Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AD1-064

West DeKalb

March 2018

Network Impacts for Primary POI

The Queue Project AD1-064 was evaluated as a 150.0 MW (Capacity 26.4 MW) injection tapping Wayne to Byron 345kV line in the ComEd area. Project AD1-064 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-064 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None

Multiple Facility Contingency

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

1. (MISO NIPS - CE) The 17GREEN_ACRE-GREENACRE; T 345 kV line (from bus 255104 to bus 270771 ckt 1) loads from 97.27% to 97.45% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 12.43 MW to the thermal violation.

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

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

Contribution to Previously Identified Overloads

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

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 108.14% to 108.35% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.78 MW to the thermal violation.

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

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

2. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.36% to 107.57% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 13.88 MW to the thermal violation.

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

3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.35% to 107.56% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 13.88 MW to the thermal violation.

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

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.28% to 107.49% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 13.87 MW to the thermal violation.

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

5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 160.31% to 160.54% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.48 MW to the thermal violation.

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

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

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6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 157.05% to 157.3% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 21.97 MW to the thermal violation.

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

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.85% to 157.1% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 22.03 MW to the thermal violation.

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

8. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 105.72% to 105.92% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 49.69 MW to the thermal violation.

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

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

9. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 102.84% to 103.02% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_641'. This project contributes approximately 48.46 MW to the thermal violation.

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

10. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.8% to 129.04% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.01 MW to the thermal violation.

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

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

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

11. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.34% to 128.58% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 18.0 MW to the thermal violation.

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

12. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 127.85% to 128.09% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 18.13 MW to the thermal violation.

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

13. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 109.21% to 109.41% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 12.43 MW to the thermal violation.

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

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

14. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 107.82% to 108.03% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 12.56 MW to the thermal violation.

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

15. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 107.8% to 108.01% (**DC power flow**) of its emergency rating (971 MVA) for

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the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 12.56 MW to the thermal violation.

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

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.14% to 108.35% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.78 MW to the thermal violation.

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

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

17. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.36% to 107.57% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 13.88 MW to the thermal violation.

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

18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.35% to 107.56% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 13.88 MW to the thermal violation.

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

19. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.27% to 107.48% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 13.87 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_023-65-BT4-5__'
```

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```
 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
```

20. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 140.65% to 140.94% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 22.58 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT5-6__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1          / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1          / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1          / WILTO;4M 345 WILTO;4C 33
 END
```

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

21. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 143.64% to 143.93% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 23.06 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT2-3__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1          / WILTO;3M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1          / WILTO;3M 345 WILTO; B 345
 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1          / WILTO;3M 345 WILTO;3C 33
 END
```

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

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 125.27% to 125.5% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 19.32 MW to the thermal violation.

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

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

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.86% to 125.09% (**DC power flow**) of its emergency rating (1399

MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 19.43 MW to the thermal violation.

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

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.84% to 125.07% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 19.43 MW to the thermal violation.

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

25. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.63% to 124.86% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 19.41 MW to the thermal violation.

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

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 131.3% to 131.55% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.07 MW to the thermal violation.

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

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

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.22% to 130.46% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 15.19 MW to the thermal violation.

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

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```
 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 130.21% to 130.46% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 15.19 MW to the thermal violation.

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

29. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.11% to 130.36% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 15.18 MW to the thermal violation.

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

30. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 140.65% to 140.94% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 22.58 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT5-6__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1          / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1          / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1          / WILTO;4M 345 WILTO;4C 33
 END
```

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

31. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 143.64% to 143.93% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 23.06 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT2-3__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1          / WILTO;3M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1          / WILTO;3M 345 WILTO; B 345
 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1          / WILTO;3M 345 WILTO;3C 33
 END
```

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

Steady-State Voltage Requirements
(Results of the steady-state voltage studies should be inserted here)

To be determined

Short Circuit
(Summary of impacted circuit breakers)

No issues identified.

Affected System Analysis & Mitigation

MISO Impacts:

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

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.27% to 107.48% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.87 MW to the thermal violation.

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

2. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.84% to 157.09% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 22.03 MW to the thermal violation.

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

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3. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 98.51% to 98.68% (**DC power flow**) of its normal rating (4105 MVA) for the single line contingency outage of 'COMED_P1-2_697_B2'. This project contributes approximately 46.08 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_697_B2'
 OPEN BRANCH FROM BUS 243229 TO BUS 274804 CKT 1              / 243229 05OLIVE 345 274804 UPNOR;RP 345 1
 END
```

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 127.83% to 128.06% (**DC power flow**) of its emergency rating (1195 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 18.13 MW to the thermal violation.

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

5. (CE - CE) The COLLINS ; R-COLLINS ;2M 345 kV line (from bus 270697 to bus 275168 ckt 1) loads from 105.1% to 105.61% (**DC power flow**) of its emergency rating (1379 MVA) for the single line contingency outage of 'COMED_P1-2_765-L2315___-S'. This project contributes approximately 15.41 MW to the thermal violation.

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

6. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 107.8% to 108.0% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 12.56 MW to the thermal violation.

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

7. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.27% to 107.47% (**DC power flow**) of its emergency rating (1091 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 13.87 MW to the thermal violation.

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

8. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.63% to 124.86% (**DC power flow**) of its emergency rating (1399 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 19.41 MW to the thermal violation.

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

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9. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.11% to 130.36% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 15.18 MW to the thermal violation.

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

10. (CE - CE) The AD1-064 TAP-WAYNE ; B 345 kV line (from bus 934400 to bus 270916 ckt 1) loads from 97.1% to 102.1% (**DC power flow**) of its emergency rating (2058 MVA) for the single line contingency outage of 'COMED_P1-2_345-L97116__-R'. This project contributes approximately 98.68 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_345-L97116__-R'
 TRIP BRANCH FROM BUS 270759 TO BUS 270883 CKT 1              / U3-021 SILVE; R 345
 END
```

11. (CE - CE) The AD1-064 TAP-WAYNE ; B 345 kV line (from bus 934400 to bus 270916 ckt 1) loads from 95.47% to 101.45% (**DC power flow**) of its normal rating (1679 MVA) for non-contingency condition. This project contributes approximately 96.11 MW to the thermal violation.

Light Load Analysis - 2021

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

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)

Multiple Facility Contingency

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1. (MISO NIPS - CE) The 17GREEN_ACRE-GREENACRE; T 345 kV line (from bus 255104 to bus 270771 ckt 1) loads from 97.27% to 97.45% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 12.43 MW to the thermal violation.

COMED:
ComEd 345kV L6615 SLD & ALDR ratings are 1195 MVA & 1374 MVA. No upgrade is required.

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

Note: this project is not the first to cause and the mitigation may be greater than $5 million; this violation was left in the report since it may be valid and cost allocation is not performed during the Feasibility study phase; the violation will be further evaluated during the System Impact Study phase.

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

1. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 108.14% to 108.35% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.78 MW to the thermal violation.

COMED:
ComEd 345kV L6617 SLD & ALDR ratings are 1237 MVA & 1423 MVA. No upgrade is required.

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

2. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.36% to 107.57% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 13.88 MW to the thermal violation.

Same as Contribution to Previously Identified #1

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3. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.35% to 107.56% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 13.88 MW to the thermal violation.

Same as Contribution to Previously Identified #1

4. (MISO NIPS - CE) The 17STJOHN-ST JOHN ; T 345 kV line (from bus 255112 to bus 270886 ckt 1) loads from 107.28% to 107.49% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 13.87 MW to the thermal violation.

Same as Contribution to Previously Identified #1

5. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 160.31% to 160.54% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.48 MW to the thermal violation.

AEP:

• (N4058) Sag study results: Stillwell - Dumont 345 kV line work will include the replacement of tower 20 with a custom steel pole, replacement of tower 24 with a custom H-frame and the removal of swing angle brackets on 2 structures. Cost estimate is $1.613M. New SE rating will be 1718 MVA limited by a Dumont wavetrap and possibly the conductor.

- **This upgrade is driven by a prior queue. Per PJM cost allocation rules, AC1-002 LTF presently does not receive cost allocation for this upgrade. Note: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, AC1-002 LTF could receive cost allocation.**

• Additional AEP-end upgrade: Rebuild 8.6 miles of the AEP owned line and upgrade necessary Dumont terminal equipment (wavetrap) at a cost of $20M. PJM Network Upgrade N4790. New AEP-end ratings to be 1409/2045 MVA (SN/SE). Limited by Dumont risers.

• Additional AEP-end upgrade: In addition to upgrading the Dumont risers, a different conductor (compared to the prior upgrade) will need to be selected to achieve the desired rating. The new conductor would be 1272 dual ACSR conductor. The additional cost for this work scope is $2M. The new AEP-end ratings to be 1690/2278 MVA SN/SE (limited by the conductor). PJM Network Upgrade N5064.

• Additional AEP-end upgrade: AEP said it would cost $4.8M to string a second Stillwell- Dumont 345 kV line on the existing tower. The $4.8M is for 8.5 miles of the AEP portion. Would need a NIPSCO portion (2.87 miles) cost estimate.

• MISO end – ratings are 1409/1779 MVA. MISO end upgrade: Rebuild NIPSCO portion of line (2.87 miles) at a cost of $6.5M and upgrade Stillwell substation

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equipment at a cost of $1.5M. Total cost is $8.0M. New expected MISO end ratings will be 1582/1898 MVA SN/SE.
• Additional MISO-end upgrade: Reconductor 2.87 miles of transmission conductor to bundled 954 ACSS, replace substation conductor to bundled 2500 AL, and replace wavetrap. $12M. New MISO-end ratings to be 2550/2923 MVA SN/SE.

Estimated Schedule: (1) Sag study : 6 to 12 months. (2) Rebuild. The standard time required for construction differs from state to state. An Approximate construction would be 36 to 48 months after signing an interconnection agreement.

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

6. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 157.05% to 157.3% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 21.97 MW to the thermal violation.

Same as Contribution to Previously Identified #5

7. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.85% to 157.1% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 22.03 MW to the thermal violation.

Same as Contribution to Previously Identified #5

8. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 105.72% to 105.92% (**DC power flow**) of its emergency rating (4105 MVA) for the tower line contingency outage of 'COMED_P7_345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 49.69 MW to the thermal violation.

COMED:
ComEd 765kV L11215 SLD & ALDR ratings are 4802 MVA & 5522 MVA. No upgrade is required.

AEP:
(1) An Engineering study need to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload, Estimated Cost: $25,000. New relay packages will be required if the settings cannot be adjusted, Estimated Cost:$600,000. An approximate construction time would be 12 months after signing an interconnection agreement.

9. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 102.84% to 103.02% (**DC power flow**) of its emergency rating (4105 MVA) for the

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tower line contingency outage of 'COMED_P7_641'. This project contributes approximately 48.46 MW to the thermal violation.

Same as Contribution to Previously Identified #8

10. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.8% to 129.04% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 18.01 MW to the thermal violation.

COMED:
ComEd 345kV L17703 SLD & ALDR ratings are 1367 MVA & 1572 MVA. The post contingency flow exceeds the ratings therefore an upgrade is required. The upgrade will be re-sag the line. Upon completion of this upgrade the ratings will be 1201/1479/1768/2033 MVA, SN/SE/SLD/ALDR. The preliminary estimate for this upgrade is $4.5M with a construction timeline of 24-30 months.
MISO NIPS:
The external (i.e. Non-PJM) Transmission Owner, MISO NIPS, will not evaluate this violation until the impact study phase.

11. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.34% to 128.58% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 18.0 MW to the thermal violation.

Same as Contribution to Previously Identified #10

12. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 127.85% to 128.09% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 18.13 MW to the thermal violation.

Same as Contribution to Previously Identified #10

13. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 109.21% to 109.41% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 12.43 MW to the thermal violation.

COMED:
ComEd 345Kv L6615 SLD & ALDR ratings are 2070 MVA & 2381 MVA. No upgrade required.

AEP:
(1)A sag study will be required on the 40.64 mile section line to mitigate the

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overload. Depending on the sag study results, cost for the upgrade is expected to be between $1,62,560 (no remediations required just sag study) and $81.28 million (complete line reconductor/rebuild required).
(2)This is a CE -AEP tie line , therefore PJM will have to coordinate this upgrade with CE as well as to make sure their equipment will not set a limit lower than what is specified here.
(3)Replace olive line risers , estimated cost :$ 100,000.

Estimated Time: (1) Sag study : 6 to 12 months. (2) Rebuild. The standard time required for construction differs from state to state. An Approximate construction would be 24 to 36 months after signing an interconnection agreement.

14. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 107.82% to 108.03% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 12.56 MW to the thermal violation.

Same as Contribution to Previously Identified #13

15. (CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 107.8% to 108.01% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 12.56 MW to the thermal violation.

Same as Contribution to Previously Identified #13

16. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 108.14% to 108.35% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 13.78 MW to the thermal violation.

COMED:
ComEd 345Kv L6617 SLD & ALDR ratings are 1237 MVA & 1423 MVA. No upgrade is required.

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

17. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.36% to 107.57% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 13.88 MW to the thermal violation.

Same as Contribution to Previously Identified #16

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18. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.35% to 107.56% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 13.88 MW to the thermal violation.

Same as Contribution to Previously Identified #16

19. (CE - MISO NIPS) The ST JOHN ; T-17GREEN_ACRE 345 kV line (from bus 270886 to bus 255104 ckt 1) loads from 107.27% to 107.48% (**DC power flow**) of its emergency rating (1091 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 13.87 MW to the thermal violation.

Same as Contribution to Previously Identified #16

20. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 140.65% to 140.94% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 22.58 MW to the thermal violation.

COMED:
ComEd post contingency facility overloaded by this event is Tr. 93 @ Station 112 Wilton Center. The upgrade will be to build out the 765kV ring bus at Wilton Center, installation of two 765 kV Bus Tie Circuit Breakers (BT 6-8 & 8-2) along with a relocation of 765kV L11216 from bus 6 to bus 8. Preliminary estimate for upgrade is $8M with an estimated construction time line of 24 months. Note, the rating for Tr. 93 at Wilton Center will remain current however with this upgrade the 112-65-BT5-6 contingency file will no longer include the Wilton Center Tr. 94 and will allow both transformers to remain in service eliminating the overload.

21. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 143.64% to 143.93% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 23.06 MW to the thermal violation.

COMED:
ComEd TSS 112 Tr. 94 SLD & ALDR ratings are 1601 MVA & 1841 MVA. The post contingency flow for this event exceeds the ratings therefore an upgrade is required. The proposed upgrade will be to install a third transformer at Wilton Center. Upgrades include expansion on the 765kV & 345kV buses at Wilton Center. The preliminary estimate for this upgrade is $15.2M with a preliminary construction time line of 24-30 months.

22. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 125.27% to 125.5% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of

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'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 19.32 MW to the thermal violation.

COMED:
ComEd 345kV L94507 SLD is 1674 MVA & ALDR is 1925 MVA. No upgrade required.

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

23. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.86% to 125.09% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 19.43 MW to the thermal violation.

Same as Contribution to Previously Identified #23

24. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.84% to 125.07% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 19.43 MW to the thermal violation.

Same as Contribution to Previously Identified #23

25. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 124.63% to 124.86% (**DC power flow**) of its emergency rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 19.41 MW to the thermal violation.

Same as Contribution to Previously Identified #23

26. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 131.3% to 131.55% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 15.07 MW to the thermal violation.

COMED:
ComEd 345kV L97008 SLD is 1237 MVA and the ALDR is 1423 MVA. No upgrade required.

AEP:
(1) The 40.64 mile section of line will have to reconductored/rebuilt to mitigate the overload. Estimated Cost is $80.42 million.

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(2)This is a CE -AEP tie line , therefore PJM is going to coordinate this upgrade with CE as well as to make sure that this equipment will not set a limit lower than what is specified here.
(3)Replace the Olive switches to line risers , estimated cost :100,000.
(4) An Engineering study need to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload,Estimated Cost: $25,000.New relay packages will be required if the settings cannot be adjusted,Estimatedcost:$600,000.
An Approximate construction time would be 24 to 36 months after signing an interconnection agreement.

27. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.22% to 130.46% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT4-5__'. This project contributes approximately 15.19 MW to the thermal violation.

Same as Contribution to Previously Identified #26

28. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.21% to 130.46% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT3-4__'. This project contributes approximately 15.19 MW to the thermal violation.

Same as Contribution to Previously Identified #26

29. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 130.11% to 130.36% (**DC power flow**) of its emergency rating (971 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 15.18 MW to the thermal violation.

Same as Contribution to Previously Identified #26

30. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 140.65% to 140.94% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 22.58 MW to the thermal violation.

Same as Contribution to Previously Identified #20

31. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 143.64% to 143.93% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 23.06 MW to the thermal violation.

Same as Contribution to Previously Identified #21

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Light Load Load Flow Analysis Reinforcements

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

None

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

None

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Network Impacts for Secondary POI

The Queue Project AD1-064 was evaluated as a 150.0 MW (Capacity 26.4 MW) injection to West Dekalb; 4R 138kV Substation in the ComEd area. Project AD1-064 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-064 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2021

Generator Deliverability

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

None

Multiple Facility Contingency

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

1. (CE - CE) The WATERMAN ; B-SANDWICH ; R 138 kV line (from bus 272728 to bus 272445 ckt 1) loads from 77.21% to 96.09% (**DC power flow**) of its load dump rating (433 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_083-38-BT3-4__'. This project contributes approximately 82.32 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_083-38-BT3-4__'
 TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1          / ELECT; B 138 W541 ; B 138
 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1          / GLIDD;BT 138 GLIDD; B 138
 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1          / GLIDD;BT 138 WATER; B 138
 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1          / W541 ; B 138 N AUR; B 138
 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1          / N AUR; B 138 SUGAR; B 138
 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1          / SUGAR; B 138 GLIDD;BT 138
 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587      / W541 ; B 138 W541 ; R 138
 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523      / SUGAR; B 138 SUGAR; R 138
 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1          / N AUR; B 138 N AUR; R 138
 TRIP BRANCH FROM BUS 271558 TO BUS 272730 CKT 1          / GLIDD; B 138 WATER;3B 138
 MOVE 100 PERCENT LOAD FROM BUS 272761 TO BUS 272759      / W DEK;7R 138 W DEK;4R 138
 DISCONNECT BUS 271581                    / B200 ; R 138
 DISCONNECT BUS 272757                    / W DEK;7T 138
 END
```

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

2. (CE - CE) The WATERMAN ; B-SANDWICH ; R 138 kV line (from bus 272728 to bus 272445 ckt 1) loads from 77.46% to 95.72% (**DC power flow**) of its load dump rating (321 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_111-38-TR82___'. This project contributes approximately 58.51 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_111-38-TR82___'
 TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1          / ELECT; B 138 W541 ; B 138
```

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```
TRIP BRANCH FROM BUS 271390 TO BUS 272724 CKT 1          / ELECT; B 138 WARRE;BT 138
TRIP BRANCH FROM BUS 271390 TO BUS 275239 CKT 1          / ELECT; B 138 ELECT;2M 138
MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587      / W541 ; B 138 W541 ; R 138
MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523      / SUGAR; B 138 SUGAR; R 138
CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1           / N AUR; B 138 N AUR; R 138
DISCONNECT BUS 271560                    / GLIDD;BT 138
DISCONNECT BUS 272522                    / SUGAR; B 138
DISCONNECT BUS 275239                    / ELECT;2M 138
REMOVE SWSHUNT FROM BUS 271390
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. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 160.17% to 160.41% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 21.39 MW to the thermal violation.

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

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

2. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.75% to 157.01% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 21.91 MW to the thermal violation.

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

3. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.72% to 156.98% (**DC power flow**) of its emergency rating (1409 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 21.94 MW to the thermal violation.

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

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.8% to 129.05% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of

'AEP_P4_#2978_05DUMONT 765'. This project contributes approximately 17.9 MW to the thermal violation.

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

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

5. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 128.32% to 128.58% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3__'. This project contributes approximately 17.87 MW to the thermal violation.

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

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 127.85% to 128.11% (**DC power flow**) of its emergency rating (1195 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT4-5__'. This project contributes approximately 18.03 MW to the thermal violation.

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

7. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 138.46% to 138.85% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 21.43 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT5-6__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1          / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1          / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1          / WILTO;4M 345 WILTO;4C 33
 END
```

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

8. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 141.47% to 141.86% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 21.88 MW to the thermal violation.

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```
CONTINGENCY 'COMED_P4_112-65-BT2-3__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1          / WILTO;3M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1          / WILTO;3M 345 WILTO; B 345
 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1          / WILTO;3M 345 WILTO;3C 33
 END
```

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

9. (CE - CE) The WATERMAN ; B-GLIDDEN ;BT 138 kV line (from bus 272728 to bus 271560 ckt 1) loads from 107.54% to 132.89% (**DC power flow**) of its load dump rating (275 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_146-38-BT_____'. This project contributes approximately 70.22 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_146-38-BT_____'
 TRIP BRANCH FROM BUS 271116 TO BUS 272250 CKT 1          / BRIST; B 138 PLANO; B 138
 TRIP BRANCH FROM BUS 272024 TO BUS 271182 CKT 1          / MONTG; B 138 W507 ; B 138
 TRIP BRANCH FROM BUS 272026 TO BUS 271116 CKT 1          / MONTG;BT 138 BRIST; B 138
 TRIP BRANCH FROM BUS 272026 TO BUS 272024 CKT 1          / MONTG;BT 138 MONTG; B 138
 TRIP BRANCH FROM BUS 272202 TO BUS 272026 CKT 1          / OSWEG; B 138 MONTG;BT 138
 TRIP BRANCH FROM BUS 272794 TO BUS 272202 CKT 1          / WOLFS; B 138 OSWEG; B 138
 MOVE 100 PERCENT LOAD FROM BUS 271116 TO BUS 271117      / BRIST; B 138 BRIST; R 138
 MOVE 100 PERCENT LOAD FROM BUS 272202 TO BUS 272203      / OSWEG; B 138 OSWEG; R 138
 CLOSE LINE FROM BUS 271182 TO BUS 271183 CKT 1          / W507 ; B 138 W507 ; R 138
 CLOSE LINE FROM BUS 272024 TO BUS 272025 CKT 1          / MONTG; B 138 MONTG; R 138
 TRIP BRANCH FROM BUS 272728 TO BUS 272445 CKT 1          / WATER; B 138 SANDW; R 138
 END
```

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

10. (CE - CE) The W DEKALB ;3T-WATERMAN ;3B 138 kV line (from bus 272756 to bus 272730 ckt 1) loads from 105.62% to 129.88% (**DC power flow**) of its load dump rating (452 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_006-45-BT3-4__'. This project contributes approximately 109.5 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_006-45-BT3-4__'
 TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1          / LEECO;BP 345 BYRON; B 345
 REMOVE UNIT 1 FROM BUS 274656                    / BYRON;1U 25
 END
```

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

11. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 138.46% to 138.85% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6__'. This project contributes approximately 21.43 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT5-6__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1          / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1          / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1          / WILTO;4M 345 WILTO;4C 33
```

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```
END
```

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

12. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 141.47% to 141.86% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 21.88 MW to the thermal violation.

```
CONTINGENCY 'COMED_P4_112-65-BT2-3__'
 TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1          / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1          / WILTO;3M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1          / WILTO;3M 345 WILTO; B 345
 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1          / WILTO;3M 345 WILTO;3C 33
 END
```

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

Steady-State Voltage Requirements
(Results of the steady-state voltage studies should be inserted here)

To be determined

Short Circuit
(Summary of impacted circuit breakers)

No issues identified.

Affected System Analysis & Mitigation

MISO Impacts:

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

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 156.7% to 156.96% (**DC power flow**) of its normal rating (1409

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MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 21.93 MW to the thermal violation.

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

2. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 127.83% to 128.09% (**DC power flow**) of its emergency rating (1195 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 18.01 MW to the thermal violation.

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

3. (CE - CE) The COLLINS ; R-COLLINS ;2M 345 kV line (from bus 270697 to bus 275168 ckt 1) loads from 105.41% to 105.94% (**DC power flow**) of its emergency rating (1379 MVA) for the single line contingency outage of 'COMED_P1-2_765-L2315___-S'. This project contributes approximately 15.46 MW to the thermal violation.

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

4. (CE - CE) The GLIDDEN ;BT-SUGAR GRV; B 138 kV line (from bus 271560 to bus 272522 ckt 1) loads from 85.98% to 106.18% (**DC power flow**) of its emergency rating (264 MVA) for the single line contingency outage of 'COMED_P1-2_138-L11301_R-R'. This project contributes approximately 53.25 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_138-L11301_R-R'
 TRIP BRANCH FROM BUS 272728 TO BUS 272445 CKT 1              / WATER; B 138 SANDW; R 138
 END
```

5. (CE - CE) The GLIDDEN ;BT-SUGAR GRV; B 138 kV line (from bus 271560 to bus 272522 ckt 1) loads from 77.02% to 94.61% (**DC power flow**) of its normal rating (208 MVA) for non-contingency condition. This project contributes approximately 36.52 MW to the thermal violation.

6. (CE - CE) The SUGAR GRV; B-N AURORA ; B 138 kV line (from bus 272522 to bus 272114 ckt 1) loads from 66.78% to 86.97% (**DC power flow**) of its emergency rating (264 MVA) for the single line contingency outage of 'COMED_P1-2_138-L11301_R-R'. This project contributes approximately 53.25 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_138-L11301_R-R'
 TRIP BRANCH FROM BUS 272728 TO BUS 272445 CKT 1              / WATER; B 138 SANDW; R 138
 END
```

7. (CE - CE) The WATERMAN ; B-GLIDDEN ;BT 138 kV line (from bus 272728 to bus 271560 ckt 1) loads from 112.01% to 138.42% (**DC power flow**) of its emergency rating (264 MVA) for the single line contingency outage of 'COMED_P1-2_138-L11301_R-R'. This project contributes approximately 70.23 MW to the thermal violation.

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```
CONTINGENCY 'COMED_P1-2_138-L11301_R-R'
 TRIP BRANCH FROM BUS 272728 TO BUS 272445 CKT 1             / WATER; B 138 SANDW; R 138
 END
```

8. (CE - CE) The WATERMAN ; B-GLIDDEN ;BT 138 kV line (from bus 272728 to bus 271560 ckt 1) loads from 101.87% to 125.15% (**DC power flow**) of its normal rating (208 MVA) for non-contingency condition. This project contributes approximately 48.37 MW to the thermal violation.

9. (CE - CE) The WATERMAN ; B-SANDWICH ; R 138 kV line (from bus 272728 to bus 272445 ckt 1) loads from 75.99% to 94.3% (**DC power flow**) of its emergency rating (321 MVA) for the single line contingency outage of 'COMED_P1-2_138-L11106_B-R'. This project contributes approximately 58.68 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_138-L11106_B-R'
 TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1             / ELECT; B 138 W541 ; B 138
 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1             / GLIDD;BT 138 GLIDD; B 138
 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1             / GLIDD;BT 138 WATER; B 138
 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1             / W541 ; B 138 N AUR; B 138
 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1             / N AUR; B 138 SUGAR; B 138
 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1             / SUGAR; B 138 GLIDD;BT 138
 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587          / W541 ; B 138 W541 ; R 138
 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523          / SUGAR; B 138 SUGAR; R 138
 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1             / N AUR; B 138 N AUR; R 138
 END
```

10. (CE - CE) The WATERMAN ;3B-GLIDDEN ; B 138 kV line (from bus 272730 to bus 271558 ckt 1) loads from 81.37% to 101.7% (**DC power flow**) of its emergency rating (449 MVA) for the single line contingency outage of 'COMED_P2-1_113-L11323__'. This project contributes approximately 91.87 MW to the thermal violation.

```
CONTINGENCY 'COMED_P2-1_113-L11323__'
 TRIP BRANCH FROM BUS 272730 TO BUS 272728 CKT 1             / WATER;3B 138 WATER; B 138
 END
```

11. (CE - CE) The WATERMAN ;3B-WATERMAN ; B 138 kV line (from bus 272730 to bus 272728 ckt 1) loads from 79.83% to 104.18% (**DC power flow**) of its emergency rating (504 MVA) for the single line contingency outage of 'COMED_P1-2_138-L10714_R-R'. This project contributes approximately 122.52 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_138-L10714_R-R'
 TRIP BRANCH FROM BUS 271333 TO BUS 272002 CKT 1             / DIXON; R 138 MCGIR; 138
 END
```

12. (CE - CE) The WATERMAN ;3B-WATERMAN ; B 138 kV line (from bus 272730 to bus 272728 ckt 1) loads from 74.55% to 93.06% (**DC power flow**) of its normal rating (487 MVA) for non-contingency condition. This project contributes approximately 90.03 MW to the thermal violation.

13. (CE - CE) The W DEKALB ;3T-WATERMAN ;3B 138 kV line (from bus 272756 to bus 272730 ckt 1) loads from 104.61% to 128.95% (**DC power flow**) of its emergency rating (452

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MVA) for the single line contingency outage of 'COMED_P1-2_345-L15502_B-R'. This project contributes approximately 109.88 MW to the thermal violation.

```
CONTINGENCY 'COMED_P1-2_345-L15502_B-R'
 TRIP BRANCH FROM BUS 270828 TO BUS 270932 CKT 1              / NELSO; B 345 WALTO; B 345
 END
```

14. (CE - CE) The W DEKALB ;3T-WATERMAN ;3B 138 kV line (from bus 272756 to bus 272730 ckt 1) loads from 95.28% to 119.54% (**DC power flow**) of its normal rating (452 MVA) for non-contingency condition. This project contributes approximately 109.56 MW to the thermal violation.

Light Load Analysis - 2021

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

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