

Feasibility Study Report

For

***PJM Generation Interconnection Request
Queue Position AC1-168***

Kewanee—Streator

March 2017

Network Impacts for Primary Point of Interconnection

The Queue Project AC1-168 was evaluated as a 79.4 MW (Capacity 10.3 MW) injection tapping the Hennepin Tap-Streator 138kV line in the ComEd area. Project AC1-168 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-168 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 KEWANEE ;12-4EDWARDS3 138 kV line (from bus 271837 to bus 349637 ckt 1) loads from 108.31% to 109.63% (**DC power flow**) of its emergency rating (143 MVA) for the line fault with failed breaker contingency outage of '155-38-L15508_'. This project contributes approximately 4.2 MW to the thermal violation.

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CONTINGENCY '155-38-L15508_'
TRIP BRANCH FROM BUS 271331 TO BUS 271333 CKT 1      / DIXON;8R 138 DIXON; R 138
TRIP BRANCH FROM BUS 272097 TO BUS 271331 CKT 1      / NELSO;RT 138 DIXON;8R 138
TRIP BRANCH FROM BUS 272097 TO BUS 272095 CKT 1      / NELSO;RT 138 NELSO; R 138
TRIP BRANCH FROM BUS 272097 TO BUS 293710 CKT 1      / NELSO;RT 138 O29 138
MOVE 100 PERCENT LOAD FROM BUS 271331 TO BUS 271330  / DIXON;8R 138 DIXON;7B 138
DISCONNECT BUS 272095                                / NELSO; R 138
END
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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. (CE - MISO AMIL) The HENNEPIN ; T-4HENNEPIN S 138 kV line (from bus 271655 to bus 348918 ckt 1) loads from 93.41% to 117.14% (**DC power flow**) of its normal rating (160 MVA) for non-contingency condition. This project contributes approximately 37.96 MW to the thermal violation.

2. (CE - MISO AMIL) The KEWANEE ;13-4KEWANEE N 138 kV line (from bus 271838 to bus 348923 ckt 1) loads from 93.38% to 94.61% (**DC power flow**) of its emergency rating (449 MVA) for the single line contingency outage of '138-L91902_R-S'. This project contributes approximately 12.28 MW to the thermal violation.

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CONTINGENCY '138-L91902_R-S'  
TRIP BRANCH FROM BUS 348918 TO BUS 271655 CKT 1 / HENNEPIN T143  
END
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3. (CE - CE) The LASCO STA; B-MAZON ; B 138 kV line (from bus 271908 to bus 271986 ckt 1) loads from 91.47% to 100.61% (**DC power flow**) of its emergency rating (223 MVA) for the single line contingency outage of 'TR81_LASCO_B-S'. This project contributes approximately 20.38 MW to the thermal violation.

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CONTINGENCY 'TR81_LASCO_B-S'  
TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345  
TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138  
END
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4. (CE - CE) The NORMANDY ; R-O09 OP1 138 138 kV line (from bus 272111 to bus 293510 ckt 1) loads from 89.21% to 90.22% (**DC power flow**) of its emergency rating (214 MVA) for

the single line contingency outage of 'KEWANEE ;13-4KEWANEE N'. This project contributes approximately 4.8 MW to the thermal violation.

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CONTINGENCY 'KEWANEE ;13-4KEWANEE N'  
DISCONNECT BRANCH FROM BUS 271838 TO BUS 348923 CKT 1  
END
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5. (CE - CE) The ROCK FALL; R-NELSON ; R 138 kV line (from bus 272367 to bus 272095 ckt 1) loads from 169.67% to 171.21% (**DC power flow**) of its emergency rating (223 MVA) for the single line contingency outage of '187-L15508__'. This project contributes approximately 7.64 MW to the thermal violation.

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CONTINGENCY '187-L15508__'  
TRIP BRANCH FROM BUS 293710 TO BUS 272097 CKT 1 / O29 ; 138 NELSO;RT 138  
END
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6. (CE - CE) The ROCK FALL; R-NELSON ; R 138 kV line (from bus 272367 to bus 272095 ckt 1) loads from 108.34% to 109.5% (**DC power flow**) of its normal rating (173 MVA) for non-contingency condition. This project contributes approximately 4.43 MW to the thermal violation.

7. (CE - CE) The O09 OP1 138-ROCK FALL; R 138 kV line (from bus 293510 to bus 272367 ckt 1) loads from 200.13% to 201.81% (**DC power flow**) of its emergency rating (214 MVA) for the single line contingency outage of '187-L15508__'. This project contributes approximately 7.99 MW to the thermal violation.

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CONTINGENCY '187-L15508__'  
TRIP BRANCH FROM BUS 293710 TO BUS 272097 CKT 1 / O29 ; 138 NELSO;RT 138  
END
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8. (CE - CE) The O09 OP1 138-ROCK FALL; R 138 kV line (from bus 293510 to bus 272367 ckt 1) loads from 134.97% to 136.19% (**DC power flow**) of its normal rating (173 MVA) for non-contingency condition. This project contributes approximately 4.71 MW to the thermal violation.

9. (CE - CE) The O29-NELSON ;RT 138 kV line (from bus 293710 to bus 272097 ckt 1) loads from 165.92% to 167.28% (**DC power flow**) of its emergency rating (264 MVA) for the single line contingency outage of '133-CB_23__'. This project contributes approximately 7.92 MW to the thermal violation.

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CONTINGENCY '133-CB_23__'  
TRIP BRANCH FROM BUS 272367 TO BUS 293510 CKT 1 / R FAL; R 138 O9 138  
END
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10. (CE - CE) The O29-NELSON ;RT 138 kV line (from bus 293710 to bus 272097 ckt 1) loads from 131.2% to 132.19% (**DC power flow**) of its normal rating (208 MVA) for non-contingency condition. This project contributes approximately 4.59 MW to the thermal violation.

11. (CE - CE) The AC1-168 TAP-HENNEPIN ; T 138 kV line (from bus 926820 to bus 271655 ckt 1) loads from 98.39% to 137.11% (**DC power flow**) of its emergency rating (184 MVA) for the single line contingency outage of '138-L0112__B-S'. This project contributes approximately 71.24 MW to the thermal violation.

CONTINGENCY '138-L0112__B-S'
TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138 LASCO; B 138
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 KEWANEE ;12-4EDWARDS3 138 kV line (from bus 271837 to bus 349637 ckt 1) loads from 108.31% to 109.63% (**DC power flow**) of its emergency rating (143

MVA) for the line fault with failed breaker contingency outage of '155-38-L15508_'. This project contributes approximately 4.2 MW to the thermal violation.

ComEd: ComEd 138kV L7423 SLD rating is 256 MVA and the ALDR rating is 290 MVA. No upgrade is required.

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

Network Impacts for Secondary POI

The Queue Project AC1-168 was evaluated as a 79.4 MW (Capacity 10.3 MW) injection tapping the Oglesby Tap-Mazon 138kV line in the ComEd area. Project AC1-168 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-168 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)

1. (CE - CE) The KEWANEE ;11-KEWANEE ;12 138 kV line (from bus 271836 to bus 271837 ckt 1) loads from 86.86% to 114.18% (**DC power flow**) of its emergency rating (256 MVA) for the line fault with failed breaker contingency outage of '077-38-BT_R___A'. This project contributes approximately 69.95 MW to the thermal violation.

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CONTINGENCY '077-38-BT_R___A'  
TRIP BRANCH FROM BUS 272189 TO BUS 926820 CKT 1 / OGLS; T 138 AC1-168 TAP 138  
TRIP BRANCH FROM BUS 272189 TO BUS 348935 CKT 1 / OGLS; T 138 4OGLESBY MN 138  
TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138  
TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138  
TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / AC1-168 TAP 138 OGLSBY ; T 138  
TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138  
TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138  
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138  
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138  
MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138  
CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138  
DISCONNECT BUS 274836 / EQUICSTAR ; R 13.8  
END
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2. (CE - CE) The KEWANEE ;11-KEWANEE ;12 138 kV line (from bus 271836 to bus 271837 ckt 1) loads from 86.53% to 113.85% (**DC power flow**) of its emergency rating (256 MVA) for the tower line contingency outage of '138-L0108__B-S+_138-L7713__R-S_B'. This project contributes approximately 69.94 MW to the thermal violation.

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CONTINGENCY '138-L0108__B-S+_138-L7713__R-S_B'  
TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO STA; B 138 MAZON ; B 138  
TRIP BRANCH FROM BUS 926820 TO BUS 271987 CKT 1 / AC1-168 TAP 138 MAZON; R 138  
TRIP BRANCH FROM BUS 272189 TO BUS 348935 CKT 1 / OGLS; T 138 4OGLESBY MN 138  
END
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3. (CE - CE) The NORMANDY ; R-O09 OP1 138 138 kV line (from bus 272111 to bus 293510 ckt 1) loads from 86.55% to 87.88% (**DC power flow**) of its emergency rating (230 MVA) for the bus fault outage of '074_KE-138__1'. This project contributes approximately 6.78 MW to the thermal violation.

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CONTINGENCY '074_KE-138__1'
DISCONNECT BUS 271836           / KEWAN; 1 138
DISCONNECT BUS 271837           / KEWAN; 5 138
DISCONNECT BUS 271838           / KEWAN; 4 138
END
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4. (CE - CE) The NORMANDY ; R-O09 OP1 138 138 kV line (from bus 272111 to bus 293510 ckt 1) loads from 86.55% to 87.88% (**DC power flow**) of its emergency rating (230 MVA) for the line fault with failed breaker contingency outage of '074-38-L7413__'. This project contributes approximately 6.78 MW to the thermal violation.

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CONTINGENCY '074-38-L7413__'
TRIP BRANCH FROM BUS 271836 TO BUS 271241 CKT 1 / KEWAN; 1 138 CRESC; R 138
DISCONNECT BUS 271836           / KEWAN; 1 138
DISCONNECT BUS 271837           / KEWAN; 5 138
DISCONNECT BUS 271838           / KEWAN; 4 138
END
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5. (CE - MISO AMIL) The OGLESBY ; T-4OGLESBY MN 138 kV line (from bus 272189 to bus 348935 ckt 1) loads from 96.22% to 124.38% (**DC power flow**) of its emergency rating (202 MVA) for the tower line contingency outage of '138-L6101__-S_+_138-L91902__R-S'. This project contributes approximately 56.87 MW to the thermal violation.

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CONTINGENCY '138-L6101__-S_+_138-L91902__R-S'
TRIP BRANCH FROM BUS 926820 TO BUS 271987 CKT 1 / AC1-168 OPT2; 138 MAZON; 138
TRIP BRANCH FROM BUS 271835 TO BUS 271655 CKT 1 / KEWANEE; 138 HENNEPIN 138
TRIP BRANCH FROM BUS 271655 TO BUS 272521 CKT 1 / HENNEPIN; 138 STREAT; 138
END
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6. (CE - MISO AMIL) The OGLESBY ; T-4OGLESBY MN 138 kV line (from bus 272189 to bus 348935 ckt 1) loads from 82.51% to 112.6% (**DC power flow**) of its emergency rating (202 MVA) for the tower line contingency outage of '138-L0903__R-S_+_138-L1206__R-S_B_A'. This project contributes approximately 60.77 MW to the thermal violation.

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CONTINGENCY '138-L0903__R-S_+_138-L1206__R-S_B_A'
TRIP BRANCH FROM BUS 271567 TO BUS 271337 CKT 1 / GOOSE LK ; R 138 DRESDEN ; R 138
TRIP BRANCH FROM BUS 271567 TO BUS 274190 CKT 7 / GOOSE LK ; R 138 GOOSE LK ; 34.5
TRIP BRANCH FROM BUS 271725 TO BUS 271723 CKT 1 / ESS J370 ;RT 138 ESS J370 ; R 138
MOVE 100 PERCENT LOAD FROM BUS 271181 TO BUS 271180 / ESS J326 ; R 138 ESS J326 ; B 138
MOVE 100 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138
MOVE 100 PERCENT LOAD FROM BUS 271783 TO BUS 271416 / JOLIET374; R 138 ESS J390 ; B 138
MOVE 100 PERCENT LOAD FROM BUS 272019 TO BUS 272018 / MINOOKA ; R 138 MINOOKA ; B 138
MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138
MOVE 100 PERCENT LOAD FROM BUS 272318 TO BUS 272319 / ESS J375 ; B 138 ESS J375 ; R 138
CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
DISCONNECT BUS 271185           / ESS J326 ;RT 138
DISCONNECT BUS 271417           / ESS J390 ; R 138
DISCONNECT BUS 271473           / ESS J305 ;RT 138
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TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138
 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138
 TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / MAZON ; R 138 AC1-168 TAP 138
 TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138
 TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138
 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
 DISCONNECT BUS 274836
 END

7. (CE - CE) The AC1-168 TAP-OGLESBY ; T 138 kV line (from bus 926820 to bus 272189 ckt 1) loads from 90.1% to 122.95% (**DC power flow**) of its emergency rating (185 MVA) for the tower line contingency outage of '138-L0903__R-S+_138-L1206__R-S_B_A'. This project contributes approximately 60.77 MW to the thermal violation.

CONTINGENCY '138-L0903__R-S+_138-L1206__R-S_B_A'
 TRIP BRANCH FROM BUS 271567 TO BUS 271337 CKT 1 / GOOSE LK ; R 138 DRESDEN ; R 138
 TRIP BRANCH FROM BUS 271567 TO BUS 274190 CKT 7 / GOOSE LK ; R 138 GOOSE LK ; 34.5
 TRIP BRANCH FROM BUS 271725 TO BUS 271723 CKT 1 / ESS J370 ;RT 138 ESS J370 ; R 138
 MOVE 100 PERCENT LOAD FROM BUS 271181 TO BUS 271180 / ESS J326 ; R 138 ESS J326 ; B 138
 MOVE 100 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138
 MOVE 100 PERCENT LOAD FROM BUS 271783 TO BUS 271416 / JOLIET374; R 138 ESS J390 ; B 138
 MOVE 100 PERCENT LOAD FROM BUS 272019 TO BUS 272018 / MINOOKA ; R 138 MINOOKA ; B 138
 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138
 MOVE 100 PERCENT LOAD FROM BUS 272318 TO BUS 272319 / ESS J375 ; B 138 ESS J375 ; R 138
 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
 DISCONNECT BUS 271185 / ESS J326 ;RT 138
 DISCONNECT BUS 271417 / ESS J390 ; R 138
 DISCONNECT BUS 271473 / ESS J305 ;RT 138
 TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138
 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138
 TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / MAZON ; R 138 AC1-168 TAP 138
 TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138
 TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138
 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
 DISCONNECT BUS 274836
 END

8. (CE - MISO AMIL) The AC1-171 TAP-4EDWARDS3 138 kV line (from bus 926840 to bus 349637 ckt 1) loads from 84.94% to 86.59% (**DC power flow**) of its emergency rating (143 MVA) for the line fault with failed breaker contingency outage of '155-38-L15508_'. This project contributes approximately 5.26 MW to the thermal violation.

CONTINGENCY '155-38-L15508_'
 TRIP BRANCH FROM BUS 271331 TO BUS 271333 CKT 1 / DIXON;8R 138 DIXON; R 138
 TRIP BRANCH FROM BUS 272097 TO BUS 271331 CKT 1 / NELSO;RT 138 DIXON;8R 138
 TRIP BRANCH FROM BUS 272097 TO BUS 272095 CKT 1 / NELSO;RT 138 NELSO; R 138
 TRIP BRANCH FROM BUS 272097 TO BUS 293710 CKT 1 / NELSO;RT 138 O29 138
 MOVE 100 PERCENT LOAD FROM BUS 271331 TO BUS 271330 / DIXON;8R 138 DIXON;7B 138
 DISCONNECT BUS 272095 / NELSO; R 138
 END

9. (CE - MISO AMIL) The AC1-171 TAP-4EDWARDS3 138 kV line (from bus 926840 to bus 349637 ckt 1) loads from 69.17% to 76.01% (**DC power flow**) of its emergency rating (143 MVA) for the tower line contingency outage of '138-L0108__B-S+_138-L7713__R-S_B'. This project contributes approximately 9.78 MW to the thermal violation.

CONTINGENCY '138-L0108__B-S+_138-L7713__R-S_B'
 TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO STA; B 138 MAZON ; B 138
 TRIP BRANCH FROM BUS 926820 TO BUS 271987 CKT 1 / AC1-168 TAP 138 MAZON; R 138
 TRIP BRANCH FROM BUS 272189 TO BUS 348935 CKT 1 / OGLES; T 138 4OGLESBY MN 138
 END

10. (CE - MISO AMIL) The AC1-171 TAP-4EDWARDS3 138 kV line (from bus 926840 to bus 349637 ckt 1) loads from 68.5% to 75.33% (**DC power flow**) of its emergency rating (143 MVA) for the line fault with failed breaker contingency outage of '077-38-BT_R__A'. This project contributes approximately 9.77 MW to the thermal violation.

CONTINGENCY '077-38-BT_R__A'
 TRIP BRANCH FROM BUS 272189 TO BUS 926820 CKT 1 / OGLES; T 138 AC1-168 TAP 138
 TRIP BRANCH FROM BUS 272189 TO BUS 348935 CKT 1 / OGLES; T 138 4OGLESBY MN 138
 TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138
 TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138
 TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / AC1-168 TAP 138 OGLESBY ; T 138
 TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138
 TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138
 MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138
 MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138
 MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138
 CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
 DISCONNECT BUS 274836 / EQUICSTAR ; R 13.8
 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. (CE - CE) The AC1-168 TAP-MAZON ; R 138 kV line (from bus 926820 to bus 271987 ckt 1) loads from 114.4% to 124.5% (**DC power flow**) of its emergency rating (230 MVA) for the bus fault outage of '001_LA-138B__1'. This project contributes approximately 23.25 MW to the thermal violation.

CONTINGENCY '001_LA-138B__1'
 DISCONNECT BUS 271908 / LASCO STA; B 138
 END

2. (CE - CE) The AC1-168 TAP-MAZON ; R 138 kV line (from bus 926820 to bus 271987 ckt 1) loads from 114.4% to 124.5% (**DC power flow**) of its emergency rating (230 MVA) for the line fault with failed breaker contingency outage of '001-38-TR81__'. This project contributes approximately 23.25 MW to the thermal violation.

CONTINGENCY '001-38-TR81__'
 TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345
 TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138
 DISCONNECT BUS 271908 / LASCO STA; B 138
 TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345
 END

3. (CE - CE) The AC1-168 TAP-MAZON ; R 138 kV line (from bus 926820 to bus 271987 ckt 1) loads from 114.4% to 124.5% (**DC power flow**) of its emergency rating (230 MVA) for the line fault with failed breaker contingency outage of '001-38-L0108__'. This project contributes approximately 23.25 MW to the thermal violation.

CONTINGENCY '001-38-L0108__'
TRIP BRANCH FROM BUS 271908 TO BUS 271986 CKT 1 / LASCO; B 138 MAZON; B 138
DISCONNECT BUS 271908 / LASCO; B 138
END

4. (CE - CE) The AC1-168 TAP-OGLESBY ; T 138 kV line (from bus 926820 to bus 272189 ckt 1) loads from 105.07% to 135.81% (**DC power flow**) of its emergency rating (185 MVA) for the tower line contingency outage of '138-L6101__-S+_138-L91902__R-S'. This project contributes approximately 56.87 MW to the thermal violation.

CONTINGENCY '138-L6101__-S+_138-L91902__R-S'
TRIP BRANCH FROM BUS 926820 TO BUS 271987 CKT 1 / AC1-168 OPT2; 138 MAZON; 138
TRIP BRANCH FROM BUS 271835 TO BUS 271655 CKT 1 / KEWANEE; 138 HENNEPIN 138
TRIP BRANCH FROM BUS 271655 TO BUS 272521 CKT 1 / HENNEPIN; 138 STREAT; 138
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. (CE - CE) The LASCO STA; B-MAZON ; B 138 kV line (from bus 271908 to bus 271986 ckt 1) loads from 102.4% to 103.75% (**DC power flow**) of its emergency rating (223 MVA) for the single line contingency outage of 'TR81_LASCO_B-S'. This project contributes approximately 6.66 MW to the thermal violation.

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CONTINGENCY 'TR81_LASCO_B-S'  
TRIP BRANCH FROM BUS 270802 TO BUS 270803 CKT 1 / LASCO STA; B 345 LASCO STA; R 345  
TRIP BRANCH FROM BUS 270802 TO BUS 271908 CKT 1 / LASCO STA; B 345 LASCO STA; B 138  
END
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2. (CE - CE) The MAZON ; R-CHANNAHON; R 138 kV line (from bus 271987 to bus 271187 ckt 1) loads from 88.08% to 97.29% (**DC power flow**) of its emergency rating (223 MVA) for the single line contingency outage of '138-L0112__B-S'. This project contributes approximately 20.54 MW to the thermal violation.

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CONTINGENCY '138-L0112__B-S'  
TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138 LASCO; B 138  
END
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3. (CE - CE) The ESS J339 ; R-DRESDEN ; R 138 kV line (from bus 272125 to bus 271337 ckt 1) loads from 92.52% to 100.17% (**DC power flow**) of its emergency rating (268 MVA) for the single line contingency outage of '138-L0112__B-S'. This project contributes approximately 20.51 MW to the thermal violation.

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CONTINGENCY '138-L0112__B-S'  
TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138 LASCO; B 138  
END
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4. (CE - MISO AMIL) The OGLESBY ; T-4OGLESBY MN 138 kV line (from bus 272189 to bus 348935 ckt 1) loads from 82.37% to 112.45% (**DC power flow**) of its emergency rating (202 MVA) for the single line contingency outage of '138-L1206__R-S_A'. This project contributes approximately 60.77 MW to the thermal violation.

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CONTINGENCY '138-L1206__R-S_A'  
TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138  
TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138  
TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / MAZON ; R 138 AC1-168 TAP 138  
TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138  
TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138  
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138  
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138  
MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138  
CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138  
DISCONNECT BUS 274836 / EQUICSTAR ; R 13.8  
END
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5. (CE - CE) The ROCK FALL; R-NELSON ; R 138 kV line (from bus 272367 to bus 272095 ckt 1) loads from 153.47% to 155.35% (**DC power flow**) of its emergency rating (223 MVA) for

the single line contingency outage of '187-L15508__'. This project contributes approximately 9.34 MW to the thermal violation.

CONTINGENCY '187-L15508__'
TRIP BRANCH FROM BUS 293710 TO BUS 272097 CKT 1 / O29 ; 138 NELSO;RT 138
END

6. (CE - CE) The ROCK FALL; R-NELSON ; R 138 kV line (from bus 272367 to bus 272095 ckt 1) loads from 96.95% to 98.36% (**DC power flow**) of its normal rating (173 MVA) for non-contingency condition. This project contributes approximately 5.43 MW to the thermal violation.

7. (CE - CE) The O09 OP1 138-ROCK FALL; R 138 kV line (from bus 293510 to bus 272367 ckt 1) loads from 182.48% to 184.53% (**DC power flow**) of its emergency rating (214 MVA) for the single line contingency outage of '187-L15508__'. This project contributes approximately 9.77 MW to the thermal violation.

CONTINGENCY '187-L15508__'
TRIP BRANCH FROM BUS 293710 TO BUS 272097 CKT 1 / O29 ; 138 NELSO;RT 138
END

8. (CE - CE) The O09 OP1 138-ROCK FALL; R 138 kV line (from bus 293510 to bus 272367 ckt 1) loads from 122.82% to 124.32% (**DC power flow**) of its normal rating (173 MVA) for non-contingency condition. This project contributes approximately 5.78 MW to the thermal violation.

9. (CE - CE) The O29-NELSON ;RT 138 kV line (from bus 293710 to bus 272097 ckt 1) loads from 151.84% to 153.5% (**DC power flow**) of its emergency rating (264 MVA) for the single line contingency outage of '133-CB_23__'. This project contributes approximately 9.69 MW to the thermal violation.

CONTINGENCY '133-CB_23__'
TRIP BRANCH FROM BUS 272367 TO BUS 293510 CKT 1 / R FAL; R 138 O9 138
END

10. (CE - CE) The O29-NELSON ;RT 138 kV line (from bus 293710 to bus 272097 ckt 1) loads from 121.34% to 122.56% (**DC power flow**) of its normal rating (208 MVA) for non-contingency condition. This project contributes approximately 5.64 MW to the thermal violation.

11. (CE - CE) The AC1-168 TAP-MAZON ; R 138 kV line (from bus 926820 to bus 271987 ckt 1) loads from 116.16% to 126.62% (**DC power flow**) of its emergency rating (223 MVA) for the single line contingency outage of '138-L0112__B-S'. This project contributes approximately 23.33 MW to the thermal violation.

CONTINGENCY '138-L0112__B-S'

TRIP BRANCH FROM BUS 271844 TO BUS 271908 CKT 1 / KICKA; B 138
LASCO; B 138
END

12. (CE - CE) The AC1-168 TAP-MAZON ; R 138 kV line (from bus 926820 to bus 271987 ckt 1) loads from 91.61% to 103.56% (**DC power flow**) of its normal rating (173 MVA) for non-contingency condition. This project contributes approximately 20.67 MW to the thermal violation.

13. (CE - CE) The AC1-168 TAP-OGLESBY ; T 138 kV line (from bus 926820 to bus 272189 ckt 1) loads from 95.62% to 130.55% (**DC power flow**) of its emergency rating (174 MVA) for the single line contingency outage of '138-L1206__R-S_A'. This project contributes approximately 60.77 MW to the thermal violation.

CONTINGENCY '138-L1206__R-S_A'

TRIP BRANCH FROM BUS 271187 TO BUS 271987 CKT 1 / CHANNAHON; R 138 MAZON ; R 138
TRIP BRANCH FROM BUS 271337 TO BUS 272125 CKT 1 / DRESDEN ; R 138 ESS J339 ; R 138
TRIP BRANCH FROM BUS 271987 TO BUS 926820 CKT 1 / MAZON ; R 138 AC1-168 TAP 138
TRIP BRANCH FROM BUS 272319 TO BUS 271187 CKT 1 / ESS J375 ; R 138 CHANNAHON; R 138
TRIP BRANCH FROM BUS 272319 TO BUS 272125 CKT 1 / ESS J375 ; R 138 ESS J339 ; R 138
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271566 / CHANNAHON; R 138 GOOSE LK ; B 138
MOVE 50 PERCENT LOAD FROM BUS 271187 TO BUS 271567 / CHANNAHON; R 138 GOOSE LK ; R 138
MOVE 100 PERCENT LOAD FROM BUS 272125 TO BUS 272124 / ESS J339 ; R 138 ESS J339 ; B 138
CLOSE LINE FROM BUS 271986 TO BUS 271987 CKT 1 / MAZON ; B 138 MAZON ; R 138
DISCONNECT BUS 274836 / EQUISTAR ; R 13.8
END

Light Load Analysis - 2020

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