

Generation Interconnection Feasibility Study Report Queue Position AD2-004

The Interconnection Customer (IC) has proposed a 600 MW (600 MW Capacity) natural gas fueled, 1x1x1 single shaft, combined cycle generating facility to be located in Denton, Caroline County, Maryland. At the IC's request, PJM studied the AD2-004 project at both a Primary and Secondary Point of Interconnection. The project was studied with a commercial probability of 53% with the results provided below. The planned in-service date, as requested by the IC during the project kick-off call, is December 1, 2022. This date may not be attainable due to additional required PJM studies and Transmission Owner construction schedule.

Point(s) of Interconnection

The Interconnection Customer requested a Primary and Secondary Point of Interconnection (POI) be evaluated for the AD2-004 project.

Primary Point of Interconnection

PJM studied the AD2-004 project as an injection into the Delmarva Power and Light Company (DPL) transmission system tapping the Vienna-Steele 230 kV circuit and evaluated it for compliance with reliability criteria for summer peak conditions in 2021. The AD2-004 project will connect with the DPL transmission system at a new 230 kV three-breaker ring bus substation to be constructed adjacent to the Vienna-Steele 230 kV circuit.

Transmission Owner Scope of Work

Substation Interconnection Estimate

Scope: Build a new 230 kV substation with a 3-position ring bus adjacent to the Vienna-Steele 230 kV circuit. Two of the positions on the ring bus will be transmission line terminals for the tie-in of Line 23085 to the substation. The other position will be a terminal configured for the interconnection of a generator.

Estimate: \$5,000,000

Construction Time: 24-36 months

Major Equipment Included in Estimate:

- | | |
|---|--------|
| • Control Enclosure, 20' x 15' | Qty. 1 |
| • Power Circuit Breaker, 230 kV, 3000A, 50kA, 3 cycle | Qty. 3 |
| • Disconnect Switch, 230 kV, 3000A, with ground switch, Manual Wormgear, Gang operated, Arcing Horns | Qty. 6 |
| • Disconnect Switch, 230 kV, 3000A, with ground switch, Manual Wormgear, Gang operated, Quick Break Whips | Qty. 3 |
| • Surge Arresters, 230kv | Qty. 9 |
| • CT/VT Combination Units, 230 kV | Qty. 3 |

• CVT, 230 kV	Qty. 9
• Disconnect Switch Stand, High, 230 kV, Steel	Qty. 6
• CT/VT Stand, Single Phase, Low, 230 kV, Steel	Qty. 3
• CVT Stand, Single Phase, Low, 230 kV, Steel	Qty. 9
• SSVT, 230 kV/240-120 V	Qty. 1
• SSVT Stand, Single Phase	Qty. 1
• Relay Panel, Transmission Line, FL/BU (20")	Qty. 2
• Relay Panel, Differential Protection, FL/BU (20")	Qty. 1
• Control Panel, 230 kV Circuit Breaker (10")	Qty. 3
• Take-off structure, 230 kV	Qty. 3
• Bus Support Structure, 3 phase, 230 kV, Steel	Qty. 8
• SCADA Communications Panel	Qty: 1

Estimate Assumptions:

- Developer to purchase required land and is available for use.
- Land purchase for the substation is not included.
- Site clearing and grading performed by Developer.
- Grounding, environmental and soil studies not included.
- Fiber to point of interconnection is not included in this study

Required Relaying and Communications

New protection relays are required for the new terminals.

An SEL-487 will be required for primary protection and an SEL-387 will be required for back-up protection. One 20" relay panel for each generator terminal will be required for front line and back-up protection.

New protection relays are required for the new line terminals. An SEL-421 will be required for primary protection and an SEL-311C will be required for back-up protection. A 20" relay panel will be required for each transmission line (2 total).

An SEL-451 relay on a 20" breaker control panel will be required for the control and operation of each new 230 kV circuit breaker (3 total).

The project will require re-wiring and adjustment of existing relay schemes to accommodate the new 230 kV substation.

Metering

Three phase 230 kV revenue metering points will need to be established. DPL will purchase and install all metering instrument transformers as well as construct a metering structure. The secondary wiring connections at the instrument transformers will be completed by DPL's metering technicians. The metering control cable and meter cabinets will be supplied and installed by DPL. DPL will install

conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined in the construction phase. DPL will provide both the Primary and the Backup meters. DPL's meter technicians will program and install the Primary & Backup solid state multi-function meters for each new metering position. Each meter will be equipped with load profile, telemetry, and DNP outputs. The IC will be provided with one meter DNP output for each meter. DPL will own the metering equipment for the interconnection point, unless the IC asserts its right to install, own, and operate the metering system.

The Interconnection Customer will be required to make provisions for a voice quality phone line within approximately 3 feet of each Company metering position to facilitate remote interrogation and data collection.

It is the IC's responsibility to send the data that PJM and DPL requires directly to PJM. The IC will grant permission for PJM to send DPL the following telemetry that the IC sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

The estimate for DPL to design, purchase, and install metering as specified in the aforementioned scope for metering is included in the Substation Interconnection Estimate.

Interconnection Customer Scope of Direct Connection Work

The Interconnection Customer is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC. Protective relaying and metering design and installation must comply with DPL's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

DPL Interconnection Customer Scope of Direct Connection Work Requirements:

- DPL requires that an IC circuit breaker is located within 500 feet of the DPL substation to facilitate the relay protection scheme between DPL and the IC at the Point of Interconnection (POI).

Special Operating Requirements

1. DPL will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by DPL.
2. DPL reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by DPL.

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or

greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

Summer Peak Analysis - 2021

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

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

1. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 99.87% to 105.02% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22084'. This project contributes approximately 90.37 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22084'

OPEN LINE FROM BUS 213750 TO BUS 231000 CIRCUIT 1/LINWOOD - CLAYMONT 230
END

2. (DP&L - DP&L) The VIENNA 230/138 kV transformer (from bus 232005 to bus 232116 ckt 1) loads from .04% to 112.96% (**DC power flow**) of its emergency rating (531 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1

OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

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

3. (DP&L - DP&L) The VIENN138-VIENNA 8 138 kV line (from bus 232116 to bus 232117 ckt 1) loads from .04% to 124.18% (**DC power flow**) of its emergency rating (483 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1

OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

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

4. (DP&L - DP&L) The VIENNA 8-NELSON 138 kV line (from bus 232117 to bus 232119 ckt 1) loads from 41.92% to 150.34% (**DC power flow**) of its emergency rating (226 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 245.02 MW to the thermal violation.

CONTINGENCY '232000'STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

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

5. (DP&L - DP&L) The NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) loads from 23.85% to 129.9% (**DC power flow**) of its emergency rating (193 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 204.68 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

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

6. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 27.23% to 103.44% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 70.87 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

7. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 33.04% to 109.24% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 70.87 MW to the thermal violation.

CONTINGENCY '232000'STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

8. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 16.64% to 118.7% (**DC power flow**) of its emergency rating (551 MVA) for the

single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 562.72 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 13707'

OPEN LINE FROM BUS 232119 TO BUS 232117 CIRCUIT 1 /NELSON - VIENNA 138
END

9. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 13.82% to 114.33% (**DC power flow**) of its emergency rating (551 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 6741'. This project contributes approximately 554.34 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 6741'

DISCONNECT BUS 232841/ NORTH SALISBURY - WALSTON SWITCH - NEW HOPE 69
DISCONNECT BUS 232834 / NEW HOPE - OCEAN PINES 69
DISCONNECT BUS 232832 / OCEAN PINES - WORCESTER 69
DISCONNECT BUS 230911 / NORTH SALISBURY 69 CAP
DISCONNECT BUS 230909 / WORCESTER 69 CAP
END

10. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 11.2% to 111.63% (**DC power flow**) of its normal rating (551 MVA) for **non-contingency** condition. This project contributes approximately 553.85 MW to the thermal violation.
11. (DP&L - DP&L) The AD2-004 TAP-VIENNA 230 kV line (from bus 936020 to bus 232005 ckt 1) loads from .0% to 108.89% (**DC power flow**) of its emergency rating (551 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

Please refer to Appendix 5 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. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 99.79% to 111.02% (**DC power flow**) of its emergency rating (790 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 195.5 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

2. (DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 79.52% to 123.55% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

3. (DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 64.61% to 108.64% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B' /* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

4. (DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 75.57% to 119.6% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

5. (DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 60.67% to 104.7% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

6. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 86.01% to 130.04% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

7. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 71.1% to 115.13% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

8. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 75.32% to 109.6% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP12'. This project contributes approximately 70.75 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP12'/*STEELE BUS BREAKER TO VIENNA
DISCONNECT BRANCH FROM BUS 232000 TO BUS 232103 CKT 2/*STEELE STEELE
230 138 AT21
DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230
END

9. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 81.13% to 115.41% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP12'. This project contributes approximately 70.75 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP12' /*STEELE BUS BREAKER TO VIENNA
DISCONNECT BRANCH FROM BUS 232000 TO BUS 232103 CKT 2 /*STEELE STEELE
230 138 AT21
DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230
END

10. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 40.84% to 141.96% (**DC power flow**) of its emergency rating (551 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP59'. This project contributes approximately 559.76 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP59'/*PINEY GROVE BUS BREAKER
DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1/*PINEY GROVE AB2-
120 TAP 138 138
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1/*PINEY GROVE
PINEY GROVE 230 138
END

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

11. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 40.75% to 141.88% (**DC power flow**) of its emergency rating (551 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP60A'. This project contributes approximately 559.76 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP60A' /*PINEY GROVE BUS BREAKER
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232006 CKT 1/*PINEY GROVE
INDIAN RIVER 230 230
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1/*PINEY GROVE
PINEY GROVE 230 138
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. (PJM500 - PJM500) The PCHBTM1S-CNASTONE 500 kV line (from bus 200064 to bus 200004 ckt 1) loads from 103.56% to 106.78% (**DC power flow**) of its emergency rating (3525 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_PEACH035/* \$

CHESCO \$ PEACH035 \$ STBK'. This project contributes approximately 239.19 MW to the thermal violation.

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CONTINGENCY 'PECO_P4_PEACH035/* $ CHESCO $ PEACH035 $ STBK'
TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1/* PCHBTM1N 500.00 3MILEI
500.00 $ CHESCO $ PEACH035 $ STBK / PJM FIXED
TRIP BRANCH FROM BUS 200066 TO BUS 213866 CKT 1/* PCHBTM1N 500.00 PCHBTM
230.00 $ CHESCO $ PEACH035 $ STBK
REMOVE MACHINE 1 FROM BUS 213794/* MDYRN5-6 13.80 $ CHESCO $ PEACH035 $
STBK
REMOVE MACHINE 2 FROM BUS 213794/* MDYRN5-6 13.80 $ CHESCO $ PEACH035 $
STBK
REMOVE MACHINE 1 FROM BUS 213795/* MDYRN7-8 13.80 $ CHESCO $ PEACH035 $
STBK
REMOVE MACHINE 2 FROM BUS 213795 /* MDYRN7-8 13.80 $ CHESCO $ PEACH035 $
STBK
SET BUS 213867 LOAD TO 0 PERCENT /* PCHBTM 35.00 $ CHESCO $ PEACH035 $
STBK
END/*$ CHESCO $ PEACH035 $ STBK
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Please refer to Appendix 11 for a table containing the generators having contribution to this flowgate.

2. (PJM500 - PJM500) The PCHBTM1N-FUR RUN_500 500 kV line (from bus 200066 to bus 270072 ckt 1) loads from 119.1% to 126.54% (**DC power flow**) of its emergency rating (2931 MVA) for the single line contingency outage of 'PJM_P1__P1_17'. This project contributes approximately 217.64 MW to the thermal violation.

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CONTINGENCY 'PJM_P1__P1_17'
DISCONNECT BRANCH FROM BUS 200004 TO BUS 200064 CKT 1/* CNASTONE
PEACHBTM 500 500
END
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Please refer to Appendix 12 for a table containing the generators having contribution to this flowgate.

3. (PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.2% (**DC power flow**) of its emergency rating (725 MVA) for the bus fault outage of 'PECO_P2-2_CHI230B1'. This project contributes approximately 47.91 MW to the thermal violation.

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CONTINGENCY 'PECO_P2-2_CHI230B1/* $ DELCO $ CHI230B1 $ B
DISCONNECT BUS 213489/* CHICHST1 230.00 $ DELCO $ CHI230B1 $ B
END
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Please refer to Appendix 13 for a table containing the generators having contribution to this flowgate.

4. (PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.2% (**DC power flow**) of its emergency rating (725 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_CHICH045'. This project contributes approximately 47.91 MW to the thermal violation.

CONTINGENCY 'PECO_P4_CHICH045' /*\$ DELCO \$ CHICH045 \$ STBK
DISCONNECT BUS 213489 /* CHICHST1 230.00 \$ DELCO \$ CHICH045 \$ STBK
DISCONNECT BUS 213627/* FOULK8 230.00 \$ DELCO \$ CHICH045 \$ STBK
END

5. (DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 130.72% to 136.02% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 92.93 MW to the thermal violation.

CONTINGENCY 'PECO_P4_LINWO225' /*\$ DELCO \$ LINWO225 \$ STBK
TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1/* LINWOOD 230.00 EDGEMR5
230.00 \$ DELCO \$ LINWO225 \$ STBK
REMOVE MACHINE 1 FROM BUS 213888/* PHLISCT1 18.00 \$ DELCO \$ LINWO225 \$
STBK
REMOVE MACHINE 1 FROM BUS 213889/* PHLISCT2 18.00 \$ DELCO \$ LINWO225 \$
STBK
END

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

6. (DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 100.81% to 106.11% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22085'. This project contributes approximately 92.93 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22085'
OPEN LINE FROM BUS 213750 TO BUS 231001 CIRCUIT 1/LINWOOD - EDGE MOOR 230
END

7. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 116.18% to 125.76% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP16'. This project contributes approximately 76.99 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP16'/*EDGE MOOR BUS BREAKER TO CLAYMONT

DISCONNECT BRANCH FROM BUS 231000 TO BUS 231001 CKT 1/*CLAYMONT
 EDGEMR 5 230 230
 DISCONNECT BRANCH FROM BUS 231001 TO BUS 231109 CKT 1/*EDGEMR 5
 EDGEMR 4 230 138
 END

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

8. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 100.99% to 105.8% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23015'. This project contributes approximately 84.31 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 23015'
 OPEN LINE FROM BUS 231000 TO BUS 231001 CIRCUIT 1/CLAYMONT - EDGE MOOR
 230
 END

9. (DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 127.43% to 132.24% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 84.42 MW to the thermal violation.

CONTINGENCY 'PECO_P4_LINWO225' /*\$ DELCO \$ LINWO225 \$ STBK
 TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1/* LINWOOD 230.00 EDGEMR5
 230.00 \$ DELCO \$ LINWO225 \$ STBK
 REMOVE MACHINE 1 FROM BUS 213888/* PHLISCT1 18.00 \$ DELCO \$ LINWO225 \$
 STBK
 REMOVE MACHINE 1 FROM BUS 213889/* PHLISCT2 18.00 \$ DELCO \$ LINWO225 \$
 STBK
 END

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

10. (DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 101.54% to 106.36% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22085'. This project contributes approximately 84.42 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22085'
 OPEN LINE FROM BUS 213750 TO BUS 231001 CIRCUIT 1/LINWOOD - EDGE MOOR 230
 END

11. (DP&L - DP&L) The KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 100.77% to 115.51% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 30.31 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'/*STEELE BUS BREAKER TO MILFORD
DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1/*MILFORD STEELE
230 230
DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230
END

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

12. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 120.51% to 162.43% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 86.5 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'/*STEELE BUS BREAKER TO MILFORD
DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1/*MILFORD STEELE
230 230
DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230
END

Please refer to Appendix 18 for a table containing the generators having contribution to this flowgate.

13. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 126.32% to 168.23% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 86.5 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'/*STEELE BUS BREAKER TO MILFORD
DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1/*MILFORD STEELE
230 230
DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230
END

Please refer to Appendix 19 for a table containing the generators having contribution to this flowgate.

14. (DP&L - DP&L) The ROCKAWLKN-NSALSBRV 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 101.56% to 106.15% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 5.89 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 13707'

OPEN LINE FROM BUS 232119 TO BUS 232117 CIRCUIT 1/NELSON - VIENNA 138
END

Please refer to Appendix 20 for a table containing the generators having contribution to this flowgate.

15. (DP&L - DP&L) The AB2-135 TAP-CHURC_69 69 kV line (from bus 924820 to bus 232203 ckt 1) loads from 124.55% to 139.28% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 30.31 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'/*STEELE BUS BREAKER TO MILFORD

DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1/*MILFORD STEELE
230 230

DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1/*STEELE AD2-004
TAP 230 230

END

Please refer to Appendix 21 for a table containing the generators having contribution to this flowgate.

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)

Generator Deliverability

1. To mitigate the (DP&L - PECO) EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) overload will require increasing the emergency rating of the Edgemoor to Linwood (PECO) 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimate to perform this work is **\$16,600,000** and will take approximately **36-60 months** to complete.
2. To mitigate the (DP&L) VIENNA 230/138 kV transformer (from bus 232005 to bus 232116 ckt 1) overload will require substation reinforcements at Vienna substation that includes adding a new 230 kV substation with a 3-position ring bus. It will also require increasing the emergency rating of the AD2-004 Tap to Vienna 230 kV line by rebuilding the circuit. The rebuild will

include the installation of new poles, foundations, insulators, and conductor. The estimate to perform this work is **\$5,300,000** and will take approximately **32-48 months** to complete.

3. To mitigate the (DP&L) VIENN138-VIENNA 8 138 kV line (from bus 232116 to bus 232117 ckt 1) overload, it will require increasing the emergency rating of the Vienna138 to Vienna8 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Vienna Substation. The estimate to perform this work is **\$380,000** and will take approximately **32-48 months** to complete.
4. To mitigate the (DP&L) VIENNA 8-NELSON 138 kV line (from bus 232117 to bus 232119 ckt 1) overload will require increasing the emergency rating of the Vienna8 to Nelson 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimate to perform this work is **\$25,100,000** and will take approximately **36-60 months** to complete.
5. To mitigate the (DP&L) NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) overload will require increasing the emergency rating of the Nelson to Indian River “2” & “3” 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimate to perform this work is **\$39,100,000** and will take approximately **36-60 months** to complete.
6. This overload is identified in a previous queue and cost was allocated to that queue, AD2-004 will not get any cost allocation for the below project. However if all prior projects withdraw, AD2-004 will need to be re-tooled and could get cost allocation for the below upgrade in the future. AD2-004 isn’t deliverable until the below upgrade is built.

Reinforcements include the replacement of a disconnect switch at Preston Substation. The estimate to perform this work is **\$36,000** and will take approximately **1 year** to complete.

7. To mitigate the (DP&L) TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require substation reinforcements at Todd Substation. The estimate to perform this work is **\$600,000** and will take approximately **24 months** to complete.

In addition, there are limiting equipment at Todd & Preston that has been previously identified in a previous queue and cost was allocated to that queue, AD2-004 will not get any cost allocation for the below project. However if all prior projects withdraw, AD2-004 will need to be re-tooled and could get cost allocation for the below upgrade in the future. AD2-004 isn’t deliverable until the below upgrade is built.

Reinforcements include substation reinforcements at Preston Substation and Todd Substation. The estimate to perform this work is **\$67,000** and will take approximately **1 year** to complete.

- 8,9,10,11. To mitigate the (DP&L) AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) overload will require increasing the emergency rating of the Vienna to Steele 230 kV line by rebuilding the circuit. The rebuild will include the installation of

new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Steele Substation. The estimate to perform this work is **\$59,000,000** and will take approximately **36-60 months** to complete.

Multiple Facility Contingency

1. To mitigate the (DP&L) CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) overload will require increasing the emergency rating of the Cartanza to Silver Run 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Red Lion & Cartanza Substation. The estimate to perform this work is **\$77,800,000** and will take approximately **36-60 months** to complete.
- 2&3. To mitigate the (DP&L) CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements at Church Substation. The estimate to perform this work is **\$500,000** and will take approximately **24-36 months** to complete.
- 4&5. To mitigate the (DP&L) MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) overload will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Middletown Tap Substation. The estimate to perform this work is **\$480,000** and will take approximately **32-48 months** to complete.
- 6&7. To mitigate the (DP&L) TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Townsend & Middletown Tap Substation. The estimate to perform this work is **\$700,000** and will take approximately **36-48 months** to complete.

8. **Same as Generator Deliverability #6**

9. **Same as Generator Deliverability #7**

10&11. **Same as Generator Deliverability #8**

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)

1. PECO: Expand Peach Bottom 500kV station to build a new 500kV line between Peach Bottom and Conastone. Estimated Cost: **\$130.5 Million**. The estimated time to complete is **7 years**.
2. PECO: Expand Peach Bottom 500kV station to build a new 500kV line between Peach Bottom and Furnace Run. Estimated Cost: **\$82.11 Million**. The estimated time to complete is **7 years**.

3&4. PECO: Line is not limited by PECO elements.

ACE: As previously identified in AB2-120 feasibility report: To mitigate the (PECO - AE) DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) overloads will require reinforcements to increase the emergency rating of the Delco Tap to Mickleton 230 kV line. Reinforcements include the replacement of substation equipment and substation bus at Mickleton Substation. The estimate to perform this work is **\$905,000** and will take **18 months** to complete.

5&6. DPL:

To mitigate the (DP&L - PECO) CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) overload will require terminal upgrades at both the Claymont and Linwood Substations. The estimate to perform this work is **\$800,000**.

PECO:

Replace Linwood CB 225 with a double breaker to eliminate the contingency. Estimated cost: **\$1.40 Million**. The estimated time to complete is **3 years**.

7&8. DPL:

To mitigate the (DP&L - PECO) CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) overload will require terminal upgrades at both the Claymont and Linwood Substations. The estimate to perform this work is **\$800,000**.

PECO:

Replace Linwood CB 225 with a double breaker to eliminate the contingency. Estimated cost: **\$1.40 Million**. The estimated time to complete is **3 years**.

9&10. DPL:

To mitigate the (DP&L - DP&L) EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) overload will require terminal upgrades at both the Edgemore and Claymont Substations. The estimate to perform this work is **\$800,000**.

PECO:

Build a new 230kV line between Linwood and Edgemoor. Estimated cost: **\$32.16 million**. The estimated time to complete is **5 years**.

11. (DPL) As previously identified in AB2-185 feasibility report: To mitigate the (DP&L) KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) overload will require increasing the emergency rating of the Kent to New Meredith 69 kV line by rebuilding the circuit. The

rebuild includes the installation of new poles, new disconnect switches, and new relays. The estimate to perform this work is **\$9,720,000** and will take **24-36 months** to complete

12. Same as Generator Deliverability #6

13. Same as Generator Deliverability #7

14. (DPL) To mitigate the overload will require increasing the emergency rating of the Rockawalkin to N Salisbury 69 kV line by rebuilding that section of the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimated cost to perform this work is **\$5,157,000** and will take **44-48 months** to complete.

Note: There is a supplemental project (s0835) in place to upgrade this entire circuit 6708 from Vienna to N Salisbury. The portion from Hebron to N Salisbury (which includes Rockawalkin – N Salisbury) is estimated to cost approximately \$8.6M and is scheduled to be completed by 12/31/2019. Total cost of the entire project (Vienna to N Salisbury) is approximately **\$21.1M**. Expected ISD is 12/31/2023.

15. (DPL) To mitigate (DP&L - DP&L) the AB2-135 TAP-CHURC_69 69 kV line (from bus 924820 to bus 232203 ckt 1) overloads will require reinforcements to increase the emergency rating of the AB2-135 tap to Church 69 kV line require the rebuild of the circuit, including the installation of new poles and a new disconnect switch. The estimate to perform this work is **\$6,600,000** and will take **36-48 months** to complete.

Steady-State Voltage Requirements

To be performed during later study phases as required.

Short Circuit

PJM has completed the short circuit analysis of the AD2-004 queue project, Steele – Vienna 230 kV. Two options were considered during this study, the primary interconnection was a tap of the Steele – Vienna 230 kV line, and the secondary interconnection was a direct connection to the Steele 230 kV substation. Our analysis found **1 new breaker** to be over-duty in the DPL transmission area.

The new over-duty breaker is listed below:

Option 1

Bus Name	BREAKER	Rating Type	Breaker Capacity (Amps)	Duty Percent With AD2-004	Duty Percent Without AD2-004	Duty Percent Difference	Duty Amps With AD2-004	Duty Amps Without AD2-004
KEENEY 230 230.kV	PCB 241	S	50000	100.41%	97.97%	2.44%	50206.8	48984.7

Option 2

Bus Name	BREAKER	Rating Type	Breaker Capacity (Amps)	Duty Percent With AD2-004	Duty Percent Without AD2-004	Duty Percent Difference	Duty Amps With AD2-004	Duty Amps Without AD2-004
KEENEY 230 230.kV	PCB 241	S	50000	100.62%	97.97%	2.65%	50308.7	48984.7

The mitigation, cost, and schedule to address this over-dutied breaker is under development and will be provided in the System Impact Study Report.

Stability and Reactive Power Requirement

To be performed during later study phases as required.

Light Load Analysis - 2021

To be performed during later study phases (as required by PJM Manual 14B).

Facilities Study Estimate

(If a Facilities Study is required, provide the estimated duration and cost estimate to perform Facilities Study)

Due to the significant amount of Transmission Owner work involved with the AD2-004 project, a Facilities Study cost estimate will be developed during the System Impact Study phase.

Delmarva Power and Light Costs

Cost estimates will further be refined as a part of the Impact Study and Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by DPL in connection with the AD2-004 project. Such costs may include, but are not limited to, any transmission system assets currently in DPL's rate base that are prematurely retired due to the AD2-004 project. PJM shall work with DPL to identify these retirement costs and any additional expenses. DPL reserves the right to reassess issues presented in this document and, upon appropriate justification, submit additional costs related to the AD2-004 project.

Secondary Point of Interconnection

PJM studied the AD2-004 project into the Delmarva Power and Light (DPL) system as a direct connection into the Steel 230 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2021.

Summer Peak Analysis - 2021

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

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

1. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 99.87% to 105.03% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22084'. This project contributes approximately 90.55 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22084'

OPEN LINE FROM BUS 213750 TO BUS 231000 CIRCUIT 1/LINWOOD - CLAYMONT 230
END

Multiple Facility Contingency

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

1. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 99.79% to 111.0% (**DC power flow**) of its emergency rating (790 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 195.19 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE 230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

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

2. (DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 79.52% to 123.78% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE 230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

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

3. (DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 64.61% to 108.88% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B' /* #1 & #2 KEENEY-STEELE 230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

4. (DP&L - DP&L) The STEEL138-OIL_CITY 138 kV line (from bus 232103 to bus 232801 ckt 1) loads from 92.58% to 151.0% (**DC power flow**) of its emergency rating (159 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 92.88 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

5. (DP&L - DP&L) The STEEL138-OIL_CITY 138 kV line (from bus 232103 to bus 232801 ckt 1) loads from 72.91% to 131.33% (**DC power flow**) of its emergency rating (159 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 92.88 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

6. (DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 75.57% to 119.84% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

7. (DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 60.67% to 104.94% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B'/* #1 & #2 KEENEY-STEELE 230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
END

8. (DP&L - DP&L) The TOWNSEND-MIDLTNTTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 86.01% to 130.27% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

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

9. (DP&L - DP&L) The TOWNSEND-MIDLTNTTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 71.1% to 115.37% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_B'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_B'/* #1 & #2 KEENEY-STEELE 230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 923960 TO BUS 232000 CKT 2
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. (PJM500 - PJM500) The PCHBTM1S-CNASTONE 500 kV line (from bus 200064 to bus 200004 ckt 1) loads from 103.55% to 106.78% (**DC power flow**) of its emergency rating (3525 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'. This project contributes approximately 239.19 MW to the thermal violation.

CONTINGENCY 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'
TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1/* PCHBTM1N 500.00 3MILEI
500.00 \$ CHESCO \$ PEACH035 \$ STBK / PJM FIXED
TRIP BRANCH FROM BUS 200066 TO BUS 213866 CKT 1/* PCHBTM1N 500.00 PCHBTM
230.00 \$ CHESCO \$ PEACH035 \$ STBK
REMOVE MACHINE 1 FROM BUS 213794/* MDYRN5-6 13.80 \$ CHESCO \$ PEACH035 \$
STBK

REMOVE MACHINE 2 FROM BUS 213794/* MDYRN5-6 13.80 \$ CHESCO \$ PEACH035 \$ STBK
 REMOVE MACHINE 1 FROM BUS 213795/* MDYRN7-8 13.80 \$ CHESCO \$ PEACH035 \$ STBK
 REMOVE MACHINE 2 FROM BUS 213795/* MDYRN7-8 13.80 \$ CHESCO \$ PEACH035 \$ STBK
 SET BUS 213867 LOAD TO 0 PERCENT/* PCHBTM 35.00 \$ CHESCO \$ PEACH035 \$ STBK
 END/* \$ CHESCO \$ PEACH035 \$ STBK

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

2. (PJM500 - PJM500) The PCHBTM1N-FUR RUN_500 500 kV line (from bus 200066 to bus 270072 ckt 1) loads from 119.09% to 126.54% (**DC power flow**) of its emergency rating (2931 MVA) for the single line contingency outage of 'PJM_P1__P1_17'. This project contributes approximately 217.66 MW to the thermal violation.

CONTINGENCY 'PJM_P1__P1_17'
 DISCONNECT BRANCH FROM BUS 200004 TO BUS 200064 CKT 1/* CNASTONE
 PEACHBTM 500 500
 END

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

3. (PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.21% (**DC power flow**) of its emergency rating (725 MVA) for the bus fault outage of 'PECO_P2-2_CHI230B1'. This project contributes approximately 48.03 MW to the thermal violation.

CONTINGENCY 'PECO_P2-2_CHI230B1'/* \$ DELCO \$ CHI230B1 \$ B
 DISCONNECT BUS 213489/* CHICHST1 230.00 \$ DELCO \$ CHI230B1 \$ B
 END

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

4. (PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.21% (**DC power flow**) of its emergency rating (725 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_CHICH045'. This project contributes approximately 48.03 MW to the thermal violation.

CONTINGENCY 'PECO_P4_CHICH045'/*\$ DELCO \$ CHICH045 \$ STBK
 DISCONNECT BUS 213489/* CHICHST1 230.00 \$ DELCO \$ CHICH045 \$ STBK
 DISCONNECT BUS 213627/* FOULK8 230.00 \$ DELCO \$ CHICH045 \$ STBK
 END

5. (DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 130.72% to 136.03% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 93.11 MW to the thermal violation.

CONTINGENCY 'PECO_P4_LINWO225' /*\$ DELCO \$ LINWO225 \$ STBK
TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1/* LINWOOD 230.00 EDGEMR5
230.00 \$ DELCO \$ LINWO225 \$ STBK
REMOVE MACHINE 1 FROM BUS 213888/* PHLISCT1 18.00 \$ DELCO \$ LINWO225 \$
STBK
REMOVE MACHINE 1 FROM BUS 213889/* PHLISCT2 18.00 \$ DELCO \$ LINWO225 \$
STBK
END

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

6. (DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 100.81% to 106.12% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22085'. This project contributes approximately 93.11 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22085'
OPEN LINE FROM BUS 213750 TO BUS 231001 CIRCUIT 1/LINWOOD - EDGE MOOR 230
END

7. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 116.18% to 125.78% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP16'. This project contributes approximately 77.15 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP16'/*EDGE MOOR BUS BREAKER TO CLAYMONT
DISCONNECT BRANCH FROM BUS 231000 TO BUS 231001 CKT 1/*CLAYMONT
EDGEMR 5 230 230
DISCONNECT BRANCH FROM BUS 231001 TO BUS 231109 CKT 1/*EDGEMR 5
EDGEMR 4 230 138
END

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

8. (DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 100.99% to 105.81% (**DC power flow**) of its emergency rating (804 MVA) for the

single line contingency outage of 'DPL_P1_2_CKT 23015'. This project contributes approximately 84.49 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 23015'

OPEN LINE FROM BUS 231000 TO BUS 231001 CIRCUIT 1/CLAYMONT - EDGE MOOR 230
END

9. (DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 127.43% to 132.25% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 84.59 MW to the thermal violation.

CONTINGENCY 'PECO_P4_LINWO225' /*\$ DELCO \$ LINWO225 \$ STBK

TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1/* LINWOOD 230.00 EDGEMR5 230.00 \$ DELCO \$ LINWO225 \$ STBK

REMOVE MACHINE 1 FROM BUS 213888/* PHLISCT1 18.00 \$ DELCO \$ LINWO225 \$ STBK

REMOVE MACHINE 1 FROM BUS 213889/* PHLISCT2 18.00 \$ DELCO \$ LINWO225 \$ STBK

END

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

10. (DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 101.54% to 106.37% (**DC power flow**) of its emergency rating (804 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 22085'. This project contributes approximately 84.59 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 22085'

OPEN LINE FROM BUS 213750 TO BUS 231001 CIRCUIT 1/LINWOOD - EDGE MOOR 230
END

11. (DP&L - DP&L) The ROCKAWLKN-NSALSBRV 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 101.56% to 105.47% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 5.02 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 13707'

OPEN LINE FROM BUS 232119 TO BUS 232117 CIRCUIT 1/NELSON - VIENNA 138
END

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

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 gauge 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.

Primary Point of Interconnection

Appendix 1

(DP&L - DP&L) The VIENNA 230/138 kV transformer (from bus 232005 to bus 232116 ckt 1) loads from .04% to 112.96% (**DC power flow**) of its emergency rating (531 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
936021	AD2-004 O1	600.

Appendix 2

(DP&L - DP&L) The VIENN138-VIENNA 8 138 kV line (from bus 232116 to bus 232117 ckt 1) loads from .04% to 124.18% (**DC power flow**) of its emergency rating (483 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
936021	AD2-004 O1	600.

Appendix 3

(DP&L - DP&L) The VIENNA 8-NELSON 138 kV line (from bus 232117 to bus 232119 ckt 1) loads from 41.92% to 150.34% (**DC power flow**) of its emergency rating (226 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 245.02 MW to the thermal violation.

CONTINGENCY '232000'

STEELE 230 936020 AD2-004 TAP 230 1

OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.43
936021	AD2-004 O1	245.02
936231	AD2-029 C	1.73
LTF	AMIL	0.02
LTF	BAYOU	0.07
232905	BAYVIEW1	0.35
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.23
LTF	BLUEG	0.12
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.03
LTF	CATAWBA	0.02
LTF	CELEVELAND	0.07
LTF	CHEOAH	0.04
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.08
LTF	CLIFTY	0.51
LTF	COTTONWOOD	0.3
232926	CRISFLD1	0.35
LTF	DEARBORN	0.06
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.06
LTF	FARMERCITY	0.02
LTF	GIBSON	0.04
LTF	HAMLET	0.08
LTF	MORGAN	0.12
LTF	NEWTON	0.09
293670	O-025 C	0.07
232912	OH NUG1	1.26
232913	OH NUG2	1.24
232914	OH NUG3	1.26
232915	OH NUG4	1.26
232916	OH NUG5	1.26
232917	OH NUG6	1.25
232918	OH NUG7	1.25

<i>LTF</i>	<i>PRAIRIE</i>	<i>0.18</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.02</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.15</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.05</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>232921</i>	<i>TASLEY2G</i>	<i>0.86</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.04</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.04</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.02</i>
<i>LTF</i>	<i>TVA</i>	<i>0.06</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.06</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.27</i>
<i>232919</i>	<i>VN10</i>	<i>0.65</i>
<i>232907</i>	<i>VN8</i>	<i>12.3</i>
<i>901003</i>	<i>W1-003 C</i>	<i>0.44</i>
<i>901013</i>	<i>W1-004 C</i>	<i>0.44</i>
<i>901023</i>	<i>W1-005 C</i>	<i>0.44</i>
<i>901033</i>	<i>W1-006 C</i>	<i>0.44</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.27</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.05</i>
<i>915541</i>	<i>Y3-058 C</i>	<i>0.11</i>
<i>917081</i>	<i>Z2-012 C</i>	<i>0.21</i>
<i>918431</i>	<i>AA1-059 C</i>	<i>0.15</i>
<i>918831</i>	<i>AA1-102</i>	<i>1.32</i>
<i>920321</i>	<i>AA2-130</i>	<i>0.07</i>
<i>924361</i>	<i>AB2-084 C</i>	<i>0.63</i>
<i>924681</i>	<i>AB2-120 C</i>	<i>5.24</i>
<i>924831</i>	<i>AB2-136 C</i>	<i>5.12</i>
<i>925151</i>	<i>AB2-172 C</i>	<i>3.44</i>
<i>925261</i>	<i>AB2-180 C</i>	<i>1.4</i>
<i>925651</i>	<i>AC1-041 C</i>	<i>0.22</i>
<i>925741</i>	<i>AC1-050 C</i>	<i>0.32</i>
<i>926911</i>	<i>AC1-177</i>	<i>0.72</i>
<i>927031</i>	<i>AC1-190 C</i>	<i>6.5</i>
<i>927191</i>	<i>AC1-213 C</i>	<i>0.19</i>

Appendix 4

(DP&L - DP&L) The NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) loads from 23.85% to 129.9% (**DC power flow**) of its emergency rating (193 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 204.68 MW to the thermal violation.

CONTINGENCY '232000'

STEELE 230 936020 AD2-004 TAP 230 1

OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.93
935121	AD1-145	1.08
936021	AD2-004 O1	204.68
936231	AD2-029 C	1.86
936691	AD2-088 C O1	2.75
LTF	AMIL	0.02
LTF	BAYOU	0.07
232905	BAYVIEW1	0.38
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.22
LTF	BLUEG	0.12
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.03
LTF	CATAWBA	0.02
LTF	CELEVELAND	0.07
LTF	CHEOAH	0.03
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.07
LTF	CLIFTY	0.5
LTF	COTTONWOOD	0.29
232926	CRISFLD1	0.36
LTF	DEARBORN	0.06
232851	DUP-SFR1	0.16
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.06
LTF	FARMERCITY	0.02
LTF	GIBSON	0.04
LTF	HAMLET	0.08
LTF	MORGAN	0.12
LTF	NEWTON	0.09
293670	O-025 C	0.24
232912	OH NUG1	1.37

232913	OH NUG2	1.35
232914	OH NUG3	1.37
232915	OH NUG4	1.37
232916	OH NUG5	1.37
232917	OH NUG6	1.36
232918	OH NUG7	1.36
LTF	PRAIRIE	0.18
LTF	RENSSELAER	0.02
LTF	ROSETON	0.15
LTF	ROWAN	0.05
LTF	SANTEETLA	0.01
LTF	SMITHLAND	0.01
292089	T-011	0.1
232921	TASLEY2G	0.94
LTF	TATANKA	0.04
LTF	TILTON	0.04
LTF	TRIMBLE	0.02
LTF	TVA	0.05
LTF	UNIONPOWER	0.05
904210	V4-022C	0.29
232919	VN10	0.7
232907	VN8	10.27
901003	W1-003 C	0.48
901013	W1-004 C	0.48
901023	W1-005 C	0.48
901033	W1-006 C	0.48
910571	X3-008 C	0.29
913411	Y1-080 C	0.06
915541	Y3-058 C	0.24
917081	Z2-012 C	0.23
918431	AA1-059 C	0.16
918831	AA1-102	1.37
920321	AA2-130	0.07
924361	AB2-084 C	0.66
924681	AB2-120 C	5.71
924781	AB2-130 C O1	4.93
924831	AB2-136 C	5.49
925091	AB2-166 C	0.48
925151	AB2-172 C	3.69
925261	AB2-180 C	3.03
925651	AC1-041 C	0.29
925741	AC1-050 C	0.44
926911	AC1-177	0.74
927031	AC1-190 C	6.97
927191	AC1-213 C	0.66

Appendix 5

(DP&L - DP&L) The AD2-004 TAP-VIENNA 230 kV line (from bus 936020 to bus 232005 ckt 1) loads from .0% to 108.89% (**DC power flow**) of its emergency rating (551 MVA) for the single line contingency outage of "'232000'. This project contributes approximately 600.0 MW to the thermal violation.

CONTINGENCY '232000' STEELE 230 936020 AD2-004 TAP 230 1
OPEN BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
936021	AD2-004 O1	600.

Appendix 6

(DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 99.79% to 111.02% (**DC power flow**) of its emergency rating (790 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 195.5 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A' /* #1 & #2 KEENEY-STEELE
230
OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1
OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	9.06
932162	AC2-023 E	6.6
933641	AC2-186 C	1.1
933642	AC2-186 E	1.8
933651	AC2-187 C	2.2
933652	AC2-187 E	3.59
933661	AC2-188 C	2.2
933662	AC2-188 E	3.59
935121	AD1-145	3.21
935131	AD1-146 C	1.36
935132	AD1-146 E	2.22
936021	AD2-004 O1	195.5
936231	AD2-029 C	2.64
936232	AD2-029 E	3.84
936351	AD2-045 C O1	2.91
936352	AD2-045 E O1	1.86
936611	AD2-076 C O1	4.69
936612	AD2-076 E O1	7.66

936691	AD2-088 C O1	6.11
936692	AD2-088 E O1	4.07
LTF	AMIL	0.12
LTF	BAYOU	0.42
LTF	BIG_CAJUN1	0.65
LTF	BIG_CAJUN2	1.3
LTF	BLUEG	0.7
LTF	CALDERWOOD	0.22
LTF	CANNELTON	0.12
LTF	CARR	0.15
232008	CARTANZA GEN	40.3
LTF	CATAWBA	0.14
LTF	CELEVELAND	0.41
LTF	CHEOAH	0.2
LTF	CHILHOWEE	0.07
LTF	CHOCTAW	0.43
LTF	CLIFTY	2.89
LTF	COTTONWOOD	1.67
LTF	DEARBORN	0.35
LTF	EDWARDS	0.21
LTF	ELMERSMITH	0.35
LTF	FARMERCITY	0.14
LTF	G-007	0.49
232616	GEN FOOD	1.98
LTF	GIBSON	0.24
LTF	HAMLET	0.46
232904	IR4	29.51
LTF	MORGAN	0.7
232923	MR1	11.26
232924	MR2	11.26
232922	MR3	13.3
LTF	NEWTON	0.54
232901	NORTHST	5.87
LTF	O-066	1.6
LTF	PRAIRIE	1.03
LTF	RENSSELAER	0.12
LTF	ROSETON	0.86
LTF	ROWAN	0.28
LTF	SANTEETLA	0.06
LTF	SMITHLAND	0.08
LTF	TATANKA	0.25
LTF	TILTON	0.25
LTF	TRIMBLE	0.13
LTF	TVA	0.31
LTF	UNIONPOWER	0.31

904210	V4-022C	0.67
904212	V4-022E	1.09
901004	W1-003 E	1.59
901014	W1-004 E	1.59
901024	W1-005 E	1.59
901034	W1-006 E	1.59
907052	X1-032 E	1.4
910572	X3-008 E	4.03
910822	X3-066 E	0.88
913362	Y1-079 E	1.66
913412	Y1-080 E	0.7
915542	Y3-058 E	3.19
917082	Z2-012 E	4.34
917432	Z2-076 E	0.72
917442	Z2-077 E	0.72
917582	Z2-097 E	0.3
918432	AA1-059 E	0.59
918832	AA1-102 E	32.41
919831	AA2-069	298.84
920312	AA2-129 E	7.01
930201	AB1-056 C	23.31
930202	AB1-056 E	66.39
930211	AB1-057 C	23.67
930212	AB1-057 E	67.47
930881	AB1-137 C	1.5
930882	AB1-137 E	0.64
930921	AB1-141 C	3.17
930922	AB1-141 E	1.48
930931	AB1-142 C	3.17
930932	AB1-142 E	1.48
931111	AB1-162 C	1.5
931112	AB1-162 E	2.45
931261	AB1-176 C	0.8
931262	AB1-176 E	1.32
923921	AB2-032 C	3.19
923922	AB2-032 E	1.5
923951	AB2-036 C	9.52
923952	AB2-036 E	15.57
923961	AB2-037 C	24.95
923962	AB2-037 E	40.76
924191	AB2-063 C	1.8
924192	AB2-063 E	2.93
924361	AB2-084 C	1.33
924362	AB2-084 E	2.16
924681	AB2-120 C	13.32

924682	AB2-120 E	21.74
924781	AB2-130 C O1	10.96
924782	AB2-130 E O1	17.88
924801	AB2-133 C O1	5.11
924802	AB2-133 E O1	6.48
924821	AB2-135 C	6.34
924822	AB2-135 E	7.23
924831	AB2-136 C	8.19
924832	AB2-136 E	8.69
924971	AB2-153 C	1.78
924972	AB2-153 E	2.91
925091	AB2-166 C	0.69
925092	AB2-166 E	1.21
925151	AB2-172 C	6.18
925152	AB2-172 E	10.08
925261	AB2-180 C	4.81
925262	AB2-180 E	2.06
925271	AB2-185 C	3.74
925272	AB2-185 E	1.6
925651	AC1-041 C	0.67
925652	AC1-041 E	1.09
925731	AC1-049 C	0.53
925732	AC1-049 E	0.87
925741	AC1-050 C	0.64
925742	AC1-050 E	1.03
926721	AC1-154 C	0.27
926722	AC1-154 E	0.44
926911	AC1-177	1.39
927031	AC1-190 C	11.42
927032	AC1-190 E	4.89
927191	AC1-213 C	1.11
927192	AC1-213 E	0.73
927241	AC1-220 C	3.59
927242	AC1-220 E	2.52
927321	AC1-229 C	1.36
927322	AC1-229 E	2.18

Appendix 7

(DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 79.52% to 123.55% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.22
936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O1	5.1
936352	AD2-045 E O1	3.26
936611	AD2-076 C O1	7.35
936612	AD2-076 E O1	11.99
936691	AD2-088 C O1	3.52
936692	AD2-088 E O1	2.35
LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09
LTF	CHILHOWEE	0.03
LTF	CHOCTAW	0.2
LTF	CLIFTY	1.3
LTF	COTTONWOOD	0.76
LTF	DEARBORN	0.16
232902	EASTMUNI	4.18
LTF	EDWARDS	0.1
LTF	ELMERSMITH	0.16

<i>LTF</i>	<i>FARMERCITY</i>	<i>0.06</i>
<i>LTF</i>	<i>G-007</i>	<i>0.02</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.11</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.21</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.32</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.24</i>
<i>232910</i>	<i>NRG_G1</i>	<i>2.05</i>
<i>232911</i>	<i>NRG_G2</i>	<i>2.05</i>
<i>LTF</i>	<i>O-066</i>	<i>0.19</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.47</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.05</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.33</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.13</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.11</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.11</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.14</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.38</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.61</i>
<i>232919</i>	<i>VN10</i>	<i>0.63</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.9</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.9</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.9</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.9</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.8</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.37</i>
<i>910572</i>	<i>X3-008 E</i>	<i>3.05</i>
<i>910821</i>	<i>X3-066 C</i>	<i>0.19</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.57</i>
<i>913361</i>	<i>Y1-079 C</i>	<i>0.28</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.29</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.06</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.48</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.92</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>2.45</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.37</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.37</i>
<i>917581</i>	<i>Z2-097 C</i>	<i>0.33</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.69</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.34</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>18.74</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>3.96</i>

930201	AB1-056 C	11.43
930202	AB1-056 E	32.54
930211	AB1-057 C	11.6
930212	AB1-057 E	33.07
930881	AB1-137 C	0.76
930882	AB1-137 E	0.32
930921	AB1-141 C	5.88
930922	AB1-141 E	2.74
930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59
923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2
924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23
924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37

925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53
926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 8

(DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 75.57% to 119.6% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.22
936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O1	5.1

936352	AD2-045 E O1	3.26
936611	AD2-076 C O1	7.35
936612	AD2-076 E O1	11.99
936691	AD2-088 C O1	3.52
936692	AD2-088 E O1	2.35
LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09
LTF	CHILHOWEE	0.03
LTF	CHOCTAW	0.2
LTF	CLIFTY	1.3
LTF	COTTONWOOD	0.76
LTF	DEARBORN	0.16
232902	EASTMUNI	4.18
LTF	EDWARDS	0.1
LTF	ELMERSMITH	0.16
LTF	FARMERCITY	0.06
LTF	G-007	0.02
LTF	GIBSON	0.11
LTF	HAMLET	0.21
LTF	MORGAN	0.32
LTF	NEWTON	0.24
232910	NRG_G1	2.05
232911	NRG_G2	2.05
LTF	O-066	0.19
LTF	PRAIRIE	0.47
LTF	RENSSELAER	0.05
LTF	ROSETON	0.33
LTF	ROWAN	0.13
LTF	SANTEETLA	0.03
LTF	SMITHLAND	0.04
LTF	TATANKA	0.11
LTF	TILTON	0.11
LTF	TRIMBLE	0.06
LTF	TVA	0.14
LTF	UNIONPOWER	0.14
904210	V4-022C	0.38

904212	V4-022E	0.61
232919	VN10	0.63
901004	W1-003 E	0.9
901014	W1-004 E	0.9
901024	W1-005 E	0.9
901034	W1-006 E	0.9
907052	X1-032 E	0.8
910571	X3-008 C	0.37
910572	X3-008 E	3.05
910821	X3-066 C	0.19
910822	X3-066 E	1.57
913361	Y1-079 C	0.28
913362	Y1-079 E	2.29
913411	Y1-080 C	0.06
913412	Y1-080 E	0.48
915542	Y3-058 E	1.92
917082	Z2-012 E	2.45
917432	Z2-076 E	0.37
917442	Z2-077 E	0.37
917581	Z2-097 C	0.33
917582	Z2-097 E	0.69
918432	AA1-059 E	0.34
918832	AA1-102 E	18.74
920312	AA2-129 E	3.96
930201	AB1-056 C	11.43
930202	AB1-056 E	32.54
930211	AB1-057 C	11.6
930212	AB1-057 E	33.07
930881	AB1-137 C	0.76
930882	AB1-137 E	0.32
930921	AB1-141 C	5.88
930922	AB1-141 E	2.74
930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59
923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2

924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23
924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925251	AB2-179 C	26.91
925252	AB2-179 E	8.87
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37
925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53
926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 9

(DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 86.01% to 130.04% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 153.22 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.22
936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O1	5.1
936352	AD2-045 E O1	3.26
936611	AD2-076 C O1	7.35
936612	AD2-076 E O1	11.99
936691	AD2-088 C O1	3.52
936692	AD2-088 E O1	2.35
LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09

<i>LTF</i>	<i>CHILHOWEE</i>	<i>0.03</i>
<i>LTF</i>	<i>CHOCTAW</i>	<i>0.2</i>
<i>LTF</i>	<i>CLIFTY</i>	<i>1.3</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.76</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.16</i>
232902	<i>EASTMUNI</i>	<i>4.18</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.1</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.16</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.06</i>
<i>LTF</i>	<i>G-007</i>	<i>0.02</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.11</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.21</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.32</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.24</i>
232910	<i>NRG_G1</i>	<i>2.05</i>
232911	<i>NRG_G2</i>	<i>2.05</i>
<i>LTF</i>	<i>O-066</i>	<i>0.19</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.47</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.05</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.33</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.13</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.11</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.11</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.14</i>
904210	<i>V4-022C</i>	<i>0.38</i>
904212	<i>V4-022E</i>	<i>0.61</i>
232919	<i>VN10</i>	<i>0.63</i>
901004	<i>W1-003 E</i>	<i>0.9</i>
901014	<i>W1-004 E</i>	<i>0.9</i>
901024	<i>W1-005 E</i>	<i>0.9</i>
901034	<i>W1-006 E</i>	<i>0.9</i>
907052	<i>X1-032 E</i>	<i>0.8</i>
910571	<i>X3-008 C</i>	<i>0.37</i>
910572	<i>X3-008 E</i>	<i>3.05</i>
910821	<i>X3-066 C</i>	<i>0.19</i>
910822	<i>X3-066 E</i>	<i>1.57</i>
913361	<i>Y1-079 C</i>	<i>0.28</i>
913362	<i>Y1-079 E</i>	<i>2.29</i>
913411	<i>Y1-080 C</i>	<i>0.06</i>
913412	<i>Y1-080 E</i>	<i>0.48</i>
915542	<i>Y3-058 E</i>	<i>1.92</i>

917082	Z2-012 E	2.45
917432	Z2-076 E	0.37
917442	Z2-077 E	0.37
917581	Z2-097 C	0.33
917582	Z2-097 E	0.69
918432	AA1-059 E	0.34
918832	AA1-102 E	18.74
920312	AA2-129 E	3.96
930201	AB1-056 C	11.43
930202	AB1-056 E	32.54
930211	AB1-057 C	11.6
930212	AB1-057 E	33.07
930881	AB1-137 C	0.76
930882	AB1-137 E	0.32
930921	AB1-141 C	5.88
930922	AB1-141 E	2.74
930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59
923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2
924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23
924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4

925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925251	AB2-179 C	26.91
925252	AB2-179 E	8.87
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37
925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53
926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 10

(DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 40.84% to 141.96% (**DC power flow**) of its emergency rating (551 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP59'. This project contributes approximately 559.76 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP59'

/*PINEY GROVE BUS BREAKER

DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1

/*PINEY GROVE

AB2-120 TAP 138 138

DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1

/*PINEY GROVE

PINEY GROVE 230 138

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	10.65
932162	AC2-023 E	7.75
935121	AD1-145	2.16
935131	AD1-146 C	0.52

935132	AD1-146 E	0.84
936021	AD2-004 O1	559.76
936231	AD2-029 C	3.11
936232	AD2-029 E	4.52
936691	AD2-088 C O1	4.8
936692	AD2-088 E O1	3.2
LTF	AMIL	0.07
LTF	BAYOU	0.24
LTF	BIG_CAJUN1	0.37
LTF	BIG_CAJUN2	0.74
LTF	BLUEG	0.4
LTF	CALDERWOOD	0.12
LTF	CANNELTON	0.07
LTF	CARR	0.08
LTF	CATAWBA	0.08
LTF	CELEVELAND	0.23
LTF	CHEOAH	0.11
LTF	CHILHOWEE	0.04
LTF	CHOCTAW	0.24
LTF	CLIFTY	1.63
LTF	COTTONWOOD	0.95
232926	CRISFLD1	0.97
LTF	DEARBORN	0.2
LTF	EDWARDS	0.12
LTF	ELMERSMITH	0.2
LTF	FARMERCITY	0.08
LTF	G-007	0.19
LTF	GIBSON	0.13
LTF	HAMLET	0.26
LTF	MORGAN	0.4
LTF	NEWTON	0.3
LTF	O-066	0.67
232912	OH NUG1	4.32
232913	OH NUG2	4.26
232914	OH NUG3	4.32
232915	OH NUG4	4.32
232916	OH NUG5	4.32
232917	OH NUG6	4.3
232918	OH NUG7	4.29
LTF	PRAIRIE	0.59
LTF	RENSSELAER	0.06
LTF	ROSETON	0.46
LTF	ROWAN	0.16
LTF	SANTEETLA	0.03
LTF	SMITHLAND	0.05

<i>LTF</i>	<i>TATANKA</i>	<i>0.14</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.14</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.08</i>
<i>LTF</i>	<i>TVA</i>	<i>0.18</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.18</i>
904210	V4-022C	0.92
904212	V4-022E	1.51
232907	VN8	17.06
901003	W1-003 C	1.49
901004	W1-003 E	2.21
901013	W1-004 C	1.49
901014	W1-004 E	2.21
901023	W1-005 C	1.49
901024	W1-005 E	2.21
901033	W1-006 C	1.49
901034	W1-006 E	2.21
907052	X1-032 E	1.97
910572	X3-008 E	3.93
913412	Y1-080 E	0.82
915542	Y3-058 E	3.69
917082	Z2-012 E	6.03
917432	Z2-076 E	0.37
917442	Z2-077 E	0.37
918431	AA1-059 C	0.42
918432	AA1-059 E	0.84
918831	AA1-102	3.65
918832	AA1-102 E	45.97
920312	AA2-129 E	9.75
920321	AA2-130	0.19
930881	AB1-137 C	0.61
930882	AB1-137 E	0.26
924361	AB2-084 C	1.87
924362	AB2-084 E	3.05
924681	AB2-120 C	18.28
924682	AB2-120 E	29.83
924781	AB2-130 C O1	8.61
924782	AB2-130 E O1	14.05
924831	AB2-136 C	9.15
924832	AB2-136 E	9.7
925091	AB2-166 C	0.74
925092	AB2-166 E	1.3
925151	AB2-172 C	6.03
925152	AB2-172 E	9.83
925261	AB2-180 C	5.55
925262	AB2-180 E	2.38

925651	AC1-041 C	0.89
925652	AC1-041 E	1.45
925731	AC1-049 C	0.27
925732	AC1-049 E	0.44
925741	AC1-050 C	0.78
925742	AC1-050 E	1.24
926911	AC1-177	1.98
927031	AC1-190 C	11.43
927032	AC1-190 E	4.9
927191	AC1-213 C	1.24
927192	AC1-213 E	0.82
927321	AC1-229 C	0.54
927322	AC1-229 E	0.87

Appendix 11

(PJM500 - PJM500) The PCHBTM1S-CNASTONE 500 kV line (from bus 200064 to bus 200004 ckt 1) loads from 103.56% to 106.78% (**DC power flow**) of its emergency rating (3525 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'. This project contributes approximately 239.19 MW to the thermal violation.

CONTINGENCY 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'

TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1 /* PCHBTM1N 500.00

3MILEI 500.00 \$ CHESCO \$ PEACH035 \$ STBK / PJM FIXED

TRIP BRANCH FROM BUS 200066 TO BUS 213866 CKT 1 /* PCHBTM1N 500.00

PCHBTM 230.00 \$ CHESCO \$ PEACH035 \$ STBK

REMOVE MACHINE 1 FROM BUS 213794 /* MDYRN5-6 13.80 \$ CHESCO
\$ PEACH035 \$ STBK

REMOVE MACHINE 2 FROM BUS 213794 /* MDYRN5-6 13.80 \$ CHESCO
\$ PEACH035 \$ STBK

REMOVE MACHINE 1 FROM BUS 213795 /* MDYRN7-8 13.80 \$ CHESCO
\$ PEACH035 \$ STBK

REMOVE MACHINE 2 FROM BUS 213795 /* MDYRN7-8 13.80 \$ CHESCO
\$ PEACH035 \$ STBK

SET BUS 213867 LOAD TO 0 PERCENT /* PCHBTM 35.00 \$ CHESCO \$

PEACH035 \$ STBK

END/* \$ CHESCO \$ PEACH035 \$ STBK

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932081	AC2-018 C1	2.19
932091	AC2-018 C2	2.19
932082	AC2-018 E1	14.2
932092	AC2-018 E2	14.2
932161	AC2-023 C	10.56
932162	AC2-023 E	7.69
933631	AC2-185 C	6.06

933632	AC2-185 E	9.89
933641	AC2-186 C	1.51
933642	AC2-186 E	2.46
933651	AC2-187 C	3.02
933652	AC2-187 E	4.93
933661	AC2-188 C	3.02
933662	AC2-188 E	4.93
935121	AD1-145	3.82
935131	AD1-146 C	1.51
935132	AD1-146 E	2.47
936021	AD2-004 O1	239.19
936231	AD2-029 C	3.16
936232	AD2-029 E	4.6
936351	AD2-045 C O1	4.76
936352	AD2-045 E O1	3.04
936451	AD2-059 C	0.09
936452	AD2-059 E	0.28
936611	AD2-076 C O1	7.29
936612	AD2-076 E O1	11.89
936691	AD2-088 C O1	7.17
936692	AD2-088 E O1	4.78
937281	AD2-167	28.41
LTF	AMIL	2.97
LTF	BAYOU	11.14
LTF	BIG_CAJUN1	17.2
LTF	BIG_CAJUN2	34.61
LTF	BLUEG	17.82
LTF	CALDERWOOD	5.9
LTF	CANNELTON	3.11
LTF	CATAWBA	3.97
LTF	CBM-N	< 0.01
LTF	CELEVELAND	11.49
LTF	CHEOAH	5.42
LTF	CHILHOWEE	1.93
LTF	CHOCTAW	11.5
LTF	CLIFTY	72.79
LTF	COTTONWOOD	44.12
LTF	DEARBORN	8.37
LTF	EDWARDS	5.31
LTF	ELMERSMITH	8.96
LTF	FARMERCITY	3.59
LTF	G-007A	63.12
LTF	GIBSON	6.01
LTF	HAMLET	13.4
231912	HR6	10.

231913	HR7	10.
231914	HR8	15.2
LTF	MORGAN	18.68
232923	MR1	6.79
232924	MR2	6.79
LTF	NEWTON	13.64
LTF	O-066A	27.35
200192	P-004 1CT	14.24
200193	P-004 2CT	14.24
200194	P-004 3CT	14.24
200195	P-004 4ST	21.99
200034	PCHBTM 2	145.99
200035	PCHBTM 3	145.3
LTF	PRAIRIE	26.59
200052	ROCKSP 1	17.58
200053	ROCKSP 2	17.58
200054	ROCKSP 3	17.74
200055	ROCKSP 4	17.74
LTF	ROWAN	7.99
LTF	SANTEETLA	1.59
LTF	SMITHLAND	2.15
LTF	TATANKA	6.43
LTF	TILTON	6.38
LTF	TRIMBLE	3.41
LTF	TVA	8.26
292769	U1-010	2.05
LTF	UNIONPOWER	8.61
904210	V4-022C	0.76
904212	V4-022E	1.24
900361	V4-045	36.36
LTF	VFT	161.82
901004	W1-003 E	1.81
901014	W1-004 E	1.81
901024	W1-005 E	1.81
901034	W1-006 E	1.81
907052	X1-032 E	1.59
910572	X3-008 E	4.93
910822	X3-066 E	1.45
913271	Y1-065 C	86.57
913362	Y1-079 E	2.44
913412	Y1-080 E	0.84
915191	Y3-043	94.57
915542	Y3-058 E	3.7
915681	Y3-102	14.52
917082	Z2-012 E	4.94

917432	Z2-076 E	0.8
917442	Z2-077 E	0.8
917582	Z2-097 E	0.57
918192	AA1-034 E	28.72
918432	AA1-059 E	0.68
918832	AA1-102 E	37.06
919831	AA2-069	180.06
920312	AA2-129 E	7.97
930201	AB1-056 C	25.67
930202	AB1-056 E	73.11
930211	AB1-057 C	26.07
930212	AB1-057 E	74.31
930881	AB1-137 C	1.67
930882	AB1-137 E	0.72
930921	AB1-141 C	5.26
930922	AB1-141 E	2.45
930931	AB1-142 C	5.26
930932	AB1-142 E	2.45
931111	AB1-162 C	2.47
931112	AB1-162 E	4.04
931261	AB1-176 C	1.33
931262	AB1-176 E	2.18
923921	AB2-032 C	5.3
923922	AB2-032 E	2.49
923951	AB2-036 C	13.73
923952	AB2-036 E	22.46
923961	AB2-037 C	30.63
923962	AB2-037 E	50.04
924191	AB2-063 C	2.96
924192	AB2-063 E	4.84
924361	AB2-084 C	1.51
924362	AB2-084 E	2.47
924681	AB2-120 C	15.14
924682	AB2-120 E	24.71
924781	AB2-130 C O1	12.87
924782	AB2-130 E O1	20.99
924801	AB2-133 C O1	9.53
924802	AB2-133 E O1	12.09
924821	AB2-135 C	11.64
924822	AB2-135 E	13.28
924831	AB2-136 C	9.86
924832	AB2-136 E	10.46
924971	AB2-153 C	2.96
924972	AB2-153 E	4.83
925091	AB2-166 C	0.8

925092	AB2-166 E	1.39
925111	AB2-168 C	1.36
925112	AB2-168 E	1.86
925151	AB2-172 C	7.55
925152	AB2-172 E	12.32
925181	AB2-175 1	12.7
925191	AB2-175 2	12.64
925251	AB2-179 C	14.15
925252	AB2-179 E	4.67
925261	AB2-180 C	5.58
925262	AB2-180 E	2.39
925271	AB2-185 C	5.5
925272	AB2-185 E	2.36
925651	AC1-041 C	0.76
925652	AC1-041 E	1.24
925731	AC1-049 C	0.6
925732	AC1-049 E	0.97
925741	AC1-050 C	0.76
925742	AC1-050 E	1.21
926131	AC1-091 C	2.99
926132	AC1-091 E	4.9
926141	AC1-092 C	2.99
926142	AC1-092 E	4.9
926151	AC1-093 C	2.83
926152	AC1-093 E	4.67
926161	AC1-094 C	2.39
926162	AC1-094 E	3.95
926171	AC1-095 C	1.52
926172	AC1-095 E	2.43
926721	AC1-154 C	0.47
926722	AC1-154 E	0.76
926911	AC1-177	1.59
927031	AC1-190 C	13.91
927032	AC1-190 E	5.96
927191	AC1-213 C	1.28
927192	AC1-213 E	0.84
927241	AC1-220 C	6.
927242	AC1-220 E	4.21
927321	AC1-229 C	1.51
927322	AC1-229 E	2.42

Appendix 12

(PJM500 - PJM500) The PCHBTM1N-FUR RUN_500 500 kV line (from bus 200066 to bus 270072 ckt 1) loads from 119.1% to 126.54% (**DC power flow**) of its emergency rating (2931 MVA) for the

single line contingency outage of 'PJM_P1__P1_17'. This project contributes approximately 217.64 MW to the thermal violation.

CONTINGENCY 'PJM_P1__P1_17'

DISCONNECT BRANCH FROM BUS 200004 TO BUS 200064 CKT 1

/* CNASTONE

PEACHBTM 500 500

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932081	AC2-018 C1	2.06
932091	AC2-018 C2	2.06
932161	AC2-023 C	9.59
933631	AC2-185 C	5.49
933641	AC2-186 C	1.37
933651	AC2-187 C	2.74
933661	AC2-188 C	2.74
935121	AD1-145	3.47
935131	AD1-146 C	1.38
936021	AD2-004 O1	217.64
936231	AD2-029 C	2.88
936351	AD2-045 C O1	4.34
936451	AD2-059 C	0.08
936611	AD2-076 C O1	6.64
936691	AD2-088 C O1	6.51
937281	AD2-167	26.74
LTF	AMIL	2.45
LTF	BAYOU	9.01
232905	BAYVIEW1	0.89
LTF	BIG_CAJUN1	13.9
LTF	BIG_CAJUN2	27.98
LTF	BLUEG	14.75
LTF	CALDERWOOD	4.73
LTF	CANNELTON	2.57
LTF	CARR	1.04
LTF	CATAWBA	3.11
LTF	CELEVELAND	8.99
LTF	CHEOAH	4.34
LTF	CHILHOWEE	1.55
LTF	CHOCTAW	9.28
LTF	CLIFTY	60.43
LTF	COTTONWOOD	35.73
232926	CRISFLD1	0.71
LTF	DEARBORN	7.15
LTF	EDWARDS	4.41
LTF	ELMERSMITH	7.39
LTF	FARMERCITY	2.96

<i>LTF</i>	<i>G-007A</i>	<i>48.21</i>
<i>LTF</i>	<i>GIBSON</i>	<i>4.98</i>
<i>LTF</i>	<i>HAMLET</i>	<i>10.36</i>
<i>231911</i>	<i>HR5</i>	<i>9.09</i>
<i>231912</i>	<i>HR6</i>	<i>9.09</i>
<i>231913</i>	<i>HR7</i>	<i>9.09</i>
<i>231914</i>	<i>HR8</i>	<i>13.82</i>
<i>232904</i>	<i>IR4</i>	<i>29.51</i>
<i>213792</i>	<i>MDYRN1-2</i>	<i>25.58</i>
<i>213793</i>	<i>MDYRN3-4</i>	<i>25.68</i>
<i>213794</i>	<i>MDYRN5-6</i>	<i>25.61</i>
<i>213795</i>	<i>MDYRN7-8</i>	<i>25.7</i>
<i>LTF</i>	<i>MORGAN</i>	<i>15.07</i>
<i>232923</i>	<i>MR1</i>	<i>6.15</i>
<i>232924</i>	<i>MR2</i>	<i>6.15</i>
<i>LTF</i>	<i>NEWTON</i>	<i>11.27</i>
<i>293670</i>	<i>O-025 C</i>	<i>0.43</i>
<i>LTF</i>	<i>O-066A</i>	<i>19.95</i>
<i>232912</i>	<i>OH NUG1</i>	<i>3.21</i>
<i>232913</i>	<i>OH NUG2</i>	<i>3.16</i>
<i>232914</i>	<i>OH NUG3</i>	<i>3.21</i>
<i>232915</i>	<i>OH NUG4</i>	<i>3.21</i>
<i>232916</i>	<i>OH NUG5</i>	<i>3.21</i>
<i>232917</i>	<i>OH NUG6</i>	<i>3.19</i>
<i>232918</i>	<i>OH NUG7</i>	<i>3.19</i>
<i>200192</i>	<i>P-004 1CT</i>	<i>13.45</i>
<i>200193</i>	<i>P-004 2CT</i>	<i>13.45</i>
<i>200194</i>	<i>P-004 3CT</i>	<i>13.45</i>
<i>200195</i>	<i>P-004 4ST</i>	<i>20.76</i>
<i>200034</i>	<i>PCHBTM 2</i>	<i>138.26</i>
<i>200035</i>	<i>PCHBTM 3</i>	<i>138.44</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>21.86</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.8</i>
<i>200052</i>	<i>ROCKSP 1</i>	<i>16.55</i>
<i>200053</i>	<i>ROCKSP 2</i>	<i>16.55</i>
<i>200054</i>	<i>ROCKSP 3</i>	<i>16.7</i>
<i>200055</i>	<i>ROCKSP 4</i>	<i>16.7</i>
<i>LTF</i>	<i>ROSETON</i>	<i>5.75</i>
<i>LTF</i>	<i>ROWAN</i>	<i>6.23</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>1.28</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>1.76</i>
<i>232921</i>	<i>TASLEY2G</i>	<i>2.19</i>
<i>LTF</i>	<i>TATANKA</i>	<i>5.31</i>
<i>LTF</i>	<i>TILTON</i>	<i>5.29</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>2.83</i>

<i>LTF</i>	<i>TVA</i>	<i>6.68</i>
<i>292769</i>	<i>U1-010</i>	<i>1.94</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>6.83</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.69</i>
<i>900361</i>	<i>V4-045</i>	<i>34.43</i>
<i>LTF</i>	<i>VFT</i>	<i>120.11</i>
<i>232907</i>	<i>VN8</i>	<i>10.91</i>
<i>901003</i>	<i>W1-003 C</i>	<i>1.1</i>
<i>901013</i>	<i>W1-004 C</i>	<i>1.1</i>
<i>901023</i>	<i>W1-005 C</i>	<i>1.1</i>
<i>901033</i>	<i>W1-006 C</i>	<i>1.1</i>
<i>913271</i>	<i>Y1-065 C</i>	<i>81.5</i>
<i>915191</i>	<i>Y3-043</i>	<i>89.3</i>
<i>915541</i>	<i>Y3-058 C</i>	<i>0.41</i>
<i>915681</i>	<i>Y3-102</i>	<i>13.67</i>
<i>917081</i>	<i>Z2-012 C</i>	<i>0.54</i>
<i>917431</i>	<i>Z2-076 C</i>	<i>0.28</i>
<i>917441</i>	<i>Z2-077 C</i>	<i>0.28</i>
<i>918431</i>	<i>AA1-059 C</i>	<i>0.31</i>
<i>918831</i>	<i>AA1-102</i>	<i>2.68</i>
<i>919831</i>	<i>AA2-069</i>	<i>163.1</i>
<i>920321</i>	<i>AA2-130</i>	<i>0.14</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>23.31</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>23.67</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>1.52</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>4.79</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>4.79</i>
<i>931111</i>	<i>AB1-162 C</i>	<i>2.25</i>
<i>931261</i>	<i>AB1-176 C</i>	<i>1.21</i>
<i>923921</i>	<i>AB2-032 C</i>	<i>4.83</i>
<i>923951</i>	<i>AB2-036 C</i>	<i>12.5</i>
<i>923961</i>	<i>AB2-037 C</i>	<i>27.89</i>
<i>924191</i>	<i>AB2-063 C</i>	<i>2.7</i>
<i>924361</i>	<i>AB2-084 C</i>	<i>1.38</i>
<i>924681</i>	<i>AB2-120 C</i>	<i>13.76</i>
<i>924781</i>	<i>AB2-130 C O1</i>	<i>11.68</i>
<i>924801</i>	<i>AB2-133 C O1</i>	<i>8.68</i>
<i>924821</i>	<i>AB2-135 C</i>	<i>10.6</i>
<i>924831</i>	<i>AB2-136 C</i>	<i>8.97</i>
<i>924971</i>	<i>AB2-153 C</i>	<i>2.7</i>
<i>925091</i>	<i>AB2-166 C</i>	<i>0.72</i>
<i>925111</i>	<i>AB2-168 C</i>	<i>1.24</i>
<i>925151</i>	<i>AB2-172 C</i>	<i>6.87</i>
<i>925181</i>	<i>AB2-175 1</i>	<i>12.03</i>
<i>925191</i>	<i>AB2-175 2</i>	<i>12.04</i>

925251	AB2-179 C	12.92
925261	AB2-180 C	5.07
925271	AB2-185 C	5.01
925651	AC1-041 C	0.69
925731	AC1-049 C	0.54
925741	AC1-050 C	0.69
926131	AC1-091 C	2.71
926141	AC1-092 C	2.71
926151	AC1-093 C	2.56
926161	AC1-094 C	2.17
926171	AC1-095 C	1.37
926721	AC1-154 C	0.43
926911	AC1-177	1.45
927031	AC1-190 C	12.65
927151	AC1-209 C	6.04
927191	AC1-213 C	1.16
927241	AC1-220 C	5.47
927321	AC1-229 C	1.38

Appendix 13

(PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.2% (**DC power flow**) of its emergency rating (725 MVA) for the bus fault outage of 'PECO_P2-2_CHI230B1'. This project contributes approximately 47.91 MW to the thermal violation.

CONTINGENCY 'PECO_P2-2_CHI230B1'

/* \$ DELCO \$ CHI230B1 \$ B

DISCONNECT BUS 213489

/* CHICHST1 230.00 \$ DELCO \$

CHI230B1 \$ B

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	1.93
932162	AC2-023 E	1.4
934661	AD1-097 1	10.88
934671	AD1-097 2	10.88
934681	AD1-097 3	10.88
934691	AD1-097 4	6.44
935121	AD1-145	0.67
935131	AD1-146 C	0.26
935132	AD1-146 E	0.43
936021	AD2-004 O1	47.91
936231	AD2-029 C	0.59
936232	AD2-029 E	0.86
936351	AD2-045 C O1	1.01
936352	AD2-045 E O1	0.65

936451	AD2-059 C	0.03
936452	AD2-059 E	0.1
936611	AD2-076 C O1	1.54
936612	AD2-076 E O1	2.51
936691	AD2-088 C O1	1.27
936692	AD2-088 E O1	0.85
LTF	AMIL	0.02
LTF	BAYOU	0.06
LTF	BIG_CAJUN1	0.09
LTF	BIG_CAJUN2	0.19
LTF	BLUEG	0.14
LTF	CALDERWOOD	0.03
LTF	CANNELTON	0.02
LTF	CARR	0.2
LTF	CATAWBA	< 0.01
LTF	CELEVELAND	0.03
LTF	CHEOAH	0.02
LTF	CHILHOWEE	< 0.01
LTF	CHOCTAW	0.06
LTF	CLIFTY	0.57
LTF	COTTONWOOD	0.25
213400	COVANTA DELA	10.62
LTF	DEARBORN	0.09
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.06
231917	EM10	0.55
231916	EM3	3.31
231901	EM4	6.76
231900	EM5	25.54
LTF	FARMERCITY	0.03
LTF	G-007	2.48
LTF	GIBSON	0.05
LTF	HAMLET	0.02
231908	HR1	4.86
231909	HR2	4.81
231910	HR3	4.86
231505	HR4	10.5
LTF	MORGAN	0.1
LTF	NEWTON	0.1
LTF	O-066	7.46
213888	PHLISCT1	12.76
213889	PHLISCT2	12.76
213890	PHLISCT3	12.76
213893	PHLISST1	17.68
LTF	PRAIRIE	0.18

<i>LTF</i>	<i>RENSSELAER</i>	<i>0.16</i>
<i>LTF</i>	<i>ROSETON</i>	<i>1.14</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.02</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.05</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.05</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.03</i>
<i>LTF</i>	<i>TVA</i>	<i>0.05</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.03</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.14</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.22</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.32</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.32</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.32</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.32</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.29</i>
<i>909032</i>	<i>X2-013 E</i>	<i>0.2</i>
<i>910572</i>	<i>X3-008 E</i>	<i>0.94</i>
<i>910822</i>	<i>X3-066 E</i>	<i>0.31</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>0.51</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.16</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>0.67</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>0.89</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.14</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.14</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.12</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.12</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>6.7</i>
<i>918852</i>	<i>AA1-104 E</i>	<i>2.29</i>
<i>918891</i>	<i>AA1-108</i>	<i>-11.44</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>1.43</i>
<i>919871</i>	<i>AB1-000 1</i>	<i>2.15</i>
<i>919881</i>	<i>AB1-000 2</i>	<i>2.15</i>
<i>919891</i>	<i>AB1-000 3</i>	<i>2.15</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>4.44</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>12.65</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>4.51</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>12.86</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>0.29</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.12</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>1.14</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>0.53</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>1.14</i>
<i>930932</i>	<i>AB1-142 E</i>	<i>0.53</i>

931111	AB1-162 C	0.53
931112	AB1-162 E	0.86
931261	AB1-176 C	0.28
931262	AB1-176 E	0.47
923921	AB2-032 C	1.14
923922	AB2-032 E	0.54
923951	AB2-036 C	2.88
923952	AB2-036 E	4.71
923961	AB2-037 C	6.27
923962	AB2-037 E	10.25
924191	AB2-063 C	0.63
924192	AB2-063 E	1.03
924361	AB2-084 C	0.27
924362	AB2-084 E	0.45
924681	AB2-120 C	2.72
924682	AB2-120 E	4.43
924781	AB2-130 C O1	2.29
924782	AB2-130 E O1	3.73
924801	AB2-133 C O1	2.07
924802	AB2-133 E O1	2.62
924821	AB2-135 C	2.4
924822	AB2-135 E	2.74
924831	AB2-136 C	1.86
924832	AB2-136 E	1.97
924971	AB2-153 C	0.64
924972	AB2-153 E	1.04
925091	AB2-166 C	0.14
925092	AB2-166 E	0.25
925111	AB2-168 C	0.39
925112	AB2-168 E	0.53
925151	AB2-172 C	1.44
925152	AB2-172 E	2.35
925251	AB2-179 C	3.49
925252	AB2-179 E	1.15
925261	AB2-180 C	1.01
925262	AB2-180 E	0.43
925271	AB2-185 C	1.15
925272	AB2-185 E	0.49
925651	AC1-041 C	0.14
925652	AC1-041 E	0.22
925731	AC1-049 C	0.1
925732	AC1-049 E	0.17
925741	AC1-050 C	0.14
925742	AC1-050 E	0.22
926721	AC1-154 C	0.1

926722	AC1-154 E	0.16
926911	AC1-177	0.29
927031	AC1-190 C	2.65
927032	AC1-190 E	1.13
927191	AC1-213 C	0.23
927192	AC1-213 E	0.15
927241	AC1-220 C	1.28
927242	AC1-220 E	0.9
927321	AC1-229 C	0.26
927322	AC1-229 E	0.42

Appendix 14

(DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 130.72% to 136.02% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 92.93 MW to the thermal violation.

```

CONTINGENCY 'PECO_P4_LINWO225'                                /*$ DELCO $ LINWO225 $
STBK
  TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1             /* LINWOOD 230.00
EDGEMR5 230.00 $ DELCO $ LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213888                             /* PHLISCT1 18.00 $ DELCO $
LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213889                             /* PHLISCT2 18.00 $ DELCO $
LINWO225 $ STBK
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.82
932162	AC2-023 E	2.78
933631	AC2-185 C	1.86
933632	AC2-185 E	3.03
933641	AC2-186 C	0.52
933642	AC2-186 E	0.85
933651	AC2-187 C	1.04
933652	AC2-187 E	1.7
933661	AC2-188 C	1.04
933662	AC2-188 E	1.7
935121	AD1-145	1.35
935131	AD1-146 C	0.53
935132	AD1-146 E	0.86
936021	AD2-004 O1	92.93
936231	AD2-029 C	1.17
936232	AD2-029 E	1.7

936351	AD2-045 C O1	1.93
936352	AD2-045 E O1	1.24
936451	AD2-059 C	0.06
936452	AD2-059 E	0.18
936611	AD2-076 C O1	2.94
936612	AD2-076 E O1	4.8
936691	AD2-088 C O1	2.54
936692	AD2-088 E O1	1.69
LTF	CARR	0.21
LTF	CBM-S1	0.06
LTF	CBM-S2	0.18
LTF	CBM-W2	0.23
LTF	CLIFTY	0.02
LTF	CPL	0.05
LTF	DEARBORN	0.03
LTF	EDWARDS	< 0.01
231917	EM10	0.99
231916	EM3	5.98
231901	EM4	12.
231900	EM5	43.76
LTF	G-007	1.94
231908	HR1	8.62
231909	HR2	8.7
231910	HR3	8.62
231505	HR4	17.99
LTF	LGEE	< 0.01
LTF	MEC	< 0.01
232923	MR1	2.12
232924	MR2	2.12
LTF	O-066	6.91
213854	PAPERTAP	-2.49
LTF	RENSSELAER	0.17
LTF	ROSETON	1.24
LTF	TILTON	< 0.01
LTF	TRIMBLE	< 0.01
904210	V4-022C	0.27
904212	V4-022E	0.44
901004	W1-003 E	0.65
901014	W1-004 E	0.65
901024	W1-005 E	0.65
901034	W1-006 E	0.65
907052	X1-032 E	0.57
910572	X3-008 E	1.84
910822	X3-066 E	0.59
913362	Y1-079 E	0.98

913412	Y1-080 E	0.31
915542	Y3-058 E	1.34
917082	Z2-012 E	1.77
917432	Z2-076 E	0.28
917442	Z2-077 E	0.28
917582	Z2-097 E	0.23
918432	AA1-059 E	0.24
918832	AA1-102 E	13.31
919831	AA2-069	56.21
920312	AA2-129 E	2.85
930201	AB1-056 C	8.92
930202	AB1-056 E	25.42
930211	AB1-057 C	9.06
930212	AB1-057 E	25.83
930881	AB1-137 C	0.58
930882	AB1-137 E	0.25
930921	AB1-141 C	2.16
930922	AB1-141 E	1.01
930931	AB1-142 C	2.16
930932	AB1-142 E	1.01
931111	AB1-162 C	1.
931112	AB1-162 E	1.64
931261	AB1-176 C	0.54
931262	AB1-176 E	0.89
923921	AB2-032 C	2.17
923922	AB2-032 E	1.02
923951	AB2-036 C	5.51
923952	AB2-036 E	9.01
923961	AB2-037 C	12.11
923962	AB2-037 E	19.78
924191	AB2-063 C	1.2
924192	AB2-063 E	1.97
924361	AB2-084 C	0.54
924362	AB2-084 E	0.89
924681	AB2-120 C	5.41
924682	AB2-120 E	8.82
924781	AB2-130 C O1	4.56
924782	AB2-130 E O1	7.44
924801	AB2-133 C O1	3.92
924802	AB2-133 E O1	4.97
924821	AB2-135 C	4.61
924822	AB2-135 E	5.26
924831	AB2-136 C	3.65
924832	AB2-136 E	3.88
924971	AB2-153 C	1.21

924972	AB2-153 E	1.98
925091	AB2-166 C	0.29
925092	AB2-166 E	0.5
925111	AB2-168 C	0.69
925112	AB2-168 E	0.94
925151	AB2-172 C	2.82
925152	AB2-172 E	4.61
925251	AB2-179 C	6.4
925252	AB2-179 E	2.11
925261	AB2-180 C	2.01
925262	AB2-180 E	0.86
925271	AB2-185 C	2.21
925272	AB2-185 E	0.95
925651	AC1-041 C	0.27
925652	AC1-041 E	0.44
925731	AC1-049 C	0.21
925732	AC1-049 E	0.34
925741	AC1-050 C	0.28
925742	AC1-050 E	0.44
926131	AC1-091 C	0.92
926132	AC1-091 E	1.5
926141	AC1-092 C	0.92
926142	AC1-092 E	1.5
926151	AC1-093 C	0.87
926152	AC1-093 E	1.43
926161	AC1-094 C	0.73
926162	AC1-094 E	1.21
926171	AC1-095 C	0.46
926172	AC1-095 E	0.74
926721	AC1-154 C	0.19
926722	AC1-154 E	0.31
926911	AC1-177	0.57
927031	AC1-190 C	5.19
927032	AC1-190 E	2.23
927191	AC1-213 C	0.46
927192	AC1-213 E	0.3
927241	AC1-220 C	2.44
927242	AC1-220 E	1.71
927321	AC1-229 C	0.53
927322	AC1-229 E	0.85

Appendix 15

(DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 116.18% to 125.76% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP16'. This project contributes approximately 76.99 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP16'
CLAYMONT

/*EDGE MOOR BUS BREAKER TO

DISCONNECT BRANCH FROM BUS 231000 TO BUS 231001 CKT 1
EDGEMR 5 230 230

/*CLAYMONT

DISCONNECT BRANCH FROM BUS 231001 TO BUS 231109 CKT 1
EDGEMR 4 230 138

/*EDGEMR 5

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.14
932162	AC2-023 E	2.28
933631	AC2-185 C	1.51
933632	AC2-185 E	2.46
933641	AC2-186 C	0.42
933642	AC2-186 E	0.69
933651	AC2-187 C	0.84
933652	AC2-187 E	1.38
933661	AC2-188 C	0.84
933662	AC2-188 E	1.38
935121	AD1-145	1.1
935131	AD1-146 C	0.43
935132	AD1-146 E	0.71
936021	AD2-004 O1	76.99
936231	AD2-029 C	0.96
936232	AD2-029 E	1.39
936351	AD2-045 C O1	1.5
936352	AD2-045 E O1	0.96
936451	AD2-059 C	0.04
936452	AD2-059 E	0.12
936611	AD2-076 C O1	2.31
936612	AD2-076 E O1	3.77
936691	AD2-088 C O1	2.08
936692	AD2-088 E O1	1.39
LTF	CARR	0.17
LTF	CBM-S1	0.13
LTF	CBM-S2	0.21
LTF	CBM-W1	0.23
LTF	CBM-W2	0.66
LTF	CIN	0.06
LTF	CPL	0.06
232902	EASTMUNI	1.7

231900	EM5	48.37
LTF	G-007	1.57
231505	HR4	19.89
LTF	IPL	0.04
LTF	LGEE	0.01
LTF	MEC	0.13
LTF	MECS	0.02
232923	MR1	1.73
232924	MR2	1.73
LTF	O-066	5.6
213854	PAPERTAP	-2.04
LTF	RENSSELAER	0.13
LTF	ROSETON	0.96
904210	V4-022C	0.22
904212	V4-022E	0.36
232907	VN8	3.65
901004	W1-003 E	0.53
901014	W1-004 E	0.53
901024	W1-005 E	0.53
901034	W1-006 E	0.53
LTF	WEC	0.02
231918	WEST 1	0.41
907052	X1-032 E	0.47
909411	X2-083	0.1
910571	X3-008 C	0.18
910572	X3-008 E	1.51
910821	X3-066 C	0.06
910822	X3-066 E	0.46
913361	Y1-079 C	0.09
913362	Y1-079 E	0.77
913411	Y1-080 C	0.03
913412	Y1-080 E	0.25
915542	Y3-058 E	1.1
917082	Z2-012 E	1.45
917432	Z2-076 E	0.23
917442	Z2-077 E	0.23
917581	Z2-097 C	0.08
917582	Z2-097 E	0.18
918432	AA1-059 E	0.2
918832	AA1-102 E	10.95
919831	AA2-069	45.95
920312	AA2-129 E	2.34
930201	AB1-056 C	7.33
930202	AB1-056 E	20.87
930211	AB1-057 C	7.44

930212	AB1-057 E	21.21
930881	AB1-137 C	0.48
930882	AB1-137 E	0.21
930921	AB1-141 C	1.67
930922	AB1-141 E	0.78
930931	AB1-142 C	1.67
930932	AB1-142 E	0.78
931111	AB1-162 C	0.78
931112	AB1-162 E	1.27
931261	AB1-176 C	0.42
931262	AB1-176 E	0.69
923921	AB2-032 C	1.68
923922	AB2-032 E	0.79
923951	AB2-036 C	4.39
923952	AB2-036 E	7.18
923961	AB2-037 C	10.1
923962	AB2-037 E	16.51
924191	AB2-063 C	0.94
924192	AB2-063 E	1.53
924361	AB2-084 C	0.45
924362	AB2-084 E	0.73
924681	AB2-120 C	4.45
924682	AB2-120 E	7.25
924781	AB2-130 C O1	3.74
924782	AB2-130 E O1	6.1
924801	AB2-133 C O1	2.98
924802	AB2-133 E O1	3.78
924821	AB2-135 C	3.54
924822	AB2-135 E	4.04
924831	AB2-136 C	2.99
924832	AB2-136 E	3.18
924971	AB2-153 C	0.94
924972	AB2-153 E	1.53
925091	AB2-166 C	0.23
925092	AB2-166 E	0.41
925111	AB2-168 C	0.45
925112	AB2-168 E	0.62
925151	AB2-172 C	2.31
925152	AB2-172 E	3.77
925251	AB2-179 C	4.51
925252	AB2-179 E	1.49
925261	AB2-180 C	1.65
925262	AB2-180 E	0.71
925271	AB2-185 C	1.75
925272	AB2-185 E	0.75

925651	AC1-041 C	0.22
925652	AC1-041 E	0.36
925731	AC1-049 C	0.17
925732	AC1-049 E	0.28
925741	AC1-050 C	0.23
925742	AC1-050 E	0.36
926131	AC1-091 C	0.74
926132	AC1-091 E	1.22
926141	AC1-092 C	0.74
926142	AC1-092 E	1.22
926151	AC1-093 C	0.7
926152	AC1-093 E	1.16
926161	AC1-094 C	0.6
926162	AC1-094 E	0.98
926171	AC1-095 C	0.38
926172	AC1-095 E	0.61
926721	AC1-154 C	0.15
926722	AC1-154 E	0.24
926911	AC1-177	0.47
927031	AC1-190 C	4.25
927032	AC1-190 E	1.82
927191	AC1-213 C	0.38
927192	AC1-213 E	0.25
927241	AC1-220 C	1.89
927242	AC1-220 E	1.33
927321	AC1-229 C	0.43
927322	AC1-229 E	0.69

Appendix 16

(DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 127.43% to 132.24% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 84.42 MW to the thermal violation.

```

CONTINGENCY 'PECO_P4_LINWO225'                                /*$ DELCO $ LINWO225 $
STBK
  TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1             /* LINWOOD 230.00
EDGEMR5 230.00 $ DELCO $ LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213888                             /* PHLISCT1 18.00 $ DELCO $
LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213889                             /* PHLISCT2 18.00 $ DELCO $
LINWO225 $ STBK
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.46
932162	AC2-023 E	2.52
933631	AC2-185 C	1.68
933632	AC2-185 E	2.74
933641	AC2-186 C	0.47
933642	AC2-186 E	0.77
933651	AC2-187 C	0.94
933652	AC2-187 E	1.53
933661	AC2-188 C	0.94
933662	AC2-188 E	1.53
935121	AD1-145	1.22
935131	AD1-146 C	0.48
935132	AD1-146 E	0.78
936021	AD2-004 O1	84.42
936231	AD2-029 C	1.06
936232	AD2-029 E	1.54
936351	AD2-045 C O1	1.72
936352	AD2-045 E O1	1.1
936451	AD2-059 C	0.05
936452	AD2-059 E	0.15
936611	AD2-076 C O1	2.63
936612	AD2-076 E O1	4.29
936691	AD2-088 C O1	2.3
936692	AD2-088 E O1	1.53
LTF	CARR	0.19
LTF	CBM-S1	0.08
LTF	CBM-S2	0.18
LTF	CBM-W1	0.02
LTF	CBM-W2	0.38
231920	CHRIST2	1.32
LTF	CIN	0.02
LTF	CPL	0.06
LTF	DEARBORN	0.02
231901	EM4	9.41
231900	EM5	43.71
LTF	G-007	1.75
231908	HR1	6.76
231910	HR3	6.76
231505	HR4	17.97
LTF	IPL	0.01
LTF	LGEE	< 0.01
LTF	MEC	0.06
232923	MR1	1.92
232924	MR2	1.92

<i>LTF</i>	<i>O-066</i>	<i>6.23</i>
<i>213854</i>	<i>PAPERTAP</i>	<i>-2.25</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.15</i>
<i>LTF</i>	<i>ROSETON</i>	<i>1.1</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.25</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.4</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.59</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.59</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.59</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.59</i>
<i>LTF</i>	<i>WEC</i>	<i>< 0.01</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.52</i>
<i>910572</i>	<i>X3-008 E</i>	<i>1.67</i>
<i>910822</i>	<i>X3-066 E</i>	<i>0.53</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>0.88</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.28</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.21</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>1.6</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.25</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.25</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.21</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.22</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>12.07</i>
<i>919831</i>	<i>AA2-069</i>	<i>50.9</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>2.58</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>8.09</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>23.04</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>8.21</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>23.41</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>0.53</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.23</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>1.92</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>0.9</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>1.92</i>
<i>930932</i>	<i>AB1-142 E</i>	<i>0.9</i>
<i>931111</i>	<i>AB1-162 C</i>	<i>0.9</i>
<i>931112</i>	<i>AB1-162 E</i>	<i>1.46</i>
<i>931261</i>	<i>AB1-176 C</i>	<i>0.48</i>
<i>931262</i>	<i>AB1-176 E</i>	<i>0.79</i>
<i>923921</i>	<i>AB2-032 C</i>	<i>1.93</i>
<i>923922</i>	<i>AB2-032 E</i>	<i>0.91</i>
<i>923951</i>	<i>AB2-036 C</i>	<i>4.95</i>
<i>923952</i>	<i>AB2-036 E</i>	<i>8.09</i>
<i>923961</i>	<i>AB2-037 C</i>	<i>11.02</i>
<i>923962</i>	<i>AB2-037 E</i>	<i>18.01</i>

924191	AB2-063 C	1.07
924192	AB2-063 E	1.75
924361	AB2-084 C	0.49
924362	AB2-084 E	0.8
924681	AB2-120 C	4.9
924682	AB2-120 E	8.
924781	AB2-130 C O1	4.13
924782	AB2-130 E O1	6.74
924801	AB2-133 C O1	3.48
924802	AB2-133 E O1	4.41
924821	AB2-135 C	4.1
924822	AB2-135 E	4.67
924831	AB2-136 C	3.31
924832	AB2-136 E	3.51
924971	AB2-153 C	1.08
924972	AB2-153 E	1.76
925091	AB2-166 C	0.26
925092	AB2-166 E	0.45
925111	AB2-168 C	0.59
925112	AB2-168 E	0.8
925151	AB2-172 C	2.55
925152	AB2-172 E	4.17
925251	AB2-179 C	5.56
925252	AB2-179 E	1.83
925261	AB2-180 C	1.82
925262	AB2-180 E	0.78
925271	AB2-185 C	1.98
925272	AB2-185 E	0.85
925651	AC1-041 C	0.24
925652	AC1-041 E	0.4
925731	AC1-049 C	0.19
925732	AC1-049 E	0.31
925741	AC1-050 C	0.25
925742	AC1-050 E	0.4
926131	AC1-091 C	0.83
926132	AC1-091 E	1.36
926141	AC1-092 C	0.83
926142	AC1-092 E	1.36
926151	AC1-093 C	0.78
926152	AC1-093 E	1.29
926161	AC1-094 C	0.66
926162	AC1-094 E	1.09
926171	AC1-095 C	0.42
926172	AC1-095 E	0.67
926721	AC1-154 C	0.17

926722	AC1-154 E	0.28
926911	AC1-177	0.52
927031	AC1-190 C	4.7
927032	AC1-190 E	2.01
927191	AC1-213 C	0.41
927192	AC1-213 E	0.27
927241	AC1-220 C	2.18
927242	AC1-220 E	1.53
927321	AC1-229 C	0.48
927322	AC1-229 E	0.77

Appendix 17

(DP&L - DP&L) The KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 100.77% to 115.51% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 30.31 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'
MILFORD

/*STEELE BUS BREAKER TO

DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1
STEELE 230 230

/*MILFORD

DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
004 TAP 230 230
END

/*STEELE AD2-

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
933631	AC2-185 C	1.04
933632	AC2-185 E	1.7
933641	AC2-186 C	0.57
933642	AC2-186 E	0.92
933651	AC2-187 C	1.13
933652	AC2-187 E	1.85
933661	AC2-188 C	1.13
933662	AC2-188 E	1.85
935121	AD1-145	0.68
935131	AD1-146 C	0.22
935132	AD1-146 E	0.36
936021	AD2-004 O1	30.31
936691	AD2-088 C O1	1.13
936692	AD2-088 E O1	0.76
LTF	AMIL	0.02
LTF	BAYOU	0.07
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.21
LTF	BLUEG	0.11

<i>LTF</i>	<i>CALDERWOOD</i>	<i>0.04</i>
<i>LTF</i>	<i>CANNELTON</i>	<i>0.02</i>
<i>LTF</i>	<i>CARR</i>	<i>0.02</i>
<i>LTF</i>	<i>CATAWBA</i>	<i>0.02</i>
<i>LTF</i>	<i>CELEVELAND</i>	<i>0.07</i>
<i>LTF</i>	<i>CHEOAH</i>	<i>0.03</i>
<i>LTF</i>	<i>CHILHOWEE</i>	<i>0.01</i>
<i>LTF</i>	<i>CHOCTAW</i>	<i>0.07</i>
<i>LTF</i>	<i>CLIFTY</i>	<i>0.46</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.27</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.06</i>
<i>232900</i>	<i>DEMECSMY</i>	<i>1.03</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.03</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.06</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.02</i>
<i>LTF</i>	<i>G-007A</i>	<i>< 0.01</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.04</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.08</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.11</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.09</i>
<i>232910</i>	<i>NRG_G1</i>	<i>2.61</i>
<i>232911</i>	<i>NRG_G2</i>	<i>2.61</i>
<i>LTF</i>	<i>O-066</i>	<i>0.04</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.17</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.02</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.11</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.05</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.04</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.04</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.02</i>
<i>LTF</i>	<i>TVA</i>	<i>0.05</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.05</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.1</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.17</i>
<i>232813</i>	<i>VAUGHN</i>	<i>0.14</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.24</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.24</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.24</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.24</i>
<i>901411</i>	<i>W1-062</i>	<i>1.05</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.21</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>0.47</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>0.67</i>

917432	Z2-076 E	0.11
917442	Z2-077 E	0.11
918432	AA1-059 E	0.09
918832	AA1-102 E	4.94
920312	AA2-129 E	1.07
930201	AB1-056 C	3.62
930202	AB1-056 E	10.3
930211	AB1-057 C	3.67
930212	AB1-057 E	10.46
930881	AB1-137 C	0.24
930882	AB1-137 E	0.1
924361	AB2-084 C	0.2
924362	AB2-084 E	0.33
924681	AB2-120 C	2.04
924682	AB2-120 E	3.33
924781	AB2-130 C O1	2.03
924782	AB2-130 E O1	3.32
925091	AB2-166 C	0.11
925092	AB2-166 E	0.19
925261	AB2-180 C	0.71
925262	AB2-180 E	0.31
925651	AC1-041 C	0.1
925652	AC1-041 E	0.17
925731	AC1-049 C	0.09
925732	AC1-049 E	0.14
926131	AC1-091 C	0.51
926132	AC1-091 E	0.84
926141	AC1-092 C	0.51
926142	AC1-092 E	0.84
926151	AC1-093 C	0.49
926152	AC1-093 E	0.8
926161	AC1-094 C	0.41
926162	AC1-094 E	0.68
926171	AC1-095 C	0.26
926172	AC1-095 E	0.42
926721	AC1-154 C	-0.17
926911	AC1-177	0.21
927191	AC1-213 C	0.17
927192	AC1-213 E	0.11
927321	AC1-229 C	0.22
927322	AC1-229 E	0.35

Appendix 18

(DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 120.51% to 162.43% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 86.5 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'

/*STEELE BUS BREAKER TO

MILFORD

DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1

/*MILFORD

STEELE 230 230

DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1

/*STEELE AD2-

004 TAP 230 230

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	4.32
932162	AC2-023 E	3.14
935121	AD1-145	0.98
935131	AD1-146 C	0.29
935132	AD1-146 E	0.47
936021	AD2-004 O1	86.5
936231	AD2-029 C	2.08
936232	AD2-029 E	3.03
936691	AD2-088 C O1	2.09
936692	AD2-088 E O1	1.4
LTF	AMIL	0.02
LTF	BAYOU	0.07
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.23
LTF	BLUEG	0.12
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.02
LTF	CATAWBA	0.02
LTF	CELEVELAND	0.07
LTF	CHEOAH	0.04
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.08
LTF	CLIFTY	0.51
LTF	COTTONWOOD	0.3
LTF	DEARBORN	0.06
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.06
LTF	FARMERCITY	0.02

<i>LTF</i>	<i>G-007</i>	<i>0.03</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.04</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.08</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.12</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.09</i>
<i>LTF</i>	<i>O-066</i>	<i>0.12</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.18</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.02</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.13</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.05</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.04</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.04</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.02</i>
<i>LTF</i>	<i>TVA</i>	<i>0.06</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.06</i>
904210	V4-022C	0.21
904212	V4-022E	0.34
232919	VN10	0.6
901004	W1-003 E	0.5
901014	W1-004 E	0.5
901024	W1-005 E	0.5
901034	W1-006 E	0.5
907052	X1-032 E	0.46
910571	X3-008 C	0.57
910572	X3-008 E	4.74
913411	Y1-080 C	0.07
913412	Y1-080 E	0.55
915541	Y3-058 C	0.17
915542	Y3-058 E	1.38
917082	Z2-012 E	1.37
917432	Z2-076 E	0.17
917442	Z2-077 E	0.17
918432	AA1-059 E	0.2
918832	AA1-102 E	10.78
920312	AA2-129 E	2.2
930201	AB1-056 C	4.65
930202	AB1-056 E	13.25
930211	AB1-057 C	4.73
930212	AB1-057 E	13.47
930881	AB1-137 C	0.33
930882	AB1-137 E	0.14
924361	AB2-084 C	0.43
924362	AB2-084 E	0.71

924681	AB2-120 C	4.15
924682	AB2-120 E	6.77
924781	AB2-130 C O1	3.76
924782	AB2-130 E O1	6.13
924831	AB2-136 C	7.4
924832	AB2-136 E	7.85
925091	AB2-166 C	0.25
925092	AB2-166 E	0.44
925151	AB2-172 C	7.26
925152	AB2-172 E	11.85
925261	AB2-180 C	2.08
925262	AB2-180 E	0.89
925651	AC1-041 C	0.21
925652	AC1-041 E	0.34
925731	AC1-049 C	0.13
925732	AC1-049 E	0.21
925741	AC1-050 C	0.35
925742	AC1-050 E	0.55
926911	AC1-177	0.46
927031	AC1-190 C	12.84
927032	AC1-190 E	5.5
927191	AC1-213 C	0.41
927192	AC1-213 E	0.27
927321	AC1-229 C	0.29
927322	AC1-229 E	0.47

Appendix 19

(DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 126.32% to 168.23% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 86.5 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'
MILFORD

/*STEELE BUS BREAKER TO

DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1
STEELE 230 230

/*MILFORD

DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
004 TAP 230 230
END

/*STEELE AD2-

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	4.32
932162	AC2-023 E	3.14
935121	AD1-145	0.98
935131	AD1-146 C	0.29

935132	AD1-146 E	0.47
936021	AD2-004 O1	86.5
936231	AD2-029 C	2.08
936232	AD2-029 E	3.03
936691	AD2-088 C O1	2.09
936692	AD2-088 E O1	1.4
LTF	AMIL	0.02
LTF	BAYOU	0.07
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.23
LTF	BLUEG	0.12
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.02
LTF	CATAWBA	0.02
LTF	CELEVELAND	0.07
LTF	CHEOAH	0.04
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.08
LTF	CLIFTY	0.51
LTF	COTTONWOOD	0.3
LTF	DEARBORN	0.06
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.06
LTF	FARMERCITY	0.02
LTF	G-007	0.03
LTF	GIBSON	0.04
LTF	HAMLET	0.08
LTF	MORGAN	0.12
LTF	NEWTON	0.09
LTF	O-066	0.12
LTF	PRAIRIE	0.18
LTF	RENSSELAER	0.02
LTF	ROSETON	0.13
LTF	ROWAN	0.05
LTF	SANTEETLA	0.01
LTF	SMITHLAND	0.01
LTF	TATANKA	0.04
LTF	TILTON	0.04
LTF	TRIMBLE	0.02
LTF	TVA	0.06
LTF	UNIONPOWER	0.06
904210	V4-022C	0.21
904212	V4-022E	0.34
232919	VN10	0.6

901004	W1-003 E	0.5
901014	W1-004 E	0.5
901024	W1-005 E	0.5
901034	W1-006 E	0.5
907052	X1-032 E	0.46
910571	X3-008 C	0.57
910572	X3-008 E	4.74
913411	Y1-080 C	0.07
913412	Y1-080 E	0.55
915541	Y3-058 C	0.17
915542	Y3-058 E	1.38
917082	Z2-012 E	1.37
917432	Z2-076 E	0.17
917442	Z2-077 E	0.17
918432	AA1-059 E	0.2
918832	AA1-102 E	10.78
920312	AA2-129 E	2.2
930201	AB1-056 C	4.65
930202	AB1-056 E	13.25
930211	AB1-057 C	4.73
930212	AB1-057 E	13.47
930881	AB1-137 C	0.33
930882	AB1-137 E	0.14
924361	AB2-084 C	0.43
924362	AB2-084 E	0.71
924681	AB2-120 C	4.15
924682	AB2-120 E	6.77
924781	AB2-130 C O1	3.76
924782	AB2-130 E O1	6.13
924831	AB2-136 C	7.4
924832	AB2-136 E	7.85
925091	AB2-166 C	0.25
925092	AB2-166 E	0.44
925151	AB2-172 C	7.26
925152	AB2-172 E	11.85
925261	AB2-180 C	2.08
925262	AB2-180 E	0.89
925651	AC1-041 C	0.21
925652	AC1-041 E	0.34
925731	AC1-049 C	0.13
925732	AC1-049 E	0.21
925741	AC1-050 C	0.35
925742	AC1-050 E	0.55
926911	AC1-177	0.46
927031	AC1-190 C	12.84

927032	AC1-190 E	5.5
927191	AC1-213 C	0.41
927192	AC1-213 E	0.27
927321	AC1-229 C	0.29
927322	AC1-229 E	0.47

Appendix 20

(DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 101.56% to 106.15% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 5.89 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 13707'

OPEN LINE FROM BUS 232119 TO BUS 232117 CIRCUIT 1 /NELSON - VIENNA
138
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	14.92
936021	AD2-004 O1	5.89
936231	AD2-029 C	1.39
LTF	CBM-N	< 0.01
LTF	CBM-S1	0.03
LTF	CBM-S2	0.03
LTF	CBM-W1	0.12
LTF	CBM-W2	0.2
LTF	CIN	0.03
LTF	CPL	< 0.01
LTF	G-007A	< 0.01
LTF	IPL	0.02
LTF	LGEE	< 0.01
LTF	MEC	0.05
LTF	MECS	0.04
LTF	NYISO	0.03
LTF	O-066A	< 0.01
LTF	VFT	0.02
232919	VN10	0.53
LTF	WEC	< 0.01
910571	X3-008 C	0.22
913411	Y1-080 C	0.04
915541	Y3-058 C	0.75
924831	AB2-136 C	4.13
925091	AB2-166 C	-0.28
925151	AB2-172 C	2.78
925261	AB2-180 C	9.38

925741	AC1-050 C	0.8
927031	AC1-190 C	5.25

Appendix 21

(DP&L - DP&L) The AB2-135 TAP-CHURC_69 69 kV line (from bus 924820 to bus 232203 ckt 1) loads from 124.55% to 139.28% (**DC power flow**) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP11'. This project contributes approximately 30.31 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP11'
MILFORD

/*STEELE BUS BREAKER TO

DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1
STEELE 230 230

/*MILFORD

DISCONNECT BRANCH FROM BUS 232000 TO BUS 936020 CKT 1
004 TAP 230 230
END

/*STEELE AD2-

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
933631	AC2-185 C	1.04
933632	AC2-185 E	1.7
933641	AC2-186 C	0.57
933642	AC2-186 E	0.92
933651	AC2-187 C	1.13
933652	AC2-187 E	1.85
933661	AC2-188 C	1.13
933662	AC2-188 E	1.85
935121	AD1-145	0.68
935131	AD1-146 C	0.22
935132	AD1-146 E	0.36
936021	AD2-004 O1	30.31
936691	AD2-088 C O1	1.13
936692	AD2-088 E O1	0.76
LTF	AMIL	0.02
LTF	BAYOU	0.07
LTF	BIG_CAJUN1	0.11
LTF	BIG_CAJUN2	0.21
LTF	BLUEG	0.11
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.02
LTF	CATAWBA	0.02
LTF	CELEVELAND	0.07
LTF	CHEOAH	0.03
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.07

<i>LTF</i>	<i>CLIFTY</i>	<i>0.46</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.27</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.06</i>
<i>232900</i>	<i>DEMECSMY</i>	<i>1.03</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.03</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.06</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.02</i>
<i>LTF</i>	<i>G-007A</i>	<i>< 0.01</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.04</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.08</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.11</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.09</i>
<i>232910</i>	<i>NRG_G1</i>	<i>2.61</i>
<i>232911</i>	<i>NRG_G2</i>	<i>2.61</i>
<i>LTF</i>	<i>O-066</i>	<i>0.04</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.17</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.02</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.11</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.05</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.04</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.04</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.02</i>
<i>LTF</i>	<i>TVA</i>	<i>0.05</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.05</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.1</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.17</i>
<i>232813</i>	<i>VAUGHN</i>	<i>0.14</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.24</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.24</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.24</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.24</i>
<i>901411</i>	<i>W1-062</i>	<i>1.05</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.21</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>0.47</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>0.67</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.11</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.11</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.09</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>4.94</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>1.07</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>3.62</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>10.3</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>3.67</i>

930212	AB1-057 E	10.46
930881	AB1-137 C	0.24
930882	AB1-137 E	0.1
924361	AB2-084 C	0.2
924362	AB2-084 E	0.33
924681	AB2-120 C	2.04
924682	AB2-120 E	3.33
924781	AB2-130 C O1	2.03
924782	AB2-130 E O1	3.32
924821	AB2-135 C	20.98
924822	AB2-135 E	23.93
925091	AB2-166 C	0.11
925092	AB2-166 E	0.19
925261	AB2-180 C	0.71
925262	AB2-180 E	0.31
925651	AC1-041 C	0.1
925652	AC1-041 E	0.17
925731	AC1-049 C	0.09
925732	AC1-049 E	0.14
926131	AC1-091 C	0.51
926132	AC1-091 E	0.84
926141	AC1-092 C	0.51
926142	AC1-092 E	0.84
926151	AC1-093 C	0.49
926152	AC1-093 E	0.8
926161	AC1-094 C	0.41
926162	AC1-094 E	0.68
926171	AC1-095 C	0.26
926172	AC1-095 E	0.42
926721	AC1-154 C	-0.17
926911	AC1-177	0.21
927191	AC1-213 C	0.17
927192	AC1-213 E	0.11
927321	AC1-229 C	0.22
927322	AC1-229 E	0.35

Secondary Point of Interconnection

Appendix 1

(DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 99.79% to 111.0% (**DC power flow**) of its emergency rating (790 MVA) for the

tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 195.19 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	9.06
932162	AC2-023 E	6.6
933641	AC2-186 C	1.1
933642	AC2-186 E	1.8
933651	AC2-187 C	2.2
933652	AC2-187 E	3.59
933661	AC2-188 C	2.2
933662	AC2-188 E	3.59
935121	AD1-145	3.21
935131	AD1-146 C	1.36
935132	AD1-146 E	2.22
936021	AD2-004 O2	195.19
936231	AD2-029 C	2.64
936232	AD2-029 E	3.84
936351	AD2-045 C O2	2.88
936352	AD2-045 E O2	1.84
936611	AD2-076 C O2	4.55
936612	AD2-076 E O2	7.42
936691	AD2-088 C O2	6.08
936692	AD2-088 E O2	4.05
LTF	AMIL	0.12
LTF	BAYOU	0.42
LTF	BIG_CAJUN1	0.65
LTF	BIG_CAJUN2	1.3
LTF	BLUEG	0.7
LTF	CALDERWOOD	0.22
LTF	CANNELTON	0.12
LTF	CARR	0.15
232008	CARTANZA GEN	40.3
LTF	CATAWBA	0.14
LTF	CELEVELAND	0.41
LTF	CHEOAH	0.2
LTF	CHILHOWEE	0.07
LTF	CHOCTAW	0.43
LTF	CLIFTY	2.89
LTF	COTTONWOOD	1.67

<i>LTF</i>	<i>DEARBORN</i>	<i>0.35</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.21</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.35</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.14</i>
<i>LTF</i>	<i>G-007</i>	<i>0.49</i>
232616	<i>GEN FOOD</i>	<i>1.98</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.24</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.46</i>
232904	<i>IR4</i>	<i>29.51</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.7</i>
232923	<i>MR1</i>	<i>11.26</i>
232924	<i>MR2</i>	<i>11.26</i>
232922	<i>MR3</i>	<i>13.3</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.54</i>
232901	<i>NORTHST</i>	<i>5.87</i>
<i>LTF</i>	<i>O-066</i>	<i>1.6</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>1.03</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.12</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.86</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.28</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.06</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.08</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.25</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.25</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.13</i>
<i>LTF</i>	<i>TVA</i>	<i>0.31</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.31</i>
904210	<i>V4-022C</i>	<i>0.67</i>
904212	<i>V4-022E</i>	<i>1.09</i>
901004	<i>W1-003 E</i>	<i>1.59</i>
901014	<i>W1-004 E</i>	<i>1.59</i>
901024	<i>W1-005 E</i>	<i>1.59</i>
901034	<i>W1-006 E</i>	<i>1.59</i>
907052	<i>X1-032 E</i>	<i>1.4</i>
910572	<i>X3-008 E</i>	<i>4.03</i>
910822	<i>X3-066 E</i>	<i>0.88</i>
913362	<i>Y1-079 E</i>	<i>1.66</i>
913412	<i>Y1-080 E</i>	<i>0.7</i>
915542	<i>Y3-058 E</i>	<i>3.19</i>
917082	<i>Z2-012 E</i>	<i>4.34</i>
917432	<i>Z2-076 E</i>	<i>0.72</i>
917442	<i>Z2-077 E</i>	<i>0.72</i>
917582	<i>Z2-097 E</i>	<i>0.3</i>
918432	<i>AA1-059 E</i>	<i>0.59</i>
918832	<i>AA1-102 E</i>	<i>32.41</i>

919831	AA2-069	298.84
920312	AA2-129 E	7.01
930201	AB1-056 C	23.31
930202	AB1-056 E	66.39
930211	AB1-057 C	23.67
930212	AB1-057 E	67.47
930881	AB1-137 C	1.5
930882	AB1-137 E	0.64
930921	AB1-141 C	3.17
930922	AB1-141 E	1.48
930931	AB1-142 C	3.17
930932	AB1-142 E	1.48
931111	AB1-162 C	1.5
931112	AB1-162 E	2.45
931261	AB1-176 C	0.8
931262	AB1-176 E	1.32
923921	AB2-032 C	3.19
923922	AB2-032 E	1.5
923951	AB2-036 C	9.52
923952	AB2-036 E	15.57
923961	AB2-037 C	24.95
923962	AB2-037 E	40.76
924191	AB2-063 C	1.8
924192	AB2-063 E	2.93
924361	AB2-084 C	1.33
924362	AB2-084 E	2.16
924681	AB2-120 C	13.32
924682	AB2-120 E	21.74
924781	AB2-130 C O1	10.96
924782	AB2-130 E O1	17.88
924801	AB2-133 C O1	5.11
924802	AB2-133 E O1	6.48
924821	AB2-135 C	6.34
924822	AB2-135 E	7.23
924831	AB2-136 C	8.19
924832	AB2-136 E	8.69
924971	AB2-153 C	1.78
924972	AB2-153 E	2.91
925091	AB2-166 C	0.69
925092	AB2-166 E	1.21
925151	AB2-172 C	6.18
925152	AB2-172 E	10.08
925261	AB2-180 C	4.81
925262	AB2-180 E	2.06
925271	AB2-185 C	3.74

925272	AB2-185 E	1.6
925651	AC1-041 C	0.67
925652	AC1-041 E	1.09
925731	AC1-049 C	0.53
925732	AC1-049 E	0.87
925741	AC1-050 C	0.64
925742	AC1-050 E	1.03
926721	AC1-154 C	0.27
926722	AC1-154 E	0.44
926911	AC1-177	1.39
927031	AC1-190 C	11.42
927032	AC1-190 E	4.89
927191	AC1-213 C	1.11
927192	AC1-213 E	0.73
927241	AC1-220 C	3.59
927242	AC1-220 E	2.52
927321	AC1-229 C	1.36
927322	AC1-229 E	2.18

Appendix 2

(DP&L - DP&L) The CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 79.52% to 123.78% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O2	154.04

936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O2	5.14
936352	AD2-045 E O2	3.29
936611	AD2-076 C O2	7.6
936612	AD2-076 E O2	12.4
936691	AD2-088 C O2	3.71
936692	AD2-088 E O2	2.47
LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09
LTF	CHILHOWEE	0.03
LTF	CHOCTAW	0.2
LTF	CLIFTY	1.3
LTF	COTTONWOOD	0.76
LTF	DEARBORN	0.16
232902	EASTMUNI	4.18
LTF	EDWARDS	0.1
LTF	ELMERSMITH	0.16
LTF	FARMERCITY	0.06
LTF	G-007	0.02
LTF	GIBSON	0.11
LTF	HAMLET	0.21
LTF	MORGAN	0.32
LTF	NEWTON	0.24
232910	NRG_G1	2.05
232911	NRG_G2	2.05
LTF	O-066	0.19
LTF	PRAIRIE	0.47
LTF	RENSSELAER	0.05
LTF	ROSETON	0.33
LTF	ROWAN	0.13
LTF	SANTEETLA	0.03
LTF	SMITHLAND	0.04
LTF	TATANKA	0.11
LTF	TILTON	0.11
LTF	TRIMBLE	0.06

<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.14</i>
904210	V4-022C	0.38
904212	V4-022E	0.61
232919	VN10	0.63
901004	W1-003 E	0.9
901014	W1-004 E	0.9
901024	W1-005 E	0.9
901034	W1-006 E	0.9
907052	X1-032 E	0.8
910571	X3-008 C	0.37
910572	X3-008 E	3.05
910821	X3-066 C	0.19
910822	X3-066 E	1.57
913361	Y1-079 C	0.28
913362	Y1-079 E	2.29
913411	Y1-080 C	0.06
913412	Y1-080 E	0.48
915542	Y3-058 E	1.92
917082	Z2-012 E	2.45
917432	Z2-076 E	0.37
917442	Z2-077 E	0.37
917581	Z2-097 C	0.33
917582	Z2-097 E	0.69
918432	AA1-059 E	0.34
918832	AA1-102 E	18.74
920312	AA2-129 E	3.96
930201	AB1-056 C	11.43
930202	AB1-056 E	32.54
930211	AB1-057 C	11.6
930212	AB1-057 E	33.07
930881	AB1-137 C	0.76
930882	AB1-137 E	0.32
930921	AB1-141 C	5.88
930922	AB1-141 E	2.74
930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59

923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2
924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23
924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37
925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53
926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 3

(DP&L - DP&L) The STEEL138-OIL_CITY 138 kV line (from bus 232103 to bus 232801 ckt 1) loads from 92.58% to 151.0% (**DC power flow**) of its emergency rating (159 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 92.88 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	2.82
932162	AC2-023 E	2.05
935121	AD1-145	0.83
935131	AD1-146 C	0.34
935132	AD1-146 E	0.56
936021	AD2-004 O2	92.88
936231	AD2-029 C	0.89
936232	AD2-029 E	1.3
936691	AD2-088 C O2	1.8
936692	AD2-088 E O2	1.2
LTF	AMIL	0.02
LTF	BAYOU	0.09
LTF	BIG_CAJUN1	0.13
LTF	BIG_CAJUN2	0.27
LTF	BLUEG	0.14
LTF	CALDERWOOD	0.04
LTF	CANNELTON	0.02
LTF	CARR	0.03
LTF	CATAWBA	0.03
LTF	CELEVELAND	0.08
LTF	CHEOAH	0.04
LTF	CHILHOWEE	0.01
LTF	CHOCTAW	0.09
LTF	CLIFTY	0.58
LTF	COTTONWOOD	0.34
LTF	DEARBORN	0.07
232902	EASTMUNI	1.61
LTF	EDWARDS	0.04
LTF	ELMERSMITH	0.07
LTF	FARMERCITY	0.03
LTF	G-007	0.01
LTF	GIBSON	0.05

<i>LTF</i>	<i>HAMLET</i>	<i>0.1</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.14</i>
232923	<i>MR1</i>	<i>0.87</i>
232924	<i>MR2</i>	<i>0.87</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.11</i>
<i>LTF</i>	<i>O-066</i>	<i>0.09</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.21</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.02</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.15</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.06</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.02</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.05</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.05</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.03</i>
<i>LTF</i>	<i>TVA</i>	<i>0.06</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.06</i>
904210	<i>V4-022C</i>	<i>0.2</i>
904212	<i>V4-022E</i>	<i>0.32</i>
232907	<i>VN8</i>	<i>3.63</i>
901004	<i>W1-003 E</i>	<i>0.47</i>
901014	<i>W1-004 E</i>	<i>0.47</i>
901024	<i>W1-005 E</i>	<i>0.47</i>
901034	<i>W1-006 E</i>	<i>0.47</i>
907052	<i>X1-032 E</i>	<i>0.42</i>
910571	<i>X3-008 C</i>	<i>0.17</i>
910572	<i>X3-008 E</i>	<i>1.41</i>
913411	<i>Y1-080 C</i>	<i>0.03</i>
913412	<i>Y1-080 E</i>	<i>0.24</i>
915542	<i>Y3-058 E</i>	<i>0.98</i>
917082	<i>Z2-012 E</i>	<i>1.28</i>
917432	<i>Z2-076 E</i>	<i>0.19</i>
917442	<i>Z2-077 E</i>	<i>0.19</i>
918432	<i>AA1-059 E</i>	<i>0.18</i>
918832	<i>AA1-102 E</i>	<i>9.83</i>
919831	<i>AA2-069</i>	<i>23.01</i>
920312	<i>AA2-129 E</i>	<i>2.06</i>
930201	<i>AB1-056 C</i>	<i>5.8</i>
930202	<i>AB1-056 E</i>	<i>16.52</i>
930211	<i>AB1-057 C</i>	<i>5.89</i>
930212	<i>AB1-057 E</i>	<i>16.79</i>
930881	<i>AB1-137 C</i>	<i>0.38</i>
930882	<i>AB1-137 E</i>	<i>0.16</i>
923961	<i>AB2-037 C</i>	<i>11.87</i>
923962	<i>AB2-037 E</i>	<i>19.4</i>

924361	AB2-084 C	0.4
924362	AB2-084 E	0.65
924681	AB2-120 C	3.91
924682	AB2-120 E	6.37
924781	AB2-130 C O1	3.
924782	AB2-130 E O1	4.9
924831	AB2-136 C	2.8
924832	AB2-136 E	2.97
925091	AB2-166 C	0.2
925092	AB2-166 E	0.36
925151	AB2-172 C	2.16
925152	AB2-172 E	3.53
925261	AB2-180 C	1.47
925262	AB2-180 E	0.63
925651	AC1-041 C	0.19
925652	AC1-041 E	0.32
925731	AC1-049 C	0.14
925732	AC1-049 E	0.23
925741	AC1-050 C	0.21
925742	AC1-050 E	0.33
926721	AC1-154 C	-0.15
926911	AC1-177	0.42
927031	AC1-190 C	3.98
927032	AC1-190 E	1.71
927191	AC1-213 C	0.33
927192	AC1-213 E	0.22
927321	AC1-229 C	0.34
927322	AC1-229 E	0.55

Appendix 4

(DP&L - DP&L) The MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 75.57% to 119.84% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05

933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O2	154.04
936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O2	5.14
936352	AD2-045 E O2	3.29
936611	AD2-076 C O2	7.6
936612	AD2-076 E O2	12.4
936691	AD2-088 C O2	3.71
936692	AD2-088 E O2	2.47
LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09
LTF	CHILHOWEE	0.03
LTF	CHOCTAW	0.2
LTF	CLIFTY	1.3
LTF	COTTONWOOD	0.76
LTF	DEARBORN	0.16
232902	EASTMUNI	4.18
LTF	EDWARDS	0.1
LTF	ELMERSMITH	0.16
LTF	FARMERCITY	0.06
LTF	G-007	0.02
LTF	GIBSON	0.11
LTF	HAMLET	0.21
LTF	MORGAN	0.32
LTF	NEWTON	0.24
232910	NRG_G1	2.05
232911	NRG_G2	2.05

<i>LTF</i>	<i>O-066</i>	<i>0.19</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.47</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.05</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.33</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.13</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.11</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.11</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.14</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.38</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.61</i>
<i>232919</i>	<i>VN10</i>	<i>0.63</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.9</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.9</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.9</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.9</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.8</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.37</i>
<i>910572</i>	<i>X3-008 E</i>	<i>3.05</i>
<i>910821</i>	<i>X3-066 C</i>	<i>0.19</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.57</i>
<i>913361</i>	<i>Y1-079 C</i>	<i>0.28</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.29</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.06</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.48</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.92</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>2.45</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.37</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.37</i>
<i>917581</i>	<i>Z2-097 C</i>	<i>0.33</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.69</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.34</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>18.74</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>3.96</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>11.43</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>32.54</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>11.6</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>33.07</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>0.76</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.32</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>5.88</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>2.74</i>

930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59
923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2
924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23
924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925251	AB2-179 C	26.91
925252	AB2-179 E	8.87
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37
925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53

926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 5

(DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 86.01% to 130.27% (**DC power flow**) of its emergency rating (348 MVA) for the tower line contingency outage of 'DPL_P7_1_DBL_1NCB_A'. This project contributes approximately 154.04 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O2	154.04
936231	AD2-029 C	1.82
936232	AD2-029 E	2.65
936351	AD2-045 C O2	5.14
936352	AD2-045 E O2	3.29
936611	AD2-076 C O2	7.6
936612	AD2-076 E O2	12.4
936691	AD2-088 C O2	3.71
936692	AD2-088 E O2	2.47

LTF	AMIL	0.05
LTF	BAYOU	0.19
LTF	BIG_CAJUN1	0.3
LTF	BIG_CAJUN2	0.6
LTF	BLUEG	0.32
LTF	CALDERWOOD	0.1
LTF	CANNELTON	0.06
LTF	CARR	0.06
LTF	CATAWBA	0.06
LTF	CELEVELAND	0.19
LTF	CHEOAH	0.09
LTF	CHILHOWEE	0.03
LTF	CHOCTAW	0.2
LTF	CLIFTY	1.3
LTF	COTTONWOOD	0.76
LTF	DEARBORN	0.16
232902	EASTMUNI	4.18
LTF	EDWARDS	0.1
LTF	ELMERSMITH	0.16
LTF	FARMERCITY	0.06
LTF	G-007	0.02
LTF	GIBSON	0.11
LTF	HAMLET	0.21
LTF	MORGAN	0.32
LTF	NEWTON	0.24
232910	NRG_G1	2.05
232911	NRG_G2	2.05
LTF	O-066	0.19
LTF	PRAIRIE	0.47
LTF	RENSSELAER	0.05
LTF	ROSETON	0.33
LTF	ROWAN	0.13
LTF	SANTEETLA	0.03
LTF	SMITHLAND	0.04
LTF	TATANKA	0.11
LTF	TILTON	0.11
LTF	TRIMBLE	0.06
LTF	TVA	0.14
LTF	UNIONPOWER	0.14
904210	V4-022C	0.38
904212	V4-022E	0.61
232919	VN10	0.63
901004	W1-003 E	0.9
901014	W1-004 E	0.9
901024	W1-005 E	0.9

901034	W1-006 E	0.9
907052	X1-032 E	0.8
910571	X3-008 C	0.37
910572	X3-008 E	3.05
910821	X3-066 C	0.19
910822	X3-066 E	1.57
913361	Y1-079 C	0.28
913362	Y1-079 E	2.29
913411	Y1-080 C	0.06
913412	Y1-080 E	0.48
915542	Y3-058 E	1.92
917082	Z2-012 E	2.45
917432	Z2-076 E	0.37
917442	Z2-077 E	0.37
917581	Z2-097 C	0.33
917582	Z2-097 E	0.69
918432	AA1-059 E	0.34
918832	AA1-102 E	18.74
920312	AA2-129 E	3.96
930201	AB1-056 C	11.43
930202	AB1-056 E	32.54
930211	AB1-057 C	11.6
930212	AB1-057 E	33.07
930881	AB1-137 C	0.76
930882	AB1-137 E	0.32
930921	AB1-141 C	5.88
930922	AB1-141 E	2.74
930931	AB1-142 C	5.88
930932	AB1-142 E	2.74
931111	AB1-162 C	2.67
931112	AB1-162 E	4.37
931261	AB1-176 C	1.43
931262	AB1-176 E	2.36
923921	AB2-032 C	5.92
923922	AB2-032 E	2.79
923951	AB2-036 C	12.59
923952	AB2-036 E	20.59
923961	AB2-037 C	19.69
923962	AB2-037 E	32.17
924191	AB2-063 C	3.2
924192	AB2-063 E	5.23
924361	AB2-084 C	0.76
924362	AB2-084 E	1.24
924681	AB2-120 C	7.5
924682	AB2-120 E	12.23

924781	AB2-130 C O1	6.31
924782	AB2-130 E O1	10.3
924801	AB2-133 C O1	11.57
924802	AB2-133 E O1	14.67
924821	AB2-135 C	12.3
924822	AB2-135 E	14.03
924831	AB2-136 C	5.82
924832	AB2-136 E	6.17
924971	AB2-153 C	3.31
924972	AB2-153 E	5.4
925091	AB2-166 C	0.4
925092	AB2-166 E	0.7
925151	AB2-172 C	4.68
925152	AB2-172 E	7.63
925251	AB2-179 C	26.91
925252	AB2-179 E	8.87
925261	AB2-180 C	2.89
925262	AB2-180 E	1.24
925271	AB2-185 C	5.16
925272	AB2-185 E	2.21
925651	AC1-041 C	0.37
925652	AC1-041 E	0.61
925731	AC1-049 C	0.28
925732	AC1-049 E	0.45
925741	AC1-050 C	0.41
925742	AC1-050 E	0.65
926721	AC1-154 C	0.53
926722	AC1-154 E	0.87
926911	AC1-177	0.81
927031	AC1-190 C	8.54
927032	AC1-190 E	3.66
927191	AC1-213 C	0.64
927192	AC1-213 E	0.42
927241	AC1-220 C	6.57
927242	AC1-220 E	4.61
927321	AC1-229 C	0.68
927322	AC1-229 E	1.1

Appendix 6

(PJM500 - PJM500) The PCHBTM1S-CNASTONE 500 kV line (from bus 200064 to bus 200004 ckt 1) loads from 103.55% to 106.78% (**DC power flow**) of its emergency rating (3525 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'. This project contributes approximately 239.19 MW to the thermal violation.

CONTINGENCY 'PECO_P4_PEACH035/* \$ CHESCO \$ PEACH035 \$ STBK'
 TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1 /* PCHBTM1N 500.00
 3MILEI 500.00 \$ CHESCO \$ PEACH035 \$ STBK / PJM FIXED
 TRIP BRANCH FROM BUS 200066 TO BUS 213866 CKT 1 /* PCHBTM1N 500.00
 PCHBTM 230.00 \$ CHESCO \$ PEACH035 \$ STBK
 REMOVE MACHINE 1 FROM BUS 213794 /* MDYRN5-6 13.80 \$ CHESCO
 \$ PEACH035 \$ STBK
 REMOVE MACHINE 2 FROM BUS 213794 /* MDYRN5-6 13.80 \$ CHESCO
 \$ PEACH035 \$ STBK
 REMOVE MACHINE 1 FROM BUS 213795 /* MDYRN7-8 13.80 \$ CHESCO
 \$ PEACH035 \$ STBK
 REMOVE MACHINE 2 FROM BUS 213795 /* MDYRN7-8 13.80 \$ CHESCO
 \$ PEACH035 \$ STBK
 SET BUS 213867 LOAD TO 0 PERCENT /* PCHBTM 35.00 \$ CHESCO \$
 PEACH035 \$ STBK
 END/* \$ CHESCO \$ PEACH035 \$ STBK

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932081	AC2-018 C1	2.19
932091	AC2-018 C2	2.19
932082	AC2-018 E1	14.2
932092	AC2-018 E2	14.2
932161	AC2-023 C	10.56
932162	AC2-023 E	7.69
933631	AC2-185 C	6.06
933632	AC2-185 E	9.89
933641	AC2-186 C	1.51
933642	AC2-186 E	2.46
933651	AC2-187 C	3.02
933652	AC2-187 E	4.93
933661	AC2-188 C	3.02
933662	AC2-188 E	4.93
935121	AD1-145	3.82
935131	AD1-146 C	1.51
935132	AD1-146 E	2.47
936021	AD2-004 O2	239.19
936231	AD2-029 C	3.16
936232	AD2-029 E	4.6
936351	AD2-045 C O2	4.76
936352	AD2-045 E O2	3.04
936451	AD2-059 C	0.09
936452	AD2-059 E	0.28
936611	AD2-076 C O2	7.28
936612	AD2-076 E O2	11.87

936691	AD2-088 C O2	7.17
936692	AD2-088 E O2	4.78
937281	AD2-167	28.41
LTF	AMIL	2.97
LTF	BAYOU	11.14
LTF	BIG_CAJUN1	17.2
LTF	BIG_CAJUN2	34.61
LTF	BLUEG	17.82
LTF	CALDERWOOD	5.9
LTF	CANNELTON	3.11
LTF	CATAWBA	3.97
LTF	CBM-N	< 0.01
LTF	CELEVELAND	11.49
LTF	CHEOAH	5.42
LTF	CHILHOWEE	1.93
LTF	CHOCTAW	11.5
LTF	CLIFTY	72.79
LTF	COTTONWOOD	44.12
LTF	DEARBORN	8.37
LTF	EDWARDS	5.31
LTF	ELMERSMITH	8.96
LTF	FARMERCITY	3.59
LTF	G-007A	63.12
LTF	GIBSON	6.01
LTF	HAMLET	13.4
231912	HR6	10.
231913	HR7	10.
231914	HR8	15.2
LTF	MORGAN	18.68
232923	MR1	6.79
232924	MR2	6.79
LTF	NEWTON	13.64
LTF	O-066A	27.35
200192	P-004 1CT	14.24
200193	P-004 2CT	14.24
200194	P-004 3CT	14.24
200195	P-004 4ST	21.99
200034	PCHBTM 2	145.99
200035	PCHBTM 3	145.3
LTF	PRAIRIE	26.59
200052	ROCKSP 1	17.58
200053	ROCKSP 2	17.58
200054	ROCKSP 3	17.74
200055	ROCKSP 4	17.74
LTF	ROWAN	7.99

<i>LTF</i>	<i>SANTEETLA</i>	<i>1.59</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>2.15</i>
<i>LTF</i>	<i>TATANKA</i>	<i>6.43</i>
<i>LTF</i>	<i>TILTON</i>	<i>6.38</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>3.41</i>
<i>LTF</i>	<i>TVA</i>	<i>8.26</i>
<i>292769</i>	<i>U1-010</i>	<i>2.05</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>8.61</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.76</i>
<i>904212</i>	<i>V4-022E</i>	<i>1.24</i>
<i>900361</i>	<i>V4-045</i>	<i>36.36</i>
<i>LTF</i>	<i>VFT</i>	<i>161.82</i>
<i>901004</i>	<i>W1-003 E</i>	<i>1.81</i>
<i>901014</i>	<i>W1-004 E</i>	<i>1.81</i>
<i>901024</i>	<i>W1-005 E</i>	<i>1.81</i>
<i>901034</i>	<i>W1-006 E</i>	<i>1.81</i>
<i>907052</i>	<i>X1-032 E</i>	<i>1.59</i>
<i>910572</i>	<i>X3-008 E</i>	<i>4.93</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.45</i>
<i>913271</i>	<i>Y1-065 C</i>	<i>86.57</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.44</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.84</i>
<i>915191</i>	<i>Y3-043</i>	<i>94.57</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>3.7</i>
<i>915681</i>	<i>Y3-102</i>	<i>14.52</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>4.94</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.8</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.8</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.57</i>
<i>918192</i>	<i>AA1-034 E</i>	<i>28.72</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.68</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>37.06</i>
<i>919831</i>	<i>AA2-069</i>	<i>180.06</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>7.97</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>25.67</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>73.11</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>26.07</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>74.31</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>1.67</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.72</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>5.26</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>2.45</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>5.26</i>
<i>930932</i>	<i>AB1-142 E</i>	<i>2.45</i>
<i>931111</i>	<i>AB1-162 C</i>	<i>2.47</i>

931112	AB1-162 E	4.04
931261	AB1-176 C	1.33
931262	AB1-176 E	2.18
923921	AB2-032 C	5.3
923922	AB2-032 E	2.49
923951	AB2-036 C	13.73
923952	AB2-036 E	22.46
923961	AB2-037 C	30.63
923962	AB2-037 E	50.04
924191	AB2-063 C	2.96
924192	AB2-063 E	4.84
924361	AB2-084 C	1.51
924362	AB2-084 E	2.47
924681	AB2-120 C	15.14
924682	AB2-120 E	24.71
924781	AB2-130 C O1	12.87
924782	AB2-130 E O1	20.99
924801	AB2-133 C O1	9.53
924802	AB2-133 E O1	12.09
924821	AB2-135 C	11.64
924822	AB2-135 E	13.28
924831	AB2-136 C	9.86
924832	AB2-136 E	10.46
924971	AB2-153 C	2.96
924972	AB2-153 E	4.83
925091	AB2-166 C	0.8
925092	AB2-166 E	1.39
925111	AB2-168 C	1.36
925112	AB2-168 E	1.86
925151	AB2-172 C	7.55
925152	AB2-172 E	12.32
925181	AB2-175 1	12.7
925191	AB2-175 2	12.64
925251	AB2-179 C	14.15
925252	AB2-179 E	4.67
925261	AB2-180 C	5.58
925262	AB2-180 E	2.39
925271	AB2-185 C	5.5
925272	AB2-185 E	2.36
925651	AC1-041 C	0.76
925652	AC1-041 E	1.24
925731	AC1-049 C	0.6
925732	AC1-049 E	0.97
925741	AC1-050 C	0.76
925742	AC1-050 E	1.21

926131	AC1-091 C	2.99
926132	AC1-091 E	4.9
926141	AC1-092 C	2.99
926142	AC1-092 E	4.9
926151	AC1-093 C	2.83
926152	AC1-093 E	4.67
926161	AC1-094 C	2.39
926162	AC1-094 E	3.95
926171	AC1-095 C	1.52
926172	AC1-095 E	2.43
926721	AC1-154 C	0.47
926722	AC1-154 E	0.76
926911	AC1-177	1.59
927031	AC1-190 C	13.91
927032	AC1-190 E	5.96
927191	AC1-213 C	1.28
927192	AC1-213 E	0.84
927241	AC1-220 C	6.
927242	AC1-220 E	4.21
927321	AC1-229 C	1.51
927322	AC1-229 E	2.42

Appendix 7

(PJM500 - PJM500) The PCHBTM1N-FUR RUN_500 500 kV line (from bus 200066 to bus 270072 ckt 1) loads from 119.09% to 126.54% (**DC power flow**) of its emergency rating (2931 MVA) for the single line contingency outage of 'PJM_P1__P1_17'. This project contributes approximately 217.66 MW to the thermal violation.

CONTINGENCY 'PJM_P1__P1_17'

DISCONNECT BRANCH FROM BUS 200004 TO BUS 200064 CKT 1

/* CNASTONE

PEACHBTM 500 500

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932081	AC2-018 C1	2.06
932091	AC2-018 C2	2.06
932161	AC2-023 C	9.59
933631	AC2-185 C	5.49
933641	AC2-186 C	1.37
933651	AC2-187 C	2.74
933661	AC2-188 C	2.74
935121	AD1-145	3.47
935131	AD1-146 C	1.38
936021	AD2-004 O2	217.66

936231	AD2-029 C	2.88
936351	AD2-045 C O2	4.33
936451	AD2-059 C	0.08
936611	AD2-076 C O2	6.63
936691	AD2-088 C O2	6.51
937281	AD2-167	26.74
LTF	AMIL	2.45
LTF	BAYOU	9.01
232905	BAYVIEW1	0.89
LTF	BIG_CAJUN1	13.9
LTF	BIG_CAJUN2	27.98
LTF	BLUEG	14.75
LTF	CALDERWOOD	4.73
LTF	CANNELTON	2.57
LTF	CARR	1.04
LTF	CATAWBA	3.11
LTF	CELEVELAND	8.99
LTF	CHEOAH	4.34
LTF	CHILHOWEE	1.55
LTF	CHOCTAW	9.28
LTF	CLIFTY	60.43
LTF	COTTONWOOD	35.73
232926	CRISFLD1	0.71
LTF	DEARBORN	7.15
LTF	EDWARDS	4.41
LTF	ELMERSMITH	7.39
LTF	FARMERCITY	2.96
LTF	G-007A	48.21
LTF	GIBSON	4.98
LTF	HAMLET	10.36
231911	HR5	9.09
231912	HR6	9.09
231913	HR7	9.09
231914	HR8	13.82
232904	IR4	29.51
213792	MDYRN1-2	25.58
213793	MDYRN3-4	25.68
213794	MDYRN5-6	25.61
213795	MDYRN7-8	25.7
LTF	MORGAN	15.07
232923	MR1	6.15
232924	MR2	6.15
LTF	NEWTON	11.27
293670	O-025 C	0.43
LTF	O-066A	19.95

232912	OH NUG1	3.21
232913	OH NUG2	3.16
232914	OH NUG3	3.21
232915	OH NUG4	3.21
232916	OH NUG5	3.21
232917	OH NUG6	3.19
232918	OH NUG7	3.19
200192	P-004 1CT	13.45
200193	P-004 2CT	13.45
200194	P-004 3CT	13.45
200195	P-004 4ST	20.76
200034	PCHBTM 2	138.26
200035	PCHBTM 3	138.44
LTF	PRAIRIE	21.86
LTF	RENSSELAER	0.8
200052	ROCKSP 1	16.55
200053	ROCKSP 2	16.55
200054	ROCKSP 3	16.7
200055	ROCKSP 4	16.7
LTF	ROSETON	5.75
LTF	ROWAN	6.23
LTF	SANTEETLA	1.28
LTF	SMITHLAND	1.76
232921	TASLEY2G	2.19
LTF	TATANKA	5.31
LTF	TILTON	5.29
LTF	TRIMBLE	2.83
LTF	TVA	6.68
292769	U1-010	1.94
LTF	UNIONPOWER	6.83
904210	V4-022C	0.69
900361	V4-045	34.43
LTF	VFT	120.11
232907	VN8	10.91
901003	W1-003 C	1.1
901013	W1-004 C	1.1
901023	W1-005 C	1.1
901033	W1-006 C	1.1
913271	Y1-065 C	81.5
915191	Y3-043	89.3
915541	Y3-058 C	0.41
915681	Y3-102	13.67
917081	Z2-012 C	0.54
917431	Z2-076 C	0.28
917441	Z2-077 C	0.28

918431	AA1-059 C	0.31
918831	AA1-102	2.68
919831	AA2-069	163.1
920321	AA2-130	0.14
930201	AB1-056 C	23.31
930211	AB1-057 C	23.67
930881	AB1-137 C	1.52
930921	AB1-141 C	4.79
930931	AB1-142 C	4.79
931111	AB1-162 C	2.25
931261	AB1-176 C	1.21
923921	AB2-032 C	4.83
923951	AB2-036 C	12.5
923961	AB2-037 C	27.89
924191	AB2-063 C	2.7
924361	AB2-084 C	1.38
924681	AB2-120 C	13.76
924781	AB2-130 C O1	11.68
924801	AB2-133 C O1	8.68
924821	AB2-135 C	10.6
924831	AB2-136 C	8.97
924971	AB2-153 C	2.7
925091	AB2-166 C	0.72
925111	AB2-168 C	1.24
925151	AB2-172 C	6.87
925181	AB2-175 1	12.03
925191	AB2-175 2	12.04
925251	AB2-179 C	12.92
925261	AB2-180 C	5.07
925271	AB2-185 C	5.01
925651	AC1-041 C	0.69
925731	AC1-049 C	0.54
925741	AC1-050 C	0.69
926131	AC1-091 C	2.71
926141	AC1-092 C	2.71
926151	AC1-093 C	2.56
926161	AC1-094 C	2.17
926171	AC1-095 C	1.37
926721	AC1-154 C	0.43
926911	AC1-177	1.45
927031	AC1-190 C	12.65
927151	AC1-209 C	6.04
927191	AC1-213 C	1.16
927241	AC1-220 C	5.47
927321	AC1-229 C	1.38

Appendix 8

(PECO - AE) The DELCOTAP-MCKLTON 230 kV line (from bus 213559 to bus 228401 ckt 1) loads from 107.38% to 114.21% (**DC power flow**) of its emergency rating (725 MVA) for the bus fault outage of 'PECO_P2-2_CHI230B1'. This project contributes approximately 48.03 MW to the thermal violation.

CONTINGENCY 'PECO_P2-2_CHI230B1'

/* \$ DELCO \$ CHI230B1 \$ B

DISCONNECT BUS 213489

/* CHICHST1 230.00 \$ DELCO \$

CHI230B1 \$ B

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	1.93
932162	AC2-023 E	1.4
934661	AD1-097 1	10.88
934671	AD1-097 2	10.88
934681	AD1-097 3	10.88
934691	AD1-097 4	6.44
935121	AD1-145	0.67
935131	AD1-146 C	0.26
935132	AD1-146 E	0.43
936021	AD2-004 O2	48.03
936231	AD2-029 C	0.59
936232	AD2-029 E	0.86
936351	AD2-045 C O2	1.02
936352	AD2-045 E O2	0.65
936451	AD2-059 C	0.03
936452	AD2-059 E	0.1
936611	AD2-076 C O2	1.55
936612	AD2-076 E O2	2.52
936691	AD2-088 C O2	1.3
936692	AD2-088 E O2	0.86
LTF	AMIL	0.02
LTF	BAYOU	0.06
LTF	BIG_CAJUN1	0.09
LTF	BIG_CAJUN2	0.19
LTF	BLUEG	0.14
LTF	CALDERWOOD	0.03
LTF	CANNELTON	0.02
LTF	CARR	0.2
LTF	CATAWBA	< 0.01
LTF	CELEVELAND	0.03
LTF	CHEOAH	0.02

<i>LTF</i>	<i>CHILHOWEE</i>	<i>< 0.01</i>
<i>LTF</i>	<i>CHOCTAW</i>	<i>0.06</i>
<i>LTF</i>	<i>CLIFTY</i>	<i>0.57</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.25</i>
<i>213400</i>	<i>COVANTA DELA</i>	<i>10.62</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.09</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.04</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.06</i>
<i>231917</i>	<i>EM10</i>	<i>0.55</i>
<i>231916</i>	<i>EM3</i>	<i>3.31</i>
<i>231901</i>	<i>EM4</i>	<i>6.76</i>
<i>231900</i>	<i>EM5</i>	<i>25.54</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.03</i>
<i>LTF</i>	<i>G-007</i>	<i>2.48</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.05</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.02</i>
<i>231908</i>	<i>HR1</i>	<i>4.86</i>
<i>231909</i>	<i>HR2</i>	<i>4.81</i>
<i>231910</i>	<i>HR3</i>	<i>4.86</i>
<i>231505</i>	<i>HR4</i>	<i>10.5</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.1</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.1</i>
<i>LTF</i>	<i>O-066</i>	<i>7.46</i>
<i>213888</i>	<i>PHLISCT1</i>	<i>12.76</i>
<i>213889</i>	<i>PHLISCT2</i>	<i>12.76</i>
<i>213890</i>	<i>PHLISCT3</i>	<i>12.76</i>
<i>213893</i>	<i>PHLISST1</i>	<i>17.68</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.18</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.16</i>
<i>LTF</i>	<i>ROSETON</i>	<i>1.14</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.02</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>< 0.01</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.01</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.05</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.05</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.03</i>
<i>LTF</i>	<i>TVA</i>	<i>0.05</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.03</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.14</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.22</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.32</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.32</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.32</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.32</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.29</i>

909032	X2-013 E	0.2
910572	X3-008 E	0.94
910822	X3-066 E	0.31
913362	Y1-079 E	0.51
913412	Y1-080 E	0.16
915542	Y3-058 E	0.67
917082	Z2-012 E	0.89
917432	Z2-076 E	0.14
917442	Z2-077 E	0.14
917582	Z2-097 E	0.12
918432	AA1-059 E	0.12
918832	AA1-102 E	6.7
918852	AA1-104 E	2.29
918891	AA1-108	-11.44
920312	AA2-129 E	1.43
919871	AB1-000 1	2.15
919881	AB1-000 2	2.15
919891	AB1-000 3	2.15
930201	AB1-056 C	4.44
930202	AB1-056 E	12.65
930211	AB1-057 C	4.51
930212	AB1-057 E	12.86
930881	AB1-137 C	0.29
930882	AB1-137 E	0.12
930921	AB1-141 C	1.14
930922	AB1-141 E	0.53
930931	AB1-142 C	1.14
930932	AB1-142 E	0.53
931111	AB1-162 C	0.53
931112	AB1-162 E	0.86
931261	AB1-176 C	0.28
931262	AB1-176 E	0.47
923921	AB2-032 C	1.14
923922	AB2-032 E	0.54
923951	AB2-036 C	2.88
923952	AB2-036 E	4.71
923961	AB2-037 C	6.27
923962	AB2-037 E	10.25
924191	AB2-063 C	0.63
924192	AB2-063 E	1.03
924361	AB2-084 C	0.27
924362	AB2-084 E	0.45
924681	AB2-120 C	2.72
924682	AB2-120 E	4.43
924781	AB2-130 C O1	2.29

924782	AB2-130 E O1	3.73
924801	AB2-133 C O1	2.07
924802	AB2-133 E O1	2.62
924821	AB2-135 C	2.4
924822	AB2-135 E	2.74
924831	AB2-136 C	1.86
924832	AB2-136 E	1.97
924971	AB2-153 C	0.64
924972	AB2-153 E	1.04
925091	AB2-166 C	0.14
925092	AB2-166 E	0.25
925111	AB2-168 C	0.39
925112	AB2-168 E	0.53
925151	AB2-172 C	1.44
925152	AB2-172 E	2.35
925251	AB2-179 C	3.49
925252	AB2-179 E	1.15
925261	AB2-180 C	1.01
925262	AB2-180 E	0.43
925271	AB2-185 C	1.15
925272	AB2-185 E	0.49
925651	AC1-041 C	0.14
925652	AC1-041 E	0.22
925731	AC1-049 C	0.1
925732	AC1-049 E	0.17
925741	AC1-050 C	0.14
925742	AC1-050 E	0.22
926721	AC1-154 C	0.1
926722	AC1-154 E	0.16
926911	AC1-177	0.29
927031	AC1-190 C	2.65
927032	AC1-190 E	1.13
927191	AC1-213 C	0.23
927192	AC1-213 E	0.15
927241	AC1-220 C	1.28
927242	AC1-220 E	0.9
927321	AC1-229 C	0.26
927322	AC1-229 E	0.42

Appendix 9

(DP&L - PECO) The CLAY_230-LINWOOD 230 kV line (from bus 231000 to bus 213750 ckt 1) loads from 130.72% to 136.03% (**DC power flow**) of its emergency rating (804 MVA) for the line

fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 93.11 MW to the thermal violation.

```

CONTINGENCY 'PECO_P4_LINWO225'                                /*$ DELCO $ LINWO225 $
STBK
  TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1              /* LINWOOD 230.00
EDGEMR5 230.00 $ DELCO $ LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213888                             /* PHLISCT1 18.00 $ DELCO $
LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213889                             /* PHLISCT2 18.00 $ DELCO $
LINWO225 $ STBK
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.82
932162	AC2-023 E	2.78
933631	AC2-185 C	1.86
933632	AC2-185 E	3.03
933641	AC2-186 C	0.52
933642	AC2-186 E	0.85
933651	AC2-187 C	1.04
933652	AC2-187 E	1.7
933661	AC2-188 C	1.04
933662	AC2-188 E	1.7
935121	AD1-145	1.35
935131	AD1-146 C	0.53
935132	AD1-146 E	0.86
936021	AD2-004 O2	93.11
936231	AD2-029 C	1.17
936232	AD2-029 E	1.7
936351	AD2-045 C O2	1.93
936352	AD2-045 E O2	1.24
936451	AD2-059 C	0.06
936452	AD2-059 E	0.18
936611	AD2-076 C O2	2.95
936612	AD2-076 E O2	4.81
936691	AD2-088 C O2	2.58
936692	AD2-088 E O2	1.72
LTF	CARR	0.21
LTF	CBM-S1	0.06
LTF	CBM-S2	0.18
LTF	CBM-W2	0.23
LTF	CLIFTY	0.02
LTF	CPL	0.05
LTF	DEARBORN	0.03
LTF	EDWARDS	< 0.01

231917	EM10	0.99
231916	EM3	5.98
231901	EM4	12.
231900	EM5	43.76
LTF	G-007	1.94
231908	HR1	8.62
231909	HR2	8.7
231910	HR3	8.62
231505	HR4	17.99
LTF	LGEE	< 0.01
LTF	MEC	< 0.01
232923	MR1	2.12
232924	MR2	2.12
LTF	O-066	6.91
213854	PAPERTAP	-2.49
LTF	RENSSELAER	0.17
LTF	ROSETON	1.24
LTF	TILTON	< 0.01
LTF	TRIMBLE	< 0.01
904210	V4-022C	0.27
904212	V4-022E	0.44
901004	W1-003 E	0.65
901014	W1-004 E	0.65
901024	W1-005 E	0.65
901034	W1-006 E	0.65
907052	X1-032 E	0.57
910572	X3-008 E	1.84
910822	X3-066 E	0.59
913362	Y1-079 E	0.98
913412	Y1-080 E	0.31
915542	Y3-058 E	1.34
917082	Z2-012 E	1.77
917432	Z2-076 E	0.28
917442	Z2-077 E	0.28
917582	Z2-097 E	0.23
918432	AA1-059 E	0.24
918832	AA1-102 E	13.31
919831	AA2-069	56.21
920312	AA2-129 E	2.85
930201	AB1-056 C	8.92
930202	AB1-056 E	25.42
930211	AB1-057 C	9.06
930212	AB1-057 E	25.83
930881	AB1-137 C	0.58
930882	AB1-137 E	0.25

930921	AB1-141 C	2.16
930922	AB1-141 E	1.01
930931	AB1-142 C	2.16
930932	AB1-142 E	1.01
931111	AB1-162 C	1.
931112	AB1-162 E	1.64
931261	AB1-176 C	0.54
931262	AB1-176 E	0.89
923921	AB2-032 C	2.17
923922	AB2-032 E	1.02
923951	AB2-036 C	5.51
923952	AB2-036 E	9.01
923961	AB2-037 C	12.11
923962	AB2-037 E	19.78
924191	AB2-063 C	1.2
924192	AB2-063 E	1.97
924361	AB2-084 C	0.54
924362	AB2-084 E	0.89
924681	AB2-120 C	5.41
924682	AB2-120 E	8.82
924781	AB2-130 C O1	4.56
924782	AB2-130 E O1	7.44
924801	AB2-133 C O1	3.92
924802	AB2-133 E O1	4.97
924821	AB2-135 C	4.61
924822	AB2-135 E	5.26
924831	AB2-136 C	3.65
924832	AB2-136 E	3.88
924971	AB2-153 C	1.21
924972	AB2-153 E	1.98
925091	AB2-166 C	0.29
925092	AB2-166 E	0.5
925111	AB2-168 C	0.69
925112	AB2-168 E	0.94
925151	AB2-172 C	2.82
925152	AB2-172 E	4.61
925251	AB2-179 C	6.4
925252	AB2-179 E	2.11
925261	AB2-180 C	2.01
925262	AB2-180 E	0.86
925271	AB2-185 C	2.21
925272	AB2-185 E	0.95
925651	AC1-041 C	0.27
925652	AC1-041 E	0.44
925731	AC1-049 C	0.21

925732	AC1-049 E	0.34
925741	AC1-050 C	0.28
925742	AC1-050 E	0.44
926131	AC1-091 C	0.92
926132	AC1-091 E	1.5
926141	AC1-092 C	0.92
926142	AC1-092 E	1.5
926151	AC1-093 C	0.87
926152	AC1-093 E	1.43
926161	AC1-094 C	0.73
926162	AC1-094 E	1.21
926171	AC1-095 C	0.46
926172	AC1-095 E	0.74
926721	AC1-154 C	0.19
926722	AC1-154 E	0.31
926911	AC1-177	0.57
927031	AC1-190 C	5.19
927032	AC1-190 E	2.23
927191	AC1-213 C	0.46
927192	AC1-213 E	0.3
927241	AC1-220 C	2.44
927242	AC1-220 E	1.71
927321	AC1-229 C	0.53
927322	AC1-229 E	0.85

Appendix 10

(DP&L - PECO) The EDGEMR 5-LINWOOD 230 kV line (from bus 231001 to bus 213750 ckt 1) loads from 116.18% to 125.78% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP16'. This project contributes approximately 77.15 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP16'
CLAYMONT

/*EDGE MOOR BUS BREAKER TO

DISCONNECT BRANCH FROM BUS 231000 TO BUS 231001 CKT 1
EDGEMR 5 230 230

/*CLAYMONT

DISCONNECT BRANCH FROM BUS 231001 TO BUS 231109 CKT 1
EDGEMR 4 230 138

/*EDGEMR 5

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.14
932162	AC2-023 E	2.28
933631	AC2-185 C	1.51
933632	AC2-185 E	2.46

933641	AC2-186 C	0.42
933642	AC2-186 E	0.69
933651	AC2-187 C	0.84
933652	AC2-187 E	1.38
933661	AC2-188 C	0.84
933662	AC2-188 E	1.38
935121	AD1-145	1.1
935131	AD1-146 C	0.43
935132	AD1-146 E	0.71
936021	AD2-004 O2	77.15
936231	AD2-029 C	0.96
936232	AD2-029 E	1.39
936351	AD2-045 C O2	1.5
936352	AD2-045 E O2	0.96
936451	AD2-059 C	0.04
936452	AD2-059 E	0.12
936611	AD2-076 C O2	2.3
936612	AD2-076 E O2	3.75
936691	AD2-088 C O2	2.11
936692	AD2-088 E O2	1.41
LTF	CARR	0.17
LTF	CBM-S1	0.13
LTF	CBM-S2	0.21
LTF	CBM-W1	0.23
LTF	CBM-W2	0.66
LTF	CIN	0.06
LTF	CPL	0.06
232902	EASTMUNI	1.7
231900	EM5	48.37
LTF	G-007	1.57
231505	HR4	19.89
LTF	IPL	0.04
LTF	LGEE	0.01
LTF	MEC	0.13
LTF	MECS	0.02
232923	MR1	1.73
232924	MR2	1.73
LTF	O-066	5.6
213854	PAPERTAP	-2.04
LTF	RENSSELAER	0.13
LTF	ROSETON	0.96
904210	V4-022C	0.22
904212	V4-022E	0.36
232907	VN8	3.65
901004	W1-003 E	0.53

901014	W1-004 E	0.53
901024	W1-005 E	0.53
901034	W1-006 E	0.53
LTF	WEC	0.02
231918	WEST 1	0.41
907052	X1-032 E	0.47
909411	X2-083	0.1
910571	X3-008 C	0.18
910572	X3-008 E	1.51
910821	X3-066 C	0.06
910822	X3-066 E	0.46
913361	Y1-079 C	0.09
913362	Y1-079 E	0.77
913411	Y1-080 C	0.03
913412	Y1-080 E	0.25
915542	Y3-058 E	1.1
917082	Z2-012 E	1.45
917432	Z2-076 E	0.23
917442	Z2-077 E	0.23
917581	Z2-097 C	0.08
917582	Z2-097 E	0.18
918432	AA1-059 E	0.2
918832	AA1-102 E	10.95
919831	AA2-069	45.95
920312	AA2-129 E	2.34
930201	AB1-056 C	7.33
930202	AB1-056 E	20.87
930211	AB1-057 C	7.44
930212	AB1-057 E	21.21
930881	AB1-137 C	0.48
930882	AB1-137 E	0.21
930921	AB1-141 C	1.67
930922	AB1-141 E	0.78
930931	AB1-142 C	1.67
930932	AB1-142 E	0.78
931111	AB1-162 C	0.78
931112	AB1-162 E	1.27
931261	AB1-176 C	0.42
931262	AB1-176 E	0.69
923921	AB2-032 C	1.68
923922	AB2-032 E	0.79
923951	AB2-036 C	4.39
923952	AB2-036 E	7.18
923961	AB2-037 C	10.1
923962	AB2-037 E	16.51

924191	AB2-063 C	0.94
924192	AB2-063 E	1.53
924361	AB2-084 C	0.45
924362	AB2-084 E	0.73
924681	AB2-120 C	4.45
924682	AB2-120 E	7.25
924781	AB2-130 C O1	3.74
924782	AB2-130 E O1	6.1
924801	AB2-133 C O1	2.98
924802	AB2-133 E O1	3.78
924821	AB2-135 C	3.54
924822	AB2-135 E	4.04
924831	AB2-136 C	2.99
924832	AB2-136 E	3.18
924971	AB2-153 C	0.94
924972	AB2-153 E	1.53
925091	AB2-166 C	0.23
925092	AB2-166 E	0.41
925111	AB2-168 C	0.45
925112	AB2-168 E	0.62
925151	AB2-172 C	2.31
925152	AB2-172 E	3.77
925251	AB2-179 C	4.51
925252	AB2-179 E	1.49
925261	AB2-180 C	1.65
925262	AB2-180 E	0.71
925271	AB2-185 C	1.75
925272	AB2-185 E	0.75
925651	AC1-041 C	0.22
925652	AC1-041 E	0.36
925731	AC1-049 C	0.17
925732	AC1-049 E	0.28
925741	AC1-050 C	0.23
925742	AC1-050 E	0.36
926131	AC1-091 C	0.74
926132	AC1-091 E	1.22
926141	AC1-092 C	0.74
926142	AC1-092 E	1.22
926151	AC1-093 C	0.7
926152	AC1-093 E	1.16
926161	AC1-094 C	0.6
926162	AC1-094 E	0.98
926171	AC1-095 C	0.38
926172	AC1-095 E	0.61
926721	AC1-154 C	0.15

926722	AC1-154 E	0.24
926911	AC1-177	0.47
927031	AC1-190 C	4.25
927032	AC1-190 E	1.82
927191	AC1-213 C	0.38
927192	AC1-213 E	0.25
927241	AC1-220 C	1.89
927242	AC1-220 E	1.33
927321	AC1-229 C	0.43
927322	AC1-229 E	0.69

Appendix 11

(DP&L - DP&L) The EDGEMR 5-CLAY_230 230 kV line (from bus 231001 to bus 231000 ckt 1) loads from 127.43% to 132.25% (**DC power flow**) of its emergency rating (804 MVA) for the line fault with failed breaker contingency outage of 'PECO_P4_LINWO225'. This project contributes approximately 84.59 MW to the thermal violation.

```

CONTINGENCY 'PECO_P4_LINWO225'                                /*$ DELCO $ LINWO225 $
STBK
  TRIP BRANCH FROM BUS 213750 TO BUS 231001 CKT 1             /* LINWOOD 230.00
EDGEMR5 230.00 $ DELCO $ LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213888                             /* PHLISCT1 18.00 $ DELCO $
LINWO225 $ STBK
  REMOVE MACHINE 1 FROM BUS 213889                             /* PHLISCT2 18.00 $ DELCO $
LINWO225 $ STBK
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	3.46
932162	AC2-023 E	2.52
933631	AC2-185 C	1.68
933632	AC2-185 E	2.74
933641	AC2-186 C	0.47
933642	AC2-186 E	0.77
933651	AC2-187 C	0.94
933652	AC2-187 E	1.53
933661	AC2-188 C	0.94
933662	AC2-188 E	1.53
935121	AD1-145	1.22
935131	AD1-146 C	0.48
935132	AD1-146 E	0.78
936021	AD2-004 O2	84.59
936231	AD2-029 C	1.06
936232	AD2-029 E	1.54

936351	AD2-045 C O2	1.72
936352	AD2-045 E O2	1.1
936451	AD2-059 C	0.05
936452	AD2-059 E	0.15
936611	AD2-076 C O2	2.63
936612	AD2-076 E O2	4.29
936691	AD2-088 C O2	2.33
936692	AD2-088 E O2	1.56
LTF	CARR	0.19
LTF	CBM-S1	0.08
LTF	CBM-S2	0.18
LTF	CBM-W1	0.02
LTF	CBM-W2	0.38
231920	CHRIST2	1.32
LTF	CIN	0.02
LTF	CPL	0.06
LTF	DEARBORN	0.02
231901	EM4	9.41
231900	EM5	43.71
LTF	G-007	1.75
231908	HR1	6.76
231910	HR3	6.76
231505	HR4	17.97
LTF	IPL	0.01
LTF	LGEE	< 0.01
LTF	MEC	0.06
232923	MR1	1.92
232924	MR2	1.92
LTF	O-066	6.23
213854	PAPERTAP	-2.25
LTF	RENSSELAER	0.15
LTF	ROSETON	1.1
904210	V4-022C	0.25
904212	V4-022E	0.4
901004	W1-003 E	0.59
901014	W1-004 E	0.59
901024	W1-005 E	0.59
901034	W1-006 E	0.59
LTF	WEC	< 0.01
907052	X1-032 E	0.52
910572	X3-008 E	1.67
910822	X3-066 E	0.53
913362	Y1-079 E	0.88
913412	Y1-080 E	0.28
915542	Y3-058 E	1.21

917082	Z2-012 E	1.6
917432	Z2-076 E	0.25
917442	Z2-077 E	0.25
917582	Z2-097 E	0.21
918432	AA1-059 E	0.22
918832	AA1-102 E	12.07
919831	AA2-069	50.9
920312	AA2-129 E	2.58
930201	AB1-056 C	8.09
930202	AB1-056 E	23.04
930211	AB1-057 C	8.21
930212	AB1-057 E	23.41
930881	AB1-137 C	0.53
930882	AB1-137 E	0.23
930921	AB1-141 C	1.92
930922	AB1-141 E	0.9
930931	AB1-142 C	1.92
930932	AB1-142 E	0.9
931111	AB1-162 C	0.9
931112	AB1-162 E	1.46
931261	AB1-176 C	0.48
931262	AB1-176 E	0.79
923921	AB2-032 C	1.93
923922	AB2-032 E	0.91
923951	AB2-036 C	4.95
923952	AB2-036 E	8.09
923961	AB2-037 C	11.02
923962	AB2-037 E	18.01
924191	AB2-063 C	1.07
924192	AB2-063 E	1.75
924361	AB2-084 C	0.49
924362	AB2-084 E	0.8
924681	AB2-120 C	4.9
924682	AB2-120 E	8.
924781	AB2-130 C O1	4.13
924782	AB2-130 E O1	6.74
924801	AB2-133 C O1	3.48
924802	AB2-133 E O1	4.41
924821	AB2-135 C	4.1
924822	AB2-135 E	4.67
924831	AB2-136 C	3.31
924832	AB2-136 E	3.51
924971	AB2-153 C	1.08
924972	AB2-153 E	1.76
925091	AB2-166 C	0.26

925092	AB2-166 E	0.45
925111	AB2-168 C	0.59
925112	AB2-168 E	0.8
925151	AB2-172 C	2.55
925152	AB2-172 E	4.17
925251	AB2-179 C	5.56
925252	AB2-179 E	1.83
925261	AB2-180 C	1.82
925262	AB2-180 E	0.78
925271	AB2-185 C	1.98
925272	AB2-185 E	0.85
925651	AC1-041 C	0.24
925652	AC1-041 E	0.4
925731	AC1-049 C	0.19
925732	AC1-049 E	0.31
925741	AC1-050 C	0.25
925742	AC1-050 E	0.4
926131	AC1-091 C	0.83
926132	AC1-091 E	1.36
926141	AC1-092 C	0.83
926142	AC1-092 E	1.36
926151	AC1-093 C	0.78
926152	AC1-093 E	1.29
926161	AC1-094 C	0.66
926162	AC1-094 E	1.09
926171	AC1-095 C	0.42
926172	AC1-095 E	0.67
926721	AC1-154 C	0.17
926722	AC1-154 E	0.28
926911	AC1-177	0.52
927031	AC1-190 C	4.7
927032	AC1-190 E	2.01
927191	AC1-213 C	0.41
927192	AC1-213 E	0.27
927241	AC1-220 C	2.18
927242	AC1-220 E	1.53
927321	AC1-229 C	0.48
927322	AC1-229 E	0.77

Appendix 12

(DP&L - DP&L) The ROCKAWLKN-NSALSBRV 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 101.56% to 105.47% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 5.02 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 13707'

OPEN LINE FROM BUS 232119 TO BUS 232117 CIRCUIT 1

/NELSON - VIENNA

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END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	14.92
936021	AD2-004 O2	5.02
936231	AD2-029 C	1.39
936691	AD2-088 C O2	1.14
LTF	CBM-N	< 0.01
LTF	CBM-S1	0.03
LTF	CBM-S2	0.03
LTF	CBM-W1	0.12
LTF	CBM-W2	0.2
LTF	CIN	0.03
LTF	CPL	< 0.01
LTF	G-007A	< 0.01
LTF	IPL	0.02
LTF	LGEE	< 0.01
LTF	MEC	0.05
LTF	MECS	0.04
LTF	NYISO	0.03
LTF	O-066A	< 0.01
LTF	VFT	0.02
232919	VN10	0.53
LTF	WEC	< 0.01
910571	X3-008 C	0.22
913411	Y1-080 C	0.04
915541	Y3-058 C	0.75
924831	AB2-136 C	4.13
925091	AB2-166 C	-0.28
925151	AB2-172 C	2.78
925261	AB2-180 C	9.38
925741	AC1-050 C	0.8
927031	AC1-190 C	5.25