Generation Interconnection
Feasibility Study Report
Queue Position AD2-088

The Interconnection Customer (IC) has proposed a 30 MW (18 MW Capacity) solar generating facility to be located in Sussex County, Delaware. At the IC's request, PJM studied the AD2-088 project at both a Primary and Secondary Point of Interconnection. The project was studied at 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 31, 2020. 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 AD2-088 project.

Primary Point of Interconnection

PJM studied the AD2-088 project as an injection into the Delmarva Power and Light Company (DPL) transmission system at the Laurel 69 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2021. The AD2-088 project will connect with the DPL transmission system at the Laurel 69 kV Substation.

Transmission Owner Scope of Attachment Facilities Work

Substation Interconnection Estimate

Scope: Build a new 69 kV line terminal, at Laurel Substation, configured for the interconnection of a generator.

Note: The AB2-130 project is responsible for the expansion of the Laurel 69 kV Substation. Should AB2-130 not move forward, the AD2-088 project will incur the cost and scope for the substation expansion. The AD2-088 project will connect to the reconfigured Laurel Substation via a new breaker position .

Estimate: $4,100,000
Construction Time: 24-36 months

Major Equipment Included in Estimate:

- Power Circuit Breaker, 69 kV, 2000A, 40kA, 3 cycle — Qty. 1
- Disconnect Switch, 69 kV, 2000A, Manual Wormgear, Arcing Horns — Qty. 6
- Disconnect Switch, 69 kV, 2000A, Arcing Horns — Qty. 3
- CT/VT Combination Units, 69 kV — Qty. 3
- CVT, 69 kV — Qty. 3
- Disconnect Switch Stand, Low, 69 kV, Steel — Qty. 1
- CT/VT Stand, Single Phase, Low, 69 kV, Steel — Qty. 1

- CVT Stand, Single Phase, Low, 69 kV, Steel Qty. 1
- Relay Panel, Transmission Line, FL/BU (20") Qty. 1
- Control Panel, 69 kV Circuit Breaker (10") Qty. 1
- Take-off structure, 69 kV Qty. 2
- Bus Support Structure, 3 phase, 69 kV, Steel Qty. 6
- 69KV Lightning Arresters Qty. 3

Estimate Assumptions:

- Required lot is available for use.
- Land purchase for the substation is not included.

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.

An SEL-451 relay on a 20" breaker control panel will be required for the control and operation of each new 69 kV circuit breaker (1 total).

The project will require re-wiring and adjustment of existing relay schemes to accommodate the new 69 kV substation.

Metering

Three phase 69 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.

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)

None

Multiple Facility Contingency

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

None

Contribution to Previously Identified Overloads

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

1. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 112.86% to 113.44% (**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 10.17 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 133.96% to 134.72% (**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 5.86 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 119.06% to 119.82% (**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 5.86 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 130.02% to 130.78% (**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 5.86 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 MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 115.15% to 115.91% (**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 5.86 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 140.45% to 141.21% (**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 5.86 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 TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 125.58% to 126.34% (**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 5.86 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 NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) loads from 130.78% to 132.2% (**DC power flow**) of its emergency rating (193 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 2.75 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.

9. (DP&L - DP&L) The KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 116.77% to 117.69% (**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 1.89 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 6 for a table containing the generators having contribution to this flowgate.

10. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 169.7% to 171.39% (**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 3.49 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 7 for a table containing the generators having contribution to this flowgate.

11. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 115.77% to 117.07% (**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 2.69 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

12. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 105.75% to 107.49% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 1.62 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

13. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 175.51% to 177.2% (**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 3.49 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 8 for a table containing the generators having contribution to this flowgate.

14. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 121.58% to 122.88% (**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 2.69 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

15. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 111.56% to 113.3% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 1.62 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

16. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 142.89% to 143.54% (**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 8.0 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 9 for a table containing the generators having contribution to this flowgate.

17. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 142.8% to 143.45% (**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 8.0 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

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements

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

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

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 **$580,000** and will take approximately **14-36 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 **$8,300,000** and will take approximately **36-60 months** to complete.

8. 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.

9. To mitigate the (DP&L) KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) overload, it will require increasing the emergency rating of the Kent to New Meredith 69 kV line by rebuilding of 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.

10,11,12. This overload is identified in a previous queue and cost was allocated to that queue, AD2-088 will not get any cost allocation for the below project. However if all prior projects withdraw, AD2-088 will need to be re-tooled and could get cost allocation for the below upgrade in the future. AD2-088 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.

13,14,15. 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.

16&17. 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.

Steady-State Voltage Requirements

To be performed during later study phases as required.

Short Circuit

No issues identified.

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)

The deposit would be $100,000 and is estimated to take 8 months to complete.

Delivery of Energy Portion of Interconnection Request
PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request. Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a

subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (DP&L - PJM500) The CEDAR CK-SILVER RUN 230 kV line (from bus 232002 to bus 232013 ckt 1) loads from 107.44% to 108.27% (**DC power flow**) of its emergency rating (679 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23032B'. This project contributes approximately 12.31 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23032B'
   OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1/SILVER RUN - CARTANZA 230
   END

2. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 110.22% to 110.82% (**DC power flow**) of its emergency rating (790 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23030A'. This project contributes approximately 10.43 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23030A'
   OPEN LINE FROM BUS 232002 TO BUS 232013 CIRCUIT 1/CEDAR CREEK - SILVER RUN 230
   END

3. (DP&L - DP&L) The MILF_230-STEELE 230 kV line (from bus 232004 to bus 232000 ckt 1) loads from 100.04% to 100.61% (**DC power flow**) of its emergency rating (551 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23032B'. This project contributes approximately 7.03 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23032B'
   OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1/SILVER RUN - CARTANZA 230
   END

4. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 105.01% to 105.49% (**DC power flow**) of its normal rating (273 MVA) for non-contingency condition. This project contributes approximately 2.91 MW to the thermal violation.

5. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 104.71% to 105.17% (**DC power flow**) of its emergency rating (348 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23032B'. This project contributes approximately 3.5 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23032B'
   OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1/SILVER RUN - CARTANZA 230

END

6. (DP&L - DP&L) The NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) loads from 153.1% to 154.17% (**DC power flow**) of its emergency rating (193 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 4.58 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 LORETTO-PINEY138 138 kV line (from bus 232127 to bus 232128 ckt 1) loads from 128.75% to 129.39% (**DC power flow**) of its emergency rating (159 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 2.26 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 PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 114.89% to 116.2% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 2.69 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

9. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 120.7% to 122.01% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 2.69 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

10. (DP&L - DP&L) The AD1-145 TAP-DUP-SFRD 69 kV line (from bus 935120 to bus 232247 ckt 1) loads from 92.25% to 103.26% (**DC power flow**) of its emergency rating (93 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 10.24 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

11. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 139.11% to 139.61% (**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 6.11 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

12. (DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 133.52% to 134.1% (**DC power flow**) of its normal rating (551 MVA) for non-contingency condition. This project contributes approximately 7.1 MW to the thermal violation.

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 AD2-088 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 AD2-088 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 AD2-088 project.

Secondary Point of Interconnection

PJM studied the AD2-088 project into the Delmarva Power and Light (DPL) system as a tap of the Laurel-Sharptown 69 kV circuit 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 - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 83.81% to 107.07% (**DC power flow**) of its emergency rating (43 MVA) for the single line contingency outage of 'DPL_P1_3_COOLSPG AT20'. This project contributes approximately 10.0 MW to the thermal violation.

    CONTINGENCY 'DPL_P1_3_COOLSPG AT20'
    OPEN LINE FROM BUS 232001 TO BUS 232269 CIRCUIT 1/COOL SPRINGS AT20 230/69
    END

2. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 83.37% to 106.84% (**DC power flow**) of its emergency rating (43 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 13707'. This project contributes approximately 10.09 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

Multiple Facility Contingency

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

None

Contribution to Previously Identified Overloads

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

1. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 112.82% to 113.4% (**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 10.13 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 134.41% to 135.21% (**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 6.18 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 119.51% to 120.31% (**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 6.18 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 130.46% to 131.26% (**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 6.18 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 MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 115.59% to 116.39% (**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 6.18 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 140.9% to 141.7% (**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 6.18 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 TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 126.02% to 126.82% (**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 6.18 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 KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 102.04% to 102.84% (**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 1.65 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 232005 CKT 1/*STEELE VIENNA 230 230
   END

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

9. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 127.79% to 132.74% (**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 4.61 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 232005 CKT 1/*STEELE VIENNA 230 230
   END

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

10. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 133.6% to 138.55% (**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 4.61 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 232005 CKT 1/*STEELE VIENNA 230 230
END

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

11. (DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 116.24% to 117.9% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 6728'. This project contributes approximately 0.96 MW to the thermal violation.

    CONTINGENCY 'DPL_P1_2_CKT 6728'
    OPEN LINE FROM BUS 232272 TO BUS 232274 CIRCUIT 1/MOUNT HERMON - PINEY GROVE 69
    DISCONNECT BUS 230912/ PINEY GROVE 69 CAP
    END

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

12. (DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 115.94% to 117.73% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_3_LORETO AT1&2'. This project contributes approximately 1.04 MW to the thermal violation.

    CONTINGENCY 'DPL_P1_3_LORETO AT1&2'
    OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 1/LORETTO AT1 138/69
    OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 2/LORETTO AT2 138/69
    END

13. (DP&L - DP&L) The AB2-135 TAP-CHURC_69 69 kV line (from bus 924820 to bus 232203 ckt 1) loads from 125.81% to 126.62% (**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 1.65 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 232005 CKT 1 /*STEELE VIENNA 230 230
    END

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

14. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 118.9% to 157.57% (**DC power flow**) of its emergency rating (43 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP35'. This project contributes approximately 16.63 MW to the thermal violation.

    CONTINGENCY 'DPL_P4-2_DP35'/*COOL SPRINGS BUS BREAKER TO IR
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232006 CKT 1/*COOL SPRINGS INDRIV 4 230 230
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232269 CKT 1/*COOL SPRINGS 230 138
    END

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

15. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 118.9% to 157.57% (**DC power flow**) of its emergency rating (43 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP34'. This project contributes approximately 16.63 MW to the thermal violation.

    CONTINGENCY 'DPL_P4-2_DP34'/*COOL SPRINGS BUS BREAKER TO MILFORD
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232004 CKT 1/*COOL SPRINGS INDRIV 4 230 230
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232269 CKT 1/*COOL SPRINGS 230 138
    END

16. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 118.9% to 157.57% (**DC power flow**) of its emergency rating (43 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP36'. This project contributes approximately 16.63 MW to the thermal violation.

    CONTINGENCY 'DPL_P4-2_DP36'/*COOL SPRINGS BUS BREAKER TO IR 2
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232006 CKT 1/*COOL SPRINGS INDRIV 4 230 230
    DISCONNECT BRANCH FROM BUS 232001 TO BUS 232004 CKT 1/*COOL SPRINGS MILFORD 230 230
    END

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The

developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

1. (DP&L - PJM500) The CEDAR CK-SILVER RUN 230 kV line (from bus 232002 to bus 232013 ckt 1) loads from 107.31% to 108.09% (**DC power flow**) of its emergency rating (679 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23032B'. This project contributes approximately 11.66 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23032B'
   OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1/SILVER RUN - CARTANZA 230
   END

2. (DP&L - PJM500) The CARTANZA-SILVER RUN 230 kV line (from bus 232003 to bus 232013 ckt 1) loads from 110.11% to 110.68% (**DC power flow**) of its emergency rating (790 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23030A'. This project contributes approximately 9.95 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23030A'
   OPEN LINE FROM BUS 232002 TO BUS 232013 CIRCUIT 1/CEDAR CREEK - SILVER RUN 230
   END

3. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 105.01% to 106.06% (**DC power flow**) of its emergency rating (348 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 23032B'. This project contributes approximately 3.63 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 23032B'
   OPEN LINE FROM BUS 232013 TO BUS 232003 CIRCUIT 1/SILVER RUN - CARTANZA 230
   END

4. (DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 105.43% to 105.94% (**DC power flow**) of its normal rating (273 MVA) for non-contingency condition. This project contributes approximately 3.06 MW to the thermal violation.

5. (DP&L - DP&L) The HEBRON-ROCKAWLKN 69 kV line (from bus 232270 to bus 232291 ckt 1) loads from 123.08% to 124.3% (**DC power flow**) of its emergency rating (64 MVA) for the single line contingency outage of 'DPL_P1_3_LORETO AT1&2'. This project contributes approximately 1.73 MW to the thermal violation.

CONTINGENCY 'DPL_P1_3_LORETO AT1&2'
OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 1/LORETTO AT1 138/69
OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 2/LORETTO AT2 138/69
END

6. (DP&L - DP&L) The HEBRON-ROCKAWLKN 69 kV line (from bus 232270 to bus 232291 ckt 1) loads from 102.73% to 104.11% (**DC power flow**) of its normal rating (64 MVA) for non-contingency condition. This project contributes approximately 1.95 MW to the thermal violation.

7. (DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 177.59% to 178.94% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_3_LORETO AT1&2'. This project contributes approximately 1.73 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_3_LORETO AT1&2'
   OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 1/LORETTO AT1 138/69
   OPEN LINE FROM BUS 232127 TO BUS 232275 CIRCUIT 2/LORETTO AT2 138/69
   END

8. (DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 156.4% to 157.91% (**DC power flow**) of its normal rating (58 MVA) for non-contingency condition. This project contributes approximately 1.95 MW to the thermal violation.

9. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 116.03% to 156.37% (**DC power flow**) of its emergency rating (43 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 6708'. This project contributes approximately 17.35 MW to the thermal violation.

   CONTINGENCY 'DPL_P1_2_CKT 6708'
   DISCONNECT BUS 232270/ MARDELA - HEBRON 69 & HEBRON XFMR
   DISCONNECT BUS 232838 / VIENNA - MARDELA 69
   DISCONNECT BUS 232644/ HEBRON 12
   DISCONNECT BUS 232291/ ROCKAWALKIN - NORTH SALISBURY 69
   END

10. (DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 96.54% to 135.76% (**DC power flow**) of its normal rating (43 MVA) for non-contingency condition. This project contributes approximately 16.86 MW to the thermal violation.

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which

projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.
It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

Primary 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 112.86% to 113.44% (**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 10.17 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

Bus Number	*Bus Name*	*Full Contribution*
932161	*AC2-023 C*	*9.06*
932162	*AC2-023 E*	*6.59*
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*	*195.46*
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*	*6.1*
936692	*AD2-088 E O1*	*4.07*
LTF	*AMIL*	*0.12*
LTF	*BAYOU*	*0.43*
LTF	*BIG_CAJUN1*	*0.66*
LTF	*BIG_CAJUN2*	*1.32*
LTF	*BLUEG*	*0.71*

LTF	*CALDERWOOD*	*0.22*
LTF	*CANNELTON*	*0.12*
LTF	*CARR*	*0.15*
232008	*CARTANZA GEN*	*38.06*
LTF	*CATAWBA*	*0.14*
LTF	*CELEVELAND*	*0.41*
LTF	*CHEOAH*	*0.2*
LTF	*CHILHOWEE*	*0.07*
LTF	*CHOCTAW*	*0.44*
LTF	*CLIFTY*	*2.93*
LTF	*COTTONWOOD*	*1.69*
LTF	*DEARBORN*	*0.36*
LTF	*EDWARDS*	*0.21*
LTF	*ELMERSMITH*	*0.36*
LTF	*FARMERCITY*	*0.14*
LTF	*G-007*	*0.5*
232616	*GEN FOOD*	*1.87*
LTF	*GIBSON*	*0.24*
LTF	*HAMLET*	*0.47*
232904	*IR4*	*27.86*
LTF	*MORGAN*	*0.71*
232923	*MR1*	*11.26*
232924	*MR2*	*11.26*
232922	*MR3*	*12.56*
LTF	*NEWTON*	*0.54*
232901	*NORTHST*	*5.54*
LTF	*O-066*	*3.1*
LTF	*PRAIRIE*	*1.05*
LTF	*RENSSELAER*	*0.12*
LTF	*ROSETON*	*0.88*
LTF	*ROWAN*	*0.28*
LTF	*SANTEETLA*	*0.06*
LTF	*SMITHLAND*	*0.08*
LTF	*TATANKA*	*0.26*
LTF	*TILTON*	*0.26*
LTF	*TRIMBLE*	*0.14*
LTF	*TVA*	*0.32*
LTF	*UNIONPOWER*	*0.32*
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*	*32.4*
919831	*AA2-069*	*298.81*
920312	*AA2-129 E*	*7.01*
930201	*AB1-056 C*	*23.31*
930202	*AB1-056 E*	*66.37*
930211	*AB1-057 C*	*23.67*
930212	*AB1-057 E*	*67.46*
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*	*9.51*
923952	*AB2-036 E*	*15.57*
923961	*AB2-037 C*	*24.95*
923962	*AB2-037 E*	*40.75*
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*	*10.95*
924782	*AB2-130 E O1*	*17.87*
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*	*11.41*
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 133.96% to 134.72% (**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 5.86 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*153.2*
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*	*2.34*
LTF	*AMIL*	*0.05*
LTF	*BAYOU*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 130.02% to 130.78% (**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 5.86 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*153.2*
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*	*2.34*
LTF	*AMIL*	*0.05*
LTF	*BAYOU*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 4

(DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 140.45% to 141.21% (**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 5.86 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*153.2*
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*	*2.34*
LTF	*AMIL*	*0.05*
LTF	*BAYOU*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 NELSON-INDRV2&3 138 kV line (from bus 232119 to bus 232121 ckt 1) loads from 130.78% to 132.2% (**DC power flow**) of its emergency rating (193 MVA) for the single line contingency outage of '"232000'. This project contributes approximately 2.75 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*0.36*
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*	*0.5*
LTF	*COTTONWOOD*	*0.29*
232926	*CRISFLD1*	*0.34*
LTF	*DEARBORN*	*0.06*
232851	*DUP-SFR1*	*0.15*
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*	*0.23*
232912	*OH NUG1*	*1.29*

232913	*OH NUG2*	*1.27*
232914	*OH NUG3*	*1.29*
232915	*OH NUG4*	*1.29*
232916	*OH NUG5*	*1.29*
232917	*OH NUG6*	*1.28*
232918	*OH NUG7*	*1.28*
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*	*0.09*
232921	*TASLEY2G*	*0.88*
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*	*0.66*
232907	*VN8*	*9.7*
901003	*W1-003 C*	*0.45*
901013	*W1-004 C*	*0.45*
901023	*W1-005 C*	*0.45*
901033	*W1-006 C*	*0.45*
910571	*X3-008 C*	*0.27*
913411	*Y1-080 C*	*0.06*
915541	*Y3-058 C*	*0.23*
917081	*Z2-012 C*	*0.22*
918431	*AA1-059 C*	*0.15*
918831	*AA1-102*	*1.24*
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 6

(DP&L - DP&L) The KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 116.77% to 117.69% (**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 1.89 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*30.3*
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*
LTF	*CLIFTY*	*0.47*
LTF	*COTTONWOOD*	*0.27*

LTF	*DEARBORN*	*0.06*
232900	*DEMECSMY*	*0.97*
LTF	*EDWARDS*	*0.03*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007A*	*< 0.01*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.12*
LTF	*NEWTON*	*0.09*
232910	*NRG_G1*	*2.47*
232911	*NRG_G2*	*2.47*
LTF	*O-066*	*0.07*
LTF	*PRAIRIE*	*0.17*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.12*
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*	*0.05*
LTF	*UNIONPOWER*	*0.05*
904210	*V4-022C*	*0.1*
904212	*V4-022E*	*0.17*
232813	*VAUGHN*	*0.14*
901004	*W1-003 E*	*0.24*
901014	*W1-004 E*	*0.24*
901024	*W1-005 E*	*0.24*
901034	*W1-006 E*	*0.24*
901411	*W1-062*	*0.99*
907052	*X1-032 E*	*0.21*
915542	*Y3-058 E*	*0.47*
917082	*Z2-012 E*	*0.66*
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*	*3.61*
930202	*AB1-056 E*	*10.29*
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 7

(DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 169.7% to 171.39% (**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 3.49 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*0.08*
LTF	*BIG_CAJUN1*	*0.12*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.13*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.02*
LTF	*CATAWBA*	*0.03*
LTF	*CELEVELAND*	*0.07*
LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.52*
LTF	*COTTONWOOD*	*0.3*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.03*

LTF	*G-007*	*0.03*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.13*
LTF	*NEWTON*	*0.1*
LTF	*O-066*	*0.24*
LTF	*PRAIRIE*	*0.19*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.14*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.05*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.06*
LTF	*UNIONPOWER*	*0.06*
904210	*V4-022C*	*0.21*
904212	*V4-022E*	*0.34*
232919	*VN10*	*0.57*
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*	*0.54*
910572	*X3-008 E*	*4.74*
913411	*Y1-080 C*	*0.06*
913412	*Y1-080 E*	*0.55*
915541	*Y3-058 C*	*0.16*
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*	*11.84*
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 8

(DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 175.51% to 177.2% (**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 3.49 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*0.08*
LTF	*BIG_CAJUN1*	*0.12*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.13*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.02*
LTF	*CATAWBA*	*0.03*
LTF	*CELEVELAND*	*0.07*
LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.52*
LTF	*COTTONWOOD*	*0.3*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.03*

LTF	*G-007*	*0.03*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.13*
LTF	*NEWTON*	*0.1*
LTF	*O-066*	*0.24*
LTF	*PRAIRIE*	*0.19*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.14*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.05*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.06*
LTF	*UNIONPOWER*	*0.06*
904210	*V4-022C*	*0.21*
904212	*V4-022E*	*0.34*
232919	*VN10*	*0.57*
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*	*0.54*
910572	*X3-008 E*	*4.74*
913411	*Y1-080 C*	*0.06*
913412	*Y1-080 E*	*0.55*
915541	*Y3-058 C*	*0.16*
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*	*11.84*
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 9

(DP&L - DP&L) The AD2-004 TAP-STEELE 230 kV line (from bus 936020 to bus 232000 ckt 1) loads from 142.89% to 143.54% (**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 8.0 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

Bus Number	*Bus Name*	*Full Contribution*
932161	*AC2-023 C*	*10.65*
932162	*AC2-023 E*	*7.75*
935121	*AD1-145*	*2.16*
935131	*AD1-146 C*	*0.51*
935132	*AD1-146 E*	*0.84*
936021	*AD2-004 O1*	*559.74*
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*	*0.75*
LTF	*BLUEG*	*0.4*
LTF	*CALDERWOOD*	*0.13*
LTF	*CANNELTON*	*0.07*
LTF	*CARR*	*0.08*
LTF	*CATAWBA*	*0.08*
LTF	*CELEVELAND*	*0.23*
LTF	*CHEOAH*	*0.12*
LTF	*CHILHOWEE*	*0.04*
LTF	*CHOCTAW*	*0.25*
LTF	*CLIFTY*	*1.66*
LTF	*COTTONWOOD*	*0.96*
232926	*CRISFLD1*	*0.92*
LTF	*DEARBORN*	*0.2*
LTF	*EDWARDS*	*0.12*
LTF	*ELMERSMITH*	*0.2*
LTF	*FARMERCITY*	*0.08*

LTF	*G-007*	*0.19*
LTF	*GIBSON*	*0.14*
LTF	*HAMLET*	*0.27*
LTF	*MORGAN*	*0.4*
LTF	*NEWTON*	*0.31*
LTF	*O-066*	*1.3*
232912	*OH NUG1*	*4.08*
232913	*OH NUG2*	*4.02*
232914	*OH NUG3*	*4.08*
232915	*OH NUG4*	*4.08*
232916	*OH NUG5*	*4.08*
232917	*OH NUG6*	*4.06*
232918	*OH NUG7*	*4.05*
LTF	*PRAIRIE*	*0.59*
LTF	*RENSSELAER*	*0.06*
LTF	*ROSETON*	*0.47*
LTF	*ROWAN*	*0.16*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.05*
LTF	*TATANKA*	*0.14*
LTF	*TILTON*	*0.14*
LTF	*TRIMBLE*	*0.08*
LTF	*TVA*	*0.18*
LTF	*UNIONPOWER*	*0.18*
904210	*V4-022C*	*0.92*
904212	*V4-022E*	*1.51*
232907	*VN8*	*16.11*
901003	*W1-003 C*	*1.4*
901004	*W1-003 E*	*2.21*
901013	*W1-004 C*	*1.4*
901014	*W1-004 E*	*2.21*
901023	*W1-005 C*	*1.4*
901024	*W1-005 E*	*2.21*
901033	*W1-006 C*	*1.4*
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*	*0.4*
918432	*AA1-059 E*	*0.84*
918831	*AA1-102*	*3.32*

918832	*AA1-102 E*	*45.97*
920312	*AA2-129 E*	*9.75*
920321	*AA2-130*	*0.18*
930881	*AB1-137 C*	*0.6*
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*	*9.14*
924832	*AB2-136 E*	*9.7*
925091	*AB2-166 C*	*0.74*
925092	*AB2-166 E*	*1.3*
925151	*AB2-172 C*	*6.02*
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*	*11.42*
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*

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 112.82% to 113.4% (**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 10.13 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

Bus Number	*Bus Name*	*Full Contribution*
932161	*AC2-023 C*	*9.06*
932162	*AC2-023 E*	*6.59*
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*	*195.15*
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*	*0.43*
LTF	*BIG_CAJUN1*	*0.66*
LTF	*BIG_CAJUN2*	*1.32*
LTF	*BLUEG*	*0.71*
LTF	*CALDERWOOD*	*0.22*
LTF	*CANNELTON*	*0.12*
LTF	*CARR*	*0.15*
232008	*CARTANZA GEN*	*38.06*
LTF	*CATAWBA*	*0.14*
LTF	*CELEVELAND*	*0.41*
LTF	*CHEOAH*	*0.2*
LTF	*CHILHOWEE*	*0.07*
LTF	*CHOCTAW*	*0.44*
LTF	*CLIFTY*	*2.93*
LTF	*COTTONWOOD*	*1.69*
LTF	*DEARBORN*	*0.36*
LTF	*EDWARDS*	*0.21*

LTF	*ELMERSMITH*	*0.36*
LTF	*FARMERCITY*	*0.14*
LTF	*G-007*	*0.5*
232616	*GEN FOOD*	*1.87*
LTF	*GIBSON*	*0.24*
LTF	*HAMLET*	*0.47*
232904	*IR4*	*27.86*
LTF	*MORGAN*	*0.71*
232923	*MR1*	*11.26*
232924	*MR2*	*11.26*
232922	*MR3*	*12.56*
LTF	*NEWTON*	*0.54*
232901	*NORTHST*	*5.54*
LTF	*O-066*	*3.1*
LTF	*PRAIRIE*	*1.05*
LTF	*RENSSELAER*	*0.12*
LTF	*ROSETON*	*0.88*
LTF	*ROWAN*	*0.28*
LTF	*SANTEETLA*	*0.06*
LTF	*SMITHLAND*	*0.08*
LTF	*TATANKA*	*0.26*
LTF	*TILTON*	*0.26*
LTF	*TRIMBLE*	*0.14*
LTF	*TVA*	*0.32*
LTF	*UNIONPOWER*	*0.32*
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*	*32.4*
919831	*AA2-069*	*298.81*
920312	*AA2-129 E*	*7.01*

930201	*AB1-056 C*	*23.31*
930202	*AB1-056 E*	*66.37*
930211	*AB1-057 C*	*23.67*
930212	*AB1-057 E*	*67.46*
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*	*9.51*
923952	*AB2-036 E*	*15.57*
923961	*AB2-037 C*	*24.95*
923962	*AB2-037 E*	*40.75*
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*	*10.95*
924782	*AB2-130 E O1*	*17.87*
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*	*11.41*
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 134.41% to 135.21% (**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 6.18 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*154.02*
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*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) loads from 130.46% to 131.26% (**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 6.18 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*154.02*
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*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 4

(DP&L - DP&L) The TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 140.9% to 141.7% (**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 6.18 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

Bus Number	*Bus Name*	*Full Contribution*
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*	*154.02*
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*	*0.2*
LTF	*BIG_CAJUN1*	*0.3*
LTF	*BIG_CAJUN2*	*0.61*
LTF	*BLUEG*	*0.32*
LTF	*CALDERWOOD*	*0.1*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*0.06*
LTF	*CATAWBA*	*0.07*
LTF	*CELEVELAND*	*0.19*
LTF	*CHEOAH*	*0.09*

LTF	*CHILHOWEE*	*0.03*
LTF	*CHOCTAW*	*0.2*
LTF	*CLIFTY*	*1.32*
LTF	*COTTONWOOD*	*0.77*
LTF	*DEARBORN*	*0.16*
232902	*EASTMUNI*	*3.95*
LTF	*EDWARDS*	*0.1*
LTF	*ELMERSMITH*	*0.16*
LTF	*FARMERCITY*	*0.06*
LTF	*G-007*	*0.02*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.22*
LTF	*MORGAN*	*0.33*
LTF	*NEWTON*	*0.25*
232910	*NRG_G1*	*1.94*
232911	*NRG_G2*	*1.94*
LTF	*O-066*	*0.38*
LTF	*PRAIRIE*	*0.48*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.33*
LTF	*ROWAN*	*0.13*
LTF	*SANTEETLA*	*0.03*
LTF	*SMITHLAND*	*0.04*
LTF	*TATANKA*	*0.12*
LTF	*TILTON*	*0.12*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.14*
LTF	*UNIONPOWER*	*0.15*
904210	*V4-022C*	*0.38*
904212	*V4-022E*	*0.61*
232919	*VN10*	*0.59*
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*	*0.35*
910572	*X3-008 E*	*3.05*
910821	*X3-066 C*	*0.18*
910822	*X3-066 E*	*1.57*
913361	*Y1-079 C*	*0.26*
913362	*Y1-079 E*	*2.29*
913411	*Y1-080 C*	*0.05*
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*	*0.31*
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*	*11.42*
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*	*32.16*
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 KENT-NMEREDTH 69 kV line (from bus 232215 to bus 232812 ckt 1) loads from 102.04% to 102.84% (**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 1.65 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 232005 CKT 1 /*STEELE VIENNA 230 230
 END

Bus Number	*Bus Name*	*Full Contribution*
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*
936691	*AD2-088 C O2*	*0.99*
936692	*AD2-088 E O2*	*0.66*
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*
LTF	*CLIFTY*	*0.47*
LTF	*COTTONWOOD*	*0.27*
LTF	*DEARBORN*	*0.06*

232900	*DEMECSMY*	*0.97*
LTF	*EDWARDS*	*0.03*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007A*	*< 0.01*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.12*
LTF	*NEWTON*	*0.09*
232910	*NRG_G1*	*2.47*
232911	*NRG_G2*	*2.47*
LTF	*O-066*	*0.07*
LTF	*PRAIRIE*	*0.17*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.12*
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*	*0.05*
LTF	*UNIONPOWER*	*0.05*
904210	*V4-022C*	*0.1*
904212	*V4-022E*	*0.17*
232813	*VAUGHN*	*0.14*
901004	*W1-003 E*	*0.24*
901014	*W1-004 E*	*0.24*
901024	*W1-005 E*	*0.24*
901034	*W1-006 E*	*0.24*
901411	*W1-062*	*0.99*
907052	*X1-032 E*	*0.21*
915542	*Y3-058 E*	*0.47*
917082	*Z2-012 E*	*0.66*
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*	*3.61*
930202	*AB1-056 E*	*10.29*
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 6

(DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 127.79% to 132.74% (**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 4.61 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 232005 CKT 1 /*STEELE VIENNA 230 230
 END

Bus Number	*Bus Name*	*Full Contribution*
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*
936231	*AD2-029 C*	*2.08*
936232	*AD2-029 E*	*3.03*
936691	*AD2-088 C O2*	*2.76*
936692	*AD2-088 E O2*	*1.84*
LTF	*AMIL*	*0.02*
LTF	*BAYOU*	*0.08*
LTF	*BIG_CAJUN1*	*0.12*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.13*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.02*
LTF	*CATAWBA*	*0.03*
LTF	*CELEVELAND*	*0.07*
LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.52*
LTF	*COTTONWOOD*	*0.3*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.03*
LTF	*G-007*	*0.03*

LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.13*
LTF	*NEWTON*	*0.1*
LTF	*O-066*	*0.24*
LTF	*PRAIRIE*	*0.19*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.14*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.05*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.06*
LTF	*UNIONPOWER*	*0.06*
904210	*V4-022C*	*0.21*
904212	*V4-022E*	*0.34*
232919	*VN10*	*0.57*
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*	*0.54*
910572	*X3-008 E*	*4.74*
913411	*Y1-080 C*	*0.06*
913412	*Y1-080 E*	*0.55*
915541	*Y3-058 C*	*0.16*
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*	*11.84*
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 7

(DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 133.6% to 138.55% (**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 4.61 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 232005 CKT 1 /*STEELE VIENNA 230 230
 END

Bus Number	*Bus Name*	*Full Contribution*
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*
936231	*AD2-029 C*	*2.08*
936232	*AD2-029 E*	*3.03*
936691	*AD2-088 C O2*	*2.76*
936692	*AD2-088 E O2*	*1.84*
LTF	*AMIL*	*0.02*
LTF	*BAYOU*	*0.08*
LTF	*BIG_CAJUN1*	*0.12*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.13*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.02*
LTF	*CATAWBA*	*0.03*
LTF	*CELEVELAND*	*0.07*
LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.52*
LTF	*COTTONWOOD*	*0.3*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.03*
LTF	*G-007*	*0.03*

LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.13*
LTF	*NEWTON*	*0.1*
LTF	*O-066*	*0.24*
LTF	*PRAIRIE*	*0.19*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.14*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.05*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.06*
LTF	*UNIONPOWER*	*0.06*
904210	*V4-022C*	*0.21*
904212	*V4-022E*	*0.34*
232919	*VN10*	*0.57*
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*	*0.54*
910572	*X3-008 E*	*4.74*
913411	*Y1-080 C*	*0.06*
913412	*Y1-080 E*	*0.55*
915541	*Y3-058 C*	*0.16*
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*	*11.84*
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 8

(DP&L - DP&L) The ROCKAWLKN-NSALSBRY 69 kV line (from bus 232291 to bus 232271 ckt 1) loads from 116.24% to 117.9% (**DC power flow**) of its emergency rating (58 MVA) for the single line contingency outage of 'DPL_P1_2_CKT 6728'. This project contributes approximately 0.96 MW to the thermal violation.

CONTINGENCY 'DPL_P1_2_CKT 6728'
OPEN LINE FROM BUS 232272 TO BUS 232274 CIRCUIT 1 /MOUNT HERMON - PINEY GROVE 69
DISCONNECT BUS 230912 / PINEY GROVE 69 CAP
END

Bus Number	*Bus Name*	*Full Contribution*
932161	*AC2-023 C*	*14.15*
936021	*AD2-004 O2*	*3.12*
936231	*AD2-029 C*	*1.24*
936691	*AD2-088 C O2*	*0.96*
LTF	*CBM-N*	*< 0.01*
LTF	*CBM-S1*	*0.02*
LTF	*CBM-S2*	*0.02*
LTF	*CBM-W1*	*0.07*
LTF	*CBM-W2*	*0.11*
LTF	*CIN*	*0.01*
LTF	*CPLE*	*< 0.01*
LTF	*IPL*	*< 0.01*
LTF	*LGEE*	*< 0.01*
LTF	*MEC*	*0.03*
LTF	*MECS*	*0.02*
LTF	*NYISO*	*0.02*
LTF	*VFT*	*< 0.01*
232919	*VN10*	*0.44*
LTF	*WEC*	*< 0.01*
910571	*X3-008 C*	*0.18*
913411	*Y1-080 C*	*0.04*
915541	*Y3-058 C*	*0.68*
924831	*AB2-136 C*	*3.68*
925091	*AB2-166 C*	*-0.32*
925151	*AB2-172 C*	*2.47*
925261	*AB2-180 C*	*8.94*
925741	*AC1-050 C*	*0.75*
927031	*AC1-190 C*	*4.67*

Appendix 9

(DP&L - DP&L) The AB2-135 TAP-CHURC_69 69 kV line (from bus 924820 to bus 232203 ckt 1) loads from 125.81% to 126.62% (**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 1.65 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 232005 CKT 1 /*STEELE VIENNA 230 230
END

Bus Number	*Bus Name*	*Full Contribution*
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*
936691	*AD2-088 C O2*	*0.99*
936692	*AD2-088 E O2*	*0.66*
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*
LTF	*CLIFTY*	*0.47*
LTF	*COTTONWOOD*	*0.27*
LTF	*DEARBORN*	*0.06*

232900	*DEMECSMY*	*0.97*
LTF	*EDWARDS*	*0.03*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007A*	*< 0.01*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.12*
LTF	*NEWTON*	*0.09*
232910	*NRG_G1*	*2.47*
232911	*NRG_G2*	*2.47*
LTF	*O-066*	*0.07*
LTF	*PRAIRIE*	*0.17*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.12*
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*	*0.05*
LTF	*UNIONPOWER*	*0.05*
904210	*V4-022C*	*0.1*
904212	*V4-022E*	*0.17*
232813	*VAUGHN*	*0.14*
901004	*W1-003 E*	*0.24*
901014	*W1-004 E*	*0.24*
901024	*W1-005 E*	*0.24*
901034	*W1-006 E*	*0.24*
901411	*W1-062*	*0.99*
907052	*X1-032 E*	*0.21*
915542	*Y3-058 E*	*0.47*
917082	*Z2-012 E*	*0.66*
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*	*3.61*
930202	*AB1-056 E*	*10.29*
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*
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*

Appendix 10

(DP&L - DP&L) The AD2-088 TAP-LAUREL 69 kV line (from bus 936690 to bus 232249 ckt 1) loads from 118.9% to 157.57% (**DC power flow**) of its emergency rating (43 MVA) for the line fault with failed breaker contingency outage of 'DPL_P4-2_DP35'. This project contributes approximately 16.63 MW to the thermal violation.

CONTINGENCY 'DPL_P4-2_DP35' /*COOL SPRINGS BUS BREAKER TO IR
 DISCONNECT BRANCH FROM BUS 232001 TO BUS 232006 CKT 1 /*COOL SPRINGS INDRIV 4 230 230
 DISCONNECT BRANCH FROM BUS 232001 TO BUS 232269 CKT 1 /*COOL SPRINGS 230 138
 END

Bus Number	*Bus Name*	*Full Contribution*
932161	*AC2-023 C*	*1.7*
932162	*AC2-023 E*	*1.24*
936231	*AD2-029 C*	*1.19*
936232	*AD2-029 E*	*1.73*
936691	*AD2-088 C O2*	*9.98*
936692	*AD2-088 E O2*	*6.65*
LTF	*CARR*	*< 0.01*
LTF	*G-007*	*< 0.01*
LTF	*O-066*	*0.04*
LTF	*RENSSELAER*	*< 0.01*
LTF	*ROSETON*	*< 0.01*
232919	*VN10*	*0.42*
910571	*X3-008 C*	*0.18*
910572	*X3-008 E*	*1.55*
913411	*Y1-080 C*	*0.04*
913412	*Y1-080 E*	*0.31*
924831	*AB2-136 C*	*3.53*
924832	*AB2-136 E*	*3.75*
925151	*AB2-172 C*	*2.38*
925152	*AB2-172 E*	*3.89*
925741	*AC1-050 C*	*0.19*
925742	*AC1-050 E*	*0.31*
927031	*AC1-190 C*	*4.49*
927032	*AC1-190 E*	*1.93*