

Network Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet required performance criteria in accordance with the AEP FERC Form 715. Therefore, this criterion was used to assess the impact of the proposed facility on the AEP System. The Interconnection Customer's project was studied as a 100 MW (13 MW capacity) generating facility consistent with the interconnection application. Project #Y1-030 was evaluated for compliance with reliability criteria for summer peak conditions in 2015.

Generator Deliverability

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

1. George Washington-Ireland Mine 69 kV Line overloads to 102.4% of summer emergency rating of 41 MVA. Without addition of this IPP, same facility loads to 99.3% of summer emergency rating.

Contingency '5213_B2_TOR773' single line outage of George Washington – Kammer 1 138 kV line.

2. Newcomerstown 138/69 kV Transformer overloads to 103.5% of summer emergency rating of 69.2 MVA. Without addition of this IPP, same facility loads to 99.5% of summer emergency rating.

Contingency '5161_B2_TOR732' single line outage of Hillview - Newcomerstown 138 kV line, Hillview – West New Philadelphia 138 kV line, and Hillview 138 kV – Hillview 12 kV transformer.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

1. The NEVADA8-BROK SWR 69 kV line (from bus 245709 to bus 245687 ckt 1) loads from 75.61% to 133.7% (**DC power flow**) of its emergency rating (31 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 18.1 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LEASIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
END
```

2. The NEVADA8-BROK SWR 69 kV line (from bus 245709 to bus 245687 ckt 1) loads from 75.61% to 133.7% (**DC power flow**) of its emergency rating (31 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 18.1 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LESIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
END
```

3. The U SANDSK-NEVADA8 69 kV line (from bus 245715 to bus 245709 ckt 1) loads from 81.93% to 140.02% (**DC power flow**) of its emergency rating (31 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 18.1 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LESIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
END
```

4. The U SANDSK-NEVADA8 69 kV line (from bus 245715 to bus 245709 ckt 1) loads from 81.93% to 140.02% (**DC power flow**) of its emergency rating (31 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 18.1 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LESIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
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. The V1-010 TAP-05MELMOR 138 kV line (from bus 892000 to bus 243039 ckt 1) loads from 134.33% to 134.83% (**DC power flow**) of its emergency rating (167 MVA) for the tower line contingency ('C5-TWL-SR062'). This project contributes approximately 5.17 MW to the thermal violation.

CONTINGENCY 'C5-TWL-SR062' /* BROOKSIDE-HOWARD & BROOKSIDE-LEASIDE COMMON
TOWER

DISCONNECT BRANCH FROM BUS 238586 TO BUS 243024 CKT 1 /* 02BRKSID 138.00 05HOWARD 138.00

DISCONNECT BRANCH FROM BUS 238586 TO BUS 239195 CKT 1 /* 02BRKSID 138.00 02MILIRN 138.00

DISCONNECT BRANCH FROM BUS 239195 TO BUS 238891 CKT 1 /* 02MILIRN 138.00 02LESIDE 138.00

REDUCE BUS 239195 LOAD BY 100 PERCENT /* 02MILIRN 138.00

DISCONNECT BUS 239195 /* 02MILIRN 138.00

END

2. The V1-010 TAP-05MELMOR 138 kV line (from bus 892000 to bus 243039 ckt 1) loads from 134.33% to 134.83% (**DC power flow**) of its emergency rating (167 MVA) for the tower line contingency ('C5-TWL-SR062'). This project contributes approximately 5.17 MW to the thermal violation.

CONTINGENCY 'C5-TWL-SR062' /* BROOKSIDE-HOWARD & BROOKSIDE-LEASIDE COMMON
TOWER

DISCONNECT BRANCH FROM BUS 238586 TO BUS 243024 CKT 1 /* 02BRKSID 138.00 05HOWARD 138.00

DISCONNECT BRANCH FROM BUS 238586 TO BUS 239195 CKT 1 /* 02BRKSID 138.00 02MILIRN 138.00

DISCONNECT BRANCH FROM BUS 239195 TO BUS 238891 CKT 1 /* 02MILIRN 138.00 02LESIDE 138.00

REDUCE BUS 239195 LOAD BY 100 PERCENT /* 02MILIRN 138.00

DISCONNECT BUS 239195 /* 02MILIRN 138.00

END

3. The 02OTTAWA-02LAKVIEW 138 kV line (from bus 239030 to bus 238874 ckt 1) loads from 209.07% to 209.31% (**DC power flow**) of its emergency rating (339 MVA) for the tower line contingency ('C5-TWL-CR040'). This project contributes approximately 5.73 MW to the thermal violation.

CONTINGENCY 'C5-TWL-CR040' /* DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV

DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1 /* 02DAV-BE 345.00 02HAYES 345.00

DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1 /* 02DAV-BE 345.00 02BEAVER 345.00

END

4. The 02OTTAWA-02LAKVIEW 138 kV line (from bus 239030 to bus 238874 ckt 1) loads from 209.07% to 209.31% (**DC power flow**) of its emergency rating (339 MVA) for the tower

line contingency ('C5-TWL-CR040'). This project contributes approximately 5.73 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-CR040'                /* DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV
DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1    /* 02DAV-BE 345.00 02HAYES 345.00
DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1    /* 02DAV-BE 345.00 02BEAVER 345.00
END
```

5. The 05HOWARD-02BRKSID 138 kV line (from bus 243024 to bus 238586 ckt 1) loads from 225.27% to 225.94% (**DC power flow**) of its emergency rating (173 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 7.23 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LESIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
END
```

6. The 05HOWARD-02BRKSID 138 kV line (from bus 243024 to bus 238586 ckt 1) loads from 225.27% to 225.94% (**DC power flow**) of its emergency rating (173 MVA) for the tower line contingency ('C5-TWL-SR063'). This project contributes approximately 7.23 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-SR063'                /* GALION-LEASIDE & GALION-GM COMMON TOWER
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238891 CKT 1    /* 02GALION 138.00 02LESIDE 138.00
DISCONNECT BRANCH FROM BUS 238746 TO BUS 238758 CKT 1    /* 02GALION 138.00 02GM MAN 138.00
END
```

7. The 02LAKVIEW-02GRNFLD 138 kV line (from bus 238874 to bus 238768 ckt 1) loads from 256.05% to 256.39% (**DC power flow**) of its emergency rating (243 MVA) for the tower line contingency ('C5-TWL-CR040'). This project contributes approximately 5.73 MW to the thermal violation.

```
CONTINGENCY 'C5-TWL-CR040'                /* DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV
DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1    /* 02DAV-BE 345.00 02HAYES 345.00
```

DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1 /* 02DAV-BE 345.00 02BEAVER 345.00
END

8. The 02LAKVEW-02GRNFLD 138 kV line (from bus 238874 to bus 238768 ckt 1) loads from 256.05% to 256.39% (**DC power flow**) of its emergency rating (243 MVA) for the tower line contingency ('C5-TWL-CR040'). This project contributes approximately 5.73 MW to the thermal violation.

CONTINGENCY 'C5-TWL-CR040' /* DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV
DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1 /* 02DAV-BE 345.00 02HAYES 345.00
DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1 /* 02DAV-BE 345.00 02BEAVER 345.00
END

9. Howard-Brookside 138 kV Line overloads to 146.9% of summer normal rating of 133 MVA. Without addition of this IPP, same facility loads to 141.1% of summer normal rating.

10. Howard-Brookside 138 kV Line overloads to 127.9% of summer emergency rating of 173 MVA. Without addition of this IPP, same facility loads to 123.8% of summer emergency rating.

Contingency '1286_B2_TOR556A_MOAB_WOMOP' single line outage of Galion – Ohio Central 345 kV line.

Short Circuit

(Summary of impacted circuit breakers)

No Problems Identified

New System Reinforcements

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

1, 2, 3, 4 listed in the Multiple Facility Contingency section of this report are not violations because sub-transmission is not planned for category C contingencies, these facilities are not monitored.

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)

| Upgrade | Description | Total Cost |
|---------|---|------------------|
| 1, 2 | MELMORE-V1-010 TAP 138 kV: The 397.5 ACSR conductor (section 1), Howard Risers, and Howard CT are the limiting elements. A sag check will be required for the 397.5 ACSR conductor (section 1) to determine if the line section can be operated above its emergency rating of 167 MVA. The results of the sag study could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 26.93 mile section of line would need to be rebuilt. | \$107,720 |
| | The Howard 138 kV risers will need to be replaced. | \$50,000 |
| | An engineering study will need to be conducted to adjust the ratio settings for the Howard 138 kV CT (400A connected 2000 A capable) to mitigate the overload. The existing connected ratio is 80/1 and it has the capability of 400/1. | \$10,000 |
| | Total | \$167,720 |

Table 2 –Contribution to Previously Identified System Reinforcements in AEP

| Upgrade | Description | Total Cost |
|-------------------|---|---------------------|
| 3, 4, 7, 8 | Add new Hayes-West Freemont No.2 138kV Line Position to the Hayes 138kV substation @ Hayes SS | \$1,014,900 |
| | Hayes-West Freemont No.2, 138kV New 28 Mile line | \$5,744,900 |
| | OPGW fiber for 28 miles | \$640,500 |
| | Create the West Fremont - Hayes 138kV #2 line by installing a 138 kV power circuit breaker and associated equipment at West Fremont Substation. This exit assumes a new breaker string is constructed for the 1st 138 kV exit to Hayes Substation @ West Freemont | \$727,100 |
| | Hayes Sub. Add new 138 kV circuit Breaker for new line exit for new Hayes - West Freemont 138 kV line. Modify relaying for Groton 138 kV Substation | \$1,194,900 |
| | West Freemont Sub. Add two new 138 kV circuit breakers to create a new line exit for the new Hayes-West Freemont 138 kV Line | \$2,114,400 |
| | Groton Sub. Install new 138/69 kV substation near existing Bellevue-Greenfield 69 kV Line. | \$9,475,100 |
| | Nameplate and Drawing Modifications. | \$104,300 |
| | Groton 138 kV Loop. Hayes-West Freemont 138 kV, Loop to proposed 138/69 kV Groton Substation. | \$1,261,800 |
| | Groton 69 kV Loop. Bellevue-Greenfield West 69 kV, Loop to proposed 138/69 kV Groton Substation. | \$152,900 |
| | Hayes-West Freemont 138 kV, New 28 Mile Line. Install a new 138 kV line between the proposed Hayes Sub and the existing West Freemont Sub. The exact route is to be determined after the selection studies are completed. | \$24,757,100 |
| | OPGE Fiber. Install on new 138 kV line between the proposed Hayes Substation and the existing West Freemont Substation, 28 Miles. This includes additional fiber from new Groton substation to Hayes Substation, 9 miles. | \$3,752,900 |
| | Totals | \$50,940,800 |

Table 3 –Contribution to Previously Identified System Reinforcements in both ATSI and AEP

| Upgrade | TO | Option | Description | Total Cost |
|--|-----|--------|--|--------------|
| 5, 6, 9, 10 | FE | 1 | Upgrade based on Gen Retirement = Reconductor Howard-Brookside 138kV line - ATSI portion | \$3M to \$5M |
| | | 2 | Upgrade based on Generation Queue Additions = 138kV Station + new 138kV line | \$22M |
| | AEP | 1 | The near future AEP solution for the Brookside-Howard 138 kV overload involves performing a Sag Study, including both Tabletop and LiDAR components, to raise the emergency rating of the line to 235 MVA. So long as re-conductoring is not apparent as immediately being necessary, AEP currently estimates a cost of approximately \$50K and about a year to complete the Study. The project has already been approved by AEP as a baseline upgrade | \$50,000 |
| Totals (Assuming most expensive FE Option 2) | | | | \$22M |

Table 4 –Contribution to Previously Identified System Reinforcements in First Energy and AEP

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. The FOREST-U SANDSK 69 kV line (from bus 245695 to bus 245715 ckt 1) loads from 20.95% to 101.82% (**DC power flow**) of its normal rating (69 MVA) for non-contingency condition. This project contributes approximately 55.8 MW to the thermal violation.

2. The FOREST-U SANDSK 69 kV line (from bus 245695 to bus 245715 ckt 1) loads from 21.03% to 101.91% (**DC power flow**) of its normal rating (69 MVA) for non-contingency condition. This project contributes approximately 55.8 MW to the thermal violation.

3. The NEVADA8-BROK SWR 69 kV line (from bus 245709 to bus 245687 ckt 1) loads from 47.66% to 105.91% (**DC power flow**) of its normal rating (31 MVA) for non-contingency condition. This project contributes approximately 18.14 MW to the thermal violation.

4. The U SANDSK-NEVADA8 69 kV line (from bus 245715 to bus 245709 ckt 1) loads from 54.01% to 112.26% (**DC power flow**) of its normal rating (31 MVA) for non-contingency condition. This project contributes approximately 18.14 MW to the thermal violation.

5. The BUCYRS C-N BUCYRU 69 kV line (from bus 245653 to bus 245667 ckt 1) loads from 115.31% to 119.63% (**DC power flow**) of its emergency rating (31 MVA) for the single line contingency ('5132_B2_TOR688'). This project contributes approximately 8.28 MW to the thermal violation.

CONTINGENCY '5132_B2_TOR688'

OPEN BRANCH FROM BUS 242976 TO BUS 243117 CKT 1 / 242976 05BUCYRC 138 243117 05SULFRS 138 1

OPEN BRANCH FROM BUS 243024 TO BUS 243117 CKT 1 / 243024 05HOWARD 138 243117 05SULFRS 138 1

END

6. The 05HOWARD-02BRKSID 138 kV line (from bus 243024 to bus 238586 ckt 1) loads from 236.01% to 236.93% (**DC power flow**) of its normal rating (133 MVA) for non-contingency condition. This project contributes approximately 7.67 MW to the thermal violation.

7. The 05HOWARD-02BRKSID 138 kV line (from bus 243024 to bus 238586 ckt 1) loads from 236.01% to 236.93% (**DC power flow**) of its normal rating (133 MVA) for non-contingency condition. This project contributes approximately 7.67 MW to the thermal violation.

Conclusion

The primary point of interconnection (POI) for the project is at the Forest 69 kV Substation via a single 69 kV breaker.

The secondary point of interconnection (POI) for the project is at Fostoria 345 kV Substation via a new 345 kV breaker.

Network Impact data is provided for both POIs, but cost estimates are only provided for the Primary POI at Forest 69 kV. Table 5 lists the estimated costs for the primary point of interconnection. The estimate also assumes the \$22M First Energy upgrade from table 4 will be required.

| Table | Description | Cost |
|--------------|-------------------------------------|---------------------|
| 1 | Attachment Facilities (Primary POI) | \$597,412 |
| 2 | AEP CPISR | \$167,720 |
| 3 | ATSI/AEP CPISR | \$50,940,800 |
| 4 | FE/AEP CPISR | \$22,000,000 |
| | Total | \$73,705,932 |

Table 5 – Feasibility cost estimate for Y1-030

OPTION 2

Network Impacts

The Queue Project #Y1-030 secondary POI was studied as a 120.0MW (Capacity13.0MW) injection at the FOSTORIA 345 kV substation in the AEP area. Project #Y1-030 was evaluated for compliance with reliability criteria for summer peak conditions in 2015. Network impacts are evaluated for secondary POI at the feasibility level, but estimates are only provided for the Primary POI. Potential network impacts were as follows:

Generator Deliverability

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

1. George Washington-Ireland Mine 69 kV Line overloads to 102.4% of summer emergency rating of 41 MVA. Without addition of this IPP, same facility loads to 99.3% of summer emergency rating.

Contingency '5213_B2_TOR773' single line outage of George Washington – Kammer 1 138 kV line.

2. Newcomerstown 138/69 kV Transformer overloads to 103.5% of summer emergency rating of 69.2 MVA. Without addition of this IPP, same facility loads to 99.5% of summer emergency rating.

Contingency '5161_B2_TOR732' single line outage of Hillview - Newcomerstown 138 kV line, Hillview – West New Philadelphia 138 kV line, and Hillview 138 kV – Hillview 12 kV transformer.

Multiple Facility Contingency

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

1. The 05FOSTOR 345/138 kV transformer (from bus 242936 to bus 243006 ckt 1) loads from 74.62% to 78.26% (**DC power flow**) of its rating (549 MVA) for the tower line contingency ('517'). This project contributes approximately 17.41 MW to the thermal violation.

CONTINGENCY '517'

OPEN BRANCH FROM BUS 238563 TO BUS 913490 CKT 1 / 238563 02BAY SH 345 242936 05FOSTOR 345 1

OPEN BRANCH FROM BUS 238889 TO BUS 242936 CKT 1 / 238889 02LEMOYN 345 242936 05FOSTOR 345 1

END

Short Circuit

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

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. The 02BEAVER-02CARLIL 345 kV line (from bus 238569 to bus 238607 ckt 1) loads from 101.31% to 101.55% (**DC power flow**) of its rating (1030 MVA) for the tower line contingency ('513'). This project contributes approximately 14.223 MW to the thermal violation.

CONTINGENCY '513'

OPEN BRANCH FROM BUS 238551 TO BUS 238569 CKT 1 /238551 02AVON 345 238569 02BEAVER 345 1

OPEN BRANCH FROM BUS 238551 TO BUS 238569 CKT 2 /238551 02AVON 345 238569 02BEAVER 345 2

END

2. The 02HAYES 345/138 kV transformer (from bus 239289 to bus 239290 ckt 1) loads from 138.22% to 138.45% (**DC power flow**) of its rating (573 MVA) for the tower line contingency ('C5-TWL-CR041'). This project contributes approximately 7.23 MW to the thermal violation.

CONTINGENCY 'C5-TWL-CR041'

/ DAVIS BESSE-BEAVER + BEAVER-HAYES 345KV*

DISCONNECT BRANCH FROM BUS 238569 TO BUS 239289 CKT 1 / 02BEAVER 345.00 02HAYES 345.00*

DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1 / 02DAV-BE 345.00 02BEAVER 345.00*

END

3. The 02OTTAWA-02LAKVEW 138 kV line (from bus 239030 to bus 238874 ckt 1) loads from 204.39% to 204.8% (**DC power flow**) of its rating (339 MVA) for the tower line contingency ('C5-TWL-CR040'). This project contributes approximately 7.845 MW to the thermal violation.

CONTINGENCY 'C5-TWL-CR040'

/ DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV*

DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1 / 02DAV-BE 345.00 02HAYES 345.00*

DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1 / 02DAV-BE 345.00 02BEAVER 345.00*

END

4. The 02LAKVEW-02GRNFLD 138 kV line (from bus 238874 to bus 238768 ckt 1) loads from 252.53% to 253.09% (**DC power flow**) of its rating (243 MVA) for the tower line contingency ('C5-TWL-CR040'). This project contributes approximately 7.845 MW to the thermal violation.

CONTINGENCY 'C5-TWL-CR040'

/* DAVIS BESSE-BEAVER + DAVIS BESSE-HAYES 345KV

DISCONNECT BRANCH FROM BUS 238654 TO BUS 239289 CKT 1

/* 02DAV-BE 345.00 02HAYES 345.00

DISCONNECT BRANCH FROM BUS 238654 TO BUS 238569 CKT 1

/* 02DAV-BE 345.00 02BEAVER 345.00

END

5. Kammer-Ireland Mine 69 kV Line overloads to 103.5% of summer emergency rating of 41 MVA. Without addition of this IPP, same facility loads to 100.4% of summer emergency rating.

Contingency '5232_B2_TOR2295_WOMOAB' single line outage of Bethlehem – Brues 138 kV line, Bethlehem – County Line 138 kV line, Brues Tap – County Line 138 kV line, Brues Tap – Fort Henry 138 kV line, Brues Tap – Kammer 1 138 kV line, Fort Henry – Tidd 138 kV line, Brues 2 138 kV – Brues 2 69 kV transformer, County Line 138 kV – County Line 34.5 kV transformer, Bethlehem 138 kV – Bethlehem 12 kV transformer, and Fort Henry 138 kV – Fort Henry 12 kV transformer.

New System Reinforcements

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

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)

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.