180 to bus 271336 ckt 1) loads from 124.47% to 137.72% (**DC power flow**) of its emergency rating (530 MVA) for the line fault with failed breaker contingency outage of '900-45-BT4-5__'. This project contributes approximately 70.25 MW to the thermal violation.

```
CONTINGENCY '900-45-BT4-5__'
 TRIP BRANCH FROM BUS 270737 TO BUS 270767 CKT 1          / ELWOO; R 345 GOODI;1R 345
 TRIP BRANCH FROM BUS 270736 TO BUS 270737 CKT 1          / ELWOO; B 345 ELWOO; R 345
 END
```

Please refer to Appendix 26 for a table containing the generators having contribution to this flowgate.

38. (CE - CE) The DRESDEN ;3M-DRESDEN ; B 138 kV line (from bus 275180 to bus 271336 ckt 1) loads from 103.39% to 118.08% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of '345-L1222__R-S'. This project contributes approximately 70.51 MW to the thermal violation.

```
CONTINGENCY '345-L1222__R-S'
 TRIP BRANCH FROM BUS 270717 TO BUS 270737 CKT 1          / DRESD; R 345 ELWOO; R 345
 END
```

39. (CE - CE) The DRESDEN ;3M-DRESDEN ; B 138 kV line (from bus 275180 to bus 271336 ckt 1) loads from 104.24% to 117.54% (**DC power flow**) of its emergency rating (530 MVA) for the line fault with failed breaker contingency outage of '900-45-BT2-3__'. This project contributes approximately 70.48 MW to the thermal violation.

```
CONTINGENCY '900-45-BT2-3__'
 TRIP BRANCH FROM BUS 270717 TO BUS 270737 CKT 1          / DRESD; R 345 ELWOO; R 345
 TRIP BRANCH FROM BUS 270737 TO BUS 274757 CKT 1          / ELWOO; R 345 ELWOO;1P 345
 TRIP BRANCH FROM BUS 274757 TO BUS 274729 CKT 1          / ELWOO;1P 345 ELWOO;1P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274731 CKT 1          / ELWOO;1P 345 ELWOO;2P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274733 CKT 1          / ELWOO;1P 345 ELWOO;3P 18
 TRIP BRANCH FROM BUS 274757 TO BUS 274735 CKT 1          / ELWOO;1P 345 ELWOO;4P 18
 REMOVE UNIT 1 FROM BUS 274729                  / ELWOO;1P 18
 REMOVE UNIT 2 FROM BUS 274731                  / ELWOO;2P 18
 REMOVE UNIT 3 FROM BUS 274733                  / ELWOO;3P 18
 REMOVE UNIT 4 FROM BUS 274735                  / ELWOO;4P 18
 END
```

40. (CE - CE) The DRESDEN ;3M-DRESDEN ; B 138 kV line (from bus 275180 to bus 271336 ckt 1) loads from 100.84% to 111.05% (**DC power flow**) of its emergency rating (480 MVA) for the single line contingency outage of '111-L1223T__'. This project contributes approximately 48.98 MW to the thermal violation.

```
CONTINGENCY '111-L1223T__'
 TRIP BRANCH FROM BUS 270717 TO BUS 270731 CKT 1          / DRESD; R 345 ELECT;4R 345
 END
```

41. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 122.84% to 127.85% (**DC 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 177.93 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 27 for a table containing the generators having contribution to this flowgate.

42. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 125.4% to 130.51% (**DC 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 181.68 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 28 for a table containing the generators having contribution to this flowgate.

43. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 121.36% to 122.49% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 92.2 MW to the thermal violation.

```
CONTINGENCY '286_B2_TOR1687'
 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1          / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1
 OPEN BRANCH FROM BUS 348885 TO BUS 348887 CKT 1          / 348885 7BUNSONVILLE 345 348887 7SIDNEY 345 1
 OPEN BRANCH FROM BUS 348885 TO BUS 348886 CKT 1          / 348885 7BUNSONVILLE 345 348886 4BUNSONVILLE 138 1
 END
```

Please refer to Appendix 29 for a table containing the generators having contribution to this flowgate.

44. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 121.04% to 122.1% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '1363_B2'. This project contributes approximately 86.96 MW to the thermal violation.

```
CONTINGENCY '1363_B2'
 OPEN BRANCH FROM BUS 348885 TO BUS 348887 CKT 1          / 348885 7BUNSONVILLE 345 348887 7SIDNEY 345 1
 END
```

45. (MISO AMIL - AEP) The 7BUNSONVILLE-05EUGENE 345 kV line (from bus 348885 to bus 243221 ckt 1) loads from 120.33% to 122.02% (**DC power flow**) of its normal rating (822 MVA) for the single line contingency outage of '685_B2_TOR1686'. This project contributes approximately 83.06 MW to the thermal violation.

```
CONTINGENCY '685_B2_TOR1686'
 OPEN BRANCH FROM BUS 243213 TO BUS 346809 CKT 1          / 243213 05BREED 345 346809 7CASEY 345 1
 END
```

Please refer to Appendix 30 for a table containing the generators having contribution to this flowgate.

46. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 123.75% to 126.66% (**DC 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 91.26 MW to the thermal violation.

```
CONTINGENCY '2978_C2_05DUMONT 765-B_A'
 OPEN BRANCH FROM BUS 243206 TO BUS 907040 CKT 1          / 243206 05DUMONT 765 907040 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 31 for a table containing the generators having contribution to this flowgate.

47. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.86% to 117.0% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '112-65-BT4-5__'. This project contributes approximately 98.21 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
```

48. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 113.85% to 116.99% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of '112-65-BT3-4__'. This project contributes approximately 98.21 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
```

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)

Overdutied circuit breaker at Dresden 138kV L1206 is being replaced under S-0896.

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 - 2019

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