

Generation Interconnection Feasibility Study Report Queue Position AC2-189

The Interconnection Customer (IC), has proposed an 11.6 MW (10.3 MW Capacity) mixed technology generating facility to be located in Crisfield, Maryland. The AC2-189 project will consist of a 9.6 MW biogas fueled reciprocating engine facility along with a 2 MW solar facility. At the IC's request, PJM studied the AC2-189 project at both a Primary and Secondary Point of Interconnection. The study results are provided below. The planned in-service date, as requested by the IC during the project kick-off call, is December 31, 2018. This date may not be not 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 AC2-189 project.

Primary Point of Interconnection

PJM studied the AC2-189 project as an injection into the Delmarva Power and Light Company (DPL) transmission system at the Crisfield 69 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2020. The AC2-189 project will connect with the DPL transmission system at a new 69 kV line terminal to be constructed at the Crisfield 69 kV Substation.

Transmission Owner Scope of Attachment Facilities Work

Substation Interconnection Estimate

Scope: Build a new 69 kV terminal off of the Crisfield 69 kV Substation. The new position will be connected to a generator. The project will require the addition of a 69kV breaker, 3 disconnect switches, 3 CT/VT combination unites, and substation bus.

Estimate: \$2,382,000

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. 3
- CT/VT Combination Units, 69 kV Qty. 3
- Disconnect Switch Stand, High, 69 kV, Steel Qty. 1
- Disconnect Switch Stand, Low, 69 kV, Steel Qty. 2
- CT/VT Stand, Single Phase, Low, 69 kV, Steel Qty. 3
- Relay Panel, Transmission Line, FL/BU (20") Qty. 1
- Control Panel, 69 kV Circuit Breaker (10") Qty. 1
- Bus Support Structure, 3 phase, 69 kV, Steel Qty. 3

Estimate Assumptions:

- Permitting will be performed by the Interconnection Customer

Required Relaying and Communications

New protection relays are required for the new terminal. An SEL-487 will be required for primary protection and an SEL-387 will be required for back-up protection. One 20” relay panel 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 the new 69 kV circuit breaker.

The cost of the required relay and communications is included in the Substation Interconnection Estimate.

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 - 2020

System Reinforcement responsible by Transmission Owner

Existing Supplement Projects

1. (DP&L - DP&L) The PEMBERTN-NSALSBRV 69 kV line (from bus 232273 to bus 232271 ckt 1) loads from 99.34% to 103.5% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

PJM supplemental project (s0832) will eliminate the identified overload. The scheduled in service date is 12/31/2017.

2. (DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 129.89% to 132.22% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

To mitigate the overload, will require increasing the emergency rating of the Hebron to Mardela 69 kV line by rebuilding that section of the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimated cost to perform this work is \$2,894,000 and will take 44-48 months to complete.

Note: There is a supplemental project (s0835) in place to upgrade this entire circuit 6708 from Vienna to N Salisbury (which includes Hebron to Mardela). Total cost of the entire project is approximately \$21.1M. Expected ISD is 12/31/2023.

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

3. (DP&L - DP&L) The FRUITLND-PEMBERTN 69 kV line (from bus 232288 to bus 232273 ckt 1) loads from 126.48% to 130.64% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

PJM supplemental project (s0820) will eliminate the identified overload. The scheduled in service date is 12/31/2017.

4. (DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 124.45% to 126.79% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

To mitigate the overload, it will require increasing the emergency rating of the Rockawalkin to Hebron 69 kV line by rebuilding that section of the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimated cost to perform this work is \$3,424,000 and will take 44-48 months to complete.

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

5. (DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 122.03% to 124.37% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

To mitigate the overload, it will require increasing the emergency rating of the Mardela to Vienna 69 kV line by rebuilding that section of the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimated cost to perform this work is \$9,626,000 and will take 44-48 months to complete.

Note: There is a supplemental project (s0835) in place to upgrade this entire circuit 6708 from Vienna to N Salisbury (which includes Mardela to Vienna). Total cost of the entire project is approximately \$21.1M. Expected ISD is 12/31/2023.

6. (DP&L - DP&L) The NSALSBRY-ROCKAWLKN 69 kV line (from bus 232271 to bus 232291 ckt 1) loads from 110.72% to 113.29% (DC power flow) of its emergency rating (58 MVA) for

the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

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

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

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 WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) loads from 57.99% to 100.9% (DC power flow) of its normal rating (24 MVA) for non-contingency condition. This project contributes approximately 10.3 MW to the thermal violation.

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

Multiple Facility Contingency

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

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 - DP&L) The LORETTO 138/69 kV transformer (from bus 232127 to bus 232275 ckt 1) loads from 111.19% to 114.01% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

2. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 163.29% to 164.79% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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 4 for a table containing the generators having contribution to this flowgate.

3. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 102.63% to 103.13% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP12'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '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 232005 CKT 1/*STEELE VIENNA
230 230
END

4. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 169.31% to 170.81% (DC power flow) of its emergency rating (93 MVA) for the line fault

with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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.

5. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 108.65% to 109.15% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP12'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '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 232005 CKT 1/*STEELE VIENNA
230 230
END

6. (DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 117.23% to 118.47% (DC power flow) of its emergency rating (174 MVA) for the line fault with failed breaker contingency outage of 'DP15'. This project contributes approximately 2.16 MW to the thermal violation.

CONTINGENCY 'DP15'/*INDIAN RIVER BUS BREAKER TO PINEY GROVE
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232006 CKT 1/*PINEY GR INDRIV 4
230 230
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1/*PINEY GR PINEY
GR 230 138
DISCONNECT BRANCH FROM BUS 232006 TO BUS 232004 CKT 1/*MILFORD INDIAN
RIVER 230 230
END

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

7. (DP&L - DP&L) The LORET_69-FRUITLND 69 kV line (from bus 232275 to bus 232288 ckt 1) loads from 114.23% to 117.0% (DC power flow) of its emergency rating (137 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

Summer Peak Load Flow Analysis Reinforcements

New System Reinforcements

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

1. To mitigate the (DP&L) WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) overload will require increasing the emergency rating of the Westover – Kings Creek 69 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. The estimated cost to perform this work is \$4,620,000 and will take 44-48 months to complete.

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) LORETTO 138/69 kV transformer (from bus 232127 to bus 232275 ckt 1) overload will require replacement of the Loretto AT1 autotransformer, which requires the reconfiguration of the 138 kV and 69 kV buses at Loretto Substation. The estimated cost to perform this work is **\$4,377,000** and will take **24 months** to complete.
2. To mitigate the (DP&L) PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) overload will require replacement of a disconnect switch at Preston Substation. The estimated cost to perform this work is **\$36,000** and will take **12 months** to complete.
3. To mitigate the (DP&L) PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) overload will require the same mitigation as Contribution to Previously Identified System Reinforcement #2 above.
4. To mitigate the (DP&L) TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require substation reinforcements at Preston Substation and Todd Substations. The estimated cost to perform this work is **\$67,000** and will take approximately **12 months** to complete.

5. To mitigate the (DP&L) TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) overload will require the same mitigation as Contribution to Previously Identified System Reinforcement #4 above.
6. To mitigate the (DP&L) PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) overload will require the rebuild of the Piney Grove – Mount Hermon 69 kV transmission line and substation reinforcements at Piney Grove Substation and Mount Hermon Substation. The estimated cost to perform this work is **\$9,688,000** and will take **36 months** to complete.
7. To mitigate the (DP&L) LORET_69-FRUITLND 69 kV line (from bus 232275 to bus 232288 ckt 1) overload will require the rebuild of the Loretto – Fruitland 69 kV transmission line and substation reinforcements at Loretto Substation and Fruitland Substation. The estimated cost to perform the work is \$7,196,000 and will take 36 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 - 2020

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

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 - DP&L) The PINEY138-LORETTO 138 kV line (from bus 232128 to bus 232127 ckt 1) loads from 126.79% to 129.08% (DC power flow) of its emergency rating (159 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 3.64 MW to the thermal violation.

CONTINGENCY 'CKT 13713'

OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1 /KINGS CREEK - LORETTO
138
END

2. (DP&L - DP&L) The KINGS CK-LORETTO 138 kV line (from bus 232129 to bus 232127 ckt 1) loads from 97.5% to 100.14% (DC power flow) of its emergency rating (351 MVA) for the single line contingency outage of 'CKT 13764_B'. This project contributes approximately 9.29 MW to the thermal violation.

CONTINGENCY 'CKT 13764_B'
OPEN LINE FROM BUS 924680 TO BUS 232128 CIRCUIT 1/AB2-120 TAP - PINEY
GROVE 138
END

3. (DP&L - DP&L) The N_CHURCH-AB2-120 TAP 138 kV line (from bus 232131 to bus 924680 ckt 1) loads from 120.43% to 123.08% (DC power flow) of its emergency rating (226 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 5.98 MW to the thermal violation.

CONTINGENCY 'CKT 13713'
OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1/KINGS CREEK - LORETTO
138
END

4. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 101.74% to 102.24% (DC power flow) of its emergency rating (93 MVA) for the single line contingency outage of '23085 &13710'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '23085 &13710'
DISCONNECT BUS 232005/STEELE - VIENNA 230 & VIENNA AT20
DISCONNECT BUS 232116/VIENNA XFMR - VIENNA 138
END

5. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 107.76% to 108.26% (DC power flow) of its emergency rating (93 MVA) for the single line contingency outage of '23085 &13710'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '23085 &13710'
DISCONNECT BUS 232005/STEELE - VIENNA 230 & VIENNA AT20
DISCONNECT BUS 232116/VIENNA XFMR - VIENNA 138
END

6. (DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 111.05% to 112.96% (DC power flow) of its emergency rating (64 MVA) for the

single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'

OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138

END

7. (DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 116.87% to 118.12% (DC power flow) of its emergency rating (174 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 2.18 MW to the thermal violation.

CONTINGENCY 'CKT 23002'

DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20

XFMR

END

8. (DP&L - DP&L) The KINGS CK 138/69 kV transformer (from bus 232276 to bus 232129 ckt 1) loads from 184.07% to 203.73% (DC power flow) of its normal rating (59 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.
9. (DP&L - DP&L) The FRUITLND-PEMBERTN 69 kV line (from bus 232288 to bus 232273 ckt 1) loads from 102.47% to 104.67% (DC power flow) of its emergency rating (91 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'CKT 13780'

OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138

END

10. (DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 106.24% to 108.14% (DC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'

OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138

END

11. (DP&L - DP&L) The SHORT 1-LAUREL 69 kV line (from bus 232828 to bus 232249 ckt 1) loads from 117.06% to 117.94% (DC power flow) of its emergency rating (57 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 1.12 MW to the thermal violation.

CONTINGENCY 'CKT 23002'

DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20
XFMER
END

12. (DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 103.02% to 104.92% (DC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'
OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138
END

13. (DP&L - DP&L) The WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) loads from 452.51% to 500.83% (DC power flow) of its normal rating (24 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.
14. (DP&L - DP&L) The X1-096 TAP-WESTOVER 69 kV line (from bus 907322 to bus 232842 ckt 1) loads from 290.0% to 320.53% (DC power flow) of its normal rating (38 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.
15. (DP&L - DP&L) The AB2-120 TAP-PINEY138 138 kV line (from bus 924680 to bus 232128 ckt 1) loads from 147.51% to 150.16% (DC power flow) of its emergency rating (226 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 5.98 MW to the thermal violation.

CONTINGENCY 'CKT 13713'
OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1/KINGS CREEK - LORETTO
138
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 AC2-189 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 AC2-188 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 AC2-189 project.

Secondary Point of Interconnection

PJM studied the AC2-189 project into the Delmarva Power and Light (DPL) system as a direct connection into the Crisfield 24.9 kV Substation and evaluated it for compliance with reliability criteria for summer peak conditions in 2020.

Summer Peak Analysis - 2020

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 WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) loads from 58.0% to 100.91% (DC power flow) of its normal rating (24 MVA) for non-contingency condition. This project contributes approximately 10.3 MW to the thermal violation.

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

Multiple Facility Contingency

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

1. (DP&L - DP&L) The PEMBERTN-NSALSBRY 69 kV line (from bus 232273 to bus 232271 ckt 1) loads from 99.35% to 103.51% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

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 - DP&L) The LORETTO 138/69 kV transformer (from bus 232127 to bus 232275 ckt 1) loads from 111.2% to 114.01% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY GROVE 138 138
END

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

2. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 163.29% to 164.79% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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 4 for a table containing the generators having contribution to this flowgate.

3. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 102.63% to 103.14% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP12'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '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 232005 CKT 1/*STEELE VIENNA
230 230
END

4. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 169.21% to 170.71% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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.

5. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 108.65% to 109.16% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP12'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '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 232005 CKT 1/*STEELE VIENNA
230 230
END

6. (DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 129.9% to 132.23% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

7. (DP&L - DP&L) The NSALSBRYPY-ROCKAWLKN 69 kV line (from bus 232271 to bus 232291 ckt 1) loads from 110.73% to 113.31% (DC power flow) of its emergency rating (58 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

8. (DP&L - DP&L) The NSALSBRV-WALSTN S 69 kV line (from bus 232271 to bus 232841 ckt 1) loads from 112.27% to 112.95% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP59_A'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'DP59_A'/*PINEY GROVE BUS BREAKER
DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1/*NEW CHURCH 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 8 for a table containing the generators having contribution to this flowgate.

9. (DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 117.23% to 118.48% (DC power flow) of its emergency rating (174 MVA) for the line fault with failed breaker contingency outage of 'DP15'. This project contributes approximately 2.16 MW to the thermal violation.

CONTINGENCY 'DP15'/*INDIAN RIVER BUS BREAKER TO PINEY GROVE
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232006 CKT 1/*PINEY GR INDRIV 4 230 230
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1/*PINEY GR PINEY GR 230 138
DISCONNECT BRANCH FROM BUS 232006 TO BUS 232004 CKT 1/*MILFORD INDIAN RIVER 230 230
END

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

10. (DP&L - DP&L) The LORET_69-FRUITLND 69 kV line (from bus 232275 to bus 232288 ckt 1) loads from 114.24% to 117.0% (DC power flow) of its emergency rating (137 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY GROVE 138 138
END

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

11. (DP&L - DP&L) The FRUITLND-PEMBERTN 69 kV line (from bus 232288 to bus 232273 ckt 1) loads from 126.5% to 130.65% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

12. (DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 124.46% to 126.8% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

13. (DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 122.04% to 124.38% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'/*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1/*LORETTO VIENNA
138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1/*LORETTO PINEY
GROVE 138 138
END

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

14. (DP&L - DP&L) The WALSTN S-NEW HOPE 69 kV line (from bus 232841 to bus 232834 ckt 1) loads from 103.54% to 104.22% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP59_A'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'DP59_A' /*PINEY GROVE BUS BREAKER
DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1/*NEW CHURCH 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 14 for a table containing the generators having contribution to this flowgate.

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 - DP&L) The PINEY138-LORETTO 138 kV line (from bus 232128 to bus 232127 ckt 1) loads from 126.8% to 129.09% (DC power flow) of its emergency rating (159 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 3.64 MW to the thermal violation.

CONTINGENCY 'CKT 13713'
OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1 /KINGS CREEK - LORETTO
138
END

2. (DP&L - DP&L) The KINGS CK-LORETTO 138 kV line (from bus 232129 to bus 232127 ckt 1) loads from 97.48% to 100.12% (DC power flow) of its emergency rating (351 MVA) for the single line contingency outage of 'CKT 13764_B'. This project contributes approximately 9.29 MW to the thermal violation.

CONTINGENCY 'CKT 13764_B'
OPEN LINE FROM BUS 924680 TO BUS 232128 CIRCUIT 1/AB2-120 TAP - PINEY
GROVE 138
END

3. (DP&L - DP&L) The N_CHURCH-AB2-120 TAP 138 kV line (from bus 232131 to bus 924680 ckt 1) loads from 120.44% to 123.09% (DC power flow) of its emergency rating (226 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 5.98 MW to the thermal violation.

CONTINGENCY 'CKT 13713'

OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1/KINGS CREEK - LORETTO
138
END

4. (DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 101.74% to 102.25% (DC power flow) of its emergency rating (93 MVA) for the single line contingency outage of '23085 &13710'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '23085 &13710'

DISCONNECT BUS 232005/STEELE - VIENNA 230 & VIENNA AT20
DISCONNECT BUS 232116 /VIENNA XFMR - VIENNA 138
END

5. (DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 107.76% to 108.27% (DC power flow) of its emergency rating (93 MVA) for the single line contingency outage of '23085 &13710'. This project contributes approximately 1.04 MW to the thermal violation.

CONTINGENCY '23085 &13710'

DISCONNECT BUS 232005/STEELE - VIENNA 230 & VIENNA AT20
DISCONNECT BUS 232116/VIENNA XFMR - VIENNA 138
END

6. (DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 110.9% to 112.8% (DC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'

OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138
END

7. (DP&L - DP&L) The NSALSBRYS-WALSTON S 69 kV line (from bus 232271 to bus 232841 ckt 1) loads from 110.49% to 111.17% (DC power flow) of its emergency rating (71 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'CKT 23002'

DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20
XFMER
END

8. (DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 116.88% to 118.13% (DC power flow) of its emergency rating (174 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 2.18 MW to the thermal violation.

CONTINGENCY 'CKT 23002'
DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20
XFMER
END

9. (DP&L - DP&L) The KINGS CK 138/69 kV transformer (from bus 232276 to bus 232129 ckt 1) loads from 184.08% to 203.73% (DC power flow) of its normal rating (59 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.
10. (DP&L - DP&L) The FRUITLND-PEMBERTN 69 kV line (from bus 232288 to bus 232273 ckt 1) loads from 102.48% to 104.68% (DC power flow) of its emergency rating (91 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'CKT 13780'
OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138
END

11. (DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 106.24% to 108.14% (DC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'
OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138
END

12. (DP&L - DP&L) The SHORT 1-LAUREL 69 kV line (from bus 232828 to bus 232249 ckt 1) loads from 117.07% to 117.95% (DC power flow) of its emergency rating (57 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 1.12 MW to the thermal violation.

CONTINGENCY 'CKT 23002'
DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20
XFMER
END

13. (DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 103.02% to 104.92% (DC power flow) of its emergency rating (64 MVA) for the single line contingency outage of 'CKT 13780'. This project contributes approximately 1.22 MW to the thermal violation.

CONTINGENCY 'CKT 13780'

OPEN LINE FROM BUS 232127 TO BUS 232117 CIRCUIT 1/LORETTO - VIENNA 138
END

14. (DP&L - DP&L) The WALSTN S-NEW HOPE 69 kV line (from bus 232841 to bus 232834 ckt 1) loads from 101.75% to 102.44% (DC power flow) of its emergency rating (71 MVA) for the single line contingency outage of 'CKT 23002'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'CKT 23002'

DISCONNECT BUS 232007/INDIAN RIVER - PINEY GROVE 230 & PNY GRV AT-20
XFMR
END

15. (DP&L - DP&L) The WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) loads from 452.52% to 500.85% (DC power flow) of its normal rating (24 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.

16. (DP&L - DP&L) The X1-096 TAP-WESTOVER 69 kV line (from bus 907322 to bus 232842 ckt 1) loads from 290.01% to 320.53% (DC power flow) of its normal rating (38 MVA) for non-contingency condition. This project contributes approximately 11.6 MW to the thermal violation.

17. (DP&L - DP&L) The AB2-120 TAP-PINEY138 138 kV line (from bus 924680 to bus 232128 ckt 1) loads from 147.53% to 150.17% (DC power flow) of its emergency rating (226 MVA) for the single line contingency outage of 'CKT 13713'. This project contributes approximately 5.98 MW to the thermal violation.

CONTINGENCY 'CKT 13713'

OPEN LINE FROM BUS 232129 TO BUS 232127 CIRCUIT 1/KINGS CREEK - LORETTO
138
END

| | | |
|--------|-------------|--------|
| 932672 | AC2-189 E O | 0.42 |
| 232905 | BAYVIEW1 | 0.35 |
| 232926 | CRISFLD1 | 0.53 |
| 232912 | OH NUG1 | 1.27 |
| 232913 | OH NUG2 | 1.25 |
| 232914 | OH NUG3 | 1.27 |
| 232915 | OH NUG4 | 1.27 |
| 232916 | OH NUG5 | 1.27 |
| 232917 | OH NUG6 | 1.26 |
| 232918 | OH NUG7 | 1.26 |
| 232921 | TASLEY2G | 0.87 |
| 904210 | V4-022 C | 0.05 |
| 904212 | V4-022 E | 0.54 |
| 901003 | W1-003 C | 0.08 |
| 901004 | W1-003 E | 0.82 |
| 901013 | W1-004 C | 0.08 |
| 901014 | W1-004 E | 0.82 |
| 901023 | W1-005 C | 0.08 |
| 901024 | W1-005 E | 0.82 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.82 |
| 907052 | X1-032 E | 1.1 |
| 907323 | X1-096 C | 1.04 |
| 907324 | X1-096 E | 30.34 |
| 920582 | Z1-076 C | 0.67 |
| 920583 | Z1-076 E | 1.09 |
| 920592 | Z1-077 C | 0.48 |
| 920593 | Z1-077 E | 0.78 |
| 916441 | Z1-100 | 0.12 |
| 916451 | Z1-101 | 0.12 |
| 916461 | Z1-102 | 0.12 |
| 920602 | Z1-103 | 0.12 |
| 917081 | Z2-012 C | 0.22 |
| 917082 | Z2-012 E | 2.15 |
| 920952 | AA1-025 | 0.11 |
| 920962 | AA1-026 | 0.11 |
| 920972 | AA1-027 | 0.11 |
| 920982 | AA1-028 | 0.11 |
| 921122 | AA1-059 C | 1.4 |
| 921123 | AA1-059 E | 0.55 |
| 918831 | AA1-102 | 2. |
| 921602 | AA1-141 C | 0.52 |
| 921603 | AA1-141 E | 0.85 |
| 922213 | AA2-129 E | 3.46 |
| 922222 | AA2-130 | 0.65 |

| | | |
|--------|--------------|------|
| 923902 | AB2-030 E | 0.69 |
| 923931 | AB2-033 C | 1.24 |
| 923932 | AB2-033 E | 0.49 |
| 924361 | AB2-084 C | 1.04 |
| 924362 | AB2-084 E | 1.7 |
| 924681 | AB2-120 C OP | 6.05 |
| 924682 | AB2-120 E OP | 9.88 |
| 925101 | AB2-167 C | 0.66 |
| 925102 | AB2-167 E | 1.09 |
| 925231 | AB2-177 C | 0.23 |
| 925232 | AB2-177 E | 0.38 |
| 925381 | AC1-009 C | 1.32 |
| 925382 | AC1-009 E | 2.15 |
| 925651 | AC1-041 C | 0.12 |
| 925652 | AC1-041 E | 0.2 |
| 925761 | AC1-052 C | 1.73 |
| 925762 | AC1-052 E | 0.69 |
| 926911 | AC1-177 | 1.31 |

Appendix 3

(DP&L - DP&L) The LORETTO 138/69 kV transformer (from bus 232127 to bus 232275 ckt 1) loads from 111.19% to 114.01% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 932671 | AC2-189 C1 O | 0.12 |
| 932673 | AC2-189 C2 O | 1.66 |
| 932672 | AC2-189 E O | 0.22 |
| 232926 | CRISFLD1 | 0.28 |
| 904212 | V4-022 E | 0.28 |
| 901004 | W1-003 E | 0.43 |
| 901014 | W1-004 E | 0.43 |
| 901024 | W1-005 E | 0.43 |
| 901034 | W1-006 E | 0.43 |
| 907052 | X1-032 E | 0.58 |
| 907323 | X1-096 C | 0.55 |
| 907324 | X1-096 E | 16.04 |

| | | |
|--------|------------------|--------|
| 232926 | <i>CRISFLDI</i> | 0.2 |
| 293670 | <i>O-025 C</i> | 0.13 |
| 297076 | <i>V2-028 C</i> | 0.08 |
| 297077 | <i>V2-028 E</i> | 0.81 |
| 904212 | <i>V4-022 E</i> | 0.36 |
| 232919 | <i>VN10</i> | 0.51 |
| 232907 | <i>VN8</i> | 3.71 |
| 901003 | <i>W1-003 C</i> | 0.05 |
| 901004 | <i>W1-003 E</i> | 0.52 |
| 901013 | <i>W1-004 C</i> | 0.05 |
| 901014 | <i>W1-004 E</i> | 0.52 |
| 901023 | <i>W1-005 C</i> | 0.05 |
| 901024 | <i>W1-005 E</i> | 0.52 |
| 901033 | <i>W1-006 C</i> | < 0.01 |
| 901034 | <i>W1-006 E</i> | 0.52 |
| 907052 | <i>X1-032 E</i> | 0.47 |
| 907323 | <i>X1-096 C</i> | 0.38 |
| 907324 | <i>X1-096 E</i> | 11.19 |
| 910571 | <i>X3-008 C</i> | 0.48 |
| 910572 | <i>X3-008 E</i> | 4.78 |
| 910591 | <i>X3-015 C</i> | 0.34 |
| 910592 | <i>X3-015 E</i> | 3.43 |
| 913411 | <i>Y1-080 C</i> | 0.06 |
| 913412 | <i>Y1-080 E</i> | 0.56 |
| 915541 | <i>Y3-058 C</i> | 0.14 |
| 915542 | <i>Y3-058 E</i> | 1.43 |
| 920582 | <i>Z1-076 C</i> | 0.61 |
| 920583 | <i>Z1-076 E</i> | 0.99 |
| 920592 | <i>Z1-077 C</i> | 0.44 |
| 920593 | <i>Z1-077 E</i> | 0.71 |
| 916441 | <i>Z1-100</i> | 0.08 |
| 916451 | <i>Z1-101</i> | 0.08 |
| 916461 | <i>Z1-102</i> | 0.08 |
| 920602 | <i>Z1-103</i> | 0.08 |
| 917082 | <i>Z2-012 E</i> | 1.42 |
| 920763 | <i>Z2-076 E</i> | 0.18 |
| 920773 | <i>Z2-077 E</i> | 0.18 |
| 920952 | <i>AA1-025</i> | 0.07 |
| 920962 | <i>AA1-026</i> | 0.07 |
| 920972 | <i>AA1-027</i> | 0.07 |
| 920982 | <i>AA1-028</i> | 0.07 |
| 921122 | <i>AA1-059 C</i> | 0.52 |
| 921123 | <i>AA1-059 E</i> | 0.2 |
| 921142 | <i>AA1-061 C</i> | 4.87 |
| 921143 | <i>AA1-061 E</i> | 2.4 |

| | | |
|--------|--------------|-------|
| 918831 | AA1-102 | 0.74 |
| 921592 | AA1-140 C | 0.67 |
| 921593 | AA1-140 E | 1.1 |
| 921602 | AA1-141 C | 0.65 |
| 921603 | AA1-141 E | 1.07 |
| 922213 | AA2-129 E | 2.29 |
| 922222 | AA2-130 | 0.24 |
| 922752 | AB1-056 C OP | 4.91 |
| 922753 | AB1-056 E OP | 13.99 |
| 922762 | AB1-057 C | 4.99 |
| 922763 | AB1-057 E | 14.22 |
| 923282 | AB1-137 C | 0.34 |
| 923283 | AB1-137 E | 0.15 |
| 923902 | AB2-030 E | 0.46 |
| 923931 | AB2-033 C | 0.82 |
| 923932 | AB2-033 E | 0.33 |
| 924361 | AB2-084 C | 0.45 |
| 924362 | AB2-084 E | 0.73 |
| 924681 | AB2-120 C OP | 4.32 |
| 924682 | AB2-120 E OP | 7.05 |
| 924781 | AB2-130 C OP | 3.88 |
| 924782 | AB2-130 E OP | 6.34 |
| 924831 | AB2-136 C OP | 7.47 |
| 924832 | AB2-136 E OP | 7.92 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.45 |
| 925101 | AB2-167 C | 0.61 |
| 925102 | AB2-167 E | 1. |
| 925151 | AB2-172 C OP | 7.33 |
| 925152 | AB2-172 E OP | 11.95 |
| 925231 | AB2-177 C | 0.29 |
| 925232 | AB2-177 E | 0.47 |
| 925261 | AB2-180 C | 2.15 |
| 925262 | AB2-180 E | 0.92 |
| 925381 | AC1-009 C | 0.87 |
| 925382 | AC1-009 E | 1.42 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.36 |
| 925731 | AC1-049 C | 0.13 |
| 925732 | AC1-049 E | 0.22 |
| 925741 | AC1-050 C | 0.35 |
| 925742 | AC1-050 E | 0.58 |
| 925761 | AC1-052 C | 1.15 |
| 925762 | AC1-052 E | 0.46 |
| 926911 | AC1-177 | 0.48 |

| | | |
|--------|-----------|-------|
| 927031 | AC1-190 C | 12.97 |
| 927032 | AC1-190 E | 5.56 |
| 927191 | AC1-213 C | 0.47 |
| 927192 | AC1-213 E | 0.24 |
| 927311 | AC1-228 C | 0.42 |
| 927312 | AC1-228 E | 0.73 |
| 927321 | AC1-229 C | 0.31 |
| 927322 | AC1-229 E | 0.5 |

Appendix 5

(DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 169.31% to 170.81% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 4.44 |
| 931162 | AC2-023 E | 8.39 |
| 932671 | AC2-189 C1 O | 0.08 |
| 932673 | AC2-189 C2 O | 1.15 |
| 932672 | AC2-189 E O | 0.16 |
| 932691 | AC2-191 | 1.7 |
| 232926 | CRISFLD1 | 0.2 |
| 293670 | O-025 C | 0.13 |
| 297076 | V2-028 C | 0.08 |
| 297077 | V2-028 E | 0.81 |
| 904212 | V4-022 E | 0.36 |
| 232919 | VN10 | 0.51 |
| 232907 | VN8 | 3.71 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.52 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.52 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.52 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.52 |
| 907052 | X1-032 E | 0.47 |

| | | |
|--------|--------------|-------|
| 907323 | X1-096 C | 0.38 |
| 907324 | X1-096 E | 11.19 |
| 910571 | X3-008 C | 0.48 |
| 910572 | X3-008 E | 4.78 |
| 910591 | X3-015 C | 0.34 |
| 910592 | X3-015 E | 3.43 |
| 913411 | Y1-080 C | 0.06 |
| 913412 | Y1-080 E | 0.56 |
| 915541 | Y3-058 C | 0.14 |
| 915542 | Y3-058 E | 1.43 |
| 920582 | Z1-076 C | 0.61 |
| 920583 | Z1-076 E | 0.99 |
| 920592 | Z1-077 C | 0.44 |
| 920593 | Z1-077 E | 0.71 |
| 916441 | Z1-100 | 0.08 |
| 916451 | Z1-101 | 0.08 |
| 916461 | Z1-102 | 0.08 |
| 920602 | Z1-103 | 0.08 |
| 917082 | Z2-012 E | 1.42 |
| 920763 | Z2-076 E | 0.18 |
| 920773 | Z2-077 E | 0.18 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.52 |
| 921123 | AA1-059 E | 0.2 |
| 921142 | AA1-061 C | 4.87 |
| 921143 | AA1-061 E | 2.4 |
| 918831 | AA1-102 | 0.74 |
| 921592 | AA1-140 C | 0.67 |
| 921593 | AA1-140 E | 1.1 |
| 921602 | AA1-141 C | 0.65 |
| 921603 | AA1-141 E | 1.07 |
| 922213 | AA2-129 E | 2.29 |
| 922222 | AA2-130 | 0.24 |
| 922752 | AB1-056 C OP | 4.91 |
| 922753 | AB1-056 E OP | 13.99 |
| 922762 | AB1-057 C | 4.99 |
| 922763 | AB1-057 E | 14.22 |
| 923282 | AB1-137 C | 0.34 |
| 923283 | AB1-137 E | 0.15 |
| 923902 | AB2-030 E | 0.46 |
| 923931 | AB2-033 C | 0.82 |
| 923932 | AB2-033 E | 0.33 |

| | | |
|--------|--------------|-------|
| 924361 | AB2-084 C | 0.45 |
| 924362 | AB2-084 E | 0.73 |
| 924681 | AB2-120 C OP | 4.32 |
| 924682 | AB2-120 E OP | 7.05 |
| 924781 | AB2-130 C OP | 3.88 |
| 924782 | AB2-130 E OP | 6.34 |
| 924831 | AB2-136 C OP | 7.47 |
| 924832 | AB2-136 E OP | 7.92 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.45 |
| 925101 | AB2-167 C | 0.61 |
| 925102 | AB2-167 E | 1. |
| 925151 | AB2-172 C OP | 7.33 |
| 925152 | AB2-172 E OP | 11.95 |
| 925231 | AB2-177 C | 0.29 |
| 925232 | AB2-177 E | 0.47 |
| 925261 | AB2-180 C | 2.15 |
| 925262 | AB2-180 E | 0.92 |
| 925381 | AC1-009 C | 0.87 |
| 925382 | AC1-009 E | 1.42 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.36 |
| 925731 | AC1-049 C | 0.13 |
| 925732 | AC1-049 E | 0.22 |
| 925741 | AC1-050 C | 0.35 |
| 925742 | AC1-050 E | 0.58 |
| 925761 | AC1-052 C | 1.15 |
| 925762 | AC1-052 E | 0.46 |
| 926911 | AC1-177 | 0.48 |
| 927031 | AC1-190 C | 12.97 |
| 927032 | AC1-190 E | 5.56 |
| 927191 | AC1-213 C | 0.47 |
| 927192 | AC1-213 E | 0.24 |
| 927311 | AC1-228 C | 0.42 |
| 927312 | AC1-228 E | 0.73 |
| 927321 | AC1-229 C | 0.31 |
| 927322 | AC1-229 E | 0.5 |

Appendix 6

(DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 129.89% to 132.22% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'

/*LORETTO BUS BREAKER

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1
VIENNA 138 1380

/*LORETTO

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1
PINEY GROVE 138 138

/*LORETTO

END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 12.13 |
| 931162 | AC2-023 E | 22.88 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |
| 915542 | Y3-058 E | 3.31 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |

| | | |
|--------|--------------|------|
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 7

(DP&L - DP&L) The NSALSBRY-ROCKAWLKN 69 kV line (from bus 232271 to bus 232291 ckt 1) loads from 110.72% to 113.29% (DC power flow) of its emergency rating (58 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
 DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
 VIENNA 138 1380
 DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
 PINEY GROVE 138 138
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 27.12 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.24 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |

| | | |
|--------|--------------|------|
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.45 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 8

(DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 117.23% to 118.47% (DC power flow) of its emergency rating (174 MVA) for the line

fault with failed breaker contingency outage of 'DP15'. This project contributes approximately 2.16 MW to the thermal violation.

CONTINGENCY 'DP15' /*INDIAN RIVER BUS BREAKER TO
 PINEY GROVE
 DISCONNECT BRANCH FROM BUS 232007 TO BUS 232006 CKT 1 /*PINEY GR
 INDRIV 4 230 230
 DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1 /*PINEY GR
 PINEY GR 230 138
 DISCONNECT BRANCH FROM BUS 232006 TO BUS 232004 CKT 1 /*MILFORD
 INDIAN RIVER 230 230
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 5.22 |
| 932671 | AC2-189 C1 O | 0.13 |
| 932673 | AC2-189 C2 O | 1.79 |
| 932672 | AC2-189 E O | 0.24 |
| 232905 | BAYVIEW1 | 0.49 |
| 232926 | CRISFLD1 | 0.3 |
| 232912 | OH NUG1 | 1.75 |
| 232913 | OH NUG2 | 1.73 |
| 232914 | OH NUG3 | 1.75 |
| 232915 | OH NUG4 | 1.75 |
| 232916 | OH NUG5 | 1.75 |
| 232917 | OH NUG6 | 1.74 |
| 232918 | OH NUG7 | 1.74 |
| 232921 | TASLEY2G | 1.21 |
| 904210 | V4-022 C | 0.07 |
| 904212 | V4-022 E | 0.75 |
| 901003 | W1-003 C | 0.11 |
| 901004 | W1-003 E | 1.07 |
| 901013 | W1-004 C | 0.11 |
| 901014 | W1-004 E | 1.07 |
| 901023 | W1-005 C | 0.11 |
| 901024 | W1-005 E | 1.07 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 1.07 |
| 907052 | X1-032 E | 0.82 |
| 907323 | X1-096 C | 0.59 |
| 907324 | X1-096 E | 17.31 |
| 920582 | Z1-076 C | 1.54 |
| 920583 | Z1-076 E | 2.52 |
| 920592 | Z1-077 C | 1.1 |
| 920593 | Z1-077 E | 1.8 |
| 916441 | Z1-100 | 0.16 |

| | | |
|--------|--------------|-------|
| 916451 | Z1-101 | 0.16 |
| 916461 | Z1-102 | 0.16 |
| 920602 | Z1-103 | 0.16 |
| 917081 | Z2-012 C | 0.3 |
| 917082 | Z2-012 E | 2.99 |
| 920952 | AA1-025 | 0.14 |
| 920962 | AA1-026 | 0.14 |
| 920972 | AA1-027 | 0.14 |
| 920982 | AA1-028 | 0.14 |
| 921122 | AA1-059 C | 0.8 |
| 921123 | AA1-059 E | 0.32 |
| 918831 | AA1-102 | 1.14 |
| 921602 | AA1-141 C | 1.86 |
| 921603 | AA1-141 E | 3.04 |
| 922213 | AA2-129 E | 4.76 |
| 922222 | AA2-130 | 0.37 |
| 923902 | AB2-030 E | 0.97 |
| 923931 | AB2-033 C | 1.73 |
| 923932 | AB2-033 E | 0.68 |
| 924361 | AB2-084 C | 0.78 |
| 924362 | AB2-084 E | 1.27 |
| 924681 | AB2-120 C OP | 9.17 |
| 924682 | AB2-120 E OP | 14.96 |
| 925101 | AB2-167 C | 1.54 |
| 925102 | AB2-167 E | 2.53 |
| 925231 | AB2-177 C | 0.82 |
| 925232 | AB2-177 E | 1.34 |
| 925381 | AC1-009 C | 1.83 |
| 925382 | AC1-009 E | 2.99 |
| 925651 | AC1-041 C | 0.68 |
| 925652 | AC1-041 E | 1.1 |
| 925761 | AC1-052 C | 2.41 |
| 925762 | AC1-052 E | 0.97 |
| 926911 | AC1-177 | 0.74 |

Appendix 9

(DP&L - DP&L) The LORET_69-FRUITLND 69 kV line (from bus 232275 to bus 232288 ckt 1) loads from 114.23% to 117.0% (DC power flow) of its emergency rating (137 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1
 PINEY GROVE 138 138
 END

/*LORETTO

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 3.84 |
| 932671 | AC2-189 C1 O | 0.23 |
| 932673 | AC2-189 C2 O | 3.13 |
| 932672 | AC2-189 E O | 0.42 |
| 232905 | BAYVIEW1 | 0.35 |
| 232926 | CRISFLD1 | 0.53 |
| 232912 | OH NUG1 | 1.27 |
| 232913 | OH NUG2 | 1.25 |
| 232914 | OH NUG3 | 1.27 |
| 232915 | OH NUG4 | 1.27 |
| 232916 | OH NUG5 | 1.27 |
| 232917 | OH NUG6 | 1.26 |
| 232918 | OH NUG7 | 1.26 |
| 232921 | TASLEY2G | 0.87 |
| 904210 | V4-022 C | 0.05 |
| 904212 | V4-022 E | 0.54 |
| 901003 | W1-003 C | 0.08 |
| 901004 | W1-003 E | 0.82 |
| 901013 | W1-004 C | 0.08 |
| 901014 | W1-004 E | 0.82 |
| 901023 | W1-005 C | 0.08 |
| 901024 | W1-005 E | 0.82 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.82 |
| 907052 | X1-032 E | 1.1 |
| 907323 | X1-096 C | 1.04 |
| 907324 | X1-096 E | 30.34 |
| 920582 | Z1-076 C | 0.67 |
| 920583 | Z1-076 E | 1.09 |
| 920592 | Z1-077 C | 0.48 |
| 920593 | Z1-077 E | 0.78 |
| 916441 | Z1-100 | 0.12 |
| 916451 | Z1-101 | 0.12 |
| 916461 | Z1-102 | 0.12 |
| 920602 | Z1-103 | 0.12 |
| 917081 | Z2-012 C | 0.22 |
| 917082 | Z2-012 E | 2.15 |
| 920952 | AA1-025 | 0.11 |
| 920962 | AA1-026 | 0.11 |
| 920972 | AA1-027 | 0.11 |
| 920982 | AA1-028 | 0.11 |

| | | |
|--------|------------------|--------|
| 232926 | <i>CRISFLD1</i> | 0.53 |
| 232912 | <i>OH NUG1</i> | 1.27 |
| 232913 | <i>OH NUG2</i> | 1.25 |
| 232914 | <i>OH NUG3</i> | 1.27 |
| 232915 | <i>OH NUG4</i> | 1.27 |
| 232916 | <i>OH NUG5</i> | 1.27 |
| 232917 | <i>OH NUG6</i> | 1.26 |
| 232918 | <i>OH NUG7</i> | 1.26 |
| 232921 | <i>TASLEY2G</i> | 0.87 |
| 904210 | <i>V4-022 C</i> | 0.05 |
| 904212 | <i>V4-022 E</i> | 0.54 |
| 901003 | <i>W1-003 C</i> | 0.08 |
| 901004 | <i>W1-003 E</i> | 0.82 |
| 901013 | <i>W1-004 C</i> | 0.08 |
| 901014 | <i>W1-004 E</i> | 0.82 |
| 901023 | <i>W1-005 C</i> | 0.08 |
| 901024 | <i>W1-005 E</i> | 0.82 |
| 901033 | <i>W1-006 C</i> | < 0.01 |
| 901034 | <i>W1-006 E</i> | 0.82 |
| 907052 | <i>X1-032 E</i> | 1.1 |
| 907323 | <i>X1-096 C</i> | 1.04 |
| 907324 | <i>X1-096 E</i> | 30.34 |
| 920582 | <i>Z1-076 C</i> | 0.67 |
| 920583 | <i>Z1-076 E</i> | 1.09 |
| 920592 | <i>Z1-077 C</i> | 0.48 |
| 920593 | <i>Z1-077 E</i> | 0.78 |
| 916441 | <i>Z1-100</i> | 0.12 |
| 916451 | <i>Z1-101</i> | 0.12 |
| 916461 | <i>Z1-102</i> | 0.12 |
| 920602 | <i>Z1-103</i> | 0.12 |
| 917081 | <i>Z2-012 C</i> | 0.22 |
| 917082 | <i>Z2-012 E</i> | 2.15 |
| 920952 | <i>AA1-025</i> | 0.11 |
| 920962 | <i>AA1-026</i> | 0.11 |
| 920972 | <i>AA1-027</i> | 0.11 |
| 920982 | <i>AA1-028</i> | 0.11 |
| 921122 | <i>AA1-059 C</i> | 1.4 |
| 921123 | <i>AA1-059 E</i> | 0.55 |
| 918831 | <i>AA1-102</i> | 2. |
| 921602 | <i>AA1-141 C</i> | 0.52 |
| 921603 | <i>AA1-141 E</i> | 0.85 |
| 922213 | <i>AA2-129 E</i> | 3.46 |
| 922222 | <i>AA2-130</i> | 0.65 |
| 923902 | <i>AB2-030 E</i> | 0.69 |
| 923931 | <i>AB2-033 C</i> | 1.24 |

| | | |
|--------|--------------|------|
| 923932 | AB2-033 E | 0.49 |
| 924361 | AB2-084 C | 1.04 |
| 924362 | AB2-084 E | 1.7 |
| 924681 | AB2-120 C OP | 6.05 |
| 924682 | AB2-120 E OP | 9.88 |
| 925101 | AB2-167 C | 0.66 |
| 925102 | AB2-167 E | 1.09 |
| 925231 | AB2-177 C | 0.23 |
| 925232 | AB2-177 E | 0.38 |
| 925381 | AC1-009 C | 1.32 |
| 925382 | AC1-009 E | 2.15 |
| 925651 | AC1-041 C | 0.12 |
| 925652 | AC1-041 E | 0.2 |
| 925761 | AC1-052 C | 1.73 |
| 925762 | AC1-052 E | 0.69 |
| 926911 | AC1-177 | 1.31 |

Appendix 11

(DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 124.45% to 126.79% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 27.12 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |

| | | |
|--------|--------------|--------|
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |
| 915542 | Y3-058 E | 3.31 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |

| | | |
|--------|-----------|------|
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 12

(DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 122.03% to 124.37% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
 DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
 VIENNA 138 1380
 DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
 PINEY GROVE 138 138
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 12.13 |
| 931162 | AC2-023 E | 22.88 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |
| 915542 | Y3-058 E | 3.31 |

| | | |
|--------|--------------|------|
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925741 | AC1-050 C | 1.13 |
| 925742 | AC1-050 E | 1.84 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |

| | | |
|--------|-----------|------|
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Secondary Point of Interconnection

Appendix 1

(DP&L - DP&L) The WESTOVER-KINGS_69 69 kV line (from bus 232842 to bus 232276 ckt 1) loads from 58.0% to 100.91% (DC power flow) of its normal rating (24 MVA) for non-contingency condition. This project contributes approximately 10.3 MW to the thermal violation.

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 932671 | AC2-189 C1 O | 0.7 |
| 932673 | AC2-189 C2 O | 9.6 |
| 232926 | CRISFLD1 | 1.63 |
| 907323 | X1-096 C | 3.19 |
| 921122 | AA1-059 C | 4.3 |

Appendix 2

(DP&L - DP&L) The PEMBERTN-NSALSBRV 69 kV line (from bus 232273 to bus 232271 ckt 1) loads from 99.35% to 103.51% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 3.84 |
| 932671 | AC2-189 C1 O | 0.23 |
| 932673 | AC2-189 C2 O | 3.13 |
| 932672 | AC2-189 E O | 0.42 |
| 232905 | BAYVIEW1 | 0.35 |
| 232926 | CRISFLD1 | 0.53 |
| 232912 | OH NUG1 | 1.27 |
| 232913 | OH NUG2 | 1.25 |

| | | |
|--------|------------------|--------|
| 232914 | <i>OH NUG3</i> | 1.27 |
| 232915 | <i>OH NUG4</i> | 1.27 |
| 232916 | <i>OH NUG5</i> | 1.27 |
| 232917 | <i>OH NUG6</i> | 1.27 |
| 232918 | <i>OH NUG7</i> | 1.26 |
| 232921 | <i>TASLEY2G</i> | 0.87 |
| 904210 | <i>V4-022 C</i> | 0.05 |
| 904212 | <i>V4-022 E</i> | 0.54 |
| 901003 | <i>W1-003 C</i> | 0.08 |
| 901004 | <i>W1-003 E</i> | 0.82 |
| 901013 | <i>W1-004 C</i> | 0.08 |
| 901014 | <i>W1-004 E</i> | 0.82 |
| 901023 | <i>W1-005 C</i> | 0.08 |
| 901024 | <i>W1-005 E</i> | 0.82 |
| 901033 | <i>W1-006 C</i> | < 0.01 |
| 901034 | <i>W1-006 E</i> | 0.82 |
| 907052 | <i>X1-032 E</i> | 1.1 |
| 907323 | <i>X1-096 C</i> | 1.04 |
| 907324 | <i>X1-096 E</i> | 30.34 |
| 920582 | <i>Z1-076 C</i> | 0.67 |
| 920583 | <i>Z1-076 E</i> | 1.09 |
| 920592 | <i>Z1-077 C</i> | 0.48 |
| 920593 | <i>Z1-077 E</i> | 0.78 |
| 916441 | <i>Z1-100</i> | 0.12 |
| 916451 | <i>Z1-101</i> | 0.12 |
| 916461 | <i>Z1-102</i> | 0.12 |
| 920602 | <i>Z1-103</i> | 0.12 |
| 917081 | <i>Z2-012 C</i> | 0.22 |
| 917082 | <i>Z2-012 E</i> | 2.15 |
| 920952 | <i>AA1-025</i> | 0.11 |
| 920962 | <i>AA1-026</i> | 0.11 |
| 920972 | <i>AA1-027</i> | 0.11 |
| 920982 | <i>AA1-028</i> | 0.11 |
| 921122 | <i>AA1-059 C</i> | 1.4 |
| 921123 | <i>AA1-059 E</i> | 0.55 |
| 918831 | <i>AA1-102</i> | 2. |
| 921602 | <i>AA1-141 C</i> | 0.52 |
| 921603 | <i>AA1-141 E</i> | 0.85 |
| 922213 | <i>AA2-129 E</i> | 3.46 |
| 922222 | <i>AA2-130</i> | 0.65 |
| 923902 | <i>AB2-030 E</i> | 0.69 |
| 923931 | <i>AB2-033 C</i> | 1.24 |
| 923932 | <i>AB2-033 E</i> | 0.49 |
| 924361 | <i>AB2-084 C</i> | 1.04 |
| 924362 | <i>AB2-084 E</i> | 1.7 |

| | | |
|--------|--------------|------|
| 924681 | AB2-120 C OP | 6.05 |
| 924682 | AB2-120 E OP | 9.88 |
| 925101 | AB2-167 C | 0.66 |
| 925102 | AB2-167 E | 1.09 |
| 925231 | AB2-177 C | 0.23 |
| 925232 | AB2-177 E | 0.38 |
| 925381 | AC1-009 C | 1.32 |
| 925382 | AC1-009 E | 2.15 |
| 925651 | AC1-041 C | 0.12 |
| 925652 | AC1-041 E | 0.2 |
| 925761 | AC1-052 C | 1.73 |
| 925762 | AC1-052 E | 0.69 |
| 926911 | AC1-177 | 1.31 |

Appendix 3

(DP&L - DP&L) The LORETTO 138/69 kV transformer (from bus 232127 to bus 232275 ckt 1) loads from 111.2% to 114.01% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 2.0 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 932671 | AC2-189 C1 O | 0.12 |
| 932673 | AC2-189 C2 O | 1.66 |
| 932672 | AC2-189 E O | 0.22 |
| 232926 | CRISFLD1 | 0.28 |
| 904212 | V4-022 E | 0.28 |
| 901004 | W1-003 E | 0.43 |
| 901014 | W1-004 E | 0.43 |
| 901024 | W1-005 E | 0.43 |
| 901034 | W1-006 E | 0.43 |
| 907052 | X1-032 E | 0.58 |
| 907323 | X1-096 C | 0.55 |
| 907324 | X1-096 E | 16.04 |
| 920582 | Z1-076 C | 0.35 |
| 920583 | Z1-076 E | 0.57 |
| 920592 | Z1-077 C | 0.25 |
| 920593 | Z1-077 E | 0.41 |

| | | |
|--------|--------------|------|
| 917082 | Z2-012 E | 1.14 |
| 921122 | AA1-059 C | 0.74 |
| 921123 | AA1-059 E | 0.29 |
| 918831 | AA1-102 | 1.06 |
| 922213 | AA2-129 E | 1.83 |
| 922222 | AA2-130 | 0.35 |
| 923902 | AB2-030 E | 0.37 |
| 923931 | AB2-033 C | 0.66 |
| 923932 | AB2-033 E | 0.26 |
| 924361 | AB2-084 C | 0.55 |
| 924362 | AB2-084 E | 0.9 |
| 924681 | AB2-120 C OP | 3.2 |
| 924682 | AB2-120 E OP | 5.22 |
| 925101 | AB2-167 C | 0.35 |
| 925102 | AB2-167 E | 0.58 |
| 925381 | AC1-009 C | 0.7 |
| 925382 | AC1-009 E | 1.14 |
| 925761 | AC1-052 C | 0.92 |
| 925762 | AC1-052 E | 0.37 |
| 926911 | AC1-177 | 0.69 |

Appendix 4

(DP&L - DP&L) The PRESTON-TANYARD 69 kV line (from bus 232233 to bus 232821 ckt 1) loads from 163.29% to 164.79% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 4.44 |
| 931162 | AC2-023 E | 8.39 |
| 932671 | AC2-189 C1 O | 0.08 |
| 932673 | AC2-189 C2 O | 1.15 |
| 932672 | AC2-189 E O | 0.16 |
| 932691 | AC2-191 | 1.7 |
| 232926 | CRISFLD1 | 0.2 |
| 293670 | O-025 C | 0.13 |
| 297076 | V2-028 C | 0.08 |

| | | |
|--------|-----------|--------|
| 297077 | V2-028 E | 0.81 |
| 904212 | V4-022 E | 0.36 |
| 232919 | VN10 | 0.51 |
| 232907 | VN8 | 3.71 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.52 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.52 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.52 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.52 |
| 907052 | X1-032 E | 0.47 |
| 907323 | X1-096 C | 0.38 |
| 907324 | X1-096 E | 11.19 |
| 910571 | X3-008 C | 0.48 |
| 910572 | X3-008 E | 4.78 |
| 910591 | X3-015 C | 0.34 |
| 910592 | X3-015 E | 3.43 |
| 913411 | Y1-080 C | 0.06 |
| 913412 | Y1-080 E | 0.56 |
| 915541 | Y3-058 C | 0.14 |
| 915542 | Y3-058 E | 1.43 |
| 920582 | Z1-076 C | 0.61 |
| 920583 | Z1-076 E | 0.99 |
| 920592 | Z1-077 C | 0.44 |
| 920593 | Z1-077 E | 0.71 |
| 916441 | Z1-100 | 0.08 |
| 916451 | Z1-101 | 0.08 |
| 916461 | Z1-102 | 0.08 |
| 920602 | Z1-103 | 0.08 |
| 917082 | Z2-012 E | 1.42 |
| 920763 | Z2-076 E | 0.18 |
| 920773 | Z2-077 E | 0.18 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.52 |
| 921123 | AA1-059 E | 0.2 |
| 921142 | AA1-061 C | 4.87 |
| 921143 | AA1-061 E | 2.4 |
| 918831 | AA1-102 | 0.74 |
| 921592 | AA1-140 C | 0.67 |
| 921593 | AA1-140 E | 1.1 |

| | | |
|--------|--------------|-------|
| 921602 | AA1-141 C | 0.65 |
| 921603 | AA1-141 E | 1.07 |
| 922213 | AA2-129 E | 2.29 |
| 922222 | AA2-130 | 0.24 |
| 922752 | AB1-056 C OP | 4.91 |
| 922753 | AB1-056 E OP | 13.99 |
| 922762 | AB1-057 C | 4.99 |
| 922763 | AB1-057 E | 14.22 |
| 923282 | AB1-137 C | 0.34 |
| 923283 | AB1-137 E | 0.15 |
| 923902 | AB2-030 E | 0.46 |
| 923931 | AB2-033 C | 0.82 |
| 923932 | AB2-033 E | 0.33 |
| 924361 | AB2-084 C | 0.45 |
| 924362 | AB2-084 E | 0.73 |
| 924681 | AB2-120 C OP | 4.32 |
| 924682 | AB2-120 E OP | 7.05 |
| 924781 | AB2-130 C OP | 3.88 |
| 924782 | AB2-130 E OP | 6.34 |
| 924831 | AB2-136 C OP | 7.47 |
| 924832 | AB2-136 E OP | 7.92 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.45 |
| 925101 | AB2-167 C | 0.61 |
| 925102 | AB2-167 E | 1. |
| 925151 | AB2-172 C OP | 7.33 |
| 925152 | AB2-172 E OP | 11.95 |
| 925231 | AB2-177 C | 0.29 |
| 925232 | AB2-177 E | 0.47 |
| 925261 | AB2-180 C | 2.15 |
| 925262 | AB2-180 E | 0.92 |
| 925381 | AC1-009 C | 0.87 |
| 925382 | AC1-009 E | 1.42 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.36 |
| 925731 | AC1-049 C | 0.13 |
| 925732 | AC1-049 E | 0.22 |
| 925741 | AC1-050 C | 0.35 |
| 925742 | AC1-050 E | 0.58 |
| 925761 | AC1-052 C | 1.15 |
| 925762 | AC1-052 E | 0.46 |
| 926911 | AC1-177 | 0.48 |
| 927031 | AC1-190 C | 12.97 |
| 927032 | AC1-190 E | 5.56 |
| 927191 | AC1-213 C | 0.47 |

| | | |
|--------|-----------|------|
| 927192 | AC1-213 E | 0.24 |
| 927311 | AC1-228 C | 0.42 |
| 927312 | AC1-228 E | 0.73 |
| 927321 | AC1-229 C | 0.31 |
| 927322 | AC1-229 E | 0.5 |

Appendix 5

(DP&L - DP&L) The TODD-PRESTON 69 kV line (from bus 232234 to bus 232233 ckt 1) loads from 169.21% to 170.71% (DC power flow) of its emergency rating (93 MVA) for the line fault with failed breaker contingency outage of 'DP11'. This project contributes approximately 1.4 MW to the thermal violation.

CONTINGENCY '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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 4.44 |
| 931162 | AC2-023 E | 8.39 |
| 932671 | AC2-189 C1 O | 0.08 |
| 932673 | AC2-189 C2 O | 1.15 |
| 932672 | AC2-189 E O | 0.16 |
| 932691 | AC2-191 | 1.7 |
| 232926 | CRISFLD1 | 0.2 |
| 293670 | O-025 C | 0.13 |
| 297076 | V2-028 C | 0.08 |
| 297077 | V2-028 E | 0.81 |
| 904212 | V4-022 E | 0.36 |
| 232919 | VN10 | 0.51 |
| 232907 | VN8 | 3.71 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.52 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.52 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.52 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.52 |
| 907052 | X1-032 E | 0.47 |
| 907323 | X1-096 C | 0.38 |
| 907324 | X1-096 E | 11.19 |

| | | |
|--------|--------------|-------|
| 910571 | X3-008 C | 0.48 |
| 910572 | X3-008 E | 4.78 |
| 910591 | X3-015 C | 0.34 |
| 910592 | X3-015 E | 3.43 |
| 913411 | Y1-080 C | 0.06 |
| 913412 | Y1-080 E | 0.56 |
| 915541 | Y3-058 C | 0.14 |
| 915542 | Y3-058 E | 1.43 |
| 920582 | Z1-076 C | 0.61 |
| 920583 | Z1-076 E | 0.99 |
| 920592 | Z1-077 C | 0.44 |
| 920593 | Z1-077 E | 0.71 |
| 916441 | Z1-100 | 0.08 |
| 916451 | Z1-101 | 0.08 |
| 916461 | Z1-102 | 0.08 |
| 920602 | Z1-103 | 0.08 |
| 917082 | Z2-012 E | 1.42 |
| 920763 | Z2-076 E | 0.18 |
| 920773 | Z2-077 E | 0.18 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.52 |
| 921123 | AA1-059 E | 0.2 |
| 921142 | AA1-061 C | 4.87 |
| 921143 | AA1-061 E | 2.4 |
| 918831 | AA1-102 | 0.74 |
| 921592 | AA1-140 C | 0.67 |
| 921593 | AA1-140 E | 1.1 |
| 921602 | AA1-141 C | 0.65 |
| 921603 | AA1-141 E | 1.07 |
| 922213 | AA2-129 E | 2.29 |
| 922222 | AA2-130 | 0.24 |
| 922752 | AB1-056 C OP | 4.91 |
| 922753 | AB1-056 E OP | 13.99 |
| 922762 | AB1-057 C | 4.99 |
| 922763 | AB1-057 E | 14.22 |
| 923282 | AB1-137 C | 0.34 |
| 923283 | AB1-137 E | 0.15 |
| 923902 | AB2-030 E | 0.46 |
| 923931 | AB2-033 C | 0.82 |
| 923932 | AB2-033 E | 0.33 |
| 924361 | AB2-084 C | 0.45 |
| 924362 | AB2-084 E | 0.73 |

| | | |
|--------|--------------|-------|
| 924681 | AB2-120 C OP | 4.32 |
| 924682 | AB2-120 E OP | 7.05 |
| 924781 | AB2-130 C OP | 3.88 |
| 924782 | AB2-130 E OP | 6.34 |
| 924831 | AB2-136 C OP | 7.47 |
| 924832 | AB2-136 E OP | 7.92 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.45 |
| 925101 | AB2-167 C | 0.61 |
| 925102 | AB2-167 E | 1. |
| 925151 | AB2-172 C OP | 7.33 |
| 925152 | AB2-172 E OP | 11.95 |
| 925231 | AB2-177 C | 0.29 |
| 925232 | AB2-177 E | 0.47 |
| 925261 | AB2-180 C | 2.15 |
| 925262 | AB2-180 E | 0.92 |
| 925381 | AC1-009 C | 0.87 |
| 925382 | AC1-009 E | 1.42 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.36 |
| 925731 | AC1-049 C | 0.13 |
| 925732 | AC1-049 E | 0.22 |
| 925741 | AC1-050 C | 0.35 |
| 925742 | AC1-050 E | 0.58 |
| 925761 | AC1-052 C | 1.15 |
| 925762 | AC1-052 E | 0.46 |
| 926911 | AC1-177 | 0.48 |
| 927031 | AC1-190 C | 12.97 |
| 927032 | AC1-190 E | 5.56 |
| 927191 | AC1-213 C | 0.47 |
| 927192 | AC1-213 E | 0.24 |
| 927311 | AC1-228 C | 0.42 |
| 927312 | AC1-228 E | 0.73 |
| 927321 | AC1-229 C | 0.31 |
| 927322 | AC1-229 E | 0.5 |

Appendix 6

(DP&L - DP&L) The HEBRON-MARDELA 69 kV line (from bus 232270 to bus 232838 ckt 1) loads from 129.9% to 132.23% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'

/*LORETTO BUS BREAKER

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1
 VIENNA 138 1380
 DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1
 PINEY GROVE 138 138
 END

/*LORETTO

/*LORETTO

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 12.13 |
| 931162 | AC2-023 E | 22.88 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |
| 915542 | Y3-058 E | 3.31 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |

| | | |
|--------|--------------|------|
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 7

(DP&L - DP&L) The NSALSBRY-ROCKAWLKN 69 kV line (from bus 232271 to bus 232291 ckt 1) loads from 110.73% to 113.31% (DC power flow) of its emergency rating (58 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56'

/*LORETTO BUS BREAKER

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1

/*LORETTO

VIENNA 138 1380

DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1

/*LORETTO

PINEY GROVE 138 138

END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 27.12 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.24 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |

| | | |
|--------|--------------|------|
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.45 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 8

(DP&L - DP&L) The NSALSBRV-WALSTN S 69 kV line (from bus 232271 to bus 232841 ckt 1) loads from 112.27% to 112.95% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP59_A'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'DP59_A'

/*PINEY GROVE BUS BREAKER

DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1
 AB2-120 TAP 138 138
 DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1
 PINEY GROVE 230 138
 END

/*NEW CHURCH
 /*PINEY GROVE

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 3.26 |
| 931162 | AC2-023 E | 6.15 |
| 932671 | AC2-189 C1 O | 0.07 |
| 932673 | AC2-189 C2 O | 0.89 |
| 932672 | AC2-189 E O | 0.12 |
| 293670 | O-025 C | 0.16 |
| 297077 | V2-028 E | 0.24 |
| 904212 | V4-022 E | 0.3 |
| 901004 | W1-003 E | 0.44 |
| 901014 | W1-004 E | 0.44 |
| 901024 | W1-005 E | 0.44 |
| 901034 | W1-006 E | 0.44 |
| 907052 | X1-032 E | 0.38 |
| 907324 | X1-096 E | 8.66 |
| 910572 | X3-008 E | 0.63 |
| 910592 | X3-015 E | 0.71 |
| 913412 | Y1-080 E | 0.13 |
| 915541 | Y3-058 C | 0.13 |
| 915542 | Y3-058 E | 1.3 |
| 920582 | Z1-076 C | 0.55 |
| 920583 | Z1-076 E | 0.9 |
| 920592 | Z1-077 C | 0.4 |
| 920593 | Z1-077 E | 0.65 |
| 917082 | Z2-012 E | 1.22 |
| 920762 | Z2-076 C | 1.93 |
| 921122 | AA1-059 C | 0.4 |
| 921123 | AA1-059 E | 0.16 |
| 921142 | AA1-061 C | 0.71 |
| 921143 | AA1-061 E | 0.35 |
| 921602 | AA1-141 C | 0.62 |
| 921603 | AA1-141 E | 1.01 |
| 922213 | AA2-129 E | 1.95 |
| 922222 | AA2-130 | 0.19 |
| 923902 | AB2-030 E | 0.39 |
| 923931 | AB2-033 C | 0.7 |
| 923932 | AB2-033 E | 0.28 |
| 924361 | AB2-084 C | 0.36 |
| 924362 | AB2-084 E | 0.59 |
| 924681 | AB2-120 C OP | 3.87 |

| | | |
|--------|--------------|------|
| 924682 | AB2-120 E OP | 6.32 |
| 924831 | AB2-136 C OP | 1.43 |
| 924832 | AB2-136 E OP | 1.52 |
| 925091 | AB2-166 C | 0.23 |
| 925092 | AB2-166 E | 0.4 |
| 925101 | AB2-167 C | 0.55 |
| 925102 | AB2-167 E | 0.91 |
| 925151 | AB2-172 C OP | 0.97 |
| 925152 | AB2-172 E OP | 1.58 |
| 925231 | AB2-177 C | 0.27 |
| 925232 | AB2-177 E | 0.44 |
| 925261 | AB2-180 C | 1.96 |
| 925262 | AB2-180 E | 0.84 |
| 925381 | AC1-009 C | 0.75 |
| 925382 | AC1-009 E | 1.22 |
| 925651 | AC1-041 C | 0.21 |
| 925652 | AC1-041 E | 0.35 |
| 925741 | AC1-050 C | 0.19 |
| 925742 | AC1-050 E | 0.31 |
| 925761 | AC1-052 C | 0.98 |
| 925762 | AC1-052 E | 0.39 |
| 926911 | AC1-177 | 0.37 |
| 927031 | AC1-190 C | 1.83 |
| 927032 | AC1-190 E | 0.78 |
| 927191 | AC1-213 C | 0.57 |
| 927192 | AC1-213 E | 0.29 |
| 927311 | AC1-228 C | 0.06 |
| 927312 | AC1-228 E | 0.1 |

Appendix 9

(DP&L - DP&L) The PINEY_69-M HERMON 69 kV line (from bus 232274 to bus 232272 ckt 1) loads from 117.23% to 118.48% (DC power flow) of its emergency rating (174 MVA) for the line fault with failed breaker contingency outage of 'DP15'. This project contributes approximately 2.16 MW to the thermal violation.

| | |
|---|-------------------------------|
| CONTINGENCY 'DP15' | /*INDIAN RIVER BUS BREAKER TO |
| PINEY GROVE | |
| DISCONNECT BRANCH FROM BUS 232007 TO BUS 232006 CKT 1 | /*PINEY GR |
| INDRIV 4 230 230 | |
| DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1 | /*PINEY GR |
| PINEY GR 230 138 | |
| DISCONNECT BRANCH FROM BUS 232006 TO BUS 232004 CKT 1 | /*MILFORD |
| INDIAN RIVER 230 230 | |

END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 5.22 |
| 932671 | AC2-189 C1 O | 0.13 |
| 932673 | AC2-189 C2 O | 1.79 |
| 932672 | AC2-189 E O | 0.24 |
| 232905 | BAYVIEW1 | 0.49 |
| 232926 | CRISFLD1 | 0.3 |
| 232912 | OH NUG1 | 1.75 |
| 232913 | OH NUG2 | 1.73 |
| 232914 | OH NUG3 | 1.75 |
| 232915 | OH NUG4 | 1.75 |
| 232916 | OH NUG5 | 1.75 |
| 232917 | OH NUG6 | 1.74 |
| 232918 | OH NUG7 | 1.74 |
| 232921 | TASLEY2G | 1.21 |
| 904210 | V4-022 C | 0.07 |
| 904212 | V4-022 E | 0.75 |
| 901003 | W1-003 C | 0.11 |
| 901004 | W1-003 E | 1.07 |
| 901013 | W1-004 C | 0.11 |
| 901014 | W1-004 E | 1.07 |
| 901023 | W1-005 C | 0.11 |
| 901024 | W1-005 E | 1.07 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 1.07 |
| 907052 | X1-032 E | 0.82 |
| 907323 | X1-096 C | 0.59 |
| 907324 | X1-096 E | 17.31 |
| 920582 | Z1-076 C | 1.54 |
| 920583 | Z1-076 E | 2.52 |
| 920592 | Z1-077 C | 1.1 |
| 920593 | Z1-077 E | 1.8 |
| 916441 | Z1-100 | 0.16 |
| 916451 | Z1-101 | 0.16 |
| 916461 | Z1-102 | 0.16 |
| 920602 | Z1-103 | 0.16 |
| 917081 | Z2-012 C | 0.3 |
| 917082 | Z2-012 E | 2.99 |
| 920952 | AA1-025 | 0.14 |
| 920962 | AA1-026 | 0.14 |
| 920972 | AA1-027 | 0.14 |
| 920982 | AA1-028 | 0.14 |
| 921122 | AA1-059 C | 0.8 |
| 921123 | AA1-059 E | 0.32 |

| | | |
|--------|--------------|-------|
| 918831 | AA1-102 | 1.14 |
| 921602 | AA1-141 C | 1.86 |
| 921603 | AA1-141 E | 3.04 |
| 922213 | AA2-129 E | 4.76 |
| 922222 | AA2-130 | 0.37 |
| 923902 | AB2-030 E | 0.97 |
| 923931 | AB2-033 C | 1.73 |
| 923932 | AB2-033 E | 0.68 |
| 924361 | AB2-084 C | 0.78 |
| 924362 | AB2-084 E | 1.27 |
| 924681 | AB2-120 C OP | 9.17 |
| 924682 | AB2-120 E OP | 14.96 |
| 925101 | AB2-167 C | 1.54 |
| 925102 | AB2-167 E | 2.53 |
| 925231 | AB2-177 C | 0.82 |
| 925232 | AB2-177 E | 1.34 |
| 925381 | AC1-009 C | 1.83 |
| 925382 | AC1-009 E | 2.99 |
| 925651 | AC1-041 C | 0.68 |
| 925652 | AC1-041 E | 1.1 |
| 925761 | AC1-052 C | 2.41 |
| 925762 | AC1-052 E | 0.97 |
| 926911 | AC1-177 | 0.74 |

Appendix 10

(DP&L - DP&L) The LORET_69-FRUITLND 69 kV line (from bus 232275 to bus 232288 ckt 1) loads from 114.24% to 117.0% (DC power flow) of its emergency rating (137 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 3.84 |
| 932671 | AC2-189 C1 O | 0.23 |
| 932673 | AC2-189 C2 O | 3.13 |
| 932672 | AC2-189 E O | 0.42 |
| 232905 | BAYVIEW1 | 0.35 |
| 232926 | CRISFLD1 | 0.53 |

| | | |
|--------|------------------|--------|
| 232912 | <i>OH NUG1</i> | 1.27 |
| 232913 | <i>OH NUG2</i> | 1.25 |
| 232914 | <i>OH NUG3</i> | 1.27 |
| 232915 | <i>OH NUG4</i> | 1.27 |
| 232916 | <i>OH NUG5</i> | 1.27 |
| 232917 | <i>OH NUG6</i> | 1.27 |
| 232918 | <i>OH NUG7</i> | 1.26 |
| 232921 | <i>TASLEY2G</i> | 0.87 |
| 904210 | <i>V4-022 C</i> | 0.05 |
| 904212 | <i>V4-022 E</i> | 0.54 |
| 901003 | <i>W1-003 C</i> | 0.08 |
| 901004 | <i>W1-003 E</i> | 0.82 |
| 901013 | <i>W1-004 C</i> | 0.08 |
| 901014 | <i>W1-004 E</i> | 0.82 |
| 901023 | <i>W1-005 C</i> | 0.08 |
| 901024 | <i>W1-005 E</i> | 0.82 |
| 901033 | <i>W1-006 C</i> | < 0.01 |
| 901034 | <i>W1-006 E</i> | 0.82 |
| 907052 | <i>X1-032 E</i> | 1.1 |
| 907323 | <i>X1-096 C</i> | 1.04 |
| 907324 | <i>X1-096 E</i> | 30.34 |
| 920582 | <i>Z1-076 C</i> | 0.67 |
| 920583 | <i>Z1-076 E</i> | 1.09 |
| 920592 | <i>Z1-077 C</i> | 0.48 |
| 920593 | <i>Z1-077 E</i> | 0.78 |
| 916441 | <i>Z1-100</i> | 0.12 |
| 916451 | <i>Z1-101</i> | 0.12 |
| 916461 | <i>Z1-102</i> | 0.12 |
| 920602 | <i>Z1-103</i> | 0.12 |
| 917081 | <i>Z2-012 C</i> | 0.22 |
| 917082 | <i>Z2-012 E</i> | 2.15 |
| 920952 | <i>AA1-025</i> | 0.11 |
| 920962 | <i>AA1-026</i> | 0.11 |
| 920972 | <i>AA1-027</i> | 0.11 |
| 920982 | <i>AA1-028</i> | 0.11 |
| 921122 | <i>AA1-059 C</i> | 1.4 |
| 921123 | <i>AA1-059 E</i> | 0.55 |
| 918831 | <i>AA1-102</i> | 2. |
| 921602 | <i>AA1-141 C</i> | 0.52 |
| 921603 | <i>AA1-141 E</i> | 0.85 |
| 922213 | <i>AA2-129 E</i> | 3.46 |
| 922222 | <i>AA2-130</i> | 0.65 |
| 923902 | <i>AB2-030 E</i> | 0.69 |
| 923931 | <i>AB2-033 C</i> | 1.24 |
| 923932 | <i>AB2-033 E</i> | 0.49 |

| | | |
|--------|--------------|------|
| 924361 | AB2-084 C | 1.04 |
| 924362 | AB2-084 E | 1.7 |
| 924681 | AB2-120 C OP | 6.05 |
| 924682 | AB2-120 E OP | 9.88 |
| 925101 | AB2-167 C | 0.66 |
| 925102 | AB2-167 E | 1.09 |
| 925231 | AB2-177 C | 0.23 |
| 925232 | AB2-177 E | 0.38 |
| 925381 | AC1-009 C | 1.32 |
| 925382 | AC1-009 E | 2.15 |
| 925651 | AC1-041 C | 0.12 |
| 925652 | AC1-041 E | 0.2 |
| 925761 | AC1-052 C | 1.73 |
| 925762 | AC1-052 E | 0.69 |
| 926911 | AC1-177 | 1.31 |

Appendix 11

(DP&L - DP&L) The FRUITLND-PEMBERTN 69 kV line (from bus 232288 to bus 232273 ckt 1) loads from 126.5% to 130.65% (DC power flow) of its emergency rating (91 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 3.78 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 3.84 |
| 932671 | AC2-189 C1 O | 0.23 |
| 932673 | AC2-189 C2 O | 3.13 |
| 932672 | AC2-189 E O | 0.42 |
| 232905 | BAYVIEW1 | 0.35 |
| 232926 | CRISFLD1 | 0.53 |
| 232912 | OH NUG1 | 1.27 |
| 232913 | OH NUG2 | 1.25 |
| 232914 | OH NUG3 | 1.27 |
| 232915 | OH NUG4 | 1.27 |
| 232916 | OH NUG5 | 1.27 |
| 232917 | OH NUG6 | 1.27 |
| 232918 | OH NUG7 | 1.26 |
| 232921 | TASLEY2G | 0.87 |

| | | |
|--------|--------------|--------|
| 904210 | V4-022 C | 0.05 |
| 904212 | V4-022 E | 0.54 |
| 901003 | W1-003 C | 0.08 |
| 901004 | W1-003 E | 0.82 |
| 901013 | W1-004 C | 0.08 |
| 901014 | W1-004 E | 0.82 |
| 901023 | W1-005 C | 0.08 |
| 901024 | W1-005 E | 0.82 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.82 |
| 907052 | X1-032 E | 1.1 |
| 907323 | X1-096 C | 1.04 |
| 907324 | X1-096 E | 30.34 |
| 920582 | Z1-076 C | 0.67 |
| 920583 | Z1-076 E | 1.09 |
| 920592 | Z1-077 C | 0.48 |
| 920593 | Z1-077 E | 0.78 |
| 916441 | Z1-100 | 0.12 |
| 916451 | Z1-101 | 0.12 |
| 916461 | Z1-102 | 0.12 |
| 920602 | Z1-103 | 0.12 |
| 917081 | Z2-012 C | 0.22 |
| 917082 | Z2-012 E | 2.15 |
| 920952 | AA1-025 | 0.11 |
| 920962 | AA1-026 | 0.11 |
| 920972 | AA1-027 | 0.11 |
| 920982 | AA1-028 | 0.11 |
| 921122 | AA1-059 C | 1.4 |
| 921123 | AA1-059 E | 0.55 |
| 918831 | AA1-102 | 2. |
| 921602 | AA1-141 C | 0.52 |
| 921603 | AA1-141 E | 0.85 |
| 922213 | AA2-129 E | 3.46 |
| 922222 | AA2-130 | 0.65 |
| 923902 | AB2-030 E | 0.69 |
| 923931 | AB2-033 C | 1.24 |
| 923932 | AB2-033 E | 0.49 |
| 924361 | AB2-084 C | 1.04 |
| 924362 | AB2-084 E | 1.7 |
| 924681 | AB2-120 C OP | 6.05 |
| 924682 | AB2-120 E OP | 9.88 |
| 925101 | AB2-167 C | 0.66 |
| 925102 | AB2-167 E | 1.09 |
| 925231 | AB2-177 C | 0.23 |
| 925232 | AB2-177 E | 0.38 |

| | | |
|--------|-----------|------|
| 925381 | AC1-009 C | 1.32 |
| 925382 | AC1-009 E | 2.15 |
| 925651 | AC1-041 C | 0.12 |
| 925652 | AC1-041 E | 0.2 |
| 925761 | AC1-052 C | 1.73 |
| 925762 | AC1-052 E | 0.69 |
| 926911 | AC1-177 | 1.31 |

Appendix 12

(DP&L - DP&L) The ROCKAWLKN-HEBRON 69 kV line (from bus 232291 to bus 232270 ckt 1) loads from 124.46% to 126.8% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

CONTINGENCY 'DP56' /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1 /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1 /*LORETTO
PINEY GROVE 138 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931162 | AC2-023 E | 27.12 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |

| | | |
|--------|--------------|--------|
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |
| 915542 | Y3-058 E | 3.31 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |

| | | |
|---------------|------------------|-------------|
| <i>925382</i> | <i>ACI-009 E</i> | <i>1.33</i> |
| <i>925651</i> | <i>ACI-041 C</i> | <i>0.22</i> |
| <i>925652</i> | <i>ACI-041 E</i> | <i>0.35</i> |
| <i>925761</i> | <i>ACI-052 C</i> | <i>1.07</i> |
| <i>925762</i> | <i>ACI-052 E</i> | <i>0.43</i> |
| <i>926911</i> | <i>ACI-177</i> | <i>0.51</i> |
| <i>927191</i> | <i>ACI-213 C</i> | <i>0.74</i> |
| <i>927192</i> | <i>ACI-213 E</i> | <i>0.38</i> |

Appendix 13

(DP&L - DP&L) The MARDELA-VIENN_69 69 kV line (from bus 232838 to bus 232241 ckt 1) loads from 122.04% to 124.38% (DC power flow) of its emergency rating (64 MVA) for the line fault with failed breaker contingency outage of 'DP56'. This project contributes approximately 1.49 MW to the thermal violation.

```
CONTINGENCY 'DP56'                                /*LORETTO BUS BREAKER
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232117 CKT 1      /*LORETTO
VIENNA 138 1380
DISCONNECT BRANCH FROM BUS 232127 TO BUS 232128 CKT 1      /*LORETTO
PINEY GROVE 138 138
END
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 12.13 |
| 931162 | AC2-023 E | 22.88 |
| 932671 | AC2-189 C1 O | 0.09 |
| 932673 | AC2-189 C2 O | 1.23 |
| 932672 | AC2-189 E O | 0.17 |
| 232905 | BAYVIEW1 | 0.22 |
| 232926 | CRISFLD1 | 0.21 |
| 293670 | O-025 C | 0.21 |
| 232912 | OH NUG1 | 0.78 |
| 232913 | OH NUG2 | 0.77 |
| 232914 | OH NUG3 | 0.78 |
| 232915 | OH NUG4 | 0.78 |
| 232916 | OH NUG5 | 0.78 |
| 232917 | OH NUG6 | 0.78 |
| 232918 | OH NUG7 | 0.78 |
| 232921 | TASLEY2G | 0.54 |
| 904210 | V4-022 C | 0.03 |
| 904212 | V4-022 E | 0.33 |
| 901003 | W1-003 C | 0.05 |
| 901004 | W1-003 E | 0.49 |
| 901013 | W1-004 C | 0.05 |
| 901014 | W1-004 E | 0.49 |
| 901023 | W1-005 C | 0.05 |
| 901024 | W1-005 E | 0.49 |
| 901033 | W1-006 C | < 0.01 |
| 901034 | W1-006 E | 0.49 |
| 907052 | X1-032 E | 0.48 |
| 907323 | X1-096 C | 0.41 |
| 907324 | X1-096 E | 11.96 |
| 915541 | Y3-058 C | 0.33 |

| | | |
|--------|--------------|------|
| 915542 | Y3-058 E | 3.31 |
| 920582 | Z1-076 C | 0.58 |
| 920583 | Z1-076 E | 0.95 |
| 920592 | Z1-077 C | 0.42 |
| 920593 | Z1-077 E | 0.68 |
| 916441 | Z1-100 | 0.07 |
| 916451 | Z1-101 | 0.07 |
| 916461 | Z1-102 | 0.07 |
| 920602 | Z1-103 | 0.07 |
| 917081 | Z2-012 C | 0.13 |
| 917082 | Z2-012 E | 1.33 |
| 920952 | AA1-025 | 0.07 |
| 920962 | AA1-026 | 0.07 |
| 920972 | AA1-027 | 0.07 |
| 920982 | AA1-028 | 0.07 |
| 921122 | AA1-059 C | 0.55 |
| 921123 | AA1-059 E | 0.22 |
| 918831 | AA1-102 | 0.79 |
| 921602 | AA1-141 C | 0.64 |
| 921603 | AA1-141 E | 1.04 |
| 922213 | AA2-129 E | 2.13 |
| 922222 | AA2-130 | 0.26 |
| 923902 | AB2-030 E | 0.43 |
| 923931 | AB2-033 C | 0.77 |
| 923932 | AB2-033 E | 0.3 |
| 924361 | AB2-084 C | 0.46 |
| 924362 | AB2-084 E | 0.75 |
| 924681 | AB2-120 C OP | 3.95 |
| 924682 | AB2-120 E OP | 6.44 |
| 925091 | AB2-166 C | 0.26 |
| 925092 | AB2-166 E | 0.46 |
| 925101 | AB2-167 C | 0.58 |
| 925102 | AB2-167 E | 0.95 |
| 925231 | AB2-177 C | 0.28 |
| 925232 | AB2-177 E | 0.46 |
| 925261 | AB2-180 C | 4.98 |
| 925262 | AB2-180 E | 2.13 |
| 925381 | AC1-009 C | 0.82 |
| 925382 | AC1-009 E | 1.33 |
| 925651 | AC1-041 C | 0.22 |
| 925652 | AC1-041 E | 0.35 |
| 925741 | AC1-050 C | 1.13 |
| 925742 | AC1-050 E | 1.84 |
| 925761 | AC1-052 C | 1.07 |
| 925762 | AC1-052 E | 0.43 |

| | | |
|--------|-----------|------|
| 926911 | AC1-177 | 0.51 |
| 927191 | AC1-213 C | 0.74 |
| 927192 | AC1-213 E | 0.38 |

Appendix 14

(DP&L - DP&L) The WALSTN S-NEW HOPE 69 kV line (from bus 232841 to bus 232834 ckt 1) loads from 103.54% to 104.22% (DC power flow) of its emergency rating (71 MVA) for the line fault with failed breaker contingency outage of 'DP59_A'. This project contributes approximately 1.08 MW to the thermal violation.

CONTINGENCY 'DP59_A' /*PINEY GROVE BUS BREAKER
DISCONNECT BRANCH FROM BUS 232131 TO BUS 924680 CKT 1 /*NEW CHURCH
AB2-120 TAP 138 138
DISCONNECT BRANCH FROM BUS 232007 TO BUS 232128 CKT 1 /*PINEY GROVE
PINEY GROVE 230 138
END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 931161 | AC2-023 C | 3.26 |
| 931162 | AC2-023 E | 6.15 |
| 932671 | AC2-189 C1 O | 0.07 |
| 932673 | AC2-189 C2 O | 0.89 |
| 932672 | AC2-189 E O | 0.12 |
| 293670 | O-025 C | 0.16 |
| 297077 | V2-028 E | 0.24 |
| 904212 | V4-022 E | 0.3 |
| 901004 | W1-003 E | 0.44 |
| 901014 | W1-004 E | 0.44 |
| 901024 | W1-005 E | 0.44 |
| 901034 | W1-006 E | 0.44 |
| 907052 | X1-032 E | 0.38 |
| 907324 | X1-096 E | 8.66 |
| 910572 | X3-008 E | 0.63 |
| 910592 | X3-015 E | 0.71 |
| 913412 | Y1-080 E | 0.13 |
| 915541 | Y3-058 C | 0.13 |
| 915542 | Y3-058 E | 1.3 |
| 920582 | Z1-076 C | 0.55 |
| 920583 | Z1-076 E | 0.9 |
| 920592 | Z1-077 C | 0.4 |
| 920593 | Z1-077 E | 0.65 |
| 917082 | Z2-012 E | 1.22 |
| 920762 | Z2-076 C | 1.93 |
| 921122 | AA1-059 C | 0.4 |

| | | |
|--------|--------------|------|
| 921123 | AA1-059 E | 0.16 |
| 921142 | AA1-061 C | 0.71 |
| 921143 | AA1-061 E | 0.35 |
| 921602 | AA1-141 C | 0.62 |
| 921603 | AA1-141 E | 1.01 |
| 922213 | AA2-129 E | 1.95 |
| 922222 | AA2-130 | 0.19 |
| 923902 | AB2-030 E | 0.39 |
| 923931 | AB2-033 C | 0.7 |
| 923932 | AB2-033 E | 0.28 |
| 924361 | AB2-084 C | 0.36 |
| 924362 | AB2-084 E | 0.59 |
| 924681 | AB2-120 C OP | 3.87 |
| 924682 | AB2-120 E OP | 6.32 |
| 924831 | AB2-136 C OP | 1.43 |
| 924832 | AB2-136 E OP | 1.52 |
| 925091 | AB2-166 C | 0.23 |
| 925092 | AB2-166 E | 0.4 |
| 925101 | AB2-167 C | 0.55 |
| 925102 | AB2-167 E | 0.91 |
| 925151 | AB2-172 C OP | 0.97 |
| 925152 | AB2-172 E OP | 1.58 |
| 925231 | AB2-177 C | 0.27 |
| 925232 | AB2-177 E | 0.44 |
| 925261 | AB2-180 C | 1.96 |
| 925262 | AB2-180 E | 0.84 |
| 925381 | AC1-009 C | 0.75 |
| 925382 | AC1-009 E | 1.22 |
| 925651 | AC1-041 C | 0.21 |
| 925652 | AC1-041 E | 0.35 |
| 925741 | AC1-050 C | 0.19 |
| 925742 | AC1-050 E | 0.31 |
| 925761 | AC1-052 C | 0.98 |
| 925762 | AC1-052 E | 0.39 |
| 926911 | AC1-177 | 0.37 |
| 927031 | AC1-190 C | 1.83 |
| 927032 | AC1-190 E | 0.78 |
| 927191 | AC1-213 C | 0.57 |
| 927192 | AC1-213 E | 0.29 |
| 927311 | AC1-228 C | 0.06 |
| 927312 | AC1-228 E | 0.1 |