

Generation Interconnection Feasibility Study Report Queue Position AC1-187

General

Interconnection Customer has proposed a wind generating facility located in Potter County, PA. The installed facilities will have a total capability of 117.0 MW with 15.0 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is 12-31-2019. **This study does not imply a Pennsylvania Electric Company (“Transmission Owner” or “Penelec”) commitment to this in-service date.**

Point of Interconnection

AC1-187 will interconnect with the Penelec transmission system by tapping the Potter – Gold 115 kV line via a new three-breaker ring bus substation. The POI is located where the generator overhead line terminates at substation fence. Please refer to the single-line diagram in Appendix 19 for system configuration.

Network Impacts

The Queue Project AC1-187 was evaluated as a 117.0 MW (Capacity 15.0 MW) injection tapping the Gold-Tennessee Gas 115kV line in the PenElec area. Project AC1-187 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC1-187 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)

1. (PENELEC - PENELEC) The W3-099 TAP-26FOURMILE 230 kV line (from bus 903645 to bus 200928 ckt 1) loads from 99.97% to 100.25% (**DC power flow**) of its emergency rating (592 MVA) for the single line contingency outage of 'B2-PN-230-003'. This project contributes approximately 1.66 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-003' /* ERIE SOUTH - WARREN
230KV
DISCONNECT BRANCH FROM BUS 200918 TO BUS 200811 CKT 1 /* 26ERIE S
TIE230 26WARREN 230
END

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

Multiple Facility Contingency

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

1. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the bus fault outage of 'C1-WP-230-004_A'. This project contributes approximately 9.14 MW to the thermal violation.

CONTINGENCY 'C1-WP-230-004_A' /* MILESBERG #2 230KV
BUS
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 236745 CKT 82 /* 01MILESB
230 01MILESBG 46
END

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

2. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-643_A'. This project contributes approximately 9.14 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-643_A'                /* 460
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1    /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 82    /*
01MILESBG 46 01MILESB 230
END
```

3. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-456_A'. This project contributes approximately 9.14 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-456_A'                /* 463
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1    /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 235970 CKT 1    /* 01MILESB
230 01DALE 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 81    /*
01MILESBG 46 01MILESB 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 82    /*
01MILESBG 46 01MILESB 230
END
```

4. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the bus fault outage of 'C1-WP-230-004_A'. This project contributes approximately 9.14 MW to the thermal violation.

```
CONTINGENCY 'C1-WP-230-004_A'                /* MILESBURG #2 230KV
BUS
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1    /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 236745 CKT 82    /* 01MILESB
230 01MILESBG 46
END
```

5. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-456_A'. This project contributes approximately 9.14 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-456_A'                /* 463
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1    /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 235970 CKT 1    /* 01MILESB
230 01DALE 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 81    /*
01MILESBG 46 01MILESB 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 82    /*
01MILESBG 46 01MILESB 230
END
```

6. (PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-643_A'. This project contributes approximately 9.14 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-643_A'                /* 460
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1    /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 236745 TO BUS 235219 CKT 82    /*
01MILESBG 46 01MILESB 230
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. (NYISO - PENELEC) The S RIPLEY-26ERIE E 230 kV line (from bus 135251 to bus 200654 ckt 1) loads from 109.44% to 110.22% (**DC power flow**) of its emergency rating (607 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-003A'. This project contributes approximately 10.62 MW to the thermal violation.

```
CONTINGENCY 'C2-PN-345-003A'                /* WAYNE 345KV STUCK
BREAKER
DISCONNECT BUS 200595                        /* 26WAYNE 345
END
```

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

2. (PENELEC - PENELEC) The 26ERIE E-W3-099 TAP 230 kV line (from bus 200654 to bus 903645 ckt 1) loads from 107.82% to 108.63% (**DC power flow**) of its emergency rating (592 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-003A'. This project contributes approximately 10.62 MW to the thermal violation.

```
CONTINGENCY 'C2-PN-345-003A'                /* WAYNE 345KV STUCK  
BREAKER  
DISCONNECT BUS 200595                      /* 26WAYNE 345  
END
```

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

3. (PENELEC - PENELEC) The 26E.TWANDA-26CANYON 230 kV line (from bus 200675 to bus 200924 ckt 1) loads from 157.6% to 158.81% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-449_A'. This project contributes approximately 17.88 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-449_A'                /* 458  
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*  
26SHAWVL 1 230 01MOSHAN 230  
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*  
26CHAPMAN+ 230 01MOSHAN 230  
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB  
230 AA1-085 TAP 230  
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*  
01MOSHAN 230 01QUEHAN 230  
END
```

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

4. (PENELEC - PENELEC) The 26E.TWANDA-26CANYON 230 kV line (from bus 200675 to bus 200924 ckt 1) loads from 157.6% to 158.81% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 17.88 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-450_A'                /* 459  
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*  
26SHAWVL 1 230 01MOSHAN 230  
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*  
26CHAPMAN+ 230 01MOSHAN 230
```

DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
01QUEHAN 230 01QUEHANNA 46
END

5. (PENELEC - PENELEC) The 26N.MESHPN 230/115 kV transformer (from bus 200677 to bus 200706 ckt 4) loads from 124.01% to 125.93% (**DC power flow**) of its emergency rating (189 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-#3A_A'. This project contributes approximately 8.04 MW to the thermal violation.

CONTINGENCY 'C2_PN230-SB-#3A_A' /* 731
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /*
26E.TWANDA 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200924 CKT 1 /*
26N.MESHPN 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 130763 TO BUS 200675 CKT 1 /* HILSD230
230 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200674 TO BUS 200675 CKT 3 /*
26TOWANDA 115 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200674 TO BUS 200675 CKT 4 /*
26TOWANDA 115 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200940 CKT 1 /*
26E.TWANDA 230 26SCOTCHHLLW230
DISCONNECT BRANCH FROM BUS 200940 TO BUS 921611 CKT 1 /*
26SCOTCHHLLW230 AA1-144 TAP 230
END

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

6. (PENELEC - PENELEC) The 26N.MESHPN-26OXBOW 230 kV line (from bus 200706 to bus 200708 ckt 1) loads from 128.85% to 129.93% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 23.52 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-450_A' /* 459
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
26CHAPMAN+ 230 01MOSHAN 230

DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
01QUEHAN 230 01QUEHANNA 46
END

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

7. (PENELEC - PENELEC) The 26N.MESHPN-26OXBOW 230 kV line (from bus 200706 to bus 200708 ckt 1) loads from 128.84% to 129.92% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-449_A'. This project contributes approximately 23.52 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-449_A' /* 458
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
26CHAPMAN+ 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
END

8. (PENELEC - PL) The 26OXBOW-LACK 230 kV line (from bus 200708 to bus 208009 ckt 1) loads from 122.28% to 123.38% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 23.89 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-450_A' /* 459
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
26CHAPMAN+ 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
230 01QUEHAN 230

DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
01QUEHAN 230 01QUEHANNA 46
END

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

9. (PENELEC - PL) The 26OXBOW-LACK 230 kV line (from bus 200708 to bus 208009 ckt 1) loads from 122.28% to 123.38% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-449_A'. This project contributes approximately 23.89 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-449_A' /* 458
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
26CHAPMAN+ 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
END

10. (PENELEC - PENELEC) The 26HOMER CT-26SHELOCTA 230 kV line (from bus 200767 to bus 200795 ckt 1) loads from 131.32% to 132.61% (**DC power flow**) of its emergency rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002A'. This project contributes approximately 26.34 MW to the thermal violation.

CONTINGENCY 'C2-PN-500-002A' /* CONEMAUGH 500KV BKR
1
DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-
GH 500 26CONEMAGH 230
DISCONNECT BUS 200031 /* CONE G2 22
END

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

11. (PENELEC - PENELEC) The 26HOMER CT-26SHELOCTA 230 kV line (from bus 200767 to bus 200795 ckt 1) loads from 131.28% to 132.57% (**DC power flow**) of its emergency rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002F'. This project contributes approximately 26.34 MW to the thermal violation.

CONTINGENCY 'C2-PN-500-002F' /* CONEMAUGH 500KV BKR 6

```
DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3      /* CONEM-
GH 500 26CONEMAGH 230
DISCONNECT BUS 200030                                       /* CONE G1 22
END
```

12. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999425 ckt N) loads from 140.4% to 144.46% (**DC power flow**) of its emergency rating (807 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9E'. This project contributes approximately 32.82 MW to the thermal violation.

```
CONTINGENCY 'C2_PN230-SB-9E'                                /* 575
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/*
26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200837 CKT 1      /* 26HOMER
CT 230 26HOMER C1 20
REMOVE MACHINE 1 FROM BUS 200837                            /* 26HOMER C1 20
END
```

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

13. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999426 ckt S) loads from 177.28% to 182.17% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-001A'. This project contributes approximately 40.23 MW to the thermal violation.

```
CONTINGENCY 'C2-PN-345-001A'                               /* HOMER CITY 345KV BKR
301
DISCONNECT BRANCH FROM BUS 200769 TO BUS 235129 CKT 1      /* 26HOMER
CY 345 01ARMSTRONG 345
DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
END
```

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

14. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999426 ckt S) loads from 122.37% to 126.35% (**DC power flow**) of its emergency rating (824 MVA) for the bus fault outage of 'C1-PN-230-001'. This project contributes approximately 32.74 MW to the thermal violation.

```
CONTINGENCY 'C1-PN-230-001'                               /* HOMER CITY NORTH 230KV
BUS
```

DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
 26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1 /* 26HOMER
 CT 230 26PIERC230 230
 REMOVE MACHINE 1 FROM BUS 200809 /* 26SITHE 138
 DISCONNECT BUS 200807 /* 26PIERC230 230
 DISCONNECT BUS 200808 /* 26PIERC138 138
 DISCONNECT BUS 200809 /* 26SITHE 138
 END

15. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999426 ckt S) loads from 122.37% to 126.35% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9I'. This project contributes approximately 32.74 MW to the thermal violation.

CONTINGENCY 'C2_PN230-SB-9I' /* 579
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1 /* 26HOMER
 CT 230 26PIERC230 230
 DISCONNECT BRANCH FROM BUS 200807 TO BUS 200808 CKT 1 /*
 26PIERC230 230 26PIERC138 138
 DISCONNECT BRANCH FROM BUS 200808 TO BUS 200809 CKT 1 /*
 26PIERC138 138 26SITHE 138
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202640 CKT N/*
 26HOMER CT 230 26HOMER CY 345 26HOMERCITYN 23.00
 REMOVE MACHINE 1 FROM BUS 200809 /* 26SITHE 138
 END

16. (PENELEC - PENELEC) The 26SHELOCTA-26KEYSTONE 230 kV line (from bus 200795 to bus 200810 ckt 1) loads from 123.47% to 124.78% (**DC power flow**) of its emergency rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002A'. This project contributes approximately 26.7 MW to the thermal violation.

CONTINGENCY 'C2-PN-500-002A' /* CONEMAUGH 500KV BKR
 1
 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-
 GH 500 26CONEMAGH 230
 DISCONNECT BUS 200031 /* CONE G2 22
 END

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

17. (PENELEC - PENELEC) The 26SHELOCTA-26KEYSTONE 230 kV line (from bus 200795 to bus 200810 ckt 1) loads from 123.41% to 124.72% (**DC power flow**) of its emergency

rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002F'. This project contributes approximately 26.7 MW to the thermal violation.

```
CONTINGENCY 'C2-PN-500-002F'                /* CONEMAUGH 500KV BKR 6
DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3      /* CONEM-
GH 500 26CONEMAGH 230
DISCONNECT BUS 200030                               /* CONE G1 22
END
```

18. (PENELEC - PENELEC) The 26CANYON-26N.MESH PN 230 kV line (from bus 200924 to bus 200706 ckt 1) loads from 154.95% to 156.16% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 17.88 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-450_A'                /* 459
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1      /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1      /*
26CHAPMAN+ 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1      /* 01MILESB
230 AA1-085 TAP 230
DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1      /*
01MOSHAN 230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1      /* 01ELKO
230 01QUEHAN 230
DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81     /*
01QUEHAN 230 01QUEHANNA 46
END
```

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

19. (PENELEC - PENELEC) The 26CANYON-26N.MESH PN 230 kV line (from bus 200924 to bus 200706 ckt 1) loads from 154.94% to 156.15% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-449_A'. This project contributes approximately 17.88 MW to the thermal violation.

```
CONTINGENCY 'C2-WPP-KV-449_A'                /* 458
DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1      /*
26SHAWVL 1 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1      /*
26CHAPMAN+ 230 01MOSHAN 230
DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1      /* 01MILESB
230 AA1-085 TAP 230
```

DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
01MOSHAN 230 01QUEHAN 230
END

20. (PENELEC - PENELEC) The 26FOURMILE-26ERIE SE 230 kV line (from bus 200928 to bus 200819 ckt 1) loads from 108.39% to 109.2% (**DC power flow**) of its emergency rating (584 MVA) for the line fault with failed breaker contingency outage of 'C2_PN115-SB-83D1'. This project contributes approximately 10.58 MW to the thermal violation.

CONTINGENCY 'C2_PN115-SB-83D1' /* FUTURE FOUR MILE
115KV SB
DISCONNECT BRANCH FROM BUS 200927 TO BUS 200928 CKT 1 /*
26FOURMILE 115 26FOURMILE 230
DISCONNECT BRANCH FROM BUS 200927 TO BUS 200570 CKT 1 /*
26FOURMILE 115 26CORRY E. 115
END

Please refer to Appendix 14 for a table containing the generators having contribution to this flowgate.

21. (PENELEC - PENELEC) The 26FOURMILE-26ERIE SE 230 kV line (from bus 200928 to bus 200819 ckt 1) loads from 107.0% to 107.78% (**DC power flow**) of its emergency rating (584 MVA) for the line fault with failed breaker contingency outage of 'C2_PN115-SB-83A1'. This project contributes approximately 10.15 MW to the thermal violation.

CONTINGENCY 'C2_PN115-SB-83A1' /* FUTURE FOUR MILE
115KV SB
DISCONNECT BRANCH FROM BUS 200927 TO BUS 200928 CKT 1 /*
26FOURMILE 115 26FOURMILE 230
DISCONNECT BRANCH FROM BUS 200927 TO BUS 200569 CKT 1 /*
26FOURMILE 115 26BUFF. RD 115
END

22. (PENELEC - PENELEC) The 26MAINESBURG-26EVERT DR 115 kV line (from bus 200929 to bus 200885 ckt 1) loads from 150.81% to 152.0% (**DC power flow**) of its emergency rating (179 MVA) for the single line contingency outage of 'B2-TIE-345-104_B'. This project contributes approximately 2.13 MW to the thermal violation.

CONTINGENCY 'B2-TIE-345-104_B' /* MAINESBURG -
WATERCURE ROAD (NYSEG) 345KV LINE
DISCONNECT BRANCH FROM BUS 920750 TO BUS 130757 CKT 1 /* AA2-300
TAP WATRC345 345
END

Please refer to Appendix 15 for a table containing the generators having contribution to this flowgate.

23. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999425 to bus 200767 ckt N) loads from 137.24% to 141.3% (**DC power flow**) of its emergency rating (807 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9E'. This project contributes approximately 32.82 MW to the thermal violation.

```
CONTINGENCY 'C2_PN230-SB-9E'                /* 575
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/*
26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200837 CKT 1      /* 26HOMER
CT 230 26HOMER C1 20
REMOVE MACHINE 1 FROM BUS 200837                /* 26HOMER C1 20
END
```

Please refer to Appendix 16 for a table containing the generators having contribution to this flowgate.

24. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999426 to bus 200767 ckt S) loads from 174.74% to 179.62% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-001A'. This project contributes approximately 40.23 MW to the thermal violation.

```
CONTINGENCY 'C2-PN-345-001A'                /* HOMER CITY 345KV BKR
301
DISCONNECT BRANCH FROM BUS 200769 TO BUS 235129 CKT 1      /* 26HOMER
CY 345 01ARMSTRONG 345
DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
END
```

Please refer to Appendix 17 for a table containing the generators having contribution to this flowgate.

25. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999426 to bus 200767 ckt S) loads from 119.81% to 123.78% (**DC power flow**) of its emergency rating (824 MVA) for the bus fault outage of 'C1-PN-230-001'. This project contributes approximately 32.74 MW to the thermal violation.

```
CONTINGENCY 'C1-PN-230-001'                /* HOMER CITY NORTH 230KV
BUS
DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1      /* 26HOMER
CT 230 26PIERC230 230
REMOVE MACHINE 1 FROM BUS 200809                /* 26SITHE 138
DISCONNECT BUS 200807                            /* 26PIERC230 230
```

```
DISCONNECT BUS 200808 /* 26PIERC138 138
DISCONNECT BUS 200809 /* 26SITHE 138
END
```

26. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999426 to bus 200767 ckt S) loads from 119.81% to 123.78% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9I'. This project contributes approximately 32.74 MW to the thermal violation.

```
CONTINGENCY 'C2_PN230-SB-9I' /* 579
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200807 CKT 1 /* 26HOMER
CT 230 26PIERC230 230
DISCONNECT BRANCH FROM BUS 200807 TO BUS 200808 CKT 1 /*
26PIERC230 230 26PIERC138 138
DISCONNECT BRANCH FROM BUS 200808 TO BUS 200809 CKT 1 /*
26PIERC138 138 26SITHE 138
DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202640 CKT N/*
26HOMER CT 230 26HOMER CY 345 26HOMERCITYN 23.00
REMOVE MACHINE 1 FROM BUS 200809 /* 26SITHE 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)

To be determined

Affected System Analysis & Mitigation

NYISO Impacts:

NYISO 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. (NYISO - PENELEC) The S RIPLEY-26ERIE E 230 kV line (from bus 135251 to bus 200654 ckt 1) loads from 121.57% to 122.48% (**DC power flow**) of its normal rating (501 MVA) for non-contingency condition. This project contributes approximately 10.21 MW to the thermal violation.

2. (NYISO - PENELEC) The S RIPLEY-26ERIE E 230 kV line (from bus 135251 to bus 200654 ckt 1) loads from 109.43% to 110.22% (**DC power flow**) of its emergency rating (607 MVA) for the single line contingency outage of 'P12_DQE_167'. This project contributes approximately 10.58 MW to the thermal violation.

CONTINGENCY 'P12_DQE_167'

DISCONNECT BRANCH FROM BUS 200595 TO BUS 200826 CKT 1
END

3. (PENELEC - PENELEC) The 26ERIE E-W3-099 TAP 230 kV line (from bus 200654 to bus 903645 ckt 1) loads from 119.48% to 120.42% (**DC power flow**) of its normal rating (488 MVA) for non-contingency condition. This project contributes approximately 10.21 MW to the thermal violation.

4. (PENELEC - PENELEC) The 26ERIE E-W3-099 TAP 230 kV line (from bus 200654 to bus 903645 ckt 1) loads from 107.81% to 108.62% (**DC power flow**) of its emergency rating (592 MVA) for the single line contingency outage of 'P12_DQE_167'. This project contributes approximately 10.58 MW to the thermal violation.

CONTINGENCY 'P12_DQE_167'

DISCONNECT BRANCH FROM BUS 200595 TO BUS 200826 CKT 1
END

5. (PENELEC - PENELEC) The 26TWO MILE-26PIERCEBRK 115 kV line (from bus 200663 to bus 200944 ckt 1) loads from 99.89% to 161.14% (**DC power flow**) of its emergency rating (191 MVA) for the single line contingency outage of 'B2-PN-115-108'. This project contributes approximately 116.98 MW to the thermal violation.

CONTINGENCY 'B2-PN-115-108'
115KV

/* NILES VALLEY - Z1-069

DISCONNECT BRANCH FROM BUS 916200 TO BUS 200670 CKT 1 /* Z1-069 TAP
115 26SABINSVI 115

DISCONNECT BRANCH FROM BUS 200670 TO BUS 200671 CKT 1 /*
26SABINSVI 115 26NILES VA 115

DISCONNECT BRANCH FROM BUS 200670 TO BUS 200694 CKT 1 /*
26SABINSVI 115 26SABNSVL 35

DISCONNECT BRANCH FROM BUS 200670 TO BUS 200694 CKT 2 /*
26SABINSVI 115 26SABNSVL 35

DISCONNECT BUS 200670
END

/* 26SABINSVI 115

6. (PENELEC - PENELEC) The 26TWO MILE-26PIERCE BRK 115 kV line (from bus 200663 to bus 200944 ckt 1) loads from 79.41% to 119.66% (**DC power flow**) of its normal rating (175 MVA) for non-contingency condition. This project contributes approximately 70.42 MW to the thermal violation.

7. (PENELEC - PENELEC) The 26FARM VLY-26RIDGWAY 115 kV line (from bus 200668 to bus 200582 ckt 1) loads from 94.12% to 103.46% (**DC power flow**) of its emergency rating (160 MVA) for the single line contingency outage of 'B2-PN-230-006'. This project contributes approximately 14.94 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-006' /* GLADE - FOREST 230KV
DISCONNECT BRANCH FROM BUS 200593 TO BUS 200581 CKT 1 /* 26GLADE
230 26FOREST 230
END

8. (PENELEC - PENELEC) The 26GOLD-Z1-069 TAP 115 kV line (from bus 200669 to bus 916200 ckt 1) loads from 65.66% to 133.67% (**DC power flow**) of its emergency rating (172 MVA) for the single line contingency outage of 'B2-TIE-115-104'. This project contributes approximately 116.99 MW to the thermal violation.

CONTINGENCY 'B2-TIE-115-104' /* PIERCE BROOK - POTTER
115KV
DISCONNECT BRANCH FROM BUS 200944 TO BUS 200663 CKT 1 /*
26PIERCEBRK 115 26TWO MILE 115
DISCONNECT BRANCH FROM BUS 200663 TO BUS 235234 CKT 1 /*
26TWO MILE 115 01POTTER 115
DISCONNECT BRANCH FROM BUS 200663 TO BUS 200664 CKT 1 /*
26TWO MILE 115 26TWO MILE 35
DISCONNECT BRANCH FROM BUS 235234 TO BUS 236796 CKT 1 /* 01POTTER
115 01POTTER 46
DISCONNECT BUS 200663 /* 26TWO MILE 115
END

9. (PENELEC - PENELEC) The 26SABINSVI-26NILES VA 115 kV line (from bus 200670 to bus 200671 ckt 1) loads from 113.54% to 181.55% (**DC power flow**) of its emergency rating (172 MVA) for the single line contingency outage of 'B2-TIE-115-104'. This project contributes approximately 116.98 MW to the thermal violation.

CONTINGENCY 'B2-TIE-115-104' /* PIERCE BROOK - POTTER
115KV
DISCONNECT BRANCH FROM BUS 200944 TO BUS 200663 CKT 1 /*
26PIERCEBRK 115 26TWO MILE 115

DISCONNECT BRANCH FROM BUS 200663 TO BUS 235234 CKT 1 /*
 26TWO MILE 115 01POTTER 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 200664 CKT 1 /*
 26TWO MILE 115 26TWO MILE 35
 DISCONNECT BRANCH FROM BUS 235234 TO BUS 236796 CKT 1 /* 01POTTER
 115 01POTTER 46
 DISCONNECT BUS 200663 /* 26TWO MILE 115
 END

10. (PENELEC - PENELEC) The 26SABINSVI-26NILES VA 115 kV line (from bus 200670 to bus 200671 ckt 1) loads from 70.38% to 104.36% (**DC power flow**) of its normal rating (137 MVA) for non-contingency condition. This project contributes approximately 46.55 MW to the thermal violation.

11. (PENELEC - PENELEC) The 26NILES VA-26MANSFIEL 115 kV line (from bus 200671 to bus 200672 ckt 1) loads from 99.13% to 162.36% (**DC power flow**) of its emergency rating (185 MVA) for the single line contingency outage of 'B2-TIE-115-104'. This project contributes approximately 116.98 MW to the thermal violation.

CONTINGENCY 'B2-TIE-115-104' /* PIERCE BROOK - POTTER
 115KV
 DISCONNECT BRANCH FROM BUS 200944 TO BUS 200663 CKT 1 /*
 26PIERCEBRK 115 26TWO MILE 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 235234 CKT 1 /*
 26TWO MILE 115 01POTTER 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 200664 CKT 1 /*
 26TWO MILE 115 26TWO MILE 35
 DISCONNECT BRANCH FROM BUS 235234 TO BUS 236796 CKT 1 /* 01POTTER
 115 01POTTER 46
 DISCONNECT BUS 200663 /* 26TWO MILE 115
 END

12. (PENELEC - PENELEC) The 26MANSFIEL-26MAINESBURG 115 kV line (from bus 200672 to bus 200929 ckt 1) loads from 87.54% to 150.98% (**DC power flow**) of its emergency rating (179 MVA) for the single line contingency outage of 'B2-TIE-115-104'. This project contributes approximately 113.55 MW to the thermal violation.

CONTINGENCY 'B2-TIE-115-104' /* PIERCE BROOK - POTTER
 115KV
 DISCONNECT BRANCH FROM BUS 200944 TO BUS 200663 CKT 1 /*
 26PIERCEBRK 115 26TWO MILE 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 235234 CKT 1 /*
 26TWO MILE 115 01POTTER 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 200664 CKT 1 /*
 26TWO MILE 115 26TWO MILE 35

DISCONNECT BRANCH FROM BUS 235234 TO BUS 236796 CKT 1 /* 01POTTER
115 01POTTER 46
DISCONNECT BUS 200663 /* 26TWO MILE 115
END

13. (PENELEC - PENELEC) The 26SOUTH TR-26TENNGAS 115 kV line (from bus 200673 to bus 200817 ckt 1) loads from 95.81% to 100.81% (**DC power flow**) of its emergency rating (313 MVA) for the single line contingency outage of 'B2-TIE-345-104_B'. This project contributes approximately 15.63 MW to the thermal violation.

CONTINGENCY 'B2-TIE-345-104_B' /* MAINESBURG -
WATERCURE ROAD (NYSEG) 345KV LINE
DISCONNECT BRANCH FROM BUS 920750 TO BUS 130757 CKT 1 /* AA2-300
TAP WATRC345 345
END

14. (PENELEC - PENELEC) The 26TOWANDA-26NO MESH0 115 kV line (from bus 200674 to bus 200677 ckt 1) loads from 154.68% to 156.41% (**DC power flow**) of its emergency rating (172 MVA) for the single line contingency outage of 'B2-PN-230-013'. This project contributes approximately 6.62 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-013' /* EAST TOWANDA - NORTH
MESHOPPEN 230KV
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /*
26E.TWANDA 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 200924 TO BUS 200706 CKT 1 /*
26CANYON 230 26N.MESHPN 230
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200677 CKT 4 /*
26N.MESHPN 230 26NO MESH0 115
END

15. (PENELEC - PENELEC) The 26E.TWANDA-26CANYON 230 kV line (from bus 200675 to bus 200924 ckt 1) loads from 157.09% to 158.49% (**DC power flow**) of its normal rating (546 MVA) for non-contingency condition. This project contributes approximately 16.98 MW to the thermal violation.

16. (PENELEC - PENELEC) The 26E.TWANDA-26CANYON 230 kV line (from bus 200675 to bus 200924 ckt 1) loads from 157.21% to 158.41% (**DC power flow**) of its emergency rating (666 MVA) for the single line contingency outage of 'B2-TIE-230-324_A'. This project contributes approximately 17.79 MW to the thermal violation.

CONTINGENCY 'B2-TIE-230-324_A' /* MOSHANNON-MARSHALL
230KV APS-PN TIE
DISCONNECT BRANCH FROM BUS 235220 TO BUS 200908 CKT 1 /*
01MOSHAN 230 26CHAPMAN+ 230

DISCONNECT BRANCH FROM BUS 200908 TO BUS 921641 CKT 1 /*
26CHAPMAN+ 230 AA2-000 TAP (AA1-111)
END

17. (PENELEC - PENELEC) The 26NO MESHO-26MESH2REA 115 kV line (from bus 200677 to bus 200825 ckt 3) loads from 195.5% to 197.44% (**DC power flow**) of its emergency rating (197 MVA) for the single line contingency outage of 'B2-PN-230-013'. This project contributes approximately 8.45 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-013' /* EAST TOWANDA - NORTH
MESHOPPEN 230KV
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /*
26E.TWANDA 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 200924 TO BUS 200706 CKT 1 /*
26CANYON 230 26N.MESHPN 230
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200677 CKT 4 /*
26N.MESHPN 230 26NO MESHO 115
END

18. (PENELEC - PENELEC) The 26N.MESHPN-26OXBOW 230 kV line (from bus 200706 to bus 200708 ckt 1) loads from 129.84% to 131.02% (**DC power flow**) of its normal rating (855 MVA) for non-contingency condition. This project contributes approximately 22.56 MW to the thermal violation.

19. (PENELEC - PENELEC) The 26N.MESHPN-26OXBOW 230 kV line (from bus 200706 to bus 200708 ckt 1) loads from 128.52% to 129.59% (**DC power flow**) of its emergency rating (984 MVA) for the single line contingency outage of 'B2-TIE-230-324_A'. This project contributes approximately 23.41 MW to the thermal violation.

CONTINGENCY 'B2-TIE-230-324_A' /* MOSHANNON-MARSHALL
230KV APS-PN TIE
DISCONNECT BRANCH FROM BUS 235220 TO BUS 200908 CKT 1 /*
01MOSHAN 230 26CHAPMAN+ 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 921641 CKT 1 /*
26CHAPMAN+ 230 AA2-000 TAP (AA1-111)
END

20. (PENELEC - PL) The 26OXBOW-LACK 230 kV line (from bus 200708 to bus 208009 ckt 1) loads from 121.96% to 123.04% (**DC power flow**) of its emergency rating (984 MVA) for the single line contingency outage of 'B2-TIE-230-324_A'. This project contributes approximately 23.78 MW to the thermal violation.

CONTINGENCY 'B2-TIE-230-324_A' /* MOSHANNON-MARSHALL
230KV APS-PN TIE
DISCONNECT BRANCH FROM BUS 235220 TO BUS 200908 CKT 1 /*
01MOSHAN 230 26CHAPMAN+ 230

DISCONNECT BRANCH FROM BUS 200908 TO BUS 921641 CKT 1 /*
26CHAPMAN+ 230 AA2-000 TAP (AA1-111)
END

21. (PENELEC - PL) The 26OXBOW-LACK 230 kV line (from bus 200708 to bus 208009 ckt 1) loads from 115.37% to 116.58% (**DC power flow**) of its normal rating (855 MVA) for non-contingency condition. This project contributes approximately 22.92 MW to the thermal violation.

22. (PENELEC - PENELEC) The 26HOMER CT-26SHELOCTA 230 kV line (from bus 200767 to bus 200795 ckt 1) loads from 128.48% to 129.66% (**DC power flow**) of its emergency rating (917 MVA) for the single line contingency outage of 'P12_DQE_167B'. This project contributes approximately 24.12 MW to the thermal violation.

CONTINGENCY 'P12_DQE_167B'
DISCONNECT BRANCH FROM BUS 200769 TO BUS 235129 CKT 1
END

23. (PENELEC - PENELEC) The 26HOMER CT-26SHELOCTA 230 kV line (from bus 200767 to bus 200795 ckt 1) loads from 126.32% to 127.62% (**DC power flow**) of its normal rating (731 MVA) for non-contingency condition. This project contributes approximately 21.0 MW to the thermal violation.

24. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999425 ckt N) loads from 123.57% to 127.65% (**DC power flow**) of its emergency rating (807 MVA) for the single line contingency outage of 'B3-PN-230-004A'. This project contributes approximately 32.92 MW to the thermal violation.

CONTINGENCY 'B3-PN-230-004A' /* HOMER CITY SOUTH
345/230KV XFMR
DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202641 CKT S/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYS 23.00
END

25. (PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999426 ckt S) loads from 121.42% to 125.4% (**DC power flow**) of its emergency rating (824 MVA) for the single line contingency outage of 'B3-PN-230-003A'. This project contributes approximately 32.74 MW to the thermal violation.

CONTINGENCY 'B3-PN-230-003A' /* HOMER CITY NORTH
345/230KV XFMR
DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
END

26. (PENELEC - PENELEC) The 26SHELOCTA-26KEYSTONE 230 kV line (from bus 200795 to bus 200810 ckt 1) loads from 118.53% to 119.84% (**DC power flow**) of its emergency rating (917 MVA) for the single line contingency outage of 'B2-PN-230-025'. This project contributes approximately 26.73 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-025' /* CONEMAUGH - SEWARD
230KV
DISCONNECT BRANCH FROM BUS 200912 TO BUS 200793 CKT 1 /*
26CONEMAGH 230 26SEWARD 2 230
END

27. (PENELEC - PENELEC) The 26SHELOCTA-26KEYSTONE 230 kV line (from bus 200795 to bus 200810 ckt 1) loads from 113.11% to 114.41% (**DC power flow**) of its normal rating (731 MVA) for non-contingency condition. This project contributes approximately 21.06 MW to the thermal violation.

28. (PENELEC - PENELEC) The 26N.MESHHPN 230/115 kV transformer (from bus 200825 to bus 200706 ckt 3) loads from 204.86% to 206.89% (**DC power flow**) of its emergency rating (188 MVA) for the single line contingency outage of 'B2-PN-230-013'. This project contributes approximately 8.45 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-013' /* EAST TOWANDA - NORTH
MESHOPPEN 230KV
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /*
26E.TWANDA 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 200924 TO BUS 200706 CKT 1 /*
26CANYON 230 26N.MESHHPN 230
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200677 CKT 4 /*
26N.MESHHPN 230 26NO MESHOPPEN 115
END

29. (PENELEC - PENELEC) The 26EVERT DR-26SOUTH TR 115 kV line (from bus 200885 to bus 200673 ckt 1) loads from 141.76% to 148.63% (**DC power flow**) of its emergency rating (242 MVA) for the single line contingency outage of 'B2-TIE-345-104_B'. This project contributes approximately 16.61 MW to the thermal violation.

CONTINGENCY 'B2-TIE-345-104_B' /* MAINESBURG -
WATERCURE ROAD (NYSEG) 345KV LINE
DISCONNECT BRANCH FROM BUS 920750 TO BUS 130757 CKT 1 /* AA2-300
TAP WATRC345 345
END

30. (PENELEC - PENELEC) The 26CANYON-26N.MESHHPN 230 kV line (from bus 200924 to bus 200706 ckt 1) loads from 154.57% to 155.77% (**DC power flow**) of its emergency rating (666 MVA) for the single line contingency outage of 'B2-TIE-230-324_A'. This project contributes approximately 17.79 MW to the thermal violation.

CONTINGENCY 'B2-TIE-230-324_A' /* MOSHANNON-MARSHALL
230KV APS-PN TIE
DISCONNECT BRANCH FROM BUS 235220 TO BUS 200908 CKT 1 /*
01MOSHAN 230 26CHAPMAN+ 230
DISCONNECT BRANCH FROM BUS 200908 TO BUS 921641 CKT 1 /*
26CHAPMAN+ 230 AA2-000 TAP (AA1-111)
END

31. (PENELEC - PENELEC) The 26CANYON-26N.MESH PN 230 kV line (from bus 200924 to bus 200706 ckt 1) loads from 153.87% to 155.27% (**DC power flow**) of its normal rating (546 MVA) for non-contingency condition. This project contributes approximately 16.98 MW to the thermal violation.

32. (PENELEC - PENELEC) The 26FOURMILE-26ERIE SE 115 kV line (from bus 200927 to bus 200820 ckt 1) loads from 111.8% to 113.08% (**DC power flow**) of its emergency rating (228 MVA) for the single line contingency outage of 'B2-PN-230-027'. This project contributes approximately 6.51 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-027' /* ERIE SOUTH - FOUR MILE
JCT. 230KV LINE
DISCONNECT BRANCH FROM BUS 200928 TO BUS 200819 CKT 1 /*
26FOURMILE 230 26ERIE SE 230
END

33. (PENELEC - PENELEC) The 26FOURMILE-26ERIE SE 230 kV line (from bus 200928 to bus 200819 ckt 1) loads from 106.98% to 107.76% (**DC power flow**) of its emergency rating (584 MVA) for the single line contingency outage of 'B3-PN-230-032'. This project contributes approximately 10.15 MW to the thermal violation.

CONTINGENCY 'B3-PN-230-032' /* FOUR MILE JCT. 230/115KV
XFMR FAULT
DISCONNECT BRANCH FROM BUS 200928 TO BUS 200927 CKT 1 /*
26FOURMILE 230 26FOURMILE 115
REDUCE BUS 200928 SHUNT BY 100 PERCENT /* 26FOURMILE 230
END

34. (PENELEC - PENELEC) The 26FOURMILE 230/115 kV transformer (from bus 200928 to bus 200927 ckt 1) loads from 139.8% to 140.77% (**DC power flow**) of its emergency rating (323 MVA) for the single line contingency outage of 'B2-PN-230-027'. This project contributes approximately 6.97 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-027' /* ERIE SOUTH - FOUR MILE
JCT. 230KV LINE
DISCONNECT BRANCH FROM BUS 200928 TO BUS 200819 CKT 1 /*
26FOURMILE 230 26ERIE SE 230

END

35. (PENELEC - PENELEC) The 26MAINESBURG-26EVERT DR 115 kV line (from bus 200929 to bus 200885 ckt 1) loads from 159.2% to 168.48% (**DC power flow**) of its emergency rating (179 MVA) for the single line contingency outage of 'B2-TIE-345-104_B'. This project contributes approximately 16.62 MW to the thermal violation.

CONTINGENCY 'B2-TIE-345-104_B' /* MAINESBURG -
WATERCURE ROAD (NYSEG) 345KV LINE
DISCONNECT BRANCH FROM BUS 920750 TO BUS 130757 CKT 1 /* AA2-300
TAP WATRC345 345
END

36. (AP - PENELEC) The 01POTTER-26TWO MILE 115 kV line (from bus 235234 to bus 200663 ckt 1) loads from 82.86% to 130.6% (**DC power flow**) of its emergency rating (245 MVA) for the single line contingency outage of 'B2-PN-115-108'. This project contributes approximately 116.98 MW to the thermal violation.

CONTINGENCY 'B2-PN-115-108' /* NILES VALLEY - Z1-069
115KV
DISCONNECT BRANCH FROM BUS 916200 TO BUS 200670 CKT 1 /* Z1-069 TAP
115 26SABINSVI 115
DISCONNECT BRANCH FROM BUS 200670 TO BUS 200671 CKT 1 /*
26SABINSVI 115 26NILES VA 115
DISCONNECT BRANCH FROM BUS 200670 TO BUS 200694 CKT 1 /*
26SABINSVI 115 26SABNSVL 35
DISCONNECT BRANCH FROM BUS 200670 TO BUS 200694 CKT 2 /*
26SABINSVI 115 26SABNSVL 35
DISCONNECT BUS 200670 /* 26SABINSVI 115
END

37. (AP - PENELEC) The 01POTTER-26TWO MILE 115 kV line (from bus 235234 to bus 200663 ckt 1) loads from 74.79% to 109.65% (**DC power flow**) of its normal rating (202 MVA) for non-contingency condition. This project contributes approximately 70.42 MW to the thermal violation.

38. (AP - PENELEC) The 01POTTER-26TWO MILE 115 kV line (from bus 235234 to bus 200663 ckt 1) loads from 74.79% to 109.65% (**DC power flow**) of its normal rating (202 MVA) for non-contingency condition. This project contributes approximately 70.42 MW to the thermal violation.

39. (AP - PENELEC) The 01SHINGL-26LEWISTWN 230 kV line (from bus 235248 to bus 200513 ckt 1) loads from 111.17% to 112.28% (**DC power flow**) of its emergency rating (554

MVA) for the single line contingency outage of 'PL100352'. This project contributes approximately 13.68 MW to the thermal violation.

CONTINGENCY 'PL100352' /* LACK-OXBO-N.MES 230KV &
OXBO TR
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200825 CKT 3
DISCONNECT BUS 200708
END

40. (FE - FE) The 02S8-ATT 345/138 kV transformer (from bus 239082 to bus 238544 ckt 8) loads from 105.94% to 107.29% (**DC power flow**) of its emergency rating (423 MVA) for the single line contingency outage of 'P12_DQE_161'. This project contributes approximately 12.72 MW to the thermal violation.

CONTINGENCY 'P12_DQE_161'
DISCONNECT BRANCH FROM BUS 238547 TO BUS 239036 CKT 1
END

41. (PENELEC - PENELEC) The W3-099 TAP-26FOURMILE 230 kV line (from bus 903645 to bus 200928 ckt 1) loads from 130.67% to 131.61% (**DC power flow**) of its normal rating (488 MVA) for non-contingency condition. This project contributes approximately 10.21 MW to the thermal violation.

42. (PENELEC - PENELEC) The W3-099 TAP-26FOURMILE 230 kV line (from bus 903645 to bus 200928 ckt 1) loads from 119.27% to 120.25% (**DC power flow**) of its emergency rating (592 MVA) for the single line contingency outage of 'B2-PN-230-003'. This project contributes approximately 12.96 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-003' /* ERIE SOUTH - WARREN
230KV
DISCONNECT BRANCH FROM BUS 200918 TO BUS 200811 CKT 1 /* 26ERIE S
TIE230 26WARREN 230
END

43. (PENELEC - PENELEC) The Z1-069 TAP-26SABINSVI 115 kV line (from bus 916200 to bus 200670 ckt 1) loads from 117.96% to 185.97% (**DC power flow**) of its emergency rating (172 MVA) for the single line contingency outage of 'B2-TIE-115-104'. This project contributes approximately 116.98 MW to the thermal violation.

CONTINGENCY 'B2-TIE-115-104' /* PIERCE BROOK - POTTER
115KV
DISCONNECT BRANCH FROM BUS 200944 TO BUS 200663 CKT 1 /*
26PIERCEBRK 115 26TWO MILE 115

DISCONNECT BRANCH FROM BUS 200663 TO BUS 235234 CKT 1 /*
 26TWO MILE 115 01POTTER 115
 DISCONNECT BRANCH FROM BUS 200663 TO BUS 200664 CKT 1 /*
 26TWO MILE 115 26TWO MILE 35
 DISCONNECT BRANCH FROM BUS 235234 TO BUS 236796 CKT 1 /* 01POTTER
 115 01POTTER 46
 DISCONNECT BUS 200663 /* 26TWO MILE 115
 END

44. (PENELEC - PENELEC) The Z1-069 TAP-26SABINSVI 115 kV line (from bus 916200 to bus 200670 ckt 1) loads from 75.93% to 109.91% (**DC power flow**) of its normal rating (137 MVA) for non-contingency condition. This project contributes approximately 46.55 MW to the thermal violation.

45. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999425 to bus 200767 ckt N) loads from 120.41% to 124.49% (**DC power flow**) of its emergency rating (807 MVA) for the single line contingency outage of 'B3-PN-230-004A'. This project contributes approximately 32.92 MW to the thermal violation.

CONTINGENCY 'B3-PN-230-004A' /* HOMER CITY SOUTH
 345/230KV XFMR
 DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202641 CKT S/*
 26HOMER CY 345 26HOMER CT 230 26HOMERCITYS 23.00
 END

46. (PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999426 to bus 200767 ckt S) loads from 118.87% to 122.85% (**DC power flow**) of its emergency rating (824 MVA) for the single line contingency outage of 'B3-PN-230-003A'. This project contributes approximately 32.74 MW to the thermal violation.

CONTINGENCY 'B3-PN-230-003A' /* HOMER CITY NORTH
 345/230KV XFMR
 DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
 26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00
 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

None.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

To be determined during the system impact study phase.

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)

Light Load Load Flow Analysis Reinforcements

New System Reinforcements

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

None

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Appendix 1

(PENELEC - PENELEC) The W3-099 TAP-26FOURMILE 230 kV line (from bus 903645 to bus 200928 ckt 1) loads from 99.97% to 100.25% (**DC power flow**) of its emergency rating (592 MVA) for the single line contingency outage of 'B2-PN-230-003'. This project contributes approximately 1.66 MW to the thermal violation.

CONTINGENCY 'B2-PN-230-003'

/* ERIE SOUTH - WARREN

230KV

DISCONNECT BRANCH FROM BUS 200918 TO BUS 200811 CKT 1

/* 26ERIE S

TIE230 26WARREN 230

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.46
203261	26BLOSSBCT	0.41
203283	26MANOR_T86	0.03
200851	26MEHOOP3	1.14
200823	26MHP_X3-003	6.05
200917	26MTNTP_P28	0.58
200949	26X1-109	16.23
292391	T-121C	0.49
903643	W3-099 C OP1	9.56
913191	Y1-047 OP1	0.3
914041	Y2-042	1.38
914151	Y2-060	0.07
LTF	Z1-019	121.28
916051	Z1-038	1.97
916201	Z1-069 C	0.32
916311	Z1-087	1.48
916351	Z1-091	2.63
916361	Z1-092	0.57
916541	Z1-110	0.4
920622	Z2-011	0.4
920822	Z2-103	0.02
920832	Z2-104	0.12
921412	AA1-106	2.12
921612	AA1-144 OP	18.08
921642	AA2-000	32.04
921932	AA2-081	2.35
922062	AA2-112	2.87
922242	AA2-132	2.93
922252	AA2-133	2.14
LTF	AA2-500	17.09
LTF	AA2-700	10.56
LTF	AA2-800	75.14

<i>922932</i>	<i>ABI-082 OP</i>	<i>2.16</i>
<i>923032</i>	<i>ABI-092</i>	<i>1.18</i>
<i>LTF</i>	<i>ABI-100</i>	<i>53.02</i>
<i>923442</i>	<i>ABI-160 C</i>	<i>0.43</i>
<i>923821</i>	<i>AB2-019</i>	<i>2.86</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.66</i>

Appendix 2

(PENELEC - AP) The 26SHAWVL 2-01SHINGL 230 kV line (from bus 200726 to bus 235248 ckt 1) loads from 99.94% to 100.69% (**DC power flow**) of its emergency rating (554 MVA) for the bus fault outage of 'C1-WP-230-004_A'. This project contributes approximately 9.14 MW to the thermal violation.

CONTINGENCY 'C1-WP-230-004_A'

/* MILESBURG #2 230KV

BUS

DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
230 AA1-085 TAP 230

DISCONNECT BRANCH FROM BUS 235219 TO BUS 236745 CKT 82 /* 01MILESB
230 01MILESBG 46

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
236828	01GRAYMONT	-1.52
200894	26K02	10.86
200913	26SHAW-D	1.28
200715	26SHAWVL 1	33.05
200722	26SHAWVL 2	34.1
200665	26SHAWVL 3	49.78
200666	26SHAWVL 4	50.27
203999	P-047 E	4.55
290086	Q-036 E	4.84
292392	T-121E	7.89
297050	V2-019 E	0.03
293393	V3-030E	1.42
903643	W3-099 C OP1	0.69
903644	W3-099 E OP1	4.58
907462	X1-109 E	5.07
913311	Y1-071	0.34
LTF	Z1-019	33.92
916202	Z1-069 E	4.01
916311	Z1-087	1.86
921283	AA1-082 E	3.43
921302	AA1-085 C	2.62
921303	AA1-085 E	17.49
921412	AA1-106	1.68
921612	AA1-144 OP	10.25
921642	AA2-000	89.85
921932	AA2-081	1.27
922242	AA2-132	1.
922932	AB1-082 OP	1.64
923032	AB1-092	3.3
923442	AB1-160 C	0.28

<i>923443</i>	<i>ABI-160 E</i>	<i>1.18</i>
<i>925401</i>	<i>AC1-011</i>	<i>0.97</i>
<i>925512</i>	<i>AC1-025 E</i>	<i>0.57</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.17</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>7.97</i>

Appendix 3

(NYISO - PENELEC) The S RIPLEY-26ERIE E 230 kV line (from bus 135251 to bus 200654 ckt 1) loads from 109.44% to 110.22% (**DC power flow**) of its emergency rating (607 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-003A'. This project contributes approximately 10.62 MW to the thermal violation.

CONTINGENCY 'C2-PN-345-003A'
BREAKER
DISCONNECT BUS 200595
END

/* WAYNE 345KV STUCK

/* 26WAYNE 345

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.43
203261	26BLOSSBCT	0.39
200894	26K02	4.86
203283	26MANOR_T86	0.03
200823	26MHP_X3-003	5.76
200949	26X1-109	15.36
294573	P-028 E	11.66
203999	P-047 E	9.14
292392	T-121E	8.26
297050	V2-019 E	0.06
907462	X1-109 E	9.
910522	X3-003 E	1.94
914041	Y2-042	1.32
LTF	Z1-019	116.63
916051	Z1-038	1.87
916202	Z1-069 E	5.38
916351	Z1-091	2.52
916361	Z1-092	0.54
920832	Z2-104	0.11
921283	AA1-082 E	6.09
921412	AA1-106	1.96
921612	AA1-144 OP	17.06
921642	AA2-000	25.28
921932	AA2-081	2.14
922062	AA2-112	2.75
922242	AA2-132	2.81
922252	AA2-133	2.03
LTF	AA2-500	16.93
LTF	AA2-700	9.87
LTF	AA2-800	74.62
922932	ABI-082 OP	1.71
923032	ABI-092	0.93
LTF	ABI-100	52.66

<i>923442</i>	<i>ABI-160 C</i>	<i>0.37</i>
<i>923443</i>	<i>ABI-160 E</i>	<i>1.58</i>
<i>923821</i>	<i>AB2-019</i>	<i>3.15</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.36</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>9.26</i>

Appendix 4

(PENELEC - PENELEC) The 26ERIE E-W3-099 TAP 230 kV line (from bus 200654 to bus 903645 ckt 1) loads from 107.82% to 108.63% (**DC power flow**) of its emergency rating (592 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-003A'. This project contributes approximately 10.62 MW to the thermal violation.

CONTINGENCY 'C2-PN-345-003A'
BREAKER
DISCONNECT BUS 200595
END

/* WAYNE 345KV STUCK
/* 26WAYNE 345

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.43
203261	26BLOSSBCT	0.39
200894	26K02	4.86
203283	26MANOR_T86	0.03
200823	26MHP_X3-003	5.76
200949	26X1-109	15.36
294573	P-028 E	11.66
203999	P-047 E	9.14
292392	T-121E	8.26
297050	V2-019 E	0.06
907462	X1-109 E	9.
910522	X3-003 E	1.94
914041	Y2-042	1.32
LTF	Z1-019	116.63
916051	Z1-038	1.87
916202	Z1-069 E	5.38
916351	Z1-091	2.52
916361	Z1-092	0.54
920832	Z2-104	0.11
921283	AA1-082 E	6.09
921412	AA1-106	1.96
921612	AA1-144 OP	17.06
921642	AA2-000	25.28
921932	AA2-081	2.14
922062	AA2-112	2.75
922242	AA2-132	2.81
922252	AA2-133	2.03
LTF	AA2-500	16.93
LTF	AA2-700	9.87
LTF	AA2-800	74.62
922932	ABI-082 OP	1.71
923032	ABI-092	0.93
LTF	ABI-100	52.66

<i>923442</i>	<i>ABI-160 C</i>	<i>0.37</i>
<i>923443</i>	<i>ABI-160 E</i>	<i>1.58</i>
<i>923821</i>	<i>AB2-019</i>	<i>3.15</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.36</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>9.26</i>

Appendix 5

(PENELEC - PENELEC) The 26E.TWANDA-26CANYON 230 kV line (from bus 200675 to bus 200924 ckt 1) loads from 157.6% to 158.81% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-449_A'. This project contributes approximately 17.88 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-449_A' /* 458
 DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
 26SHAWVL 1 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
 26CHAPMAN+ 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
 230 AA1-085 TAP 230
 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
 01MOSHAN 230 01QUEHAN 230
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200894	26K02	30.78
203283	26MANOR_T86	0.09
200949	26X1-109	67.54
203999	P-047 E	22.67
292392	T-121E	13.06
297050	V2-019 E	0.14
903643	W3-099 C OPI	1.08
903644	W3-099 E OPI	7.21
907462	X1-109 E	39.59
LTF	Z1-019	136.16
916202	Z1-069 E	9.72
916311	Z1-087	1.32
916351	Z1-091	1.53
916541	Z1-110	1.51
920622	Z2-011	1.51
921283	AA1-082 E	26.78
921412	AA1-106	7.98
921612	AA1-144 OP	75.72
921642	AA2-000	199.81
921932	AA2-081	4.22
922062	AA2-112	2.37
922242	AA2-132	2.57
922252	AA2-133	3.49
922932	AB1-082 OP	2.71
923032	AB1-092	7.34
LTF	AB1-100	91.11
923442	AB1-160 C	0.67

<i>923443</i>	<i>ABI-160 E</i>	<i>2.85</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>2.29</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>15.58</i>

Appendix 6

(PENELEC - PENELEC) The 26N.MESHPN 230/115 kV transformer (from bus 200677 to bus 200706 ckt 4) loads from 124.01% to 125.93% (**DC power flow**) of its emergency rating (189 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-#3A_A'. This project contributes approximately 8.04 MW to the thermal violation.

```

CONTINGENCY 'C2_PN230-SB-#3A_A' /* 731
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200924 CKT 1 /*
26E.TWANDA 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 200706 TO BUS 200924 CKT 1 /*
26N.MESHPN 230 26CANYON 230
DISCONNECT BRANCH FROM BUS 130763 TO BUS 200675 CKT 1 /* HILSD230
230 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200674 TO BUS 200675 CKT 3 /*
26TOWANDA 115 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200674 TO BUS 200675 CKT 4 /*
26TOWANDA 115 26E.TWANDA 230
DISCONNECT BRANCH FROM BUS 200675 TO BUS 200940 CKT 1 /*
26E.TWANDA 230 26SCOTCHHLLW230
DISCONNECT BRANCH FROM BUS 200940 TO BUS 921611 CKT 1 /*
26SCOTCHHLLW230 AA1-144 TAP 230
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200851	26MEHOOP3	4.39
200823	26MHP_X3-003	23.27
200917	26MTNTP_P28	2.23
294573	P-028 E	47.09
203999	P-047 E	11.57
292392	T-121E	5.86
297050	V2-019 E	0.07
910522	X3-003 E	7.85
913191	Y1-047 OP1	1.15
914151	Y2-060	0.26
LTF	Z1-019	62.53
916051	Z1-038	6.07
916202	Z1-069 E	4.39
916351	Z1-091	5.66
920822	Z2-103	0.07
921412	AA1-106	1.49
921932	AA2-081	1.91
922062	AA2-112	4.82
922242	AA2-132	4.61
922252	AA2-133	5.33
922932	AB1-082 OP	1.21

<i>LTF</i>	<i>ABI-100</i>	<i>37.65</i>
<i>923442</i>	<i>ABI-160 C</i>	<i>0.3</i>
<i>923443</i>	<i>ABI-160 E</i>	<i>1.29</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.03</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>7.01</i>

Appendix 7

(PENELEC - PENELEC) The 26N.MESHPN-26OXBOW 230 kV line (from bus 200706 to bus 200708 ckt 1) loads from 128.85% to 129.93% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 23.52 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-450_A' /* 459
 DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
 26SHAWVL 1 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
 26CHAPMAN+ 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
 230 AA1-085 TAP 230
 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
 01MOSHAN 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
 01QUEHAN 230 01QUEHANNA 46
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200894	26K02	33.58
200851	26MEHOOP3	6.32
200823	26MHP_X3-003	33.51
200917	26MTNTP_P28	3.21
200949	26X1-109	74.28
294573	P-028 E	67.81
203999	P-047 E	29.75
292392	T-121E	17.22
297050	V2-019 E	0.19
907462	X1-109 E	43.54
910522	X3-003 E	11.3
913191	Y1-047 OP1	1.65
914151	Y2-060	0.37
LTF	Z1-019	189.54
916051	Z1-038	8.85
916202	Z1-069 E	12.75
916351	Z1-091	9.52
920822	Z2-103	0.11
921283	AA1-082 E	29.46
921412	AA1-106	9.1
921612	AA1-144 OP	83.28
921642	AA2-000	216.89
921932	AA2-081	5.51

922062	AA2-112	8.85
922242	AA2-132	8.68
922252	AA2-133	9.27
922932	ABI-082 OP	3.57
923032	ABI-092	7.96
LTF	ABI-100	119.33
923442	ABI-160 C	0.88
923443	ABI-160 E	3.74
927001	AC1-187 C	3.02
927002	AC1-187 E	20.5

Appendix 8

(PENELEC - PL) The 26OXBOW-LACK 230 kV line (from bus 200708 to bus 208009 ckt 1) loads from 122.28% to 123.38% (**DC power flow**) of its emergency rating (984 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 23.89 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-450_A' /* 459
 DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
 26SHAWVL 1 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
 26CHAPMAN+ 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
 230 AA1-085 TAP 230
 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
 01MOSHAN 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
 01QUEHAN 230 01QUEHANNA 46
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200894	26K02	33.97
200851	26MEHOOP3	6.52
200823	26MHP_X3-003	34.59
200917	26MTNTP_P28	3.32
294573	P-028 E	69.99
203999	P-047 E	30.24
292392	T-121E	17.5
297050	V2-019 E	0.19
907462	X1-109 E	44.05
910522	X3-003 E	11.66
913191	Y1-047 OP1	1.7
914041	Y2-042	12.74
914151	Y2-060	0.39
LTF	Z1-019	192.65
916051	Z1-038	11.81
916202	Z1-069 E	12.96
916351	Z1-091	9.79
920822	Z2-103	0.11
920832	Z2-104	1.11
921283	AA1-082 E	29.8
921412	AA1-106	9.22
921612	AA1-144 OP	84.25
921642	AA2-000	219.36

921932	AA2-081	5.6
922062	AA2-112	9.07
922242	AA2-132	8.9
922252	AA2-133	10.91
922932	ABI-082 OP	3.63
923032	ABI-092	8.05
LTF	ABI-100	121.2
923442	ABI-160 C	0.89
923443	ABI-160 E	3.8
927001	AC1-187 C	3.06
927002	AC1-187 E	20.83

Appendix 9

(PENELEC - PENELEC) The 26HOMER CT-26SHELOCTA 230 kV line (from bus 200767 to bus 200795 ckt 1) loads from 131.32% to 132.61% (**DC power flow**) of its emergency rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002A'. This project contributes approximately 26.34 MW to the thermal violation.

CONTINGENCY 'C2-PN-500-002A' /* CONEMAUGH 500KV BKR
 1
 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-
 GH 500 26CONEMAGH 230
 DISCONNECT BUS 200031 /* CONE G2 22
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
236828	01GRAYMONT	0.57
200886	26ARWF_N39	0.97
200890	26BF_G21_K23	10.23
200503	26C.SLOPE	7.95
200846	26FORWARD	7.41
200888	26HIGHLAND	0.77
200837	26HOMER C1	51.96
200838	26HOMER C2	43.04
200839	26HOMER C3	45.56
200894	26K02	10.34
200823	26MHP_X3-003	6.73
203034	26NA_O38_P22	0.85
200925	26R32	0.89
202225	26SCI_S29B	1.99
200833	26SEWRDB34	36.85
200913	26SHAW-D	1.07
200715	26SHAWVL 1	19.97
200722	26SHAWVL 2	20.48
200665	26SHAWVL 3	28.07
200666	26SHAWVL 4	28.06
200809	26SITHE	3.02
200889	26STNY CRK	0.59
200834	26SW_E13_K22	0.55
203997	B14E K18E	2.02
200864	K-013 E	0.41
292340	K-022	0.1
292542	L-013 1	7.8
293301	N-039 E	20.39
293603	O-018 E	16.27
293802	O-038 E	12.74
293902	O-048 E	7.02

294515	<i>P-022 E</i>	5.1
294573	<i>P-028 E</i>	13.62
203999	<i>P-047 E</i>	15.18
294903	<i>P-060 E</i>	12.38
290086	<i>Q-036 E</i>	9.23
200883	<i>Q-053 E</i>	13.56
296332	<i>R-032 E</i>	18.77
293432	<i>R-040 E</i>	0.44
292392	<i>T-121E</i>	21.85
297050	<i>V2-019 E</i>	0.09
293393	<i>V3-030E</i>	6.24
903643	<i>W3-099 C OPI</i>	1.92
903644	<i>W3-099 E OPI</i>	12.86
907462	<i>X1-109 E</i>	11.5
910522	<i>X3-003 E</i>	2.27
913001	<i>Y1-003 C OPI</i>	0.92
913002	<i>Y1-003 E OPI</i>	6.15
913142	<i>Y1-033 E OPI</i>	6.78
913311	<i>Y1-071</i>	0.87
<i>LTF</i>	<i>Z1-019</i>	112.17
916051	<i>Z1-038</i>	2.2
920573	<i>Z1-066 E</i>	2.53
916202	<i>Z1-069 E</i>	12.26
916311	<i>Z1-087</i>	3.27
916351	<i>Z1-091</i>	2.8
920853	<i>Z2-108 E</i>	4.87
921072	<i>AA1-046 C</i>	3.02
921073	<i>AA1-046 E</i>	20.22
921283	<i>AA1-082 E</i>	7.78
921302	<i>AA1-085 C</i>	1.6
921303	<i>AA1-085 E</i>	10.63
921412	<i>AA1-106</i>	3.11
921612	<i>AA1-144 OP</i>	22.13
921642	<i>AA2-000</i>	70.41
921932	<i>AA2-081</i>	4.31
922062	<i>AA2-112</i>	3.02
922242	<i>AA2-132</i>	3.07
922252	<i>AA2-133</i>	2.5
<i>LTF</i>	<i>AA2-300</i>	36.95
922932	<i>ABI-082 OP</i>	4.53
923032	<i>ABI-092</i>	2.59
<i>LTF</i>	<i>ABI-100</i>	122.38
923442	<i>ABI-160 C</i>	0.84
923443	<i>ABI-160 E</i>	3.59
925401	<i>AC1-011</i>	2.68

<i>925512</i>	<i>ACI-025 E</i>	<i>0.21</i>
<i>926991</i>	<i>ACI-186 C OP</i>	<i>5.68</i>
<i>926992</i>	<i>ACI-186 E OP</i>	<i>38.08</i>
<i>927001</i>	<i>ACI-187 C</i>	<i>3.38</i>
<i>927002</i>	<i>ACI-187 E</i>	<i>22.96</i>

Appendix 10

(PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999425 ckt N) loads from 140.4% to 144.46% (**DC power flow**) of its emergency rating (807 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9E'. This project contributes approximately 32.82 MW to the thermal violation.

CONTINGENCY 'C2_PN230-SB-9E' /* 575
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/*
 26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200837 CKT 1 /* 26HOMER
 CT 230 26HOMER C1 20
 REMOVE MACHINE 1 FROM BUS 200837 /* 26HOMER C1 20
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.91
203261	26BLOSSBCT	0.85
200828	26HNSMLK 1	2.64
200829	26HNSMLK 2	2.64
200830	26HNSMLK 3	2.64
200831	26HNSMLK 4	2.64
200832	26HNSMLK 5	2.64
200838	26HOMER C2	60.55
200839	26HOMER C3	64.1
200894	26K02	9.08
200823	26MHP_X3-003	8.06
200642	26SENECA#1	9.51
200643	26SENECA#2	10.13
200644	26SENECA#3	1.24
200715	26SHAWVL 1	10.36
200722	26SHAWVL 2	10.58
200665	26SHAWVL 3	15.92
200666	26SHAWVL 4	15.89
294573	P-028 E	16.31
203999	P-047 E	19.28
292391	T-121C	1.28
292392	T-121E	27.05
297050	V2-019 E	0.12
903643	W3-099 C OPI	2.42
903644	W3-099 E OPI	16.17
907462	X1-109 E	13.56
910522	X3-003 E	2.72
913311	Y1-071	0.92
914041	Y2-042	1.65
LTF	Z1-019	142.66

916051	Z1-038	2.63
920573	Z1-066 E	-1.34
916201	Z1-069 C	0.78
916202	Z1-069 E	15.42
916311	Z1-087	3.71
916351	Z1-091	3.46
920832	Z2-104	0.14
921283	AA1-082 E	9.17
921412	AA1-106	3.54
921612	AA1-144 OP	25.86
921642	AA2-000	53.95
921932	AA2-081	5.49
922062	AA2-112	3.75
922242	AA2-132	3.82
922252	AA2-133	3.
LTF	AA2-300	57.08
922932	AB1-082 OP	5.61
923032	AB1-092	1.98
LTF	AB1-100	164.43
923442	AB1-160 C	1.06
923443	AB1-160 E	4.52
925401	AC1-011	2.33
927001	AC1-187 C	4.21
927002	AC1-187 E	28.61

Appendix 11

(PENELEC - PENELEC) The 26HOMER CY 345/1 kV transformer (from bus 200769 to bus 999426 ckt S) loads from 177.28% to 182.17% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-001A'. This project contributes approximately 40.23 MW to the thermal violation.

CONTINGENCY 'C2-PN-345-001A' /* HOMER CITY 345KV BKR
301

DISCONNECT BRANCH FROM BUS 200769 TO BUS 235129 CKT 1 /* 26HOMER
CY 345 01ARMSTRONG 345

DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	1.15
203261	26BLOSSBCT	1.06
200838	26HOMER C2	80.92
200839	26HOMER C3	85.66
200894	26K02	10.58
200823	26MHP_X3-003	10.24
200642	26SENECA#1	10.05
200643	26SENECA#2	10.71
200644	26SENECA#3	1.31
200715	26SHAWVL 1	10.92
200722	26SHAWVL 2	11.15
200665	26SHAWVL 3	16.48
200666	26SHAWVL 4	16.44
294573	P-028 E	20.73
203999	P-047 E	24.35
292391	T-121C	1.56
292392	T-121E	32.96
297050	V2-019 E	0.15
903643	W3-099 C OPI	1.93
903644	W3-099 E OPI	12.93
907462	X1-109 E	16.94
910522	X3-003 E	3.45
914041	Y2-042	2.2
LTF	Z1-019	171.8
916051	Z1-038	3.35
920573	Z1-066 E	-0.86
916201	Z1-069 C	0.96
916202	Z1-069 E	19.05
916311	Z1-087	3.92
916351	Z1-091	4.3

916361	Z1-092	0.96
920832	Z2-104	0.19
921283	AA1-082 E	11.46
921302	AA1-085 C	0.87
921303	AA1-085 E	5.78
921412	AA1-106	4.38
921612	AA1-144 OP	32.25
921642	AA2-000	60.23
921932	AA2-081	6.88
922062	AA2-112	4.64
922242	AA2-132	4.72
922252	AA2-133	3.78
LTF	AA2-300	86.75
922932	AB1-082 OP	6.83
923032	AB1-092	2.21
LTF	AB1-100	212.56
923442	AB1-160 C	1.31
923443	AB1-160 E	5.58
927001	AC1-187 C	5.16
927002	AC1-187 E	35.07

Appendix 12

(PENELEC - PENELEC) The 26SHELOCTA-26KEYSTONE 230 kV line (from bus 200795 to bus 200810 ckt 1) loads from 123.47% to 124.78% (**DC power flow**) of its emergency rating (917 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-500-002A'. This project contributes approximately 26.7 MW to the thermal violation.

CONTINGENCY 'C2-PN-500-002A' /* CONEMAUGH 500KV BKR
 1
 DISCONNECT BRANCH FROM BUS 200005 TO BUS 200912 CKT 3 /* CONEM-
 GH 500 26CONEMAGH 230
 DISCONNECT BUS 200031 /* CONE G2 22
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
236828	01GRAYMONT	0.63
200886	26ARWF_N39	1.
200890	26BF_G21_K23	11.17
200503	26C.SLOPE	8.96
200915	26CHSTN_FL	0.6
200805	26COLVER13	6.64
202158	26CON.GEN1	0.21
200945	26CT_V3-030	0.32
200846	26FORWARD	8.06
200888	26HIGHLAND	0.85
200837	26HOMER C1	50.27
200838	26HOMER C2	42.11
200839	26HOMER C3	44.58
200636	26IUP CO-G	0.92
200894	26K02	11.04
200823	26MHP_X3-003	6.76
203034	26NA_O38_P22	0.88
200925	26R32	0.98
202225	26SCI_S29B	2.16
200833	26SEWRDB34	38.34
200913	26SHAW-D	1.3
200715	26SHAWVL 1	22.92
200722	26SHAWVL 2	23.5
200665	26SHAWVL 3	31.71
200666	26SHAWVL 4	31.7
200809	26SITHE	2.92
200889	26STNY CRK	0.64
200834	26SW_E13_K22	0.59
203997	B14E K18E	2.21
200864	K-013 E	0.45
292340	K-022	0.11

292542	<i>L-013 I</i>	8.51
293301	<i>N-039 E</i>	21.11
293603	<i>O-018 E</i>	17.95
293802	<i>O-038 E</i>	13.19
293902	<i>O-048 E</i>	7.66
294515	<i>P-022 E</i>	5.28
294573	<i>P-028 E</i>	13.68
203999	<i>P-047 E</i>	15.21
294903	<i>P-060 E</i>	13.54
290086	<i>Q-036 E</i>	10.67
200883	<i>Q-053 E</i>	15.25
296332	<i>R-032 E</i>	20.71
293432	<i>R-040 E</i>	0.48
292392	<i>T-121E</i>	22.2
297050	<i>V2-019 E</i>	0.1
293393	<i>V3-030E</i>	9.01
903643	<i>W3-099 C OPI</i>	2.
903644	<i>W3-099 E OPI</i>	13.4
907462	<i>X1-109 E</i>	11.64
910522	<i>X3-003 E</i>	2.28
913001	<i>Y1-003 C OPI</i>	1.02
913002	<i>Y1-003 E OPI</i>	6.82
913142	<i>Y1-033 E OPI</i>	7.42
913311	<i>Y1-071</i>	1.05
<i>LTF</i>	<i>Z1-019</i>	112.99
916051	<i>Z1-038</i>	2.21
920573	<i>Z1-066 E</i>	2.76
916202	<i>Z1-069 E</i>	12.39
916311	<i>Z1-087</i>	3.42
916351	<i>Z1-091</i>	2.82
920632	<i>Z2-014</i>	0.08
920853	<i>Z2-108 E</i>	5.32
921072	<i>AA1-046 C</i>	3.29
921073	<i>AA1-046 E</i>	22.05
921283	<i>AA1-082 E</i>	7.88
921302	<i>AA1-085 C</i>	1.77
921303	<i>AA1-085 E</i>	11.79
921412	<i>AA1-106</i>	3.18
921612	<i>AA1-144 OP</i>	22.46
921642	<i>AA2-000</i>	76.64
921932	<i>AA2-081</i>	4.33
922062	<i>AA2-112</i>	3.03
922242	<i>AA2-132</i>	3.08
922252	<i>AA2-133</i>	2.52
<i>LTF</i>	<i>AA2-300</i>	34.77

922932	<i>ABI-082 OP</i>	4.6
923032	<i>ABI-092</i>	2.81
<i>LTF</i>	<i>ABI-100</i>	121.23
923442	<i>ABI-160 C</i>	0.85
923443	<i>ABI-160 E</i>	3.63
925401	<i>ACI-011</i>	3.5
925512	<i>ACI-025 E</i>	0.23
926991	<i>ACI-186 C OP</i>	6.18
926992	<i>ACI-186 E OP</i>	41.47
927001	<i>ACI-187 C</i>	3.42
927002	<i>ACI-187 E</i>	23.27

Appendix 13

(PENELEC - PENELEC) The 26CANYON-26N.MESHPN 230 kV line (from bus 200924 to bus 200706 ckt 1) loads from 154.95% to 156.16% (**DC power flow**) of its emergency rating (666 MVA) for the line fault with failed breaker contingency outage of 'C2-WPP-KV-450_A'. This project contributes approximately 17.88 MW to the thermal violation.

CONTINGENCY 'C2-WPP-KV-450_A' /* 459
 DISCONNECT BRANCH FROM BUS 200710 TO BUS 235220 CKT 1 /*
 26SHAWVL 1 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 200908 TO BUS 235220 CKT 1 /*
 26CHAPMAN+ 230 01MOSHAN 230
 DISCONNECT BRANCH FROM BUS 235219 TO BUS 921301 CKT 1 /* 01MILESB
 230 AA1-085 TAP 230
 DISCONNECT BRANCH FROM BUS 235220 TO BUS 235236 CKT 1 /*
 01MOSHAN 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235175 TO BUS 235236 CKT 1 /* 01ELKO
 230 01QUEHAN 230
 DISCONNECT BRANCH FROM BUS 235236 TO BUS 236732 CKT 81 /*
 01QUEHAN 230 01QUEHANNA 46
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200894	26K02	30.78
203283	26MANOR_T86	0.09
200949	26X1-109	67.54
203999	P-047 E	22.67
292392	T-121E	13.06
297050	V2-019 E	0.14
903643	W3-099 C OPI	1.08
903644	W3-099 E OPI	7.21
907462	X1-109 E	39.59
LTF	Z1-019	136.16
916202	Z1-069 E	9.72
916311	Z1-087	1.32
916351	Z1-091	1.53
916541	Z1-110	1.51
920622	Z2-011	1.51
921283	AA1-082 E	26.78
921412	AA1-106	7.98
921612	AA1-144 OP	75.72
921642	AA2-000	199.81
921932	AA2-081	4.22
922062	AA2-112	2.37
922242	AA2-132	2.57
922252	AA2-133	3.49

<i>922932</i>	<i>ABI-082 OP</i>	<i>2.71</i>
<i>923032</i>	<i>ABI-092</i>	<i>7.34</i>
<i>LTF</i>	<i>ABI-100</i>	<i>91.11</i>
<i>923442</i>	<i>ABI-160 C</i>	<i>0.67</i>
<i>923443</i>	<i>ABI-160 E</i>	<i>2.85</i>
<i>927001</i>	<i>ACI-187 C</i>	<i>2.29</i>
<i>927002</i>	<i>ACI-187 E</i>	<i>15.58</i>

Appendix 14

(PENELEC - PENELEC) The 26FOURMILE-26ERIE SE 230 kV line (from bus 200928 to bus 200819 ckt 1) loads from 108.39% to 109.2% (**DC power flow**) of its emergency rating (584 MVA) for the line fault with failed breaker contingency outage of 'C2_PN115-SB-83D1'. This project contributes approximately 10.58 MW to the thermal violation.

CONTINGENCY 'C2_PN115-SB-83D1' /* FUTURE FOUR MILE
 115KV SB
 DISCONNECT BRANCH FROM BUS 200927 TO BUS 200928 CKT 1 /*
 26FOURMILE 115 26FOURMILE 230
 DISCONNECT BRANCH FROM BUS 200927 TO BUS 200570 CKT 1 /*
 26FOURMILE 115 26CORRY E. 115
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.42
203261	26BLOSSBCT	0.38
200894	26K02	4.77
203283	26MANOR_T86	0.03
200823	26MHP_X3-003	5.64
200949	26X1-109	15.07
294573	P-028 E	11.41
203999	P-047 E	8.88
292392	T-121E	8.29
297050	V2-019 E	0.06
903643	W3-099 C OPI	9.71
903644	W3-099 E OPI	65.
907462	X1-109 E	8.83
910522	X3-003 E	1.9
914041	Y2-042	1.28
LTF	Z1-019	116.2
916051	Z1-038	1.83
916202	Z1-069 E	5.31
916351	Z1-091	2.48
916361	Z1-092	0.54
920832	Z2-104	0.11
921283	AA1-082 E	5.97
921412	AA1-106	1.92
921612	AA1-144 OP	16.74
921932	AA2-081	2.08
922062	AA2-112	2.72
922242	AA2-132	2.77
922252	AA2-133	1.99
LTF	AA2-500	17.36
LTF	AA2-700	10.38

<i>LTF</i>	<i>AA2-800</i>	<i>76.47</i>
<i>922932</i>	<i>ABI-082 OP</i>	<i>1.72</i>
<i>LTF</i>	<i>ABI-100</i>	<i>49.44</i>
<i>923442</i>	<i>ABI-160 C</i>	<i>0.36</i>
<i>923443</i>	<i>ABI-160 E</i>	<i>1.56</i>
<i>923821</i>	<i>AB2-019</i>	<i>2.4</i>
<i>927001</i>	<i>AC1-187 C</i>	<i>1.36</i>
<i>927002</i>	<i>AC1-187 E</i>	<i>9.23</i>

Appendix 15

(PENELEC - PENELEC) The 26MAINESBURG-26EVERT DR 115 kV line (from bus 200929 to bus 200885 ckt 1) loads from 150.81% to 152.0% (**DC power flow**) of its emergency rating (179 MVA) for the single line contingency outage of 'B2-TIE-345-104_B'. This project contributes approximately 2.13 MW to the thermal violation.

CONTINGENCY 'B2-TIE-345-104_B' /* MAINESBURG -
 WATERCURE ROAD (NYSEG) 345KV LINE
 DISCONNECT BRANCH FROM BUS 920750 TO BUS 130757 CKT 1 /* AA2-300
 TAP WATRC345 345
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
203261	26BLOSSBCT	0.44
292391	T-121C	0.5
916201	Z1-069 C	0.52
916351	Z1-091	-1.62
921932	AA2-081	5.04
LTF	AA2-300	124.1
LTF	AA2-800	14.45
922932	AB1-082 OP	2.2
LTF	AB1-100	82.57
923442	AB1-160 C	0.7
927001	AC1-187 C	2.13

Appendix 16

(PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999425 to bus 200767 ckt N) loads from 137.24% to 141.3% (**DC power flow**) of its emergency rating (807 MVA) for the line fault with failed breaker contingency outage of 'C2_PN230-SB-9E'. This project contributes approximately 32.82 MW to the thermal violation.

CONTINGENCY 'C2_PN230-SB-9E' /* 575
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200769 TO BUS 202641 CKT S/*
 26HOMER CT 230 26HOMER CY 345 26HOMERCITYS 23.00
 DISCONNECT BRANCH FROM BUS 200767 TO BUS 200837 CKT 1 /* 26HOMER
 CT 230 26HOMER C1 20
 REMOVE MACHINE 1 FROM BUS 200837 /* 26HOMER C1 20
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	0.91
203261	26BLOSSBCT	0.85
200828	26HNSMLK 1	2.64
200829	26HNSMLK 2	2.64
200830	26HNSMLK 3	2.64
200831	26HNSMLK 4	2.64
200832	26HNSMLK 5	2.64
200838	26HOMER C2	60.55
200839	26HOMER C3	64.1
200894	26K02	9.08
200823	26MHP_X3-003	8.06
200642	26SENECA#1	9.51
200643	26SENECA#2	10.13
200644	26SENECA#3	1.24
200715	26SHAWVL 1	10.36
200722	26SHAWVL 2	10.58
200665	26SHAWVL 3	15.92
200666	26SHAWVL 4	15.89
294573	P-028 E	16.31
203999	P-047 E	19.28
292391	T-121C	1.28
292392	T-121E	27.05
297050	V2-019 E	0.12
903643	W3-099 C OPI	2.42
903644	W3-099 E OPI	16.17
907462	X1-109 E	13.56
910522	X3-003 E	2.72
913311	Y1-071	0.92
914041	Y2-042	1.65
LTF	Z1-019	142.66

916051	Z1-038	2.63
920573	Z1-066 E	-1.34
916201	Z1-069 C	0.78
916202	Z1-069 E	15.42
916311	Z1-087	3.71
916351	Z1-091	3.46
920832	Z2-104	0.14
921283	AA1-082 E	9.17
921412	AA1-106	3.54
921612	AA1-144 OP	25.86
921642	AA2-000	53.95
921932	AA2-081	5.49
922062	AA2-112	3.75
922242	AA2-132	3.82
922252	AA2-133	3.
LTF	AA2-300	57.08
922932	AB1-082 OP	5.61
923032	AB1-092	1.98
LTF	AB1-100	164.43
923442	AB1-160 C	1.06
923443	AB1-160 E	4.52
925401	AC1-011	2.33
927001	AC1-187 C	4.21
927002	AC1-187 E	28.61

Appendix 17

(PENELEC - PENELEC) The 26HOMER CT 230/1 kV transformer (from bus 999426 to bus 200767 ckt S) loads from 174.74% to 179.62% (**DC power flow**) of its emergency rating (824 MVA) for the line fault with failed breaker contingency outage of 'C2-PN-345-001A'. This project contributes approximately 40.23 MW to the thermal violation.

CONTINGENCY 'C2-PN-345-001A' /* HOMER CITY 345KV BKR
301

DISCONNECT BRANCH FROM BUS 200769 TO BUS 235129 CKT 1 /* 26HOMER
CY 345 01ARMSTRONG 345

DISCONNECT BRANCH FROM BUS 200769 TO BUS 200767 TO BUS 202640 CKT N/*
26HOMER CY 345 26HOMER CT 230 26HOMERCITYN 23.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
200887	26ARMNA MT	1.15
203261	26BLOSSBCT	1.06
200838	26HOMER C2	80.92
200839	26HOMER C3	85.66
200894	26K02	10.58
200823	26MHP_X3-003	10.24
200642	26SENECA#1	10.05
200643	26SENECA#2	10.71
200644	26SENECA#3	1.31
200715	26SHAWVL 1	10.92
200722	26SHAWVL 2	11.15
200665	26SHAWVL 3	16.48
200666	26SHAWVL 4	16.44
294573	P-028 E	20.73
203999	P-047 E	24.35
292391	T-121C	1.56
292392	T-121E	32.96
297050	V2-019 E	0.15
903643	W3-099 C OPI	1.93
903644	W3-099 E OPI	12.93
907462	X1-109 E	16.94
910522	X3-003 E	3.45
914041	Y2-042	2.2
LTF	Z1-019	171.8
916051	Z1-038	3.35
920573	Z1-066 E	-0.86
916201	Z1-069 C	0.96
916202	Z1-069 E	19.05
916311	Z1-087	3.92
916351	Z1-091	4.3

916361	Z1-092	0.96
920832	Z2-104	0.19
921283	AA1-082 E	11.46
921302	AA1-085 C	0.87
921303	AA1-085 E	5.78
921412	AA1-106	4.38
921612	AA1-144 OP	32.25
921642	AA2-000	60.23
921932	AA2-081	6.88
922062	AA2-112	4.64
922242	AA2-132	4.72
922252	AA2-133	3.78
LTF	AA2-300	86.75
922932	AB1-082 OP	6.83
923032	AB1-092	2.21
LTF	AB1-100	212.56
923442	AB1-160 C	1.31
923443	AB1-160 E	5.58
927001	AC1-187 C	5.16
927002	AC1-187 E	35.07