

**Generation Interconnection
Feasibility Study Report
Queue Position AD2-076
(Rev 1.)**

The Interconnection Customer (IC) has proposed a 49 MW (18.6 MW Capacity) solar generating facility to be located in Queen Anne's County, Maryland. At the IC's request, PJM studied the AD2-076 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 November 30, 2021. 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 AD2-076 project.

Primary Point of Interconnection

PJM studied the AD2-076 project as an injection into the Delmarva Power & Light Company (DPL) transmission system at the Centreville 69 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2021. Project AD2-076 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-076 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Transmission Owner Scope of Attachment Facilities Work

The AD2-076 project will connect with the DPL transmission system at the Centreville 69 kV Substation.

Substation Interconnection Estimate

Scope: Upgrade existing 69 kV substation to a 3-position ring bus. Two of the positions on the ring bus will be transmission line terminals for the tie-in of existing DPL Line 6710. The other position will be a terminal configured for the interconnection of the AD2-076 generation.

Estimate: \$4,100,000

Construction Time: 24-36 months

Major Equipment Included in Estimate:

- | | |
|--|--------|
| • Control Enclosure, 37' x 16' | Qty. 1 |
| • Power Circuit Breaker, 69 kV, 2000A, 40kA, 3 cycle | Qty. 3 |
| • Line Switch, 69 kV, 2000A, Manual, Quick Break Whips | Qty. 3 |
| • Disconnect Switch, 69 kV, 2000A, Manual Wormgear, Arcing Horns | Qty. 6 |
| • CT/VT Combination Units, 69 kV | Qty. 3 |

• CVT, 69 kV	Qty. 6
• Disconnect Switch Stand, High, 69 kV, Steel	Qty. 6
• CT/VT Stand, Three Phase, Low, 69 kV, Steel	Qty. 1
• CVT Stand, Three Phase, Low, 69 kV, Steel	Qty. 2
• SSVT, 69 kV/240-120 V	Qty. 1
• Relay Panel, Bus Line, FL/BU (20")	Qty. 3
• Control Panel, 69 kV Circuit Breaker (10")	Qty. 3
• Take-off structure, 69 kV	Qty. 3
• Bus Support Structure, 3 phase, 69 kV, Steel	Qty. 16
• 69 kV 4" SPS Al bus	Lot
• Control Wiring	Lot

Estimate Assumptions:

- No additional land will need to be purchased.
- Existing Ground grid and storm water management system is adequate.
- Existing distribution load will be removed from 69 kV Centreville substation.

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 (3 total).

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 112.15% to 112.86% (**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 12.35 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 128.4% to 133.96% (**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 19.33 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 113.5% to 119.06% (**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 19.33 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 124.46% to 130.02% (**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 19.33 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 109.59% to 115.15% (**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 19.33 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 134.89% to 140.45% (**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 19.33 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 120.02% to 125.58% (**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 19.33 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

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, it 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. Queue project AD2-004 is first to cause this overload.
- 2&3. To mitigate the (DP&L) CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements at Church Substation. The estimate to perform this work is **\$500,000** and will take approximately **24-36 months** to complete. Queue project AD2-004 is first to cause this overload.
- 4&5. To mitigate the (DP&L) MIDLTNTP-MT PLSNT 138 kV line (from bus 232106 to bus 232104 ckt 1) overload, it 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. Queue project AD2-004 is first to cause this overload.
- 6&7. To mitigate the (DP&L) TOWNSEND-MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload, it will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. It will also require substation reinforcements at Townsend & Middletown Tap Substation. The estimate to perform this work is **\$700,000** and will take approximately **36-48 months** to complete. Queue project AD2-004 is first to cause this overload.

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 106.67% to 107.44% (**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 11.58 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 109.66% to 110.22% (**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 9.59 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-MIDLTNTTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 99.84% to 105.01% (**DC power flow**) of its normal rating (273 MVA) for **non-contingency** condition. This project contributes approximately 14.11 MW to the thermal violation.
4. (DP&L - DP&L) The TOWNSEND-MIDLTNTTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 100.51% to 104.71% (**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 14.64 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

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 AD2-076 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 AD2-076 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 AD2-076 project.

Secondary Point of Interconnection

PJM studied the AD2-076 project into the Delmarva Power and Light (DPL) system as an injection at the proposed Carville 138kV substation (s1261) which is a tap of the Church to AB1-141 TAP 138 kV line in the DPL area. Project AD2-076 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD2-076 was studied with a commercial probability of 53%. Potential network impacts were as follows:

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 112.13% to 112.71% (**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 10.03 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 128.66% to 135.64% (**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 24.27 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 113.76% to 120.73% (**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 24.27 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 124.72% to 131.69% (**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 24.27 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 109.85% to 116.82% (**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 24.27 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 135.15% to 142.12% (**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 24.27 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 120.28% to 127.25% (**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 24.27 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

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 106.54% to 107.21% (**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 10.07 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 109.57% to 110.03% (**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 8.13 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 CHURCH-TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) loads from 94.67% to 100.56% (**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 20.52 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-MIDLTNTTP 138 kV line (from bus 232107 to bus 232106 ckt 1) loads from 100.57% to 106.46% (**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 20.52 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

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 112.15% to 112.86% (**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 12.35 MW to the thermal violation.

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	9.06
932162	AC2-023 E	6.59
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

<i>LTF</i>	<i>SANTEETLA</i>	<i>0.06</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.08</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.26</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.26</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.14</i>
<i>LTF</i>	<i>TVA</i>	<i>0.32</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.32</i>
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 128.4% to 133.96% (**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 19.33 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.2
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

<i>LTF</i>	<i>CHOCTAW</i>	<i>0.2</i>
<i>LTF</i>	<i>CLIFTY</i>	<i>1.32</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.77</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.16</i>
<i>232902</i>	<i>EASTMUNI</i>	<i>3.95</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.1</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.16</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.06</i>
<i>LTF</i>	<i>G-007</i>	<i>0.02</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.11</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.22</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.33</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.25</i>
<i>232910</i>	<i>NRG_G1</i>	<i>1.94</i>
<i>232911</i>	<i>NRG_G2</i>	<i>1.94</i>
<i>LTF</i>	<i>O-066</i>	<i>0.38</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.48</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.05</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.33</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.13</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.12</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.12</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.15</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.38</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.61</i>
<i>232919</i>	<i>VN10</i>	<i>0.59</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.9</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.9</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.9</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.9</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.8</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.35</i>
<i>910572</i>	<i>X3-008 E</i>	<i>3.05</i>
<i>910821</i>	<i>X3-066 C</i>	<i>0.18</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.57</i>
<i>913361</i>	<i>Y1-079 C</i>	<i>0.26</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.29</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.05</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.48</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.92</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>2.45</i>

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 124.46% to 130.02% (**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 19.33 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46

933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.2
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

<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.12</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.12</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.15</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.38</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.61</i>
<i>232919</i>	<i>VN10</i>	<i>0.59</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.9</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.9</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.9</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.9</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.8</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.35</i>
<i>910572</i>	<i>X3-008 E</i>	<i>3.05</i>
<i>910821</i>	<i>X3-066 C</i>	<i>0.18</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.57</i>
<i>913361</i>	<i>Y1-079 C</i>	<i>0.26</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.29</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.05</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.48</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.92</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>2.45</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.37</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.37</i>
<i>917581</i>	<i>Z2-097 C</i>	<i>0.31</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.69</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.34</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>18.74</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>3.96</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>11.42</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>32.54</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>11.6</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>33.07</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>0.76</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.32</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>5.88</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>2.74</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>5.88</i>
<i>930932</i>	<i>AB1-142 E</i>	<i>2.74</i>
<i>931111</i>	<i>AB1-162 C</i>	<i>2.67</i>
<i>931112</i>	<i>AB1-162 E</i>	<i>4.37</i>
<i>931261</i>	<i>AB1-176 C</i>	<i>1.43</i>

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 134.89% to 140.45% (**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 19.33 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O1	153.2
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

<i>LTF</i>	<i>CALDERWOOD</i>	<i>0.1</i>
<i>LTF</i>	<i>CANNELTON</i>	<i>0.06</i>
<i>LTF</i>	<i>CARR</i>	<i>0.06</i>
<i>LTF</i>	<i>CATAWBA</i>	<i>0.07</i>
<i>LTF</i>	<i>CELEVELAND</i>	<i>0.19</i>
<i>LTF</i>	<i>CHEOAH</i>	<i>0.09</i>
<i>LTF</i>	<i>CHILHOWEE</i>	<i>0.03</i>
<i>LTF</i>	<i>CHOCTAW</i>	<i>0.2</i>
<i>LTF</i>	<i>CLIFTY</i>	<i>1.32</i>
<i>LTF</i>	<i>COTTONWOOD</i>	<i>0.77</i>
<i>LTF</i>	<i>DEARBORN</i>	<i>0.16</i>
232902	<i>EASTMUNI</i>	<i>3.95</i>
<i>LTF</i>	<i>EDWARDS</i>	<i>0.1</i>
<i>LTF</i>	<i>ELMERSMITH</i>	<i>0.16</i>
<i>LTF</i>	<i>FARMERCITY</i>	<i>0.06</i>
<i>LTF</i>	<i>G-007</i>	<i>0.02</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.11</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.22</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.33</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.25</i>
232910	<i>NRG_G1</i>	<i>1.94</i>
232911	<i>NRG_G2</i>	<i>1.94</i>
<i>LTF</i>	<i>O-066</i>	<i>0.38</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>0.48</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.05</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.33</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.13</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.03</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.04</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.12</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.12</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.15</i>
904210	<i>V4-022C</i>	<i>0.38</i>
904212	<i>V4-022E</i>	<i>0.61</i>
232919	<i>VN10</i>	<i>0.59</i>
901004	<i>W1-003 E</i>	<i>0.9</i>
901014	<i>W1-004 E</i>	<i>0.9</i>
901024	<i>W1-005 E</i>	<i>0.9</i>
901034	<i>W1-006 E</i>	<i>0.9</i>
907052	<i>X1-032 E</i>	<i>0.8</i>
910571	<i>X3-008 C</i>	<i>0.35</i>
910572	<i>X3-008 E</i>	<i>3.05</i>
910821	<i>X3-066 C</i>	<i>0.18</i>

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

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 112.13% to 112.71% (**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 10.03 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	9.06
932162	AC2-023 E	6.59
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	3.81
936612	AD2-076 E O2	6.22
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

<i>LTF</i>	<i>FARMERCITY</i>	<i>0.14</i>
<i>LTF</i>	<i>G-007</i>	<i>0.5</i>
<i>232616</i>	<i>GEN FOOD</i>	<i>1.87</i>
<i>LTF</i>	<i>GIBSON</i>	<i>0.24</i>
<i>LTF</i>	<i>HAMLET</i>	<i>0.47</i>
<i>232904</i>	<i>IR4</i>	<i>27.86</i>
<i>LTF</i>	<i>MORGAN</i>	<i>0.71</i>
<i>232923</i>	<i>MR1</i>	<i>11.26</i>
<i>232924</i>	<i>MR2</i>	<i>11.26</i>
<i>232922</i>	<i>MR3</i>	<i>12.56</i>
<i>LTF</i>	<i>NEWTON</i>	<i>0.54</i>
<i>232901</i>	<i>NORTHST</i>	<i>5.54</i>
<i>LTF</i>	<i>O-066</i>	<i>3.1</i>
<i>LTF</i>	<i>PRAIRIE</i>	<i>1.05</i>
<i>LTF</i>	<i>RENSSELAER</i>	<i>0.12</i>
<i>LTF</i>	<i>ROSETON</i>	<i>0.88</i>
<i>LTF</i>	<i>ROWAN</i>	<i>0.28</i>
<i>LTF</i>	<i>SANTEETLA</i>	<i>0.06</i>
<i>LTF</i>	<i>SMITHLAND</i>	<i>0.08</i>
<i>LTF</i>	<i>TATANKA</i>	<i>0.26</i>
<i>LTF</i>	<i>TILTON</i>	<i>0.26</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.14</i>
<i>LTF</i>	<i>TVA</i>	<i>0.32</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.32</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.67</i>
<i>904212</i>	<i>V4-022E</i>	<i>1.09</i>
<i>901004</i>	<i>W1-003 E</i>	<i>1.59</i>
<i>901014</i>	<i>W1-004 E</i>	<i>1.59</i>
<i>901024</i>	<i>W1-005 E</i>	<i>1.59</i>
<i>901034</i>	<i>W1-006 E</i>	<i>1.59</i>
<i>907052</i>	<i>X1-032 E</i>	<i>1.4</i>
<i>910572</i>	<i>X3-008 E</i>	<i>4.03</i>
<i>910822</i>	<i>X3-066 E</i>	<i>0.88</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>1.66</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.7</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>3.19</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>4.34</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.72</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.72</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.3</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.59</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>32.4</i>
<i>919831</i>	<i>AA2-069</i>	<i>298.81</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>7.01</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>23.31</i>

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 128.66% to 135.64% (**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 24.27 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O2	154.02
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	9.22
936612	AD2-076 E O2	15.05
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 124.72% to 131.69% (**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 24.27 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932161	AC2-023 C	5.57
932162	AC2-023 E	4.05
933641	AC2-186 C	0.73
933642	AC2-186 E	1.19
933651	AC2-187 C	1.46
933652	AC2-187 E	2.38
933661	AC2-188 C	1.46
933662	AC2-188 E	2.38
935121	AD1-145	1.83
935131	AD1-146 C	0.68
935132	AD1-146 E	1.11
936021	AD2-004 O2	154.02
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	9.22
936612	AD2-076 E O2	15.05
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 135.15% to 142.12% (**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 24.27 MW to the thermal violation.

CONTINGENCY 'DPL_P7_1_DBL_1NCB_A'

/* #1 & #2 KEENEY-STEELE

230

OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1

OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2

END

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

935132	AD1-146 E	1.11
936021	AD2-004 O2	154.02
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	9.22
936612	AD2-076 E O2	15.05
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

<i>LTF</i>	<i>TILTON</i>	<i>0.12</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>0.06</i>
<i>LTF</i>	<i>TVA</i>	<i>0.14</i>
<i>LTF</i>	<i>UNIONPOWER</i>	<i>0.15</i>
<i>904210</i>	<i>V4-022C</i>	<i>0.38</i>
<i>904212</i>	<i>V4-022E</i>	<i>0.61</i>
<i>232919</i>	<i>VN10</i>	<i>0.59</i>
<i>901004</i>	<i>W1-003 E</i>	<i>0.9</i>
<i>901014</i>	<i>W1-004 E</i>	<i>0.9</i>
<i>901024</i>	<i>W1-005 E</i>	<i>0.9</i>
<i>901034</i>	<i>W1-006 E</i>	<i>0.9</i>
<i>907052</i>	<i>X1-032 E</i>	<i>0.8</i>
<i>910571</i>	<i>X3-008 C</i>	<i>0.35</i>
<i>910572</i>	<i>X3-008 E</i>	<i>3.05</i>
<i>910821</i>	<i>X3-066 C</i>	<i>0.18</i>
<i>910822</i>	<i>X3-066 E</i>	<i>1.57</i>
<i>913361</i>	<i>Y1-079 C</i>	<i>0.26</i>
<i>913362</i>	<i>Y1-079 E</i>	<i>2.29</i>
<i>913411</i>	<i>Y1-080 C</i>	<i>0.05</i>
<i>913412</i>	<i>Y1-080 E</i>	<i>0.48</i>
<i>915542</i>	<i>Y3-058 E</i>	<i>1.92</i>
<i>917082</i>	<i>Z2-012 E</i>	<i>2.45</i>
<i>917432</i>	<i>Z2-076 E</i>	<i>0.37</i>
<i>917442</i>	<i>Z2-077 E</i>	<i>0.37</i>
<i>917581</i>	<i>Z2-097 C</i>	<i>0.31</i>
<i>917582</i>	<i>Z2-097 E</i>	<i>0.69</i>
<i>918432</i>	<i>AA1-059 E</i>	<i>0.34</i>
<i>918832</i>	<i>AA1-102 E</i>	<i>18.74</i>
<i>920312</i>	<i>AA2-129 E</i>	<i>3.96</i>
<i>930201</i>	<i>AB1-056 C</i>	<i>11.42</i>
<i>930202</i>	<i>AB1-056 E</i>	<i>32.54</i>
<i>930211</i>	<i>AB1-057 C</i>	<i>11.6</i>
<i>930212</i>	<i>AB1-057 E</i>	<i>33.07</i>
<i>930881</i>	<i>AB1-137 C</i>	<i>0.76</i>
<i>930882</i>	<i>AB1-137 E</i>	<i>0.32</i>
<i>930921</i>	<i>AB1-141 C</i>	<i>5.88</i>
<i>930922</i>	<i>AB1-141 E</i>	<i>2.74</i>
<i>930931</i>	<i>AB1-142 C</i>	<i>5.88</i>
<i>930932</i>	<i>AB1-142 E</i>	<i>2.74</i>
<i>931111</i>	<i>AB1-162 C</i>	<i>2.67</i>
<i>931112</i>	<i>AB1-162 E</i>	<i>4.37</i>
<i>931261</i>	<i>AB1-176 C</i>	<i>1.43</i>
<i>931262</i>	<i>AB1-176 E</i>	<i>2.36</i>
<i>923921</i>	<i>AB2-032 C</i>	<i>5.92</i>
<i>923922</i>	<i>AB2-032 E</i>	<i>2.79</i>

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

<i>927321</i>	<i>AC1-229 C</i>	<i>0.68</i>
<i>927322</i>	<i>AC1-229 E</i>	<i>1.1</i>