Generation Interconnection
Feasibility Study Report
For
PJM Generation Interconnection Request
Queue Position AA2-030
Nelson

September 2015

Network Impacts

The Queue Project AA2-030 was evaluated as a 190.0 MW (Capacity 157.0 MW) injection at the R33 345 kV substation in the Comed area. Project AA2-030 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AA2-030 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)

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 - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 94.71% to 95.55% (**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 26.16 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
```

2. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 85.25% to 85.79% (**DC power flow**) of its emergency rating (4802 MVA) for the tower line contingency outage of '345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 57.68 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
```

3. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 83.83% to 84.37% (**DC power flow**) of its emergency rating (4802 MVA) for the tower line contingency outage of '345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 57.76 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
```

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 83.86% to 84.65% (**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 20.92 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
```

5. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 82.97% to 83.76% (**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 21.0 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
```

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 83.4% to 84.19% (**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 20.9 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
```

7. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 86.38% to 87.09% (**DC power flow**) of its emergency rating (1117 MVA) for the line fault with failed breaker contingency outage of '2978_C2_05DUMONT 765-B_A'. This project contributes approximately 17.58 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.

8. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 92.4% to 93.12% (**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 25.69 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
```

9. (CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 94.31% to 95.05% (**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 26.23 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
```

10. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 96.25% to 96.72% (**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 14.59 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
```

11. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 96.24% to 96.71% (**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 14.59 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
```

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 104.56% to 105.38% (**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 25.71 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
```

2. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 102.82% to 103.54% (**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 25.69 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
```

3. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 105.75% to 106.49% (**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 26.23 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
```

4. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 102.21% to 102.71% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '1363_B2'. This project contributes approximately 14.9 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
```

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)

The 15507 breaker at Nelson was identified as overdutied in the AA1-146 project. Should the AA1-146 project be withdrawn, this project will be responsible for its replacement.

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.

1. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 94.54% to 95.37% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 26.17 MW to the thermal violation.

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

2. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 92.78% to 93.34% (**DC power flow**) of its normal rating (4047 MVA) for the single line contingency outage of '363_B2_TOR1682'. This project contributes approximately 50.7 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
```

3. (CE - MISO NIPS) The BURNHAM ; B-17SHEFFIELD 345 kV line (from bus 270674 to bus 255111 ckt 1) loads from 89.39% to 90.11% (**DC power flow**) of its emergency rating (1069 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 17.05 MW to the thermal violation.

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

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line (from bus 270677 to bus 255109 ckt 1) loads from 82.3% to 83.09% (**DC power flow**) of its emergency rating (1195 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 21.01 MW to the thermal violation.

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

```
END
```

5. (CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 88.82% to 89.56% (**DC power flow**) of its emergency rating (1399 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 22.76 MW to the thermal violation.

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

6. (CE - CE) The NELSON ; B-WALTO; B 345 kV line (from bus 270828 to bus 270932 ckt 1) loads from 103.71% to 107.82% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L0627__B-R'. This project contributes approximately 62.69 MW to the thermal violation.

```
CONTINGENCY '345-L0627__B-R'
 TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1              / LEECO;BP 345 BYRON; B 345
 END
```

7. (CE - CE) The WALTO; B-ELECT JCT; B 345 kV line (from bus 270932 to bus 270730 ckt 1) loads from 108.22% to 112.32% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L0627__B-R'. This project contributes approximately 62.69 MW to the thermal violation.

```
CONTINGENCY '345-L0627__B-R'
 TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1              / LEECO;BP 345 BYRON; B 345
 END
```

8. (CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 106.3% to 107.03% (**DC power flow**) of its emergency rating (1390 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 22.46 MW to the thermal violation.

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

9. (CE - CE) The LEE CO EC;BP-BYRON ; B 345 kV line (from bus 274768 to bus 270678 ckt 1) loads from 98.09% to 99.91% (**DC power flow**) of its emergency rating (1726 MVA) for the

single line contingency outage of '345-L18402_B-R'. This project contributes approximately 74.03 MW to the thermal violation.

```
CONTINGENCY '345-L18402_B-R'
 TRIP BRANCH FROM BUS 270932 TO BUS 270730 CKT 1              / WALTO; B 345 ELECT; B 345
 END
```

10. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 95.99% to 96.81% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 17.67 MW to the thermal violation.

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

11. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line (from bus 346809 to bus 243213 ckt 1) loads from 145.46% to 146.1% (**DC power flow**) of its normal rating (1332 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 18.96 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
```

12. (MISO AMIL - AEP) The 7BUNSONVILLE-05EUGENE 345 kV line (from bus 348885 to bus 243221 ckt 1) loads from 155.51% to 156.38% (**DC power flow**) of its normal rating (822 MVA) for the single line contingency outage of '685_B2_TOR1686'. This project contributes approximately 16.0 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
```

13. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line (from bus 909144 to bus 243219 ckt 2) loads from 96.12% to 96.59% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of '695_B2'. This project contributes approximately 14.58 MW to the thermal violation.

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

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)

The 15507 breaker at Nelson was identified as overdutied in the AA1-146 project. Should the AA1-146 project be withdrawn, this project will be responsible for its replacement.

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

1. (MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line:
To mitigate the overload on the Dumont-Stillwell 345 kV, AEP would need to do a sag study on the AEP owned section of the line. After mitigating violations identified under the sag study, the new ratings on this circuit will be 1409/1718 MVA (SN/SE). Per AEP's current records, the wave trap at Dumont station will set the new limit. AEP owns approximately 9 miles of the line. Depending on the sag study results, cost for this upgrade is expected to be between $40,000 (no remediation required) and $18 million (complete line rebuild required).
This is an AEP-NIPSCO tie line. PJM is going to have to coordinate this upgrade with NIPSCO as well to make sure that their equipment will not set a limit lower than what is specified here.
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 time would be 24 to 36 months after signing an interconnection agreement.

2. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 85.25% to 85.79% (**DC power flow**) of its emergency rating (4802 MVA) for the tower line contingency outage of '345-L94507_B-S_+_345-L97008_R-S'. This project contributes approximately 57.68 MW to the thermal violation.

AEP:

Replace the Dumont wave trap (3150A). Estimated Cost: $500,000; The estimated time required for construction is between 12 to 24 months after signing an interconnection agreement.

ComEd:

The first option would be to re-conductor the line. A preliminary estimate for this work would be $185M.

The second option, if re-conductoring is not an option then a new 765kV line would need to be constructed. A preliminary estimate for this work would be $380M. This cost would assume existing easements and a terminal at AEP-Dumont.

These options will be further evaluated in the SIS phase.

3. (CE - AEP) The WILTON ;-05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 83.83% to 84.37% (**DC power flow**) of its emergency rating (4802 MVA) for the tower line contingency outage of '345-L6607__B-S_+_345-L97008_R-S'. This project contributes approximately 57.76 MW to the thermal violation.

AEP:

Same reinforcement as Multiple Facility #2

ComEd:

Same reinforcement as Multiple Facility #2

4. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line:
The limiting element is owned by NIPSCO; this violation will be further evaluated in the SIS phase.

5. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line:
The limiting element is owned by NIPSCO; this violation will be further evaluated in the SIS phase.

6. (CE - MISO NIPS) The BURNHAM ;0R-17MUNSTER 345 kV line:
The limiting element is owned by NIPSCO; this violation will be further evaluated in the SIS phase.

7. (CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line:

ComEd:
No upgrades required.
AEP:
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 mile section of line would need to be rebuilt. Estimated Cost for the Sag Study: $160,000. Estimated Cost to re-conductor AEP section of line: $45 Million. If deemed necessary to rebuild section of line, Estimated Cost: $125 Million.
(1) Sag Study: 6 to 12 months
(2) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement.

8. (CE - CE) The WILTON; 765/345 kV transformer:
The upgrade is a third 765/345 kV transformer at TSS 112 Wilton Center along with station required upgrades associated with the new transformer. Cost is $30M. Timeline is 30-36 months (preliminary estimate).

9. (CE - CE) The WILTON ; 765/345 kV transformer:
Same reinforcement as Multiple Facility #9

10. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line:
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. Estimated Cost for the Sag Study: $56,000. If deemed necessary to rebuild section of line, Estimated Cost: $28,000,000
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 time would be 24 to 36 months after signing an interconnection agreement.

11. (AEP - AEP) The X2-052 TAP-05DUMONT 345 kV line:
Same reinforcement as Multiple Facility #11

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 - AEP) The 17STILLWELL-05DUMONT 345 kV line:
Same reinforcement as Multiple Facility #1

2. (CE - CE) The WILTON ; B-WILTON ;3M 345 kV line:
Same reinforcement as Multiple Facility #9

3. (CE - CE) The WILTON ; R-WILTON ;4M 345 kV line:
Same reinforcement as Multiple Facility #9

4. (MISO AMIL - AEP) The 7CASEY-05BREED 345 kV line:
The AEP conductor section 1 will be rebuilt as part of the Breed Station Rebuild project, scheduled to be completed by late 2015 to early 2016. There are also limiting elements that are owned by AMIL; this violation will be further analyzed in the SIS phase.