Generation Interconnection
Feasibility Study Report

For

PJM Generation Interconnection Request Queue
Position AB2-070

Brokaw -Lanesville

August 2016

Network Impacts for Option 1

The Queue Project AB2-070 was evaluated as a 200.0 MW (Capacity 26.0 MW) injection at the W2-048 345kV substation (tapping the Brokaw-Lanesville 345kV line) in the ComEd area. Project AB2-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB2-070 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2020

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

None

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

None

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

1. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 118.38% to 124.25% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT5-6__'. This project contributes approximately 46.79 MW to the thermal violation.

```
CONTINGENCY '080-45-BT5-6__'
 TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1          / PONTIAC ; B 345 BLUEMOUND; B 345
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

2. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 113.7% to 119.99% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT7-8__A'. This project contributes approximately 50.15 MW to the thermal violation.

```
CONTINGENCY '080-45-BT7-8__A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1          / PONTIAC ; R 345 Z2-087 TAP 345
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
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TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
END
```

3. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 114.13% to 119.98% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT4-5__'. This project contributes approximately 46.65 MW to the thermal violation.

```
CONTINGENCY '080-45-BT4-5__'
 TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1          / PONTI; B 345 BLUEM; B 345
 TRIP BRANCH FROM BUS 270852 TO BUS 270704 CKT 1          / PONTI; B 345 LORET; B 345
 END
```

4. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 104.49% to 115.65% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of 'LAN-45-BT1-3__'. This project contributes approximately 88.97 MW to the thermal violation.

```
CONTINGENCY 'LAN-45-BT1-3__'
 TRIP BRANCH FROM BUS 270673 TO BUS 348847 CKT 1          / BROKAW ; T 345 7BROKAW T1 345
 TRIP BRANCH FROM BUS 270673 TO BUS 276150 CKT 1          / BROKAW ; T 345 7LANSVLAM 345
 TRIP BRANCH FROM BUS 349700 TO BUS 349701 CKT 1          / 7LANSVLAM 345 4LANVL AM 138
 END
```

5. (MISO AMIL - AEP) The 7CASEY-05SULLIVAN 345 kV line (from bus 346809 to bus 247712 ckt 1) loads from 109.18% to 111.32% (**DC power flow**) of its emergency rating (1466 MVA) for the line fault with failed breaker contingency outage of '3128_C2_05EUGENE 345-A2'. This project contributes approximately 31.23 MW to the thermal violation.

```
CONTINGENCY '3128_C2_05EUGENE 345-A2'
 OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1          / 243221 05EUGENE 345 249504 08CAYSUB 345 1
 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1          / 243221 05EUGENE 345 348885 7BUNSONVILLE 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)

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. (AEP - AEP) The 05EUGENE-05DEQUIN 345 kV line (from bus 243221 to bus 243217 ckt 1) loads from 131.45% to 131.93% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of '363_B2_TOR1682'. This project contributes approximately 10.17 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
```

2. (CE - CE) The BLUEMOUND; B-PONTIAC ; B 345 kV line (from bus 270668 to bus 270852 ckt 1) loads from 101.67% to 103.8% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8001___-S_A'. This project contributes approximately 32.61 MW to the thermal violation.

```
CONTINGENCY '345-L8001___-S_A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1              / PONTI; R 345 Z2-087 TAP
 END
```

3. (CE - CE) The LORETTO ; B-WILTON ; B 345 kV line (from bus 270704 to bus 270926 ckt 1) loads from 151.31% to 154.49% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 48.58 MW to the thermal violation.

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1              / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1              / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1              / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1              / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1              / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

4. (CE - CE) The LORETTO ; B-WILTON ; B 345 kV line (from bus 270704 to bus 270926 ckt 1) loads from 114.9% to 117.31% (**DC power flow**) of its normal rating (1364 MVA) for non-

contingency condition. This project contributes approximately 32.88 MW to the thermal violation.

5. (CE - CE) The DRESDEN ; R-ELWOOD ; R 345 kV line (from bus 270717 to bus 270737 ckt 1) loads from 131.96% to 133.79% (**DC power flow**) of its emergency rating (1479 MVA) for the single line contingency outage of '345-L1223_TR-S'. This project contributes approximately 27.06 MW to the thermal violation.

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

6. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 108.6% to 114.41% (**DC power flow**) of its emergency rating (797 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 46.27 MW to the thermal violation.

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

7. (CE - CE) The PONTIAC ; B-LORETTO ; B 345 kV line (from bus 270852 to bus 270704 ckt 1) loads from 171.81% to 175.73% (**DC power flow**) of its emergency rating (1241 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 48.64 MW to the thermal violation.

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

8. (CE - CE) The PONTIAC ; R-DRESDEN ; R 345 kV line (from bus 270853 to bus 270717 ckt 1) loads from 154.61% to 157.86% (**DC power flow**) of its emergency rating (1481 MVA) for the single line contingency outage of '345-L11212_B-S'. This project contributes approximately 48.12 MW to the thermal violation.

```
CONTINGENCY '345-L11212_B-S'
 TRIP BRANCH FROM BUS 270926 TO BUS 270704 CKT 1          / WILTO; B 345 LORET; B 345
 END
```

9. (CE - CE) The PONTIAC ; R-DRESDEN ; R 345 kV line (from bus 270853 to bus 270717 ckt 1) loads from 111.79% to 114.14% (**DC power flow**) of its normal rating (1334 MVA) for non-contingency condition. This project contributes approximately 31.42 MW to the thermal violation.

10. (MISO AMIL - AEP) The 7CASEY-05SULLIVAN 345 kV line (from bus 346809 to bus 247712 ckt 1) loads from 113.87% to 116.18% (**DC power flow**) of its normal rating (1334 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 30.87 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
 END
```

11. (MISO AMIL - CE) The 7BROKAW-AB2-047 TAP 345 kV line (from bus 348847 to bus 924040 ckt 1) loads from 104.41% to 108.36% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8002___-S'. This project contributes approximately 60.38 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S'
 TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1              / PONTI; B 345 BLUEM; B 345
 END
```

12. (CE - CE) The W4-005 TAP-BLUEMOUND; B 345 kV line (from bus 905080 to bus 270668 ckt 1) loads from 98.26% to 100.71% (**DC power flow**) of its emergency rating (1334 MVA) for the single line contingency outage of '345-L8001___-S_A'. This project contributes approximately 32.69 MW to the thermal violation.

```
CONTINGENCY '345-L8001___-S_A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1              / PONTI; R 345 Z2-087 TAP
 END
```

13. (CE - CE) The Z2-087 TAP-PONTIAC ; R 345 kV line (from bus 920791 to bus 270853 ckt 1) loads from 121.34% to 125.29% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8002___-S'. This project contributes approximately 60.38 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S'
 TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1              / PONTI; B 345 BLUEM; B 345
 END
```

14. (CE - CE) The Z2-087 TAP-PONTIAC ; R 345 kV line (from bus 920791 to bus 270853 ckt 1) loads from 99.57% to 103.72% (**DC power flow**) of its normal rating (1334 MVA) for non-

contingency condition. This project contributes approximately 55.29 MW to the thermal violation.

15. (CE - CE) The AB2-047 TAP-Z2-087 TAP 345 kV line (from bus 924040 to bus 920791 ckt 1) loads from 113.1% to 117.05% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8002___-S'. This project contributes approximately 60.38 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S'
 TRIP BRANCH FROM BUS 270852 TO BUS 270668 CKT 1              / PONTI; B 345 BLUEM; B 345
 END
```

Light Load Analysis - 2020

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

System Reinforcements

Short Circuit

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

None.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

To be determined

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements

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

None

Contribution to Previously Identified System Reinforcements

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

1. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 118.38% to 124.25% (**DC power flow**) of its emergency rating (797

MVA) for the line fault with failed breaker contingency outage of '080-45-BT5-6__'. This project contributes approximately 46.79 MW to the thermal violation.

Comed: ComEd facility is 345kV L2106. The ComEd SLD rating is 1494 MVA (rating shown is Ameren). No ComEd upgrade required.

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

2. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 113.7% to 119.99% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT7-8__A'. This project contributes approximately 50.15 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #1

3. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 114.13% to 119.98% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT4-5__'. This project contributes approximately 46.65 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #1

4. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 104.49% to 115.65% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of 'LAN-45-BT1-3__'. This project contributes approximately 88.97 MW to the thermal violation.

Same as Contribution to Previously Identified Overload #1

5. (MISO AMIL - AEP) The 7CASEY-05SULLIVAN 345 kV line (from bus 346809 to bus 247712 ckt 1) loads from 109.18% to 111.32% (**DC power flow**) of its emergency rating (1466 MVA) for the line fault with failed breaker contingency outage of '3128_C2_05EUGENE 345-A2'. This project contributes approximately 31.23 MW to the thermal violation.

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

AEP
No upgrades required. AEP ratings are 1443/1685 MVA (SN/SE).

Network Impacts for Option 2

The Queue Project AB2-070 was evaluated as a 200.0 MW (Capacity 26.0 MW) injection tapping the Blue Mound-Latham 345kV line (W4-005 Tap) in the ComEd area. Project AB2-070 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AB2-070 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis - 2020

Generator Deliverability

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

None

Multiple Facility Contingency

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

None

Contribution to Previously Identified Overloads

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

1. (CE - CE) The DRESDEN ; R-ELWOOD ; R 345 kV line (from bus 270717 to bus 270737 ckt 1) loads from 110.54% to 112.46% (**DC power flow**) of its emergency rating (1768 MVA) for the line fault with failed breaker contingency outage of '111-45-L1223T_'. This project contributes approximately 33.86 MW to the thermal violation.

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

2. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 122.56% to 129.24% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT5-6__A'. This project contributes approximately 53.17 MW to the thermal violation.

Note to TOs: ComEd ALDR rating should be applied to the ComEd side of this overload

```
CONTINGENCY '080-45-BT5-6__A'
 TRIP BRANCH FROM BUS 270852 TO BUS 924040 CKT 1          / PONTIAC ; B 345 AB2-047 TAP OP2 345
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
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TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
END
```

3. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 118.38% to 125.05% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT4-5__A'. This project contributes approximately 53.14 MW to the thermal violation.

Note to TOs: ComEd ALDR rating should be applied to the ComEd side of this overload

```
CONTINGENCY '080-45-BT4-5__A'
 TRIP BRANCH FROM BUS 270852 TO BUS 924040 CKT 1          / PONTI; B 345 AB2-047 TAP OP2 345
 TRIP BRANCH FROM BUS 270852 TO BUS 270704 CKT 1          / PONTI; B 345 LORET; B 345
 END
```

4. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 111.8% to 116.83% (**DC power flow**) of its emergency rating (797 MVA) for the line fault with failed breaker contingency outage of '080-45-BT7-8__A'. This project contributes approximately 40.07 MW to the thermal violation.

Note to TOs: ComEd ALDR rating should be applied to the ComEd side of this overload

```
CONTINGENCY '080-45-BT7-8__A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1          / PONTIAC ; R 345 Z2-087 TAP 345
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

5. (MISO AMIL - AEP) The 7CASEY-05SULLIVAN 345 kV line (from bus 346809 to bus 247712 ckt 1) loads from 109.48% to 111.45% (**DC power flow**) of its emergency rating (1466 MVA) for the line fault with failed breaker contingency outage of '3128_C2_05EUGENE 345-A2'. This project contributes approximately 28.93 MW to the thermal violation.

```
CONTINGENCY '3128_C2_05EUGENE 345-A2'
 OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1          / 243221 05EUGENE 345 249504 08CAYSUB 345 1
 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1          / 243221 05EUGENE 345 348885 7BUNSONVILLE 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)

To be determined

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. (CE - CE) The BLUEMOUND; B-AB2-047 TAP 345 kV line (from bus 270668 to bus 924040 ckt 1) loads from 99.01% to 104.34% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8001___-S_A'. This project contributes approximately 81.45 MW to the thermal violation.

```
CONTINGENCY '345-L8001___-S_A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1          / PONTI; R 345 Z2-087 TAP
 END
```

2. (CE - CE) The LORETTO ; B-WILTON ; B 345 kV line (from bus 270704 to bus 270926 ckt 1) loads from 151.61% to 155.54% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 59.97 MW to the thermal violation.

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

3. (CE - CE) The LORETTO ; B-WILTON ; B 345 kV line (from bus 270704 to bus 270926 ckt 1) loads from 115.15% to 118.11% (**DC power flow**) of its normal rating (1364 MVA) for non-contingency condition. This project contributes approximately 40.43 MW to the thermal violation.

4. (CE - CE) The DRESDEN ; R-ELWOOD ; R 345 kV line (from bus 270717 to bus 270737 ckt 1) loads from 132.12% to 134.41% (**DC power flow**) of its emergency rating (1479 MVA)

for the single line contingency outage of '345-L1223_TR-S'. This project contributes approximately 33.86 MW to the thermal violation.

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

5. (CE - MISO AMIL) The KINCAID ; B-7AUSTIN 345 kV line (from bus 270796 to bus 347955 ckt 1) loads from 108.83% to 114.02% (**DC power flow**) of its emergency rating (797 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 41.41 MW to the thermal violation.

Note to TOs: ComEd Short Term Emergency rating should be applied to the ComEd side of this overload

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

6. (CE - MISO AMIL) The LATHAM ; T-7LATHAM 345 kV line (from bus 270804 to bus 348856 ckt 1) loads from 100.65% to 112.84% (**DC power flow**) of its emergency rating (908 MVA) for the single line contingency outage of '345-L8002___-S_A'. This project contributes approximately 110.67 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S_A'
 TRIP BRANCH FROM BUS 270852 TO BUS 924040 CKT 1          / PONTI; B 345 AB2-047 TAP OP2 345
 END
```

7. (CE - CE) The PONTIAC ; B-LORETTO ; B 345 kV line (from bus 270852 to bus 270704 ckt 1) loads from 172.2% to 177.03% (**DC power flow**) of its emergency rating (1241 MVA) for the single line contingency outage of '345-L8014_T_-S'. This project contributes approximately 60.03 MW to the thermal violation.

```
CONTINGENCY '345-L8014_T_-S'
 TRIP BRANCH FROM BUS 270853 TO BUS 270717 CKT 1          / PONTIAC ; R 345 DRESDEN ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 270853 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 345
 TRIP BRANCH FROM BUS 275210 TO BUS 272261 CKT 1          / PONTIAC ;2M 138 PONTIAC ; R 138
 TRIP BRANCH FROM BUS 275210 TO BUS 275310 CKT 1          / PONTIAC ;2M 138 PONTIAC ;2C 34.5
 CLOSE BRANCH FROM BUS 272260 TO BUS 272261 CKT 1          / PONTIAC ; B 138 PONTIAC ; R 138
 END
```

8. (CE - CE) The PONTIAC ; R-DRESDEN ; R 345 kV line (from bus 270853 to bus 270717 ckt 1) loads from 154.91% to 158.94% (**DC power flow**) of its emergency rating (1481 MVA) for the single line contingency outage of '345-L11212_B-S'. This project contributes approximately 59.66 MW to the thermal violation.

```
CONTINGENCY '345-L11212_B-S'
 TRIP BRANCH FROM BUS 270926 TO BUS 270704 CKT 1              / WILTO; B 345 LORET; B 345
 END
```

9. (CE - CE) The PONTIAC ; R-DRESDEN ; R 345 kV line (from bus 270853 to bus 270717 ckt 1) loads from 112.0% to 114.93% (**DC power flow**) of its normal rating (1334 MVA) for non-contingency condition. This project contributes approximately 39.12 MW to the thermal violation.

10. (MISO AMIL - AEP) The 7CASEY-05SULLIVAN 345 kV line (from bus 346809 to bus 247712 ckt 1) loads from 113.94% to 116.09% (**DC power flow**) of its normal rating (1334 MVA) for the single line contingency outage of '286_B2_TOR1687'. This project contributes approximately 28.64 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
 END
```

11. (MISO AMIL - CE) The 7BROKAW-Z2-087 TAP 345 kV line (from bus 348847 to bus 920791 ckt 1) loads from 107.97% to 110.81% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8002___-S_A'. This project contributes approximately 43.27 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S_A'
 TRIP BRANCH FROM BUS 270852 TO BUS 924040 CKT 1              / PONTI; B 345 AB2-047 TAP OP2 345
 END
```

12. (CE - CE) The W4-005 TAP-BLUEMOUND; B 345 kV line (from bus 905080 to bus 270668 ckt 1) loads from 95.21% to 101.32% (**DC power flow**) of its emergency rating (1334 MVA) for the single line contingency outage of '345-L8001___-S_A'. This project contributes approximately 81.53 MW to the thermal violation.

```
CONTINGENCY '345-L8001___-S_A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1              / PONTI; R 345 Z2-087 TAP
 END
```

13. (CE - CE) The Z2-087 TAP-PONTIAC ; R 345 kV line (from bus 920791 to bus 270853 ckt 1) loads from 115.9% to 118.73% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8002___-S_A'. This project contributes approximately 43.27 MW to the thermal violation.

```
CONTINGENCY '345-L8002___-S_A'
 TRIP BRANCH FROM BUS 270852 TO BUS 924040 CKT 1              / PONTI; B 345 AB2-047 TAP OP2 345
 END
```

14. (CE - CE) The AB2-047 TAP-PONTIAC ; B 345 kV line (from bus 924040 to bus 270852 ckt 1) loads from 109.39% to 114.73% (**DC power flow**) of its emergency rating (1528 MVA) for the single line contingency outage of '345-L8001___-S_A'. This project contributes approximately 81.45 MW to the thermal violation.

```
CONTINGENCY '345-L8001___-S_A'
 TRIP BRANCH FROM BUS 270853 TO BUS 920791 CKT 1              / PONTI; R 345 Z2-087 TAP
 END
```

Light Load Analysis - 2020

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