Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AD1-074/075/076

Trowbridge 230kV
320.7 MW Capacity / 484.0 MW Energy

February 2018

Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between, the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Virginia Electric and Power Company (VEPCO).

Preface

The intent of the Feasibility Study is to determine a plan, with high level estimated cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the IC. The IC may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the IC may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the Impact Study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The IC is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by ITO, the costs may be included in the study.

General

The IC has proposed a solar generating facility located in Washington County, North Carolina. The installed AD1-074/075/076 facilities will have a total capability of 484 MW with 320.7 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is June 1, 2020. **This study does not imply an ITO commitment to this in-service date.**

Point of Interconnection

AD1-074/075/076 will interconnect with the ITO transmission system via one of the following Points of Interconnection:

Option 1: AD1-074/075/076 will interconnect via a direct connection into the Trowbridge 230kV substation.

Option 2: AD1-074/075/076 will interconnect via a new three breaker ring bus switching station that connects the Trowbridge-Pantego 115kV line.

Cost Summary

The AD1-074/075/076 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 1,800,000
Direct Connection Network Upgrades	$ 0
Non Direct Connection Network Upgrades	$ 4,000,000
Total Costs	**$ 5,800,000**

In addition, the AD1-074/075/076 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 255,510,000
Previously Identified Upgrades	$ 622,560,000
Total Costs	**$ 878,070,000**

PJM Open Access Transmission Tariff (OATT) section 217.3A outlines cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. For New System Upgrades, the cost allocation rule differ depending on whether the minimum amount of upgrades to resolve a single reliability criteria violation will cost less than $5,000,000. For upgrades estimated to cost less than $5,000,000 the allocation of costs will not occur outside of the Queue in which the need for the Network Upgrade was identified. Cost allocation within the Queue will be contingent each Queue projects Distribution Factor on the overloaded facility. For upgrades estimated to cost $5,000,000 or greater the allocation of costs will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

The Feasibility Study is used to make a preliminary determination of the type and scope of Attachment Facilities, Local Upgrades, and Network Upgrades that will be necessary to accommodate the Interconnection Request and to provide the Interconnection Customer a preliminary estimate of the time that will be required to construct any necessary facilities and upgrades and the Interconnection Customer's cost responsibility. The System Impact Study provides refined and comprehensive estimates of cost responsibility and construction lead times for new facilities and system upgrades. Facilities Studies will include, commensurate with the degree of engineering specificity as provided in the Facilities Study Agreement, good faith estimates of the cost, determined in accordance with Section 217 of the Tariff,

(a) to be charged to each affected New Service Customer for the Facilities and System Upgrades that are necessary to accommodate this queue project;

(b) the time required to complete detailed design and construction of the facilities and upgrades; and

(c) a description of any site-specific environmental issues or requirements that could reasonably be anticipated to affect the cost or time required to complete construction of such facilities and upgrades.

System Reinforcements

Violation #	Upgrade Description	Upgrade Cost
	***NEW SYSTEM REINFORCEMENTS**	
1	Line #2181 Hathaway – Nash 230 kV: wreck and rebuild the line of 1 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $2,250,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	$2,250,000
3-6	Line #246 Earleys – Nucor TP – Suffolk 230 kV: wreck and rebuild the line of 45 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $110,950,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required.	$110,950,000
7,8	Line #254 AB2-100 Tap – Lakeview 230 kV: wreck and rebuild the line of 16 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $40,000,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required. A certificate from the NC PUC will most likely be required.	$40,000,000
9 (38-43)	Line #557 Elmont – Chickahominy 500 kV: replace the wave trap in the Chickahominy substation to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3937 MVA (load dump). It is estimated to cost $500,000 and 12-16 months to engineer and construct.	In upgrade cost for 38-43
11 (63-65)	Line #573 North Anna – Spotsylvania 500 kV: wreck and rebuild the line of 14 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $42,000,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	In upgrade cost for 63-65
12 (69)	05EDAN 1-05DANVL2 138 kV line: The total costs for AEP upgrades items 1 – 10 is $8,890,000. The estimated schedule is 24 to 36 months after signing the Interconnection Service Agreement. See mitigation for violation #12 for itemized list.	In upgrade cost for 69
13	Line #238 Sapony to Carson 230 kV: wreck and rebuild the line of 12 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $29,425,000 and 30-36 months to engineer and construct.	$29,425,000
14	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	TBD
15,25	Line #189 AB2-169 Tap – Five Points DP – Wharton 115 kV: wreck and rebuild the line of 24 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost $47,310,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	$47,310,000
16,17	Line #25 Pop Chap – Everetts 115 kV: replace relay in Everetts to increase its line rating to 263 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost $200,000 to 14-16 months to engineer, permit and construct.	$200,000

Violation #	Upgrade Description	Upgrade Cost
18	Trowbridge 230 – 115 kV Tx#1: replace the 230-115 kV transformer #1 increase its line rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). It is estimated to cost $5,500,000 and 24-30 months to engineer and construct.	$5,500,000
20,21,22,24	Line #2131 Z1-036 – Tap S Hertford – Winfall 230 kV: wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $19,875,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	$19,875,000
	Subtotal	**$255,510,000**
	CONTRIBUTIONS TO PREVIOUS SYSTEM REINFORCEMENTS	
26,27	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	TBD
28,31,32	Line #209(A) Skiffes Creek – Kingsmill – Pennimann – Waller 230 kV: wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $28,200,000 and 30-36 months to engineer, permit and construct. A VA CPCN is required.	$28,200,000
29	Elmont 500 – 230 kV Tx#1: replace the 500-230 kV transformer #1 increase its line rating to 1134 MVA (normal), 1203 MVA (emergency), and 1365 MVA (load dump). It is estimated to cost $17,500,000 and 24-30 months to engineer and construct.	$17,500,000
30	Line #259 Chesterfield – Basin 230 kV: reconductor 0.14 miles of 1109 ACAR with a conductor which will increase the line rating to approximately 706 MVA (normal), 706 MVA (emergency), and 812 MVA (load dump). It is estimated to cost $250,000 and 15-18 months to engineer, permit and construct.	$250,000
33	Line #2113 Lightfoot– Waller 230 kV: wreck and rebuild the line of 4 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $15,200,000 and 30-36 months to engineer, permit and construct. A VA CPCN is required.	$15,200,000
34	Line #238 Clubhouse to Sapony 230 kV: wreck and rebuild the line of 17 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $41,900,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	$41,900,000
35	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	TBD
36 (19)	Line #2021 Elizabeth City – Shawboro 230 kV wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $25,700,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required	$25,700,000

Violation #	Upgrade Description	Upgrade Cost
37	Line #563 Carson – Midlothian 500 kV: wreck and rebuild the line of 38 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $112,230,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	$112,230,000
38 - 43 (9)	Line #557 Elmont – Chickahominy 500 kV: replace the wave trap in the Chickahominy substation to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3937 MVA (load dump). It is estimated to cost $500,000 and 12-16 months to engineer and construct.	$500,000
44-46	Wreck and rebuild a 22 mile segment of the Bristers – Chancellor 500kV line #552. This will increase normal and emergency ratings to 4453 MVA. Estimated to take 36-48 months to engineer, permit and construct a VA CPCN is required. Estimated cost is $73,000,000	$73,000,000
47-51	Wreck and rebuild the Elmont - Ladysmith 500kV line #574 (26 miles) to a minimum rating of 4453 MVA. Estimated time 36-48 months to engineer and construct. Estimated cost is $78,300,000.	$78,300,000
52-57	Wreck and rebuild the Chancellor - Ladysmith 500kV line #581 (existing line of 15 miles). This will increase normal and emergency ratings to 4453 MVA. Estimated to take 36-48 months to engineer, permit and construct a VA CPCN is required. Estimated cost is $50,000,000.	$50,000,000
58,59	Line #568 Ladysmith – Possum Pt 500 kV: replace wave trap at both Ladysmith and Possum Point Substations miles to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3751 MVA (load dump). It is estimated to cost $500,000 to 14-16 months to engineer, permit and construct.	$500,000
60-62	Line #576 Midlothian – North Anna 500 kV: wreck and rebuild the line of 41 miles increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5121 MVA (load dump). It is estimated to cost $123,390,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required.	$123,390,000
63-65 (11)	Line #573 North Anna – Spotsylvania 500 kV: wreck and rebuild the line of 14 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $42,000,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	$42,000,000
66-68	Line #254 AB2-100 Tap – Clubhouse 230 kV: wreck and rebuild the AB2-100 TAP-Clubhouse 230kV line of 2 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $5,000,000 and 24-28 months to engineer, permit and construct. A VA CPCN is required.	$5,000,000
69 (12)	05EDAN 1-05DANVL2 138 kV line: The total costs for AEP upgrades items 1 – 10 in is $8,890,000. The estimated schedule is 24 to 36 months after signing the Interconnection Service Agreement. See mitigation for violation #12 for itemized list.	$8,890,000
	Subtotal	**$622,560,000**
	Total Network Upgrades	**$ 878,070,000**

*Note:

For New System Reinforcements, only violations in which the AD1-074/075/076 overloads the facility are included in the table above. Costs for New System Reinforcement for which AD1-074/075/076 is not the first project to overload the facility are included for reference in the later part of this report. Cost allocation will be provided in the Impact Study.

Attachment Facilities

Generation Substation: Install metering and associated protection equipment. The estimated cost is $600,000.

Transmission: Construct approximately one span of 230kV Attachment line between the generation substation and the Trowbridge 230kV Substation. The estimated cost for this work is $1,200,000.

The estimated total cost of the Attachment Facilities is $1,800,000. It is estimated to take 18-24 months to complete this work upon execution of an Interconnection Construction Service Agreement (ICSA). These preliminary cost estimates are based on typical engineering costs. A more detailed engineering cost estimates are normally done when the IC provides an exact site plan location for the generation substation during the Facility Study phase.

Direct Connection Cost Estimate

None.

Non-Direct Network Upgrades:

Substation: Add three breakers in the Trowbridge 230 kV Substation and rearrange the 230 kV bus. The estimated cost of this work scope is $4,000,000. It is estimated to take 24-36 months to complete this work upon execution of an Interconnection Construction Service Agreement.

Remote Terminal Work: During the Facilities Study, ITO's System Protection Engineering Department will review transmission line protection as well as anti-islanding required to accommodate the new generation and interconnection substation. System Protection Engineering will determine the minimal acceptable protection requirements to reliably interconnect the proposed generating facility with the transmission system. The review is based on maintaining system reliability by reviewing ITO's protection requirements with the known transmission system configuration which includes generating facilities in the area. This review may determine that transmission line protection and communication upgrades are required at remote substations.

Interconnection Customer Requirements

ITO's Facility Connection Requirements as posted on PJM's website
http://www.pjm.com/~/media/planning/plan-standards/private-dominion/facility-connection-requirements1.ashx

Voltage Ride Through Requirements - The Customer Facility shall be designed to remain in service (not trip) for voltages and times as specified for the Eastern Interconnection in Attachment 1 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low voltage conditions, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

Frequency Ride Through Requirements - The Customer Facility shall be designed to remain in service (not trip) for frequencies and times as specified in Attachment 2 of NERC Reliability Standard PRC-024-1, and successor Reliability Standards, for both high and low frequency

condition, irrespective of generator size, subject to the permissive trip exceptions established in PRC-024-1 (and successor Reliability Standards).

Reactive Power - The Generation Interconnection Customer shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading to 0.95 lagging measured at the generator's terminals.

Revenue Metering and SCADA Requirements

PJM Requirements

The IC will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

Meteorological Data Reporting Requirement

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance
- Forced outage data

OPTION 1:

Network Impacts

PJM assessed the impact of the proposed Queue Project as an injection into the ITO's transmission system, for compliance with NERC Reliability Criteria. The system was assessed using the summer 2021 RTEP case. When performing analysis, ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under single contingency (normal and stressed system conditions). A full listing of the ITO's Planning Criteria and interconnection requirements can be found in the ITO's Facility Connection Requirements which are publicly available at: http://www.dom.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically NERC Category C Contingency Conditions (Bus Fault, Tower Line, N-1-1, and Stuck Breaker scenarios) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For ITO Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating. The results of these studies are discussed in more detail below.

The Queue Project AD1-076 was evaluated as a 484.0 MW (Capacity 320.7 MW) injection at the Trowbridge 230kV substation in the ITO area. Project AD1-076 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-076 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
AEP_P1-2_#1377	CONTINGENCY 'AEP_P1-2_#1377' OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1 OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1 END

Contingency Name	Description
AEP_P4_#7589_05J.FERR 765	CONTINGENCY 'AEP_P4_#7589_05J.FERR 765' OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1 OPEN BRANCH FROM BUS 242514 TO BUS 242684 CKT 2 / 242514 05J.FERR 765 242684 05J.FERR 138 2 OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1 END
DVP_P1-2: LN 130-A	CONTINGENCY 'DVP_P1-2: LN 130-A' OPEN BRANCH FROM BUS 314562 TO BUS 314570 CKT 1 /* 3CLUBHSE 115.00 - 3METCATP 115.00 OPEN BRANCH FROM BUS 314570 TO BUS 314572 CKT 1 /* 3METCATP 115.00 - 3EMPORIA 115.00 OPEN BRANCH FROM BUS 314570 TO BUS 314588 CKT 1 /* 3METCATP 115.00 - 3METCALF 115.00 OPEN BRANCH FROM BUS 314572 TO BUS 925170 CKT 1 /* 3EMPORIA 115.00 - AB2-174 TAP 115.00 OPEN BRANCH FROM BUS 314572 TO BUS 314863 CKT 1 /* 3EMPORIA 115.00 - 3EMPOR_1 115.00 OPEN BUS 314570 /* ISLAND OPEN BUS 314572 /* ISLAND OPEN BUS 314588 /* ISLAND END
DVP_P1-2: LN 2020	CONTINGENCY 'DVP_P1-2: LN 2020' OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND OPEN BUS 314639 /* ISLAND OPEN BUS 913391 /* ISLAND

Contingency Name	Description
	OPEN BUS 913392 /* ISLAND END
DVP_P1-2: LN 2034-A	CONTINGENCY 'DVP_P1-2: LN 2034-A' OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 6EARLEYS 230.00 - AC2-158 TAP 230.00 END
DVP_P1-2: LN 2034-B	CONTINGENCY 'DVP_P1-2: LN 2034-B' OPEN BRANCH FROM BUS 933450 TO BUS 314620 CKT 1 /* AC2-158 TAP 230.00 - 6CASHIE 230.00 OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* 3TROWBR2 115.00 - 6TRWBRDG 230.00 OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1 /* 6TRWBRDG 230.00 - AD1-023 TAP 230.00 OPEN BUS 314620 /* ISLAND END
DVP_P1-2: LN 2058	CONTINGENCY 'DVP_P1-2: LN 2058' OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6MORNSTR 230.00 END
DVP_P1-2: LN 2126	CONTINGENCY 'DVP_P1-2: LN 2126' OPEN BRANCH FROM BUS 314203 TO BUS 314594 CKT 1 /* 6MACKEYS 230.00 - 6PLYMOTH 230.00 OPEN BRANCH FROM BUS 314594 TO BUS 314616 CKT 1 /* 6PLYMOTH 230.00 - 6TRWBRDG 230.00 OPEN BUS 314594 /* ISLAND END
DVP_P1-2: LN 2131_FSA	CONTINGENCY 'DVP_P1-2: LN 2131_FSA' OPEN BRANCH FROM BUS 314203 TO BUS 314637 CKT 1 /* 6MACKEYS 230.00 - 6EDENTON 230.00 OPEN BRANCH FROM BUS 314637 TO BUS 916040 CKT 1 /* 6EDENTON 230.00 - Z1-036 TAP 230.00 OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* ADDED BY JT FOR FULL FSA TAP REMOVAL

Contingency Name	Description
	OPEN BUS 314637 /* ISLAND END
DVP_P1-2: LN 2131A	CONTINGENCY 'DVP_P1-2: LN 2131A' OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND END
DVP_P1-2: LN 2181	CONTINGENCY 'DVP_P1-2: LN 2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END
DVP_P1-2: LN 246	CONTINGENCY 'DVP_P1-2: LN 246' OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00 OPEN BUS 314575 /* ISLAND OPEN BUS 314590 /* ISLAND END
DVP_P1-2: LN 247	CONTINGENCY 'DVP_P1-2: LN 247' OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00

Contingency Name	Description
	OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND END
DVP_P1-2: LN 552	CONTINGENCY 'DVP_P1-2: LN 552' OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 1 /* 3CHANCE 115.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00 END
DVP_P1-2: LN 557	CONTINGENCY 'DVP_P1-2: LN 557' OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00 OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00 END
DVP_P1-2: LN 563	CONTINGENCY 'DVP_P1-2: LN 563' OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 END
DVP_P1-2: LN 573	CONTINGENCY 'DVP_P1-2: LN 573' OPEN BRANCH FROM BUS 314918 TO BUS 314934 CKT 1 /* 8NO ANNA 500.00 - 8SPOTSYL 500.00 END
DVP_P1-2: LN 574	CONTINGENCY 'DVP_P1-2: LN 574' OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LDYSMTH 500.00 END
DVP_P1-2: LN 576	CONTINGENCY 'DVP_P1-2: LN 576' OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 END

Contingency Name	Description
DVP_P1-2: LN 581	CONTINGENCY 'DVP_P1-2: LN 581' OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00 END
DVP_P1-2: LN 594	CONTINGENCY 'DVP_P1-2: LN 594' OPEN BRANCH FROM BUS 314916 TO BUS 314934 CKT 1 /* 8MORRSVL 500.00 - 8SPOTSYL 500.00 END
DVP_P4-2: 2014T2034	CONTINGENCY 'DVP_P4-2: 2014T2034' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1 /* 2014 END
DVP_P4-2: 2020T2144	CONTINGENCY 'DVP_P4-2: 2020T2144' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND: 6ECITYDP2 230.00 OPEN BUS 314639 /* ISLAND: 6TANGLEW 230.00 OPEN BUS 913391 /* ISLAND: Y1-086 C 230.00 OPEN BUS 913392 /* ISLAND: Y1-086 E 230.00 OPEN BUS 917121 /* ISLAND: Z2-027 C 230.00

Contingency Name	Description
	OPEN BUS 917122 /* ISLAND: Z2-027 E 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 901080 CKT 1 /* 6WINFALL 230.00 - W1-029 230.00 END
DVP_P4-2: 24682	CONTINGENCY 'DVP_P4-2: 24682' /* 24682 @ SUFFOLK OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* SUFFOLK - NUCOR TAP OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* NUCOR TAP - EARLEYS OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2 /* SUFFOLK 230-115 TX#5 OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2 /* SUFFOLK 500-230 TX#8 END
DVP_P4-2: 246T2034	CONTINGENCY 'DVP_P4-2: 246T2034' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 314537 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 246 - NUCOR OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 2034 END
DVP_P4-2: 246T247	CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK 230 KV OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00 OPEN BUS 314575 /* ISLAND: 6NUCO TP 230.00

Contingency Name	Description
	OPEN BUS 314590 /* ISLAND: 6NUCOR 230.00 OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00 END
DVP_P4-2: 24742	CONTINGENCY 'DVP_P4-2: 24742' /* SUFFOLK 230 KV OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 1 /* 3SUFFOLK 115.00 - 6SUFFOLK 230.00 OPEN BRANCH FROM BUS 314537 TO BUS 314928 CKT 1 /* 6SUFFOLK 230.00 - 8SUFFOLK 500.00 REMOVE SWSHUNT FROM BUS 314537 END
DVP_P4-2: 557T574	CONTINGENCY 'DVP_P4-2: 557T574' /* ELMONT OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557) OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1) OPEN BRANCH FROM BUS 314911 TO BUS 314908 CKT 1 /*ELMONT TO LADYSMITH (LINE 574) END
DVP_P4-2: 56372	CONTINGENCY 'DVP_P4-2: 56372' /*CARSON OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MIDLOTHIAN 500.00

Contingency Name	Description
	OPEN BRANCH FROM BUS 314902 TO BUS 314282 CKT 1 /*CARSON 500-230 (TX#1) END
DVP_P4-2: 563T576	CONTINGENCY 'DVP_P4-2: 563T576' /* MIDLOTHIAN 500 500 KV OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 END
DVP_P4-2: 57302	CONTINGENCY 'DVP_P4-2: 57302' /*NORTH ANNA OPEN BRANCH FROM BUS 314934 TO BUS 314918 CKT 1 /*NORTH ANNA TO SPOTSYLVANIA (LINE 573) OPEN BRANCH FROM BUS 314918 TO BUS 314232 CKT 1 /*NORTH ANNA 500-230 (TX#5) END
DVP_P4-2: 57602	CONTINGENCY 'DVP_P4-2: 57602' /* NORTH ANNA 500 KV OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 OPEN BRANCH FROM BUS 314232 TO BUS 314918 CKT 1 /* 6NO ANNA 230.00 - 8NO ANNA 500.00 END
DVP_P4-2: H1T9033	CONTINGENCY 'DVP_P4-2: H1T9033' /*MORRISVILLE OPEN BRANCH FROM BUS 314934 TO BUS 314916 CKT 1 /*SPOTSYLVANIA TO MORRISVILLE (LINE 9033) OPEN BRANCH FROM BUS 314916 TO BUS 314063 CKT 1 /*MORRISVILLE 500-230 (TX#1) OPEN BRANCH FROM BUS 314916 TO BUS 314897 CKT 1 /*MORRISVILLE CAP BANK END
DVP_P4-2: H2T557	CONTINGENCY 'DVP_P4-2: H2T557' /* ELMONT OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1

Contingency Name	Description
	/*ELMONT TO CHICKAHOMINY (LINE 557) OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1) OPEN BRANCH FROM BUS 314908 TO BUS 314218 CKT 2 /*ELMONT 500-230 (TX#2) END
DVP_P4-2: SPOTSH1T9033	CONTINGENCY 'DVP_P4-2: SPOTSH1T9033' /*SPOTSYLVANIA OPEN BRANCH FROM BUS 314934 TO BUS 314916 CKT 1 /*SPOTSYLVANIA TO MORRISVILLE (LINE 9033) OPEN BRANCH FROM BUS 314934 TO BUS 314755 CKT 1 /*SPOTSYLVANIA 500/115 (TX#1) END
DVP_P4-2: WT576	CONTINGENCY 'DVP_P4-2: WT576' /* NORTH ANNA 500 KV OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 OPEN BRANCH FROM BUS 314232 TO BUS 314918 CKT 2 /* 6NO ANNA 230.00 - 8NO ANNA 500.00 END
DVP_P4-2: XT573	CONTINGENCY 'DVP_P4-2: XT573' /*NORTH ANNA OPEN BRANCH FROM BUS 314934 TO BUS 314918 CKT 1 /*NORTH ANNA TO SPOTSYLVANIA (LINE 573) OPEN BRANCH FROM BUS 314918 TO BUS 314232 CKT 2 /*NORTH ANNA 500-230 (TX#6) END
DVP_P4-3: H272	CONTINGENCY 'DVP_P4-3: H272' /* TROWBRIDGE OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1 /* LINE 2034 OPEN BRANCH FROM BUS 314616 TO BUS 314614 CKT 1 /* TROWBRIDGE TX.*2 END

Contingency Name	Description
DVP_P7-1: LN 198-552	CONTINGENCY 'DVP_P7-1: LN 198-552' OPEN BRANCH FROM BUS 314135 TO BUS 314367 CKT 1 /* 3CHANCE 115.00 - 3CHANC_1 115.00 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314775 CKT 1 /* 3CHANCE 115.00 - 3NI RVER 115.00 OPEN BRANCH FROM BUS 314775 TO BUS 314779 CKT 1 /* 3NI RVER 115.00 - 3TDTAVRN 115.00 OPEN BRANCH FROM BUS 314779 TO BUS 314755 CKT 1 /* 3TDTAVRN 115.00 - 3SPOTSYL 115.00 OPEN BUS 314367 /* ISLAND CHANC_1 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00 TRANSFORMER 2 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00 END
DVP_P7-1: LN 2058-2181	CONTINGENCY 'DVP_P7-1: LN 2058-2181' OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END
DVP_P7-1: LN 25-2034_B	CONTINGENCY 'DVP_P7-1: LN 25-2034_B' /*REPLACED ON 4/19/2016 OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1 /* 3EVERETS 115.00 - 3POPLR C 115.00 OPEN BRANCH FROM BUS 314596 TO BUS 314614 CKT 1 /* 3POPLR C 115.00 - 3TROWBR2 115.00

Contingency Name	Description
	OPEN BUS 314596 /* ISLAND OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* 3TROWBR2 115.00 - 6TRWBRDG 230.00 OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1 /* 6TRWBRDG 230.00 - AD1-023 TAP 230.00 END
DVP_P7-1: LN 81-2056	CONTINGENCY 'DVP_P7-1: LN 81-2056' OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /* 3CAROLNA 115.00 - 3HORNRTN 115.00 OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /* 3HORNRTN 115.00 - 3ROAN DP 115.00 OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /* 3ROAN DP 115.00 - 3DARLINGT DP115.00 OPEN BUS 314578 /* ISLAND: 3HORNRTN 115.00 OPEN BUS 314598 /* ISLAND: 3ROAN DP 115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6MORNSTR 230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 304226 TO BUS 304222 CKT 1 /* 6PA-RMOUNT#4230.00 - 6ROCKYMT230T OPEN BUS 304226 /* ISLAND OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END

Summer Peak Analysis – 2021

Generator Deliverability

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
1	N-1	DVP_P1-2: LN 2058	DVP - DVP	6MORNSTR-6NASH 230 kV line	313845	314591	1	DC	93.72	100.17	ER	449	28.97	1
2	N-1	DVP_P1-2: LN 563	DVP - DVP	6CARSON-6CHRL249 230 kV line	314282	314285	1	DC	97.62	99.01	ER	559	18.91	2
3	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	86.56	106.35	ER	572	112.89	3
4	N-1	DVP_P1-2: LN 2131_FSA	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	85.88	105.66	ER	572	112.92	
5	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6NUCO TP-6SUFFOLK 230 kV line	314575	314537	1	DC	80.55	100.33	ER	572	112.89	4
6	N-1	DVP_P1-2: LN 2131_FSA	DVP - DVP	6NUCO TP-6SUFFOLK 230 kV line	314575	314537	1	DC	79.84	99.62	ER	572	112.92	
7	N-1	DVP_P1-2: LN 246	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	97.05	107.75	ER	375	40	5
8	N-1	DVP_P1-2: LN 130-A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	97	105.35	ER	375	31.3	
9	Non	Non	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	99.27	100.46	NR	2442	64.36	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
10	N-1	DVP_P1-2: LN 573	DVP - DVP	8NO ANNA-8LADYSMITH 500 kV line	314918	314911	1	DC	97.71	98.36	ER	3219	43.87	6
11	N-1	DVP_P1-2: LN 552	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	99.45	100.16	ER	3219	59.86	
12	N-1	AEP_P1-2_#1377	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	95	96.82	ER	415	16.71	

Multiple Facility Contingency

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
13	LFFB	DVP_P4-2: 2020T2144	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	98.43	107.52	LD	830	75.36	7
14	LFFB	DVP_P4-2: 2020T2144	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	94.24	116.29	ER	478	105.36	
15	DCTL	DVP_P7-1: LN 25-2034_B	DVP - DVP	3FIVE PT-3WHARTON 115 kV line	314576	314622	1	DC	64.55	126.24	LD	91	56.14	8
16	LFFB	DVP_P4-2: 2014T2034	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	75.27	124.71	LD	239	118.15	9
17	LFFB	DVP_P4-2: 246T2034	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	70.74	122.42	LD	239	123.54	
18	LFFB	DVP_P4-3: H272	DVP - DVP	6TRWBRDG 230/115 kV transformer	314616	314613	1	DC	53.5	113.13	LD	220	131.05	10

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
19	LFFB	DVP_P4-2: 24742	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	85.4	108.95	LD	699	164.61	
20	LFFB	DVP_P4-2: 2014T2034	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	71.13	108.97	LD	897	339.43	11
21	LFFB	DVP_P4-2: 24682	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	84.18	108.6	LD	897	219	
22	LFFB	DVP_P4-2: 246T2034	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	71.44	108.55	LD	897	332.88	
23	DCTL	DVP_P7-1: LN 198-552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	98.99	99.97	LD	3938	90.59	
24	LFFB	DVP_P4-2: 24682	DVP - DVP	Z1-036 TAP-6S HERTFORD 230 kV line	916040	314662	1	DC	88.28	112.69	LD	897	219	12
25	DCTL	DVP_P7-1: LN 25-2034_B	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	75.87	137.56	LD	91	56.14	13

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Contributions to previously identified circuit breakers found to be over-duty:

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)

	Contingency		Affected		Bus			Power	Loading %		Rating		MW	
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution	Ref
26	DCTL	DVP_P7-1: LN 81-2056	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	146.98	152.17	ER	374	42.99	14
27	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	104.77	112.36	ER	374	28.4	
28	N-1	DVP_P1-2: LN 557	DVP - DVP	6SKIFF CREEK-6KINGS M 230 kV line	314209	314386	1	DC	140.91	142.78	ER	442	18.11	15
29	LFFB	DVP_P4-2: H2T557	DVP - DVP	8ELMONT 500/230 kV transformer	314218	314908	1	DC	124.24	126.9	LD	1051	70.76	16
30	N-1	DVP_P1-2: LN 563	DVP - DVP	6CHESTF B-6BASIN 230 kV line	314287	314276	1	DC	126.96	128.84	ER	449	18.6	17
31	N-1	DVP_P1-2: LN 557	DVP - DVP	6PENNIMAN-6WALR209 230 kV line	314296	314415	1	DC	129.95	131.82	ER	442	18.11	18
32	N-1	DVP_P1-2: LN 557	DVP - DVP	6KINGS M-6PENNIMAN 230 kV line	314386	314296	1	DC	133.39	135.27	ER	442	18.11	19
33	N-1	DVP_P1-2: LN 557	DVP - DVP	6WALR209-6LIGH209 230 kV line	314415	314391	1	DC	115.83	117.7	ER	442	18.11	20
34	LFFB	DVP_P4-2: 246T247	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	129.7	134.76	LD	637	71.24	21
35	DCTL	DVP_P7-1: LN 2058-2181	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	121.74	139.02	ER	478	82.6	22

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
36	LFFB	DVP_P4-2: 246T247	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	114.72	141.81	LD	699	189.37	23
37	LFFB	DVP_P4-2: 557T574	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	102.64	104.21	LD	3938	133.41	24
38	N-1	DVP_P1-2: LN 563	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	121.95	123.51	ER	2442	82.69	25
39	N-1	DVP_P1-2: LN 576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	121.46	122.99	ER	2442	82.87	
40	LFFB	DVP_P4-2: 563T576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	120.17	122.08	LD	3144	131.53	
41	LFFB	DVP_P4-2: 56372	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	117.35	119.18	LD	3144	125.61	
42	LFFB	DVP_P4-2: WT576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	115.28	117.08	LD	3144	125.06	
43	LFFB	DVP_P4-2: 57602	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	115.28	117.08	LD	3144	125.06	
44	N-1	DVP_P1-2: LN 594	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	121.95	122.8	ER	2442	54.83	26
45	N-1	DVP_P1-2: LN 573	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	118.06	119.08	ER	2442	53.8	
46	LFFB	DVP_P4-2: H1T9033	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	102.62	103.43	LD	3351	82.94	
47	N-1	DVP_P1-2: LN 576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	157.9	159.52	ER	2442	91.28	27

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
48	N-1	DVP_P1-2: LN 563	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	141.69	143.05	ER	2442	77.63	
49	LFFB	DVP_P4-2: 57602	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	133.54	135.21	LD	3351	137.75	
50	LFFB	DVP_P4-2: WT576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	133.54	135.21	LD	3351	137.75	
51	Non	Non	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	111.41	112.29	NR	2442	57.58	
52	N-1	DVP_P1-2: LN 573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	112.61	113.48	ER	2738	55.61	28
53	N-1	DVP_P1-2: LN 594	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	110.76	111.67	ER	2738	53.57	
54	LFFB	DVP_P4-2: SPOTSH1T 9033	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	106.54	107.38	LD	3351	83.55	
55	LFFB	DVP_P4-2: 57302	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	103.6	104.73	LD	3351	84.38	
56	LFFB	DVP_P4-2: XT573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	103.6	104.73	LD	3351	84.38	
57	LFFB	DVP_P4-2: H1T9033	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	102.74	103.83	LD	3351	81	
58	N-1	DVP_P1-2: LN 594	DVP - DVP	8LADYSMITH-8POSSUM 500 kV line	314911	314922	1	DC	115.44	115.98	ER	2442	47.72	29
59	N-1	DVP_P1-2: LN 581	DVP - DVP	8LADYSMITH-8POSSUM 500 kV line	314911	314922	1	DC	112.96	113.85	ER	2442	48.26	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
60	N-1	DVP_P1-2: LN 574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	126.91	128.47	ER	2442	83.81	30
61	N-1	DVP_P1-2: LN 557	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	118.19	119.4	ER	2442	80.31	
62	LFFB	DVP_P4-2: 557T574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	115.9	117.58	LD	3637	137.79	
63	N-1	DVP_P1-2: LN 581	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	101.85	102.61	ER	3219	60.85	31
64	N-1	DVP_P1-2: LN 552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	104.12	104.97	ER	3219	60.21	32
65	N-1	DVP_P1-2: LN 581	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	102.5	103.28	ER	3219	59.28	
66	LFFB	DVP_P4-2: 246T247	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	127.92	134.66	LD	459	68.33	33
67	N-1	DVP_P1-2: LN 246	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	108.38	119.08	ER	375	40	
68	N-1	DVP_P1-2: LN 130-A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	107.55	115.9	ER	375	31.3	
69	LFFB	AEP_P4_#7589_05J.FERR 765	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	111.36	114.09	ER	415	25.22	34

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be determined during Impact Study

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined during Impact Study

New System Reinforcements

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

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
1	6MORNSTR-6NASH 230 kV line	Line #2181 Hathaway – Nash 230 kV: wreck and rebuild the line of 1 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $2,250,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	Pending	$2,250,000
2	6CARSON-6CHRL249 230 kV line	Line #249 Carson – Chaparal – Locks 230 kV: wreck and rebuild the line of 10 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $25,875,000 and 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$25,875,000
3, 4, 5, 6	6EARLEYS-6NUCO TP 230 kV line	Line #246 Earleys – Nucor TP – Suffolk 230 kV: wreck and rebuild the line of 45 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $110,950,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required.	Pending	$110,950,000
7,8	6LAKEVEW-AB2-100 TAP 230 kV line	Line #254 AB2-100 Tap – Lakeview 230 kV: wreck and rebuild the line of 16 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $40,000,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required. A certificate from the NC PUC will most likely be required.	Pending	$40,000,000
9 (38-43)	8CHCKAHM-8ELMONT 500 kV line	Line #557 Elmont – Chickahominy 500 kV: replace the wave trap in the Chickahominy substation to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3937 MVA (load dump). It is estimated to cost $500,000 and 12-16 months to engineer and construct.	Pending	$500,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
10	8NO ANNA-8LADYSMITH 500 kV line	Line #575 North Anna – Ladysmith 500 kV: wreck and rebuild the line of 15 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5121 MVA (load dump).. It is estimated to cost $43,620,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$43,620,000
11 (63-65)	8NO ANNA-8SPOTSYL 500 kV line	Line #573 North Anna – Spotsylvania 500 kV: wreck and rebuild the line of 14 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $42,000,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$42,000,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
12 (69)	05EDAN 1-05DANVL2 138 kV line	Limiting Element: AEP Records show ratings S/N: 275 MVA S/E: 361 MVA 1) Switch (1200A) - Danville Sw. CB M - Danville Circuit Breaker M needs to be replaced. Estimated cost: $1,000,000. 2) Sub Cond 1590 AAC 61 Str - Danville Risers - Replace Danville risers, Estimated cost: $100,000. 3) ACSR ~ 336/556 six wire - conductor section 2 - 2.87 miles of conductor will need to be reconductored/rebuilt. Estimated cost: $4.3 million. 4) Relay Thermal limit 1795 Amps - E Danville 1 - An Engineering study needs to be conducted to determine if the relay thermal limit can be adjusted to mitigate the overload. Estimated Cost: $25,000. In addition, new relay packages will be required if the settings cannot be adjusted. Estimated cost: $600,000. 5) Relay Thermal limit 1795 Amps- Danville2 - An engineering study needs to be conducted to determine if the relay thermal limit can be adjusted to mitigate the overload. Estimated Cost: $25,000. In addition, new relay packages will be required if the settings cannot be adjusted. Estimated cost: $600,000. 6) Relay compliance trip limit 1916 Amps- E Danville (RCTL) - An engineering study needs to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload. Estimated Cost: $25,000. In addition, new relay packages will be required if the settings cannot be adjusted. Estimated cost: $600,000. 7) Relay compliance trip limit 1916 Amps- Danville2 (RCTL) - An engineering study needs to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload. Estimated Cost: $25,000. In addition, new relay packages will be required if the settings cannot be adjusted. Estimated cost: $600,000. 8) ACSR ~ 1351.5 ~ 45/7 ~ DIPPER - Conductor Section 3 - 0.03 miles of conductor will need to re-conductored/rebuilt. Estimated cost: $0.045 Million. 9) ACSR ~ 1351.5 ~ 45/7 ~ DIPPER - Conductor Section 1 - 0.03 miles of conductor will need to re-conductored/rebuilt. Estimated cost: $0.045 Million 10) Breaker (2000A) Non Oil- E. Danville CB L - East Danville Circuit Breaker L needs to be replaced. Estimated cost: $1,000,000. New Rating: S/N: 351 MVA S/E: 474 MVA. The total costs for AEP upgrades items 1 – 10 outlined above is $8,890,000. The estimated schedule is 24 to 36 months after signing the Interconnection Service Agreement.	Pending	$8,890,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
13	6SAPONY-6CARSON 230 kV line	Line #238 Sapony to Carson 230 kV: wreck and rebuild the line of 12 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $29,425,000 and 30-36 months to engineer and construct.	Pending	$29,425,000
14	6EVERETS-6GREENVILE T 230 kV line	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	Pending	TBD
15,25	3FIVE PT-3WHARTON 115 kV line ; AB2-169 TAP-3FIVE PT 115 kV line	Line #189 AB2-169 Tap – Five Points DP – Wharton 115 kV: wreck and rebuild the line of 24 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost $47,310,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	Pending	$47,310,000
16,17	3POPLR C-3EVERETS 115 kV	Line #25 Pop Chap – Everetts 115 kV: replace relay in Everetts to increase its line rating to 263 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost $200,000 to 14-16 months to engineer, permit and construct.	Pending	$200,000
18	6TRWBRDG 230/115 kV transformer	Trowbridge 230 – 115 kV Tx#1: replace the 230-115 kV transformer #1 increase its line rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). It is estimated to cost $5,500,000 and 24-30 months to engineer and construct.	Pending	$5,500,000
19 (36)	6ELIZ CT-6SHAWBRO 230 kV line	Line #2021 Elizabeth City – Shawboro 230 kV wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $25,700,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required	Pending	$25,700,000
20,21,22, 24	6S HERTFORD-6WINFALL 230 kV line ; Z1-036 TAP-6S HERTFORD 230 kV line	Line #2131 Z1-036 – Tap S Hertford – Winfall 230 kV: wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $19,875,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	Pending	$19,875,000
23	8SPOTSYL-8MORRSVL 500 kV line	Line #594 Morrisville – Spotsylvania 500 kV: wreck and rebuild the line of 17 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump).. It is estimated to cost $56,250,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$56,250,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
			Total New Network Upgrades	**$458,345,000**

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 %

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
26,27	6MORNSTR-6ROCKYMT230T 230 kV line	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	Pending	TBD
28,31,32	6SKIFF CREEK-6KINGS M 230 kV line; 6PENNIMAN-6WALR209 230 kV line	Line #209(A) Skiffes Creek – Kingsmill – Pennimann – Waller 230 kV: wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $28,200,000 and 30-36 months to engineer, permit and construct. A VA CPCN is required.	Pending	28,200,000
29	8ELMONT 500/230 kV transformer	Elmont 500 – 230 kV Tx#1: replace the 500-230 kV transformer #1 increase its line rating to 1134 MVA (normal), 1203 MVA (emergency), and 1365 MVA (load dump). It is estimated to cost $17,500,000 and 24-30 months to engineer and construct.	Pending	17,500,000
30	6CHESTF B-6BASIN 230 kV line	Line #259 Chesterfield – Basin 230 kV: reconductor 0.14 miles of 1109 ACAR with a conductor which will increase the line rating to approximately 706 MVA (normal), 706 MVA (emergency), and 812 MVA (load dump). It is estimated to cost $250,000 and 15-18 months to engineer, permit and construct.	Pending	250,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
33	6WALR209-6LIGH209 230 kV line	Line #2113 Lightfoot– Waller 230 kV: wreck and rebuild the line of 4 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $15,200,000 and 30-36 months to engineer, permit and construct. A VA CPCN is required.	Pending	15,200,000
34	6CLUBHSE-6SAPONY 230 kV line	Line #238 Clubhouse to Sapony 230 kV: wreck and rebuild the line of 17 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $41,900,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required.	Pending	41,900,000
35	6EVERETS-6GREENVILE T 230 kV line	The limiting element is not on the VEPCO facilities. The external Duke / Progress Energy (i.e. Non-PJM) Transmission Owner will evaluate this violation during the System Impact Study phase	Pending	TBD
36 (19)	6ELIZ CT-6SHAWBRO 230 kV line	Line #2021 Elizabeth City – Shawboro 230 kV wreck and rebuild the line of 8 miles to increase its line rating to 1047 MVA (normal), 1047 MVA (emergency), and 1204 MVA (load dump). It is estimated to cost $25,700,000 and 30-36 months to engineer, permit, and construct. A VA CPCN is required	Pending	$25,700,000
37	8CARSON-8MDLTHAN 500 kV line	Line #563 Carson – Midlothian 500 kV: wreck and rebuild the line of 38 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $112,230,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$112,230,000
38 - 43 (9)	8CHCKAHM-8ELMONT 500 kV line	Line #557 Elmont – Chickahominy 500 kV: replace the wave trap in the Chickahominy substation to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3937 MVA (load dump). It is estimated to cost $500,000 and 12-16 months to engineer and construct.	Pending	$500,000
44-46	8CHANCE-8BRISTER 500 kV line	Wreck and rebuild a 22 mile segment of the Bristers – Chancellor 500kV line #552. This will increase normal and emergency ratings to 4453 MVA. Estimated to take 36-48 months to engineer, permit and construct a VA CPCN is required. Estimated cost is $73,000,000	Pending	$73,000,000

#	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
47-51	8ELMONT-8LADYSMITH 500 kV line	Wreck and rebuild the Elmont - Ladysmith 500kV line #574 (26 miles) to a minimum rating of 4453 MVA. Estimated time 36-48 months to engineer and construct. Estimated cost is $78,300,000.	Pending	$78,300,000
52-57	8LADYSMITH-8CHANCE 500 kV line	Wreck and rebuild the Chancellor - Ladysmith 500kV line #581 (existing line of 15 miles). This will increase normal and emergency ratings to 4453 MVA. Estimated to take 36-48 months to engineer, permit and construct a VA CPCN is required. Estimated cost is $50,000,000.	Pending	$50,000,000
58,59	8LADYSMITH-8POSSUM 500 kV line	Line #568 Ladysmith – Possum Pt 500 kV: replace wave trap at both Ladysmith and Possum Point Substations miles to increase its line rating to 3424 MVA (normal), 3424 MVA (emergency), and 3751 MVA (load dump). It is estimated to cost $500,000 to 14-16 months to engineer, permit and construct.	Pending	$500,000
60-62	8MDLTHAN-8NO ANNA 500 kV line	Line #576 Midlothian – North Anna 500 kV: wreck and rebuild the line of 41 miles increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5121 MVA (load dump). It is estimated to cost $123,390,000 and 44-48 months to engineer, permit, and construct. A VA CPCN is required.	Pending	$123,390,000
63-65 (11)	8NO ANNA-8SPOTSYL 500 kV line	Line #573 North Anna – Spotsylvania 500 kV: wreck and rebuild the line of 14 miles to increase its line rating to 4453 MVA (normal), 4453 MVA (emergency), and 5152 MVA (load dump). It is estimated to cost $42,000,000 to 44-48 months to engineer, permit and construct. A VA CPCN is required.	Pending	$42,000,000
66-68	AB2-100 TAP-6CLUBHSE 230 kV line	Line #254 AB2-100 Tap – Clubhouse 230 kV: wreck and rebuild the AB2-100 TAP-Clubhouse 230kV line of 2 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost $5,000,000 and 24-28 months to engineer, permit and construct. A VA CPCN is required.	Pending	$5,000,000
69 (12)	05EDAN 1-05DANVL2 138 kV line	The total costs for AEP upgrades items 1 – 10 in previous section is $8,890,000. The estimated schedule is 24 to 36 months after signing the Interconnection Service Agreement. See mitigation for violation #12 for itemized list.	Pending	$8,890,000
			Total New Network Upgrades	**$622,560,000**

Potential Congestion due to Local Energy Deliverability

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 IC can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

Contingency					Bus				Loading %		Rating		
#	Type	Name	Affected Area	Facility Description	From	To	Cir.	Power Flow	Initial	Final	Type	MVA	MW Contribution
70	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	146.41	151.38	ER	374	42.86
71	N-1	DVP_P1-2: LN 2058	DVP - DVP	6MORNSTR-6NASH 230 kV line	313845	314591	1	DC	129.44	133.66	ER	449	43.72
72	N-1	DVP_P1-2: LN 246	DVP - DVP	6MACKEYS-6EDENTON 230 kV line	314203	314637	1	DC	81.19	111.06	ER	731	219.94
73	N-1	DVP_P1-2: LN 557	DVP - DVP	6SKIFF CREEK-6KINGSM 230 kV line	314209	314386	1	DC	135.62	138.44	ER	442	27.33
74	N-1	DVP_P1-2: LN 557	DVP - DVP	6CHARCTY-6LAKESIDE 230 kV line	314225	314227	1	DC	100.14	101.48	ER	984	35.36
75	N-1	DVP_P1-2: LN 563	DVP - DVP	6CARSON-6CHRL249 230 kV line	314282	314285	1	DC	99.34	101.1	ER	559	28.55
76	N-1	DVP_P1-2: LN 563	DVP - DVP	6CHESTF B-6BASIN 230 kV line	314287	314276	1	DC	151.72	154.57	ER	449	28.07
77	N-1	DVP_P1-2: LN 557	DVP - DVP	6PENNIMAN-6WALR209 230 kV line	314296	314415	1	DC	124.67	127.48	ER	442	27.33

Contingency					Bus				Loading %		Rating		
#	Type	Name	Affected Area	Facility Description	From	To	Cir.	Power Flow	Initial	Final	Type	MVA	MW Contribution
78	N-1	DVP_P1-2: LN 557	DVP - DVP	6KINGS M-6PENNIMAN 230 kV line	314386	314296	1	DC	128.11	130.92	ER	442	27.33
79	N-1	DVP_P1-2: LN 557	DVP - DVP	6WALR209-6LIGH209 230 kV line	314415	314391	1	DC	110.54	113.36	ER	442	27.33
80	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	120.12	131.22	ER	679	75.24
81	N-1	DVP_P1-2: LN 2126	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	125.62	138.22	ER	599	75.3
82	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	140.99	170.19	ER	572	170.37
83	Non	Non	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	88.32	103.31	NR	572	85.52
84	N-1	DVP_P1-2: LN 2131A	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	94.07	116.09	ER	478	105.26
85	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6NUCO TP-6SUFFOLK 230 kV line	314575	314537	1	DC	134.97	164.17	ER	572	170.37
86	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	140.26	159.45	ER	375	71.92
87	Non	Non	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	110.09	115.32	NR	375	43.35
88	N-1	DVP_P1-2: LN 2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	118.72	122.76	ER	470	43.72
89	N-1	DVP_P1-2: LN 2034-A	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	73.73	129.14	ER	225	124.48

Contingency					Bus				Loading %		Rating		
#	Type	Name	Affected Area	Facility Description	From	To	Cir.	Power Flow	Initial	Final	Type	MVA	MW Contribution
90	N-1	DVP_P1-2: LN 2034-A	DVP - DVP	3TRWBRDG2-3POPLR C 115 kV line	314614	314596	1	DC	61.64	105.2	ER	286	124.48
91	N-1	DVP_P1-2: LN 2034-B	DVP - DVP	6TRWBRDG 230/115 kV transformer	314616	314613	1	DC	60.09	127.35	ER	195	131.05
92	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6TRWBRDG-AD1-023 TAP 230 kV line	314616	933990	1	DC	71.78	135.23	ER	572	362.64
93	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6CASHIE-AC2-158 TAP 230 kV line	314620	933450	1	DC	86.73	150.18	ER	572	362.64
94	N-1	DVP_P1-2: LN 246	DVP - DVP	6EDENTON-Z1-036 TAP 230 kV line	314637	916040	1	DC	77.79	107.78	ER	733	219.92
95	N-1	DVP_P1-2: LN 247	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	104.33	133.02	ER	572	163.98
96	N-1	DVP_P1-2: LN 2020	DVP - DVP	6SUNBURY-6SUFFOLK 230 kV line	314648	314537	1	DC	122.22	156.3	ER	449	153.11
97	N-1	DVP_P1-2: LN 2020	DVP - DVP	6WINFALL-W1-029 230 kV line	314651	901080	1	DC	76.73	110.83	ER	449	153.21
98	N-1	DVP_P1-2: LN 246	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	102.67	132.65	ER	733	219.82
99	N-1	DVP_P1-2: LN 557	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	114.72	116.52	ER	3219	125.23
100	N-1	DVP_P1-2: LN 576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	148.39	150.7	ER	2442	125.06
101	Non	Non	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	118.11	119.9	NR	2442	97.13

Contingency					Bus				Loading %		Rating		
#	Type	Name	Affected Area	Facility Description	From	To	Cir.	Power Flow	Initial	Final	Type	MVA	MW Contribution
102	N-1	DVP_P1-2: LN 594	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	139.58	140.81	ER	2442	82.75
103	N-1	DVP_P1-2: LN 576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	183.11	185.41	ER	2442	137.77
104	Non	Non	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	126.79	128.04	NR	2442	86.9
105	N-1	DVP_P1-2: LN 573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	125.7	126.96	ER	2738	83.93
106	N-1	DVP_P1-2: LN 594	DVP - DVP	8LADYSMITH-8POSSUM 500 kV line	314911	314922	1	DC	126.84	127.49	ER	2442	72.02
107	N-1	DVP_P1-2: LN 574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	158.54	160.86	ER	2442	126.48
108	Non	Non	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	97.23	99.01	NR	2442	94.12
109	N-1	DVP_P1-2: LN 573	DVP - DVP	8NO ANNA-8LADYSMITH 500 kV line	314918	314911	1	DC	104.08	105.08	ER	3219	66.22
110	N-1	DVP_P1-2: LN 581	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	116.56	117.65	ER	3219	91.84
111	N-1	DVP_P1-2: LN 563	DVP - DVP	8SURRY-8CHCKAHM 500 kV line	314924	314903	1	DC	104.1	106.65	ER	1809	114.8
112	N-1	DVP_P1-2: LN 552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	120.38	121.59	ER	3219	90.86
113	N-1	DVP_P1-2: LN 2020	DVP - DVP	W1-029-6SUNBURY 230 kV line	901080	314648	1	DC	123.79	157.86	ER	449	153.11

Contingency					Bus				Loading %		Rating		
#	Type	Name	Affected Area	Facility Description	From	To	Cir.	Power Flow	Initial	Final	Type	MVA	MW Contribution
114	N-1	DVP_P1-2: LN 246	DVP - DVP	Z1-036 TAP-6S HERTFORD 230 kV line	916040	314662	1	DC	107.68	137.66	ER	733	219.82
115	Non	Non	DVP - DVP	Z1-036 TAP-6S HERTFORD 230 kV line	916040	314662	1	DC	74.83	101.26	NR	733	193.8
116	N-1	DVP_P1-2: LN 246	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	153.81	161.1	ER	375	60.37
117	Non	Non	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	125.19	131.7	NR	375	43.35
118	N-1	DVP_P1-2: LN 2131A	DVP - DVP	AC2-158 TAP-6EARLEYS 230 kV line	933450	314569	1	DC	97.04	160.5	ER	572	362.64
119	N-1	DVP_P1-2: LN 2131A	DVP - DVP	AD1-023 TAP-6CASHIE 230 kV line	933990	314620	1	DC	88.37	151.82	ER	572	362.64
120	N-1	AEP_P1-2_#1377	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	111.33	114.07	ER	415	25.22

Light Load Analysis

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Affected System Analysis & Mitigation

Duke, Progress & TVA Impacts:

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

OPTION 2

Network Impacts

PJM assessed the impact of the proposed Queue Project as an injection into the ITO's transmission system, for compliance with NERC Reliability Criteria. The system was assessed using the summer 2021 RTEP case. When performing analysis, ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under single contingency (normal and stressed system conditions). A full listing of the ITO's Planning Criteria and interconnection requirements can be found in the ITO's Facility Connection Requirements which are publicly available at: http://www.dom.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically NERC Category C Contingency Conditions (Bus Fault, Tower Line, N-1-1, and Stuck Breaker scenarios) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For ITO Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating. The results of these studies are discussed in more detail below.

The Queue Project AD1-076 was evaluated as a 484.0 MW (Capacity 320.7 MW) injection tapping the Trowbridge to Pantego 115kV substation in the ITO area. Project AD1-076 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-076 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
AEP_P1-2_#1377	CONTINGENCY 'AEP_P1-2_#1377' OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1 OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1 END

Contingency Name	Description
AEP_P4_#7589_05J.FERR 765	CONTINGENCY 'AEP_P4_#7589_05J.FERR 765' OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1 OPEN BRANCH FROM BUS 242514 TO BUS 242684 CKT 2 / 242514 05J.FERR 765 242684 05J.FERR 138 2 OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1 END
DVP_P1-2: LN 1020-B	CONTINGENCY 'DVP_P1-2: LN 1020-B' /*ADDED ON 4/19/2016 OPEN BRANCH FROM BUS 934520 TO BUS 314613 CKT 1 /* AD1-076 TAP 115.00 - 3TRWBRDG 115.00 END
DVP_P1-2: LN 130-A	CONTINGENCY 'DVP_P1-2: LN 130-A' OPEN BRANCH FROM BUS 314562 TO BUS 314570 CKT 1 /* 3CLUBHSE 115.00 - 3METCATP 115.00 OPEN BRANCH FROM BUS 314570 TO BUS 314572 CKT 1 /* 3METCATP 115.00 - 3EMPORIA 115.00 OPEN BRANCH FROM BUS 314570 TO BUS 314588 CKT 1 /* 3METCATP 115.00 - 3METCALF 115.00 OPEN BRANCH FROM BUS 314572 TO BUS 925170 CKT 1 /* 3EMPORIA 115.00 - AB2-174 TAP 115.00 OPEN BRANCH FROM BUS 314572 TO BUS 314863 CKT 1 /* 3EMPORIA 115.00 - 3EMPOR_1 115.00 OPEN BUS 314570 /* ISLAND OPEN BUS 314572 /* ISLAND OPEN BUS 314588 /* ISLAND END
DVP_P1-2: LN 167	CONTINGENCY 'DVP_P1-2: LN 167' OPEN BRANCH FROM BUS 314613 TO BUS 314621 CKT 1 /* 3TRWBRDG 115.00 - 3WEYERH 115.00 END

Contingency Name	Description
DVP_P1-2: LN 168	CONTINGENCY 'DVP_P1-2: LN 168' OPEN BRANCH FROM BUS 314614 TO BUS 314621 CKT 1 /* 3TROWBR2 115.00 - 3WEYERH 115.00 END
DVP_P1-2: LN 189	CONTINGENCY 'DVP_P1-2: LN 189' / PJM FIXED OPEN BRANCH FROM BUS 314576 TO BUS 314622 CKT 1 /* 3FIVE PT 115.00 - 3WHARTON 115.00 OPEN BRANCH FROM BUS 314622 TO BUS 314867 CKT 1 /* 3WHARTON 115.00 - 3WHART_1 115.00 OPEN BUS 314576 /* ISLAND: 3FIVE PT 115.00 OPEN BUS 314867 /* ISLAND: 3WHART_1 115.00 END
DVP_P1-2: LN 2020	CONTINGENCY 'DVP_P1-2: LN 2020' OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND OPEN BUS 314639 /* ISLAND OPEN BUS 913391 /* ISLAND OPEN BUS 913392 /* ISLAND END
DVP_P1-2: LN 2034-A	CONTINGENCY 'DVP_P1-2: LN 2034-A' OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 6EARLEYS 230.00 - AC2-158 TAP 230.00 END
DVP_P1-2: LN 2058	CONTINGENCY 'DVP_P1-2: LN 2058' OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6MORNSTR 230.00

Contingency Name	Description
	END
DVP_P1-2: LN 2131_FSA	CONTINGENCY 'DVP_P1-2: LN 2131_FSA' OPEN BRANCH FROM BUS 314203 TO BUS 314637 CKT 1 /* 6MACKEYS 230.00 - 6EDENTON 230.00 OPEN BRANCH FROM BUS 314637 TO BUS 916040 CKT 1 /* 6EDENTON 230.00 - Z1-036 TAP 230.00 OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* ADDED BY JT FOR FULL FSA TAP REMOVAL OPEN BUS 314637 /* ISLAND END
DVP_P1-2: LN 2131A	CONTINGENCY 'DVP_P1-2: LN 2131A' OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00 OPEN BUS 314662 /* ISLAND END
DVP_P1-2: LN 2181	CONTINGENCY 'DVP_P1-2: LN 2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END
DVP_P1-2: LN 246	CONTINGENCY 'DVP_P1-2: LN 246' OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /*

Contingency Name	Description
	6NUCO TP 230.00 - 6NUCOR 230.00 OPEN BUS 314575 /* ISLAND OPEN BUS 314590 /* ISLAND END
DVP_P1-2: LN 247	CONTINGENCY 'DVP_P1-2: LN 247' OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND END
DVP_P1-2: LN 25	CONTINGENCY 'DVP_P1-2: LN 25' OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1 /* 3EVERETS 115.00 - 3POPLR C 115.00 OPEN BRANCH FROM BUS 314596 TO BUS 314614 CKT 1 /* 3POPLR C 115.00 - 3TROWBR2 115.00 OPEN BUS 314596 /* ISLAND END
DVP_P1-2: LN 552	CONTINGENCY 'DVP_P1-2: LN 552' OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 1 /* 3CHANCE 115.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00 END
DVP_P1-2: LN 557	CONTINGENCY 'DVP_P1-2: LN 557' OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00 OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00 END
DVP_P1-2: LN 563	CONTINGENCY 'DVP_P1-2: LN 563' OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /*

Contingency Name	Description
	8CARSON 500.00 - 8MDLTHAN 500.00 END
DVP_P1-2: LN 573	CONTINGENCY 'DVP_P1-2: LN 573' OPEN BRANCH FROM BUS 314918 TO BUS 314934 CKT 1 /* 8NO ANNA 500.00 - 8SPOTSYL 500.00 END
DVP_P1-2: LN 574	CONTINGENCY 'DVP_P1-2: LN 574' OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LDYSMTH 500.00 END
DVP_P1-2: LN 575	CONTINGENCY 'DVP_P1-2: LN 575' OPEN BRANCH FROM BUS 314911 TO BUS 314918 CKT 1 /* 8LDYSMTH 500.00 - 8NO ANNA 500.00 END
DVP_P1-2: LN 576	CONTINGENCY 'DVP_P1-2: LN 576' OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 END
DVP_P1-2: LN 581	CONTINGENCY 'DVP_P1-2: LN 581' OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00 END
DVP_P1-2: LN 594	CONTINGENCY 'DVP_P1-2: LN 594' OPEN BRANCH FROM BUS 314916 TO BUS 314934 CKT 1 /* 8MORRSVL 500.00 - 8SPOTSYL 500.00 END
DVP_P1-3: 6EVERETS-3EVERETS	CONTINGENCY 'DVP_P1-3: 6EVERETS-3EVERETS' OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 1 END

Contingency Name	Description
DVP_P4-2: 2014T2034	CONTINGENCY 'DVP_P4-2: 2014T2034' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1 /* 2014 END
DVP_P4-2: 2020T2144	CONTINGENCY 'DVP_P4-2: 2020T2144' /* WINFALL 230 KV OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND: 6ECITYDP2 230.00 OPEN BUS 314639 /* ISLAND: 6TANGLEW 230.00 OPEN BUS 913391 /* ISLAND: Y1-086 C 230.00 OPEN BUS 913392 /* ISLAND: Y1-086 E 230.00 OPEN BUS 917121 /* ISLAND: Z2-027 C 230.00 OPEN BUS 917122 /* ISLAND: Z2-027 E 230.00 OPEN BRANCH FROM BUS 314651 TO BUS 901080 CKT 1 /* 6WINFALL 230.00 - W1-029 230.00 END
DVP_P4-2: 2034T2126	CONTINGENCY 'DVP_P4-2: 2034T2126' /* TROWBRIDGE OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1 /* LINE 2126 OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1 /* LINE 2126

Contingency Name	Description
	OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1 /* LINE 2034 OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1 /* TROWBRIDGE TX.*1 OPEN BRANCH FROM BUS 314616 TO BUS 314614 CKT 1 /* TROWBRIDGE TX.*2 END
DVP_P4-2: 24662	CONTINGENCY 'DVP_P4-2: 24662' /* EARLEYS OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 1 /* TX. #3 OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 314537 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 246 - NUCOR END
DVP_P4-2: 24682	CONTINGENCY 'DVP_P4-2: 24682' /* 24682 @ SUFFOLK OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* SUFFOLK - NUCOR TAP OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* NUCOR TAP - EARLEYS OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2 /* SUFFOLK 230-115 TX#5 OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2 /* SUFFOLK 500-230 TX#8 END
DVP_P4-2: 246T247	CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK 230 KV OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00 OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00

Contingency Name	Description
	OPEN BUS 314575 /* ISLAND: 6NUCO TP 230.00 OPEN BUS 314590 /* ISLAND: 6NUCOR 230.00 OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00 END
DVP_P4-2: 24742	CONTINGENCY 'DVP_P4-2: 24742' /* SUFFOLK 230 KV OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00 OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00 OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 1 /* 3SUFFOLK 115.00 - 6SUFFOLK 230.00 OPEN BRANCH FROM BUS 314537 TO BUS 314928 CKT 1 /* 6SUFFOLK 230.00 - 8SUFFOLK 500.00 REMOVE SWSHUNT FROM BUS 314537 END
DVP_P4-2: 25T168	CONTINGENCY 'DVP_P4-2: 25T168' /* TROWBRIDGE /*REPLACED ON 4/19/2016 OPEN BRANCH FROM BUS 314614 TO BUS 314621 CKT 1 /* LINE 168 OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* TROWBRIDGE TX.*2 OPEN BRANCH FROM BUS 314614 TO BUS 314596 CKT 1 /* LINE 25 BREAKER OPEN BRANCH FROM BUS 314596 TO BUS 314573 CKT 1 /* LINE 25

Contingency Name	Description
	OPEN BUS 314614 END
DVP_P4-2: 557T574	CONTINGENCY 'DVP_P4-2: 557T574' /* ELMONT OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557) OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1) OPEN BRANCH FROM BUS 314911 TO BUS 314908 CKT 1 /*ELMONT TO LADYSMITH (LINE 574) END
DVP_P4-2: 562T563	CONTINGENCY 'DVP_P4-2: 562T563' /*CARSON OPEN BRANCH FROM BUS 314902 TO BUS 314923 CKT 1 /*CARSON TO MIDLOTHIAN OPEN BRANCH FROM BUS 314914 TO BUS 314902 CKT 1 /*CARSON 500.00 - 8SEPTA 500.00 END
DVP_P4-2: 56372	CONTINGENCY 'DVP_P4-2: 56372' /*CARSON OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MIDLOTHIAN 500.00 OPEN BRANCH FROM BUS 314902 TO BUS 314282 CKT 1 /*CARSON 500-230 (TX#1) END
DVP_P4-2: 563T576	CONTINGENCY 'DVP_P4-2: 563T576' /* MIDLOTHIAN 500 500 KV OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 END
DVP_P4-2: 57302	CONTINGENCY 'DVP_P4-2: 57302' /*NORTH ANNA OPEN BRANCH FROM BUS 314934 TO BUS 314918 CKT 1 /*NORTH ANNA TO SPOTSYLVANIA (LINE 573) OPEN BRANCH FROM BUS 314918 TO BUS 314232 CKT 1

Contingency Name	Description
	/*NORTH ANNA 500-230 (TX#5) END
DVP_P4-2: 57602	CONTINGENCY 'DVP_P4-2: 57602' /* NORTH ANNA 500 KV OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 OPEN BRANCH FROM BUS 314232 TO BUS 314918 CKT 1 /* 6NO ANNA 230.00 - 8NO ANNA 500.00 END
DVP_P4-2: H1T9033	CONTINGENCY 'DVP_P4-2: H1T9033' /*MORRISVILLE OPEN BRANCH FROM BUS 314934 TO BUS 314916 CKT 1 /*SPOTSYLVANIA TO MORRISVILLE (LINE 9033) OPEN BRANCH FROM BUS 314916 TO BUS 314063 CKT 1 /*MORRISVILLE 500-230 (TX#1) OPEN BRANCH FROM BUS 314916 TO BUS 314897 CKT 1 /*MORRISVILLE CAP BANK END
DVP_P4-2: H2T2014	CONTINGENCY 'DVP_P4-2: H2T2014' /* EVERETTS OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1 /* 2014 OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 1 /* EVERETTS TX.*2 END
DVP_P4-2: H2T557	CONTINGENCY 'DVP_P4-2: H2T557' /* ELMONT OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557) OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1) OPEN BRANCH FROM BUS 314908 TO BUS 314218 CKT 2 /*ELMONT 500-230 (TX#2) END

Contingency Name	Description
DVP_P4-2: L2T168	CONTINGENCY 'DVP_P4-2: L2T168' /* TROWBRIDGE /*REPLACED ON 4/19/2016 OPEN BRANCH FROM BUS 314614 TO BUS 314621 CKT 1 /* LINE 168 OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* TROWBRIDGE TX.*2 OPEN BRANCH FROM BUS 314614 TO BUS 314596 CKT 1 /* LINE 25 BREAKER OPEN BUS 314614 END
DVP_P4-2: SPOTSH1T9033	CONTINGENCY 'DVP_P4-2: SPOTSH1T9033' /*SPOTSYLVANIA OPEN BRANCH FROM BUS 314934 TO BUS 314916 CKT 1 /*SPOTSYLVANIA TO MORRISVILLE (LINE 9033) OPEN BRANCH FROM BUS 314934 TO BUS 314755 CKT 1 /*SPOTSYLVANIA 500/115 (TX#1) END
DVP_P4-2: WT576	CONTINGENCY 'DVP_P4-2: WT576' /* NORTH ANNA 500 KV OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00 OPEN BRANCH FROM BUS 314232 TO BUS 314918 CKT 2 /* 6NO ANNA 230.00 - 8NO ANNA 500.00 END
DVP_P4-2: XT573	CONTINGENCY 'DVP_P4-2: XT573' /*NORTH ANNA OPEN BRANCH FROM BUS 314934 TO BUS 314918 CKT 1 /*NORTH ANNA TO SPOTSYLVANIA (LINE 573) OPEN BRANCH FROM BUS 314918 TO BUS 314232 CKT 2 /*NORTH ANNA 500-230 (TX#6) END
DVP_P4-3: H172	CONTINGENCY 'DVP_P4-3: H172' /* TROWBRIDGE OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1 /* LINE 2126

Contingency Name	Description
	OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1 /* LINE 2126 OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1 /* TROWBRIDGE TX.*1 END
DVP_P4-3: L262	CONTINGENCY 'DVP_P4-3: L262' /* EVERETTS OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 1 /* EVERETTS TX.*2 OPEN BRANCH FROM BUS 314573 TO BUS 314622 CKT 1 /* 82 OPEN BRANCH FROM BUS 314622 TO BUS 314618 CKT 1 /* 82 OPEN BRANCH FROM BUS 314622 TO BUS 314867 CKT 1 /* WHARTON CAP 1 OPEN BRANCH FROM BUS 314622 TO BUS 314876 CKT 1 /* WHARTON CAP 2 OPEN BRANCH FROM BUS 314622 TO BUS 314576 CKT 1 /* 189 OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1 /* 25 OPEN BRANCH FROM BUS 314573 TO BUS 314624 CKT 1 /* 96 OPEN BRANCH FROM BUS 314624 TO BUS 314601 CKT 1 /* 96 OPEN BRANCH FROM BUS 314601 TO BUS 314629 CKT 1 /* 96 OPEN BRANCH FROM BUS 314629 TO BUS 314593 CKT 1 /* 96 OPEN BUS 314864 /* EVERETTS 115KV CAP OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 2 /* EVERETTS TX.*4 OPEN BRANCH FROM BUS 314573 TO BUS 314552 CKT 1 /* 139 END

Contingency Name	Description
DVP_P4-5: L212	CONTINGENCY 'DVP_P4-5: L212' /* EVERETTS 115 KV OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1 /* 3EVERETS 115.00 - 3POPLR C 115.00 OPEN BRANCH FROM BUS 314573 TO BUS 314622 CKT 1 /* 3EVERETS 115.00 - 3WHARTON 115.00 OPEN BRANCH FROM BUS 314573 TO BUS 314574 CKT 1 /* 3EVERETS 115.00 - 6EVERETS 230.00 END
DVP_P7-1: LN 198-552	CONTINGENCY 'DVP_P7-1: LN 198-552' OPEN BRANCH FROM BUS 314135 TO BUS 314367 CKT 1 /* 3CHANCE 115.00 - 3CHANC_1 115.00 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314775 CKT 1 /* 3CHANCE 115.00 - 3NI RVER 115.00 OPEN BRANCH FROM BUS 314775 TO BUS 314779 CKT 1 /* 3NI RVER 115.00 - 3TDTAVRN 115.00 OPEN BRANCH FROM BUS 314779 TO BUS 314755 CKT 1 /* 3TDTAVRN 115.00 - 3SPOTSYL 115.00 OPEN BUS 314367 /* ISLAND CHANC_1 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00 TRANSFORMER 2 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00 END
DVP_P7-1: LN 2058-2181	CONTINGENCY 'DVP_P7-1: LN 2058-2181' OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00

Contingency Name	Description
	OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END
DVP_P7-1: LN 81-2056	CONTINGENCY 'DVP_P7-1: LN 81-2056' OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /* 3CAROLNA 115.00 - 3HORNRTN 115.00 OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /* 3HORNRTN 115.00 - 3ROAN DP 115.00 OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /* 3ROAN DP 115.00 - 3DARLINGT DP115.00 OPEN BUS 314578 /* ISLAND: 3HORNRTN 115.00 OPEN BUS 314598 /* ISLAND: 3ROAN DP 115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6MORNSTR 230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 304226 TO BUS 304222 CKT 1 /* 6PA-RMOUNT#4230.00 - 6ROCKYMT230T OPEN BUS 304226 /* ISLAND OPEN BUS 314591 /* ISLAND: 6NASH 230.00 END

Summer Peak Analysis – 2021

Generator Deliverability

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
1	N-1	DVP_P1-2: LN 563	DVP - DVP	6CARSON-6CHRL249 230 kV line	314282	314285	1	DC	99.06	100.55	ER	559	19.67	
2	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	86.74	104.79	ER	572	103.01	1
3	N-1	DVP_P1-2: LN 2131_FSA	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	86.04	104.1	ER	572	103.04	
4	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6NUCO TP-6SUFFOLK 230 kV line	314575	314537	1	DC	80.7	98.75	ER	572	103.01	2
5	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	3FIVE PT-3WHARTON 115 kV line	314576	314622	1	DC	1.35	430.51	ER	74	320.7	3
6	N-1	DVP_P1-2: LN 168	DVP - DVP	3FIVE PT-3WHARTON 115 kV line	314576	314622	1	DC	17.4	130.07	ER	74	83.67	
7	N-1	DVP_P1-2: LN 246	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	95.54	107.04	ER	375	43.01	
8	N-1	DVP_P1-2: LN 130-A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	95.86	104.94	ER	375	34.05	
9	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	3PANTEGO-AB2-169 TAP 115 kV line	314592	925120	1	DC	39.99	391.87	ER	74	320.7	4
10	N-1	DVP_P1-2: LN 168	DVP - DVP	3PANTEGO-AB2-169 TAP 115 kV line	314592	925120	1	DC	7.33	120.01	ER	74	83.67	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
11	N-1	DVP_P1-2: LN 168	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	24.98	146.48	ER	195	236.75	
12	N-1	DVP_P1-2: LN 167	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	2.04	123.66	ER	195	236.98	
13	N-1	DVP_P1-2: LN 557	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	96.02	97.18	ER	3219	80.44	
14	Non	Non	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	99.06	99.93	NR	2442	60.15	
15	N-1	DVP_P1-2: LN 575	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	99.42	100.16	ER	3219	50.14	
16	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	12.52	444.38	ER	74	320.7	5
17	N-1	DVP_P1-2: LN 168	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	31.27	143.94	ER	74	83.67	
18	Non	Non	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	23.85	104.93	NR	74	60.21	
19	N-1	AEP_P1-2_#1377	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	95.02	96.98	ER	415	18	

Multiple Facility Contingency

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
20	LFFB	DVP_P4-2: H2T2014	DVP - DVP	6EVERETS 230/115 kV transformer	314573	314574	2	DC	47	102.56	LD	289	160.76	6
21	LFFB	DVP_P4-2: 2020T2144	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	94.22	120.39	ER	478	125.06	
22	LFFB	DVP_P4-2: 2034T2126	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	20.59	162.38	LD	239	338.87	7
23	LFFB	DVP_P4-2: 2014T2034	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	75.27	127.71	LD	239	125.33	
24	LFFB	DVP_P4-2: 25T168	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	32.44	193.9	LD	220	354.88	8
25	LFFB	DVP_P4-2: L2T168	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	32.08	193.53	LD	220	354.88	
26	LFFB	DVP_P4-3: H172	DVP - DVP	3TRWBRDG-3WEYRHAEUSER 115 kV line	314613	314621	1	DC	4.45	112.74	LD	349	377.94	9
27	LFFB	DVP_P4-2: 2034T2126	DVP - DVP	3TRWBRDG-3WEYRHAEUSER 115 kV line	314613	314621	1	DC	3.73	100.95	LD	349	339.28	
28	LFFB	DVP_P4-2: 2034T2126	DVP - DVP	3TRWBRDG2-3POPLR C 115 kV line	314614	314596	1	DC	18.18	121.18	LD	329	338.87	10
29	LFFB	DVP_P4-3: L262	DVP - DVP	6TRWBRDG 230/115 kV transformer	314614	314616	1	DC	19.29	137.51	LD	200	236.2	11
30	LFFB	DVP_P4-5: L212	DVP - DVP	6TRWBRDG 230/115 kV transformer	314614	314616	1	DC	18.79	137.01	LD	200	236.2	
31	LFFB	DVP_P4-3: H172	DVP - DVP	6TRWBRDG 230/115 kV transformer	314614	314616	1	DC	17.55	129	LD	200	222.69	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
32	LFFB	DVP_P4-3: H172	DVP - DVP	3WEYRHAEUSER-3TRWBRDG2 115 kV line	314621	314614	1	DC	17.87	126.04	LD	349	377.52	12
33	LFFB	DVP_P4-2: 2034T2126	DVP - DVP	3WEYRHAEUSER-3TRWBRDG2 115 kV line	314621	314614	1	DC	17.11	114.21	LD	349	338.87	
34	LFFB	DVP_P4-2: 24742	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	85.42	104.15	LD	699	130.96	
35	LFFB	DVP_P4-2: 24682	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	84.27	104.32	LD	897	179.84	13
36	LFFB	DVP_P4-2: H2T557	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	95.61	97.07	LD	3938	124.52	
37	DCTL	DVP_P7-1: LN 198-552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	98.99	99.94	LD	3938	87.63	
38	LFFB	DVP_P4-2: 24682	DVP - DVP	Z1-036 TAP-6S HERTFORD 230 kV line	916040	314662	1	DC	88.37	108.42	LD	897	179.84	14

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None

Contributions to previously identified circuit breakers found to be over-duty:

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)

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
39	DCTL	DVP_P7-1: LN 81-2056	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	144.38	150.15	ER	374	47.78	15
40	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	103.23	111.66	ER	374	31.5	
41	N-1	DVP_P1-2: LN 557	DVP - DVP	6SKIFF CREEK-6KINGS M 230 kV line	314209	314386	1	DC	140.92	142.64	ER	442	16.69	16
42	LFFB	DVP_P4-2: H2T557	DVP - DVP	8ELMONT 500/230 kV transformer	314218	314908	1	DC	124.07	126.57	LD	1051	67.16	17
43	LFFB	DVP_P4-2: 562T563	DVP - DVP	6CARSON-6CHRL249 230 kV line	314282	314285	1	DC	112.05	113.9	LD	684	29.4	18
44	LFFB	DVP_P4-2: 562T563	DVP - DVP	6CHRL249-6LOCKS 230 kV line	314285	314316	1	DC	109.24	111.09	LD	684	29.4	19
45	N-1	DVP_P1-2: LN 563	DVP - DVP	6CHESTF B-6BASIN 230 kV line	314287	314276	1	DC	127.01	128.86	ER	449	18.25	20
46	N-1	DVP_P1-2: LN 557	DVP - DVP	6PENNIMAN-6WALR209 230 kV line	314296	314415	1	DC	129.94	131.66	ER	442	16.69	21
47	N-1	DVP_P1-2: LN 557	DVP - DVP	6KINGS M-6PENNIMAN 230 kV line	314386	314296	1	DC	133.4	135.12	ER	442	16.69	22
48	N-1	DVP_P1-2: LN 557	DVP - DVP	6WALR209-6LIGH209 230 kV line	314415	314391	1	DC	115.84	117.56	ER	442	16.69	23

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
49	LFFB	DVP_P4-2: 24662	DVP - DVP	6CLUBHSE-AD1-034 TAP 230 kV line	314563	934070	1	DC	122.27	127.07	LD	637	67.54	24
50	DCTL	DVP_P7-1: LN 2058-2181	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	119.79	143	ER	478	110.93	25
51	LFFB	DVP_P4-2: 246T247	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	117.3	132.89	LD	459	71.43	26
52	LFFB	DVP_P4-2: 246T247	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	116.15	138.4	LD	699	155.54	27
53	LFFB	DVP_P4-2: 557T574	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	102.86	104.38	LD	3938	129.37	28
54	N-1	DVP_P1-2: LN 563	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	121.99	123.45	ER	2442	78.15	29
55	N-1	DVP_P1-2: LN 576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	121.2	122.64	ER	2442	78.26	
56	LFFB	DVP_P4-2: 563T576	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	120.21	122.01	LD	3144	124.49	
57	LFFB	DVP_P4-2: 56372	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	117.22	118.91	LD	3144	118.5	
58	N-1	DVP_P1-2: LN 594	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	121.97	122.81	ER	2442	52.94	30
59	N-1	DVP_P1-2: LN 573	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	118.05	119.03	ER	2442	51.93	
60	LFFB	DVP_P4-2: H1T9033	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	102.65	103.46	LD	3351	80.08	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
61	N-1	DVP_P1-2: LN 576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	157.92	159.48	ER	2442	88.09	31
62	N-1	DVP_P1-2: LN 563	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	141.71	143.03	ER	2442	74.8	
63	LFFB	DVP_P4-2: 57602	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	133.57	135.2	LD	3351	132.93	
64	LFFB	DVP_P4-2: WT576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	133.56	135.2	LD	3351	132.93	
65	N-1	DVP_P1-2: LN 573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	112.7	113.61	ER	2738	53.67	32
66	N-1	DVP_P1-2: LN 594	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	110.75	111.63	ER	2738	51.69	
67	LFFB	DVP_P4-2: SPOTSH1T 9033	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	106.57	107.41	LD	3351	80.62	
68	LFFB	DVP_P4-2: 57302	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	103.61	104.7	LD	3351	81.43	
69	LFFB	DVP_P4-2: XT573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	103.61	104.7	LD	3351	81.42	
70	N-1	DVP_P1-2: LN 574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	126.95	128.46	ER	2442	81.53	33
71	N-1	DVP_P1-2: LN 557	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	118.17	119.35	ER	2442	77.76	
72	LFFB	DVP_P4-2: 557T574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	115.61	117.24	LD	3637	133.52	

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
73	N-1	DVP_P1-2: LN 581	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	101.83	102.56	ER	3219	58.85	34
74	N-1	DVP_P1-2: LN 552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	104.12	104.94	ER	3219	58.24	35
75	N-1	DVP_P1-2: LN 581	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	102.5	103.24	ER	3219	57.35	
76	LFFB	DVP_P4-2: 246T247	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	126.01	141.6	LD	459	71.43	36
77	LFFB	DVP_P4-2: 24682	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	123.7	137.94	LD	459	65.25	
78	N-1	DVP_P1-2: LN 246	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	106.87	118.38	ER	375	43.01	
79	N-1	DVP_P1-2: LN 130-A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	106.41	115.49	ER	375	34.05	
80	LFFB	AEP_P4_#7589_05J.FERR 765	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	111.38	114.33	ER	415	27.16	37

Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be determined during Impact Study

Stability and Reactive Power Requirement for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined during Impact Study

Potential Congestion due to Local Energy Deliverability

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 IC can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. 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 shall study all overload conditions associated with the overloaded element(s) identified.

	Contingency		Affected		Bus			Power	Loading %		Rating		MW
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution
81	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6MORNSTR-6ROCKYMT230T 230 kV line	313845	304222	1	DC	143.99	149.73	ER	374	47.53
82	N-1	DVP_P1-2: LN 2058	DVP - DVP	6MORNSTR-6NASH 230 kV line	313845	314591	1	DC	127.36	138.16	ER	449	48.49
83	N-1	DVP_P1-2: LN 246	DVP - DVP	6MACKEYS-6EDENTON 230 kV line	314203	314637	1	DC	81.3	105.8	ER	731	180.63
84	N-1	DVP_P1-2: LN 557	DVP - DVP	6SKIFF CREEK-6KINGSM 230 kV line	314209	314386	1	DC	135.64	138.23	ER	442	25.19
85	N-1	DVP_P1-2: LN 557	DVP - DVP	6CHARCTY-6LAKESIDE 230 kV line	314225	314227	1	DC	99.87	101.13	ER	984	34.19
86	N-1	DVP_P1-2: LN 563	DVP - DVP	6CARSON-6CHRL249 230 kV line	314282	314285	1	DC	101.69	103.68	ER	559	29.69
87	N-1	DVP_P1-2: LN 563	DVP - DVP	6CHRL249-6LOCKS 230 kV line	314285	314316	1	DC	98.27	100.26	ER	559	29.69
88	N-1	DVP_P1-2: LN 563	DVP - DVP	6CHESTF B-6BASIN 230 kV line	314287	314276	1	DC	151.75	154.54	ER	449	27.54

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
89	N-1	DVP_P1-2: LN 557	DVP - DVP	6PENNIMAN-6WALR209 230 kV line	314296	314415	1	DC	124.66	127.26	ER	442	25.19
90	N-1	DVP_P1-2: LN 557	DVP - DVP	6KINGS M-6PENNIMAN 230 kV line	314386	314296	1	DC	128.13	130.72	ER	442	25.19
91	N-1	DVP_P1-2: LN 557	DVP - DVP	6WALR209-6LIGH209 230 kV line	314415	314391	1	DC	110.56	113.15	ER	442	25.19
92	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	127.37	132.24	ER	679	73.26
93	N-1	DVP_P1-2: LN 246	DVP - DVP	6CLUBHSE-AD1-034 TAP 230 kV line	314563	934070	1	DC	129.92	135.04	ER	599	67.72
94	Non	Non	DVP - DVP	6CLUBHSE-AD1-034 TAP 230 kV line	314563	934070	1	DC	112.36	116.06	NR	599	48.91
95	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	141.22	167.84	ER	572	155.47
96	Non	Non	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	88.53	103.98	NR	572	88.18
97	N-1	DVP_P1-3: 6EVERETS - 3EVERETS	DVP - DVP	6EVERETS 230/115 kV transformer	314573	314574	2	DC	36.36	104.62	ER	241	164.8
98	N-1	DVP_P1-2: LN 2131A	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	93.96	119.64	ER	478	124.97
99	Non	Non	DVP - CPLE	6EVERETS-6GREENVILE T 230 kV line	314574	304451	1	DC	80.3	100.63	NR	478	97.13
100	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6NUCO TP-6SUFFOLK 230 kV line	314575	314537	1	DC	135.19	161.8	ER	572	155.47

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
101	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	3FIVE PT-3WHARTON 115 kV line	314576	314622	1	DC	45.79	697.55	ER	74	484
102	Non	Non	DVP - DVP	3FIVE PT-3WHARTON 115 kV line	314576	314622	1	DC	26.72	149.09	NR	74	90.87
103	N-1	DVP_P1-2: LN 246	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	135.81	153.15	ER	375	64.91
104	Non	Non	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	107.75	113.46	NR	375	47.36
105	N-1	DVP_P1-2: LN 2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	116.75	127.08	ER	470	48.49
106	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	3PANTEGO-AB2-169 TAP 115 kV line	314592	925120	1	DC	39.99	611.77	ER	74	484
107	Non	Non	DVP - DVP	3PANTEGO-AB2-169 TAP 115 kV line	314592	925120	1	DC	0.11	122.48	NR	74	90.87
108	N-1	DVP_P1-2: LN 2034-A	DVP - DVP	3POPLR C-3EVERETS 115 kV line	314596	314573	1	DC	73.68	134.72	ER	225	137.12
109	N-1	DVP_P1-2: LN 168	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	34.81	218.17	ER	195	357.31
110	Non	Non	DVP - DVP	6TRWBRDG 230/115 kV transformer	314613	314616	1	DC	20.29	103.34	NR	190	157.69
111	N-1	DVP_P1-2: LN 189	DVP - DVP	3TRWBRDG-3WEYRHAEUSER 115 kV line	314613	314621	1	DC	15.39	126.89	ER	270	300.83
112	N-1	DVP_P1-2: LN 2034-A	DVP - DVP	3TRWBRDG2-3POPLR C 115 kV line	314614	314596	1	DC	61.64	109.62	ER	286	137.12

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
113	N-1	DVP_P1-2: LN 25	DVP - DVP	6TRWBRDG 230/115 kV transformer	314614	314616	1	DC	21.14	121.7	ER	182	183.39
114	Non	Non	DVP - DVP	6TRWBRDG 230/115 kV transformer	314614	314616	1	DC	24.8	108.64	NR	168	140.61
115	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6TRWBRDG-AD1-023 TAP 230 kV line	314616	933990	1	DC	71.78	117.47	ER	572	261.12
116	N-1	DVP_P1-2: LN 2131A	DVP - DVP	6CASHIE-AC2-158 TAP 230 kV line	314620	933450	1	DC	86.76	132.45	ER	572	261.12
117	N-1	DVP_P1-2: LN 189	DVP - DVP	3WEYRHAEUSER-3TRWBRDG2 115 kV line	314621	314614	1	DC	25.83	137.19	ER	270	300.41
118	Non	Non	DVP - DVP	3WEYRHAEUSER-3TRWBRDG2 115 kV line	314621	314614	1	DC	19.32	114.39	NR	247	235.03
119	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	3WHARTON-3EVERETS 115 kV line	314622	314573	1	DC	9.58	155.45	ER	332	484
120	N-1	DVP_P1-2: LN 246	DVP - DVP	6EDENTON-Z1-036 TAP 230 kV line	314637	916040	1	DC	77.9	102.54	ER	733	180.61
121	N-1	DVP_P1-2: LN 247	DVP - DVP	6ELIZ CT-6SHAWBRO 230 kV line	314638	314647	1	DC	104.33	127.13	ER	572	130.35
122	N-1	DVP_P1-2: LN 2020	DVP - DVP	6SUNBURY-6SUFFOLK 230 kV line	314648	314537	1	DC	122.24	149.18	ER	449	121.05
123	N-1	DVP_P1-2: LN 2020	DVP - DVP	6WINFALL-W1-029 230 kV line	314651	901080	1	DC	77.01	105.01	ER	449	121.15
124	N-1	DVP_P1-2: LN 246	DVP - DVP	6S HERTFORD-6WINFALL 230 kV line	314662	314651	1	DC	102.77	127.39	ER	733	180.52

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
125	N-1	DVP_P1-2: LN 557	DVP - DVP	8CARSON-8MDLTHAN 500 kV line	314902	314914	1	DC	114.98	116.72	ER	3219	121.4
126	N-1	DVP_P1-2: LN 563	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	148.37	150.57	ER	2442	117.95
127	Non	Non	DVP - DVP	8CHCKAHM-8ELMONT 500 kV line	314903	314908	1	DC	117.9	119.28	NR	2442	90.78
128	N-1	DVP_P1-2: LN 594	DVP - DVP	8CHANCE-8BRISTER 500 kV line	314905	314900	1	DC	139.62	140.83	ER	2442	79.89
129	N-1	DVP_P1-2: LN 576	DVP - DVP	8ELMONT-8LADYSMITH 500 kV line	314908	314911	1	DC	183.15	185.39	ER	2442	132.94
130	N-1	DVP_P1-2: LN 573	DVP - DVP	8LADYSMITH-8CHANCE 500 kV line	314911	314905	1	DC	125.84	127.16	ER	2738	80.99
131	N-1	DVP_P1-2: LN 574	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	158.58	160.84	ER	2442	123.05
132	Non	Non	DVP - DVP	8MDLTHAN-8NO ANNA 500 kV line	314914	314918	1	DC	97.63	99.37	NR	2442	92.08
133	N-1	DVP_P1-2: LN 573	DVP - DVP	8NO ANNA-8LADYSMITH 500 kV line	314918	314911	1	DC	104.26	105.24	ER	3219	65.15
134	N-1	DVP_P1-2: LN 581	DVP - DVP	8NO ANNA-8SPOTSYL 500 kV line	314918	314934	1	DC	116.52	117.55	ER	3219	88.82
135	N-1	DVP_P1-2: LN 563	DVP - DVP	8SURRY-AD1-151 TAP 500 kV line	314924	935160	1	DC	104.04	106.21	ER	1809	108.27
136	N-1	DVP_P1-2: LN 552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	120.37	121.54	ER	3219	87.9

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
137	N-1	DVP_P1-2: LN 2020	DVP - DVP	W1-029-6SUNBURY 230 kV line	901080	314648	1	DC	123.79	150.73	ER	449	121.05
138	N-1	DVP_P1-2: LN 246	DVP - DVP	Z1-036 TAP-6S HERTFORD 230 kV line	916040	314662	1	DC	107.8	132.42	ER	733	180.52
139	N-1	DVP_P1-2: LN 246	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	151.44	168.79	ER	375	64.91
140	Non	Non	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	120.11	125.82	NR	375	47.36
141	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	59.66	711.42	ER	74	484
142	Non	Non	DVP - DVP	AB2-169 TAP-3FIVE PT 115 kV line	925120	314576	1	DC	40.59	162.96	NR	74	90.87
143	N-1	DVP_P1-2: LN 2131A	DVP - DVP	AC2-158 TAP-6EARLEYS 230 kV line	933450	314569	1	DC	97.05	142.74	ER	572	261.12
144	N-1	DVP_P1-2: LN 2131A	DVP - DVP	AD1-023 TAP-6CASHIE 230 kV line	933990	314620	1	DC	88.37	134.06	ER	572	261.12
145	N-1	DVP_P1-2: LN 246	DVP - DVP	AD1-034 TAP-6SAPONY 230 kV line	934070	314435	1	DC	138.93	144.04	ER	599	67.72
146	N-1	DVP_P1-2: LN 1020-B	DVP - DVP	AD1-076 TAP-3PANTEGO 115 kV line	934520	314592	1	DC	0	145.86	ER	332	484
147	N-1	DVP_P1-2: LN 189	DVP - DVP	AD1-076 TAP-3TRWBRDG 115 kV line	934520	314613	1	DC	13.35	159.21	ER	332	484
148	Non	Non	DVP - DVP	AD1-076 TAP-3TRWBRDG 115 kV line	934520	314613	1	DC	6.82	125.29	NR	332	393.13

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
149	N-1	DVP_P1-2: LN 563	DVP - DVP	AD1-151 TAP-8CHCKAHM 500 kV line	935160	314903	1	DC	104.19	106.46	ER	1809	108.27
150	N-1	AEP_P1-2_#1377	AEP - AEP	05EDAN 1-05DANVL2 138 kV line	242631	242620	1	DC	111.36	114.3	ER	415	27.16

Light Load Analysis

Light Load Studies to be conducted during later study phases (as required by PJM Manual 14B).

Affected System Analysis & Mitigation

Duke, Progress & TVA Impacts:

Duke Carolina, Progress, & TVA Impacts to be determined during later study phases (as applicable).

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the Appendices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the Appendices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators.

It should be noted the project/generator MW contributions presented in the body of the report and appendices sections are full contributions, whereas the loading percentages reported in the body of the report, those contributions take into consideration the commercial probability of each project as well as the ramping impact of "Adder" contributions.

OPTION 1

Appendix 1

(DVP - DVP) The 6MORNSTR-6NASH 230 kV line (from bus 313845 to bus 314591 ckt 1) loads from 93.72% to 100.17% (**DC power flow**) of its emergency rating (449 MVA) for the single line contingency outage of 'DVP_P1-2: LN 2058'. This project contributes approximately 28.97 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 2058'
OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6MORNSTR 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*1.42*
315292	*1DOMTR78*	*0.96*
315293	*1DOMTR9*	*0.78*
315131	*1EDGECMA*	*25.16*
315132	*1EDGECMB*	*25.16*
315139	*1GASTONA*	*4.12*
315141	*1GASTONB*	*4.12*
315126	*1ROARAP2*	*1.32*
315128	*1ROARAP4*	*1.27*
315136	*1ROSEMG1*	*3.44*
315138	*1ROSEMG2*	*1.61*
315137	*1ROSEMS1*	*2.14*
315115	*1S HAMPT1*	*0.91*
314704	*3LAWRENC*	*0.21*
932631	*AC2-084 C*	*8.57*
933451	*AC2-158 C*	*3.5*
933461	*AC2-159 C*	*5.08*
933711	*AC2-194 C*	*0.35*
933991	*AD1-023 C*	*7.37*
934041	*AD1-029 C*	*10.6*
934201	*AD1-047 C*	*5.87*
934231	*AD1-050 C*	*1.62*
934331	*AD1-057 C O1*	*20.13*
934521	*AD1-076 C O1*	*28.97*
LTF	*AMIL*	*0.39*
LTF	*BAYOU*	*2.04*
LTF	*BIG_CAJUN1*	*3.21*
LTF	*BIG_CAJUN2*	*6.46*
LTF	*BLUEG*	*2.05*
LTF	*CALDERWOOD*	*1.2*
LTF	*CANNELTON*	*0.39*
LTF	*CARR*	*< 0.01*

LTF	*CATAWBA*	*1.18*
LTF	*CELEVELAND*	*3.34*
LTF	*CHEOAH*	*1.12*
LTF	*CHILHOWEE*	*0.39*
LTF	*CHOCTAW*	*2.19*
LTF	*CLIFTY*	*7.53*
LTF	*COTTONWOOD*	*7.98*
LTF	*DEARBORN*	*0.75*
LTF	*EDWARDS*	*0.63*
LTF	*ELMERSMITH*	*1.14*
LTF	*FARMERCITY*	*0.49*
LTF	*G-007A*	*0.78*
LTF	*GIBSON*	*0.72*
LTF	*HAMLET*	*4.66*
LTF	*MORGAN*	*3.53*
LTF	*NEWTON*	*1.73*
LTF	*O-066A*	*0.36*
LTF	*PRAIRIE*	*3.73*
LTF	*ROWAN*	*2.47*
LTF	*SANTEETLA*	*0.33*
LTF	*SMITHLAND*	*0.33*
LTF	*TATANKA*	*0.84*
LTF	*TILTON*	*0.75*
LTF	*TRIMBLE*	*0.39*
LTF	*TVA*	*1.49*
LTF	*UNIONPOWER*	*2.14*
900671	*V4-068 C*	*0.07*
LTF	*VFT*	*2.08*
901081	*W1-029C*	*0.41*
LTF	*X1-078*	*0.6*
913391	*Y1-086 C*	*0.08*
916041	*Z1-036 C*	*0.48*
917121	*Z2-027 C*	*0.14*
917331	*Z2-043 C*	*0.37*
917341	*Z2-044 C*	*0.33*
917511	*Z2-088 C OP1*	*1.7*
917591	*Z2-099 C*	*0.12*
918411	*AA1-050*	*1.43*
918491	*AA1-063AC OP*	*1.22*
918511	*AA1-065 C OP*	*1.18*
918531	*AA1-067 C*	*0.25*
918561	*AA1-072 C*	*0.06*
919691	*AA2-053 C*	*1.35*
919701	*AA2-057 C*	*1.62*
919731	*AA2-059 C*	*0.09*

919821	AA2-068 C	0.46
920021	AA2-086 C	0.06
920041	AA2-088 C	0.75
920591	AA2-165 C	0.22
920631	AA2-169 C	1.08
920671	AA2-174 C	0.06
920691	AA2-178 C	4.42
930051	AB1-013 C	1.33
930401	AB1-081 C	14.54
930861	AB1-132 C	16.04
931231	AB1-173 C	1.65
931241	AB1-173AC	1.65
923801	AB2-015 C O1	4.12
923851	AB2-025 C	0.2
923911	AB2-031 C O1	1.64
923941	AB2-035 C	0.68
923991	AB2-040 C O1	5.38
924151	AB2-059 C O1	17.13
924381	AB2-087 C	0.4
924391	AB2-088 C	0.88
924401	AB2-089 C	0.73
924491	AB2-098 C	0.43
924501	AB2-099 C	0.41
924511	AB2-100 C	8.55
925121	AB2-169 C	4.09
925171	AB2-174 C O1	5.02
925281	AB2-186 C	0.21
925291	AB2-188 C O1	1.09
925591	AC1-034 C	13.94
925781	AC1-054 C	2.86
926071	AC1-086 C	23.63
926201	AC1-098 C	6.01
926211	AC1-099 C	2.01
926771	AC1-163 C	1.34
927021	AC1-189 C	12.37
927111	AC1-206 C	6.91
927141	AC1-208 C	8.88

Appendix 2

(DVP - DVP) The 6CARSON-6CHRL249 230 kV line (from bus 314282 to bus 314285 ckt 1) loads from 97.62% to 99.01% (**DC power flow**) of its emergency rating (559 MVA) for the single line contingency outage of 'DVP_P1-2: LN 563'. This project contributes approximately 18.91 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 563'
OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*4.15*
315103	*1BRUNSWICKG2*	*4.15*
315104	*1BRUNSWICKG3*	*4.15*
315105	*1BRUNSWICKS1*	*8.62*
315131	*1EDGECMA*	*4.35*
315132	*1EDGECMB*	*4.35*
315139	*1GASTONA*	*2.33*
315141	*1GASTONB*	*2.33*
315159	*1KERR 2*	*0.72*
315163	*1KERR 6*	*0.71*
315164	*1KERR 7*	*0.71*
315126	*1ROARAP2*	*0.91*
315128	*1ROARAP4*	*0.87*
315136	*1ROSEMG1*	*1.61*
315138	*1ROSEMG2*	*0.75*
315137	*1ROSEMS1*	*1.*
314704	*3LAWRENC*	*0.26*
932631	*AC2-084 C*	*4.22*
932701	*AC2-093 C*	*31.41*
933451	*AC2-158 C*	*2.17*
933461	*AC2-159 C*	*3.31*
933991	*AD1-023 C*	*4.74*
934041	*AD1-029 C*	*5.22*
934201	*AD1-047 C*	*5.42*
934231	*AD1-050 C*	*2.13*
934331	*AD1-057 C O1*	*5.48*
934521	*AD1-076 C O1*	*18.91*
934611	*AD1-087 C O1*	*3.13*
LTF	*AD1-120*	*4.35*
LTF	*AD1-121*	*4.33*
934911	*AD1-123 C*	*0.37*
935171	*AD1-152 C O1*	*2.9*
935211	*AD1-156 C*	*0.93*

LTF	*CARR*	*0.15*
LTF	*CBM-S1*	*5.23*
LTF	*CBM-S2*	*10.26*
LTF	*CBM-W1*	*11.26*
LTF	*CBM-W2*	*28.09*
LTF	*CIN*	*2.55*
LTF	*CPLE*	*3.23*
LTF	*IPL*	*1.62*
LTF	*LGEE*	*0.55*
LTF	*MEC*	*5.76*
LTF	*MECS*	*2.49*
LTF	*RENSSELAER*	*0.12*
LTF	*ROSETON*	*0.87*
900671	*V4-068 C*	*0.05*
LTF	*WEC*	*0.7*
916301	*Z1-086 C*	*25.24*
917331	*Z2-043 C*	*0.21*
917341	*Z2-044 C*	*0.13*
917511	*Z2-088 C OP1*	*0.42*
917591	*Z2-099 C*	*0.08*
918411	*AA1-050*	*0.36*
918491	*AA1-063AC OP*	*0.84*
918561	*AA1-072 C*	*0.03*
919691	*AA2-053 C*	*0.91*
919701	*AA2-057 C*	*0.67*
919821	*AA2-068 C*	*0.22*
LTF	*AA2-074*	*2.2*
920021	*AA2-086 C*	*0.04*
920041	*AA2-088 C*	*0.52*
920591	*AA2-165 C*	*0.09*
920631	*AA2-169 C*	*1.08*
920671	*AA2-174 C*	*0.04*
930401	*AB1-081 C*	*4.16*
930861	*AB1-132 C*	*9.08*
931231	*AB1-173 C*	*1.52*
931241	*AB1-173AC*	*1.52*
923801	*AB2-015 C O1*	*2.98*
923851	*AB2-025 C*	*0.54*
923911	*AB2-031 C O1*	*1.51*
923941	*AB2-035 C*	*0.15*
923991	*AB2-040 C O1*	*4.97*
924021	*AB2-043 C O1*	*1.25*
924151	*AB2-059 C O1*	*4.9*
924161	*AB2-060 C O1*	*3.57*
924301	*AB2-077 C O1*	*0.79*

924311	*AB2-078 C O1*	*0.79*
924321	*AB2-079 C O1*	*0.79*
924381	*AB2-087 C*	*0.25*
924391	*AB2-088 C*	*0.19*
924401	*AB2-089 C*	*0.97*
924411	*AB2-090 C*	*1.58*
924491	*AB2-098 C*	*0.23*
924501	*AB2-099 C*	*0.25*
924511	*AB2-100 C*	*10.1*
925121	*AB2-169 C*	*2.44*
925171	*AB2-174 C O1*	*4.92*
925221	*AB2-176 C*	*0.65*
925591	*AC1-034 C*	*3.08*
925611	*AC1-036 C*	*0.32*
925781	*AC1-054 C*	*3.36*
926071	*AC1-086 C*	*13.37*
926201	*AC1-098 C*	*2.96*
926211	*AC1-099 C*	*0.99*
926271	*AC1-105 C*	*1.98*
926771	*AC1-163 C*	*0.83*
927021	*AC1-189 C*	*3.71*
927111	*AC1-206 C*	*9.01*
927141	*AC1-208 C*	*4.63*

Appendix 3

(DVP - DVP) The 6EARLEYS-6NUCO TP 230 kV line (from bus 314569 to bus 314575 ckt 1) loads from 86.56% to 106.35% (**DC power flow**) of its emergency rating (572 MVA) for the single line contingency outage of 'DVP_P1-2: LN 2131A'. This project contributes approximately 112.89 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 2131A'
OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00
OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00
OPEN BUS 314662 /* ISLAND
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.77*
315292	*1DOMTR78*	*3.23*
315293	*1DOMTR9*	*2.63*
315131	*1EDGECMA*	*9.02*
315132	*1EDGECMB*	*9.02*
315139	*1GASTONA*	*3.89*
315141	*1GASTONB*	*3.89*
315159	*1KERR 2*	*0.85*
315163	*1KERR 6*	*0.84*
315164	*1KERR 7*	*0.84*
315126	*1ROARAP2*	*1.58*
315128	*1ROARAP4*	*1.52*
315136	*1ROSEMG1*	*2.75*
315138	*1ROSEMG2*	*1.29*
315137	*1ROSEMS1*	*1.7*
314704	*3LAWRENC*	*0.23*
932631	*AC2-084 C*	*11.32*
933451	*AC2-158 C*	*12.21*
933461	*AC2-159 C*	*9.55*
933991	*AD1-023 C*	*27.83*
934041	*AD1-029 C*	*14.*
934201	*AD1-047 C*	*6.39*
934231	*AD1-050 C*	*2.75*
934331	*AD1-057 C O1*	*10.19*
934521	*AD1-076 C O1*	*112.89*
LTF	*AD1-120*	*4.28*
LTF	*AD1-121*	*4.25*
LTF	*CARR*	*0.09*
LTF	*CBM-S1*	*5.29*
LTF	*CBM-S2*	*10.69*

LTF	*CBM-W1*	*11.82*
LTF	*CBM-W2*	*28.65*
LTF	*CIN*	*2.65*
LTF	*CPLE*	*3.68*
LTF	*IPL*	*1.69*
LTF	*LGEE*	*0.57*
LTF	*MEC*	*5.94*
LTF	*MECS*	*2.71*
LTF	*RENSSELAER*	*0.07*
LTF	*ROSETON*	*0.5*
900671	*V4-068 C*	*0.11*
LTF	*WEC*	*0.73*
916041	*Z1-036 C*	*2.69*
917331	*Z2-043 C*	*0.76*
917341	*Z2-044 C*	*0.27*
917511	*Z2-088 C OP1*	*1.21*
917591	*Z2-099 C*	*0.13*
918411	*AA1-050*	*1.02*
918491	*AA1-063AC OP*	*1.44*
918511	*AA1-065 C OP*	*4.02*
918531	*AA1-067 C*	*0.52*
918561	*AA1-072 C*	*0.11*
919691	*AA2-053 C*	*2.02*
919701	*AA2-057 C*	*1.49*
919731	*AA2-059 C*	*0.47*
919821	*AA2-068 C*	*0.5*
LTF	*AA2-074*	*2.51*
920021	*AA2-086 C*	*0.07*
920041	*AA2-088 C*	*0.83*
920591	*AA2-165 C*	*0.2*
920631	*AA2-169 C*	*1.56*
920671	*AA2-174 C*	*0.09*
920691	*AA2-178 C*	*19.71*
930051	*AB1-013 C*	*5.95*
930401	*AB1-081 C*	*8.64*
930861	*AB1-132 C*	*15.15*
931231	*AB1-173 C*	*1.8*
931241	*AB1-173AC*	*1.8*
923911	*AB2-031 C O1*	*1.78*
923941	*AB2-035 C*	*0.4*
923991	*AB2-040 C O1*	*5.86*
924151	*AB2-059 C O1*	*10.18*
924381	*AB2-087 C*	*1.08*
924391	*AB2-088 C*	*0.51*
924401	*AB2-089 C*	*1.25*

924491	*AB2-098 C*	*0.88*
924501	*AB2-099 C*	*0.99*
924511	*AB2-100 C*	*7.31*
925121	*AB2-169 C*	*11.96*
925171	*AB2-174 C O1*	*5.33*
925291	*AB2-188 C O1*	*4.86*
925591	*AC1-034 C*	*8.09*
925781	*AC1-054 C*	*4.54*
926071	*AC1-086 C*	*22.31*
926201	*AC1-098 C*	*7.94*
926211	*AC1-099 C*	*2.66*
926771	*AC1-163 C*	*3.28*
927021	*AC1-189 C*	*11.67*
927111	*AC1-206 C*	*5.79*
927141	*AC1-208 C*	*9.96*

Appendix 4

(DVP - DVP) The 6NUCO TP-6SUFFOLK 230 kV line (from bus 314575 to bus 314537 ckt 1) loads from 80.55% to 100.33% (**DC power flow**) of its emergency rating (572 MVA) for the single line contingency outage of 'DVP_P1-2: LN 2131A'. This project contributes approximately 112.89 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 2131A'
OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00
OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00
OPEN BUS 314662 /* ISLAND
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.77*
315292	*1DOMTR78*	*3.23*
315293	*1DOMTR9*	*2.63*
315131	*1EDGECMA*	*9.02*
315132	*1EDGECMB*	*9.02*
315139	*1GASTONA*	*3.89*
315141	*1GASTONB*	*3.89*
315159	*1KERR 2*	*0.85*
315163	*1KERR 6*	*0.84*
315164	*1KERR 7*	*0.84*
315126	*1ROARAP2*	*1.58*
315128	*1ROARAP4*	*1.52*
315136	*1ROSEMG1*	*2.75*
315138	*1ROSEMG2*	*1.29*
315137	*1ROSEMS1*	*1.7*
314704	*3LAWRENC*	*0.23*
932631	*AC2-084 C*	*11.32*
933451	*AC2-158 C*	*12.21*
933461	*AC2-159 C*	*9.55*
933991	*AD1-023 C*	*27.83*
934041	*AD1-029 C*	*14.*
934201	*AD1-047 C*	*6.39*
934231	*AD1-050 C*	*2.75*
934331	*AD1-057 C O1*	*10.19*
934521	*AD1-076 C O1*	*112.89*
LTF	*AD1-120*	*4.28*
LTF	*AD1-121*	*4.25*
LTF	*CARR*	*0.09*
LTF	*CBM-S1*	*5.29*
LTF	*CBM-S2*	*10.69*

LTF	*CBM-W1*	*11.82*
LTF	*CBM-W2*	*28.65*
LTF	*CIN*	*2.65*
LTF	*CPLE*	*3.68*
LTF	*IPL*	*1.69*
LTF	*LGEE*	*0.57*
LTF	*MEC*	*5.94*
LTF	*MECS*	*2.71*
LTF	*RENSSELAER*	*0.07*
LTF	*ROSETON*	*0.5*
900671	*V4-068 C*	*0.11*
LTF	*WEC*	*0.73*
916041	*Z1-036 C*	*2.69*
917331	*Z2-043 C*	*0.76*
917341	*Z2-044 C*	*0.27*
917511	*Z2-088 C OP1*	*1.21*
917591	*Z2-099 C*	*0.13*
918411	*AA1-050*	*1.02*
918491	*AA1-063AC OP*	*1.44*
918511	*AA1-065 C OP*	*4.02*
918531	*AA1-067 C*	*0.52*
918561	*AA1-072 C*	*0.11*
919691	*AA2-053 C*	*2.02*
919701	*AA2-057 C*	*1.49*
919731	*AA2-059 C*	*0.47*
919821	*AA2-068 C*	*0.5*
LTF	*AA2-074*	*2.51*
920021	*AA2-086 C*	*0.07*
920041	*AA2-088 C*	*0.83*
920591	*AA2-165 C*	*0.2*
920631	*AA2-169 C*	*1.56*
920671	*AA2-174 C*	*0.09*
920691	*AA2-178 C*	*19.71*
930051	*AB1-013 C*	*5.95*
930401	*AB1-081 C*	*8.64*
930861	*AB1-132 C*	*15.15*
931231	*AB1-173 C*	*1.8*
931241	*AB1-173AC*	*1.8*
923911	*AB2-031 C O1*	*1.78*
923941	*AB2-035 C*	*0.4*
923991	*AB2-040 C O1*	*5.86*
924151	*AB2-059 C O1*	*10.18*
924381	*AB2-087 C*	*1.08*
924391	*AB2-088 C*	*0.51*
924401	*AB2-089 C*	*1.25*

924491	*AB2-098 C*	*0.88*
924501	*AB2-099 C*	*0.99*
924511	*AB2-100 C*	*7.31*
925121	*AB2-169 C*	*11.96*
925171	*AB2-174 C O1*	*5.33*
925291	*AB2-188 C O1*	*4.86*
925591	*AC1-034 C*	*8.09*
925781	*AC1-054 C*	*4.54*
926071	*AC1-086 C*	*22.31*
926201	*AC1-098 C*	*7.94*
926211	*AC1-099 C*	*2.66*
926771	*AC1-163 C*	*3.28*
927021	*AC1-189 C*	*11.67*
927111	*AC1-206 C*	*5.79*
927141	*AC1-208 C*	*9.96*

Appendix 5

(DVP - DVP) The 6LAKEVEW-AB2-100 TAP 230 kV line (from bus 314583 to bus 924510 ckt 1) loads from 97.05% to 107.75% (**DC power flow**) of its emergency rating (375 MVA) for the single line contingency outage of 'DVP_P1-2: LN 246'. This project contributes approximately 40.0 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 246'
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00
OPEN BUS 314575 /* ISLAND
OPEN BUS 314590 /* ISLAND
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*1.91*
315292	*1DOMTR78*	*1.29*
315293	*1DOMTR9*	*1.06*
315131	*1EDGECMA*	*10.25*
315132	*1EDGECMB*	*10.25*
315139	*1GASTONA*	*7.85*
315141	*1GASTONB*	*7.85*
315159	*1KERR 2*	*0.55*
315163	*1KERR 6*	*0.55*
315164	*1KERR 7*	*0.55*
315126	*1ROARAP2*	*1.59*
315128	*1ROARAP4*	*1.53*
315136	*1ROSEMG1*	*5.27*
315138	*1ROSEMG2*	*2.47*
315137	*1ROSEMS1*	*3.27*
315115	*1S HAMPT1*	*0.87*
932631	*AC2-084 C*	*9.07*
933451	*AC2-158 C*	*5.83*
933461	*AC2-159 C*	*6.88*
933991	*AD1-023 C*	*10.79*
934041	*AD1-029 C*	*11.22*
934231	*AD1-050 C*	*2.06*
934331	*AD1-057 C O1*	*15.83*
934521	*AD1-076 C O1*	*40.*
LTF	*AD1-120*	*3.64*
LTF	*AD1-121*	*3.61*
LTF	*CARR*	*0.09*

LTF	*CBM-S1*	*4.38*
LTF	*CBM-S2*	*9.*
LTF	*CBM-W1*	*9.53*
LTF	*CBM-W2*	*23.61*
LTF	*CIN*	*2.14*
LTF	*CPLE*	*3.08*
LTF	*IPL*	*1.36*
LTF	*LGEE*	*0.46*
LTF	*MEC*	*4.84*
LTF	*MECS*	*2.14*
LTF	*RENSSELAER*	*0.07*
LTF	*ROSETON*	*0.53*
900671	*V4-068 C*	*0.08*
LTF	*WEC*	*0.59*
916041	*Z1-036 C*	*0.44*
917331	*Z2-043 C*	*0.48*
917341	*Z2-044 C*	*0.27*
917511	*Z2-088 C OP1*	*0.99*
917591	*Z2-099 C*	*0.13*
918411	*AA1-050*	*0.84*
918491	*AA1-063AC OP*	*1.43*
918511	*AA1-065 C OP*	*2.04*
918531	*AA1-067 C*	*0.32*
918561	*AA1-072 C*	*0.07*
919691	*AA2-053 C*	*1.72*
919701	*AA2-057 C*	*1.43*
919731	*AA2-059 C*	*0.09*
919821	*AA2-068 C*	*0.45*
LTF	*AA2-074*	*2.1*
920021	*AA2-086 C*	*0.07*
920041	*AA2-088 C*	*0.82*
920591	*AA2-165 C*	*0.19*
920631	*AA2-169 C*	*1.34*
920671	*AA2-174 C*	*0.08*
920691	*AA2-178 C*	*5.4*
930051	*AB1-013 C*	*1.63*
930401	*AB1-081 C*	*9.31*
930861	*AB1-132 C*	*30.54*
923801	*AB2-015 C O1*	*3.7*
923941	*AB2-035 C*	*0.36*
924151	*AB2-059 C O1*	*10.97*
924381	*AB2-087 C*	*0.61*
924391	*AB2-088 C*	*0.46*
924401	*AB2-089 C*	*0.94*
924491	*AB2-098 C*	*0.54*

924501	*AB2-099 C*	*0.59*
925121	*AB2-169 C*	*5.4*
925291	*AB2-188 C O1*	*1.33*
925591	*AC1-034 C*	*7.23*
925781	*AC1-054 C*	*3.61*
926071	*AC1-086 C*	*44.98*
926201	*AC1-098 C*	*6.36*
926211	*AC1-099 C*	*2.13*
926771	*AC1-163 C*	*1.96*
927021	*AC1-189 C*	*8.69*
927141	*AC1-208 C*	*9.18*

Appendix 6

(DVP - DVP) The 8NO ANNA-8LADYSMITH 500 kV line (from bus 314918 to bus 314911 ckt 1) loads from 97.71% to 98.36% (**DC power flow**) of its emergency rating (3219 MVA) for the single line contingency outage of 'DVP_P1-2: LN 573'. This project contributes approximately 43.87 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 573'
OPEN BRANCH FROM BUS 314918 TO BUS 314934 CKT 1 /* 8NO ANNA 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*10.18*
315103	*1BRUNSWICKG2*	*10.18*
315104	*1BRUNSWICKG3*	*10.18*
315105	*1BRUNSWICKS1*	*21.15*
315153	*1CLOVER1*	*14.43*
315154	*1CLOVER2*	*14.24*
315131	*1EDGECMA*	*7.41*
315132	*1EDGECMB*	*7.41*
315108	*1ELIZAR1*	*3.04*
315109	*1ELIZAR2*	*2.99*
315110	*1ELIZAR3*	*3.08*
315172	*1LOISA A*	*3.52*
315173	*1LOISA B*	*3.54*
315174	*1LOISA C*	*3.54*
315175	*1LOISA D*	*3.54*
315176	*1LOISA E*	*7.21*
315225	*1N ANNA1*	*128.45*
315226	*1N ANNA2*	*128.38*
315177	*1S ANNAG1*	*2.26*
315179	*1S ANNAG2*	*2.26*
315178	*1S ANNAS1*	*1.16*
315180	*1S ANNAS2*	*1.16*
315083	*1SPRUNCA*	*7.26*
315084	*1SPRUNCB*	*7.26*
315085	*1SPRUNCC*	*5.38*
315086	*1SPRUNCD*	*5.38*
314643	*3O INLET*	*0.42*
932041	*AC2-012 C*	*8.06*
932511	*AC2-071 C*	*1.84*
932581	*AC2-078 C*	*2.99*
932591	*AC2-079 C*	*5.23*
932631	*AC2-084 C*	*7.12*
932701	*AC2-093 C*	*76.01*

932711	AC2-094 C	31.11
933291	AC2-141 C	24.2
933451	AC2-158 C	4.42
933461	AC2-159 C	5.44
933471	AC2-161 C	1.72
933501	AC2-165 C	11.01
933711	AC2-194 C	0.87
933731	AC2-196 C	1.43
933991	AD1-023 C	10.61
934041	AD1-029 C	8.8
934061	AD1-033 C O1	5.99
934201	AD1-047 C	6.67
934231	AD1-050 C	3.86
934311	AD1-055 C	2.01
934331	AD1-057 C O1	8.09
934521	AD1-076 C O1	43.88
934531	AD1-077 C	2.48
934571	AD1-082 C O1	5.84
934611	AD1-087 C O1	7.96
934621	AD1-088 C O1	13.91
LTF	AD1-120	9.67
LTF	AD1-121	9.64
934911	AD1-123 C	0.88
935111	AD1-144 C	1.32
935171	AD1-152 C O1	7.37
935211	AD1-156 C	1.61
935221	AD1-157 C	1.25
935231	AD1-160 C	0.92
LTF	CARR	1.08
LTF	CBM-S1	10.95
LTF	CBM-S2	22.65
LTF	CBM-W1	19.53
LTF	CBM-W2	57.11
LTF	CIN	4.63
LTF	CPLE	7.06
LTF	IPL	2.94
LTF	LGEE	1.03
LTF	MEC	11.
LTF	MECS	3.27
LTF	RENSSELAER	0.86
LTF	ROSETON	6.24
LTF	WEC	1.25
916191	Z1-068 C	0.04
916301	Z1-086 C	62.
919151	AA1-139 C	2.34

LTF	*AA2-074*	*4.8*
920631	*AA2-169 C*	*1.83*
920691	*AA2-178 C*	*7.73*
930051	*AB1-013 C*	*2.33*
930401	*AB1-081 C*	*7.15*
930861	*AB1-132 C*	*11.54*
931231	*AB1-173 C*	*1.88*
931241	*AB1-173AC*	*1.88*
923801	*AB2-015 C O1*	*6.91*
923831	*AB2-022 C*	*1.84*
923851	*AB2-025 C*	*0.41*
923861	*AB2-026 C*	*0.48*
923911	*AB2-031 C O1*	*1.86*
923941	*AB2-035 C*	*0.27*
923991	*AB2-040 C O1*	*6.12*
924021	*AB2-043 C O1*	*2.55*
924071	*AB2-051*	*108.49*
924151	*AB2-059 C O1*	*8.43*
924161	*AB2-060 C O1*	*7.35*
924301	*AB2-077 C O1*	*1.62*
924311	*AB2-078 C O1*	*1.62*
924321	*AB2-079 C O1*	*1.62*
924381	*AB2-087 C*	*0.46*
924391	*AB2-088 C*	*0.35*
924401	*AB2-089 C*	*1.75*
924411	*AB2-090 C*	*3.21*
924491	*AB2-098 C*	*0.45*
924501	*AB2-099 C*	*0.48*
924511	*AB2-100 C*	*9.63*
925021	*AB2-158 C*	*25.05*
925061	*AB2-161 C O1*	*2.56*
925121	*AB2-169 C*	*5.21*
925171	*AB2-174 C O1*	*5.87*
925221	*AB2-176 C*	*1.32*
925281	*AB2-186 C*	*0.49*
925291	*AB2-188 C O1*	*1.9*
925521	*AC1-027 C*	*0.31*
925591	*AC1-034 C*	*5.49*
925611	*AC1-036 C*	*0.78*
925781	*AC1-054 C*	*5.91*
926071	*AC1-086 C*	*17.*
926201	*AC1-098 C*	*4.99*
926211	*AC1-099 C*	*1.67*
926271	*AC1-105 C*	*4.54*
926741	*AC1-159*	*52.31*

926751	*AC1-161 C*	*24.2*
926761	*AC1-162 C*	*25.06*
926771	*AC1-163 C*	*1.57*
927021	*AC1-189 C*	*6.89*
927111	*AC1-206 C*	*8.34*
927141	*AC1-208 C*	*7.38*
927261	*AC1-222 C*	*2.89*

Appendix 7

(DVP - DVP) The 6SAPONY-6CARSON 230 kV line (from bus 314435 to bus 314282 ckt 1) loads from 98.43% to 107.52% (**DC power flow**) of its load dump rating (830 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 2020T2144'. This project contributes approximately 75.36 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 2020T2144'                    /* WINFALL 230 KV
  OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1          /* 6ECITYDP2
230.00 - 6ELIZ CT 230.00
  OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1          /* 6ECITYDP2
230.00 - 6TANGLEW 230.00
  OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1          /* 6TANGLEW
230.00 - 6WINFALL 230.00
  OPEN BUS 313851                          /* ISLAND: 6ECITYDP2 230.00
  OPEN BUS 314639                          /* ISLAND: 6TANGLEW 230.00
  OPEN BUS 913391                          /* ISLAND: Y1-086 C 230.00
  OPEN BUS 913392                          /* ISLAND: Y1-086 E 230.00
  OPEN BUS 917121                          /* ISLAND: Z2-027 C 230.00
  OPEN BUS 917122                          /* ISLAND: Z2-027 E 230.00
  OPEN BRANCH FROM BUS 314651 TO BUS 901080 CKT 1          /* 6WINFALL
230.00 - W1-029 230.00
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315131	*1EDGECMA*	*9.72*
315132	*1EDGECMB*	*9.72*
315139	*1GASTONA*	*7.07*
315141	*1GASTONB*	*7.07*
315126	*1ROARAP2*	*2.51*
315128	*1ROARAP4*	*2.41*
315136	*1ROSEMG1*	*4.76*
315138	*1ROSEMG2*	*2.23*
315137	*1ROSEMS1*	*2.95*
314557	*3BETHELC*	*0.79*
314554	*3BTLEBRO*	*0.82*
314566	*3CRESWEL*	*2.18*
314572	*3EMPORIA*	*1.*
314578	*3HORNRTN*	*4.97*
314582	*3KELFORD*	*0.9*
314704	*3LAWRENC*	*0.79*
314603	*3SCOT NK*	*3.76*
314617	*3TUNIS*	*0.84*
314541	*3WATKINS*	*0.46*
314620	*6CASHIE*	*0.79*
314574	*6EVERETS*	*2.14*

314594	6PLYMOTH	0.78
314651	6WINFALL	1.56
932631	AC2-084 C	10.32
932632	AC2-084 E	5.08
933451	AC2-158 C	5.16
933452	AC2-158 E	5.16
933461	AC2-159 C	8.61
933462	AC2-159 E	8.61
933711	AC2-194 C	0.97
933712	AC2-194 E	1.56
933991	AD1-023 C	12.16
933992	AD1-023 E	6.62
934041	AD1-029 C	12.76
934042	AD1-029 E	8.41
934201	AD1-047 C	16.72
934202	AD1-047 E	11.15
934231	AD1-050 C	4.72
934232	AD1-050 E	2.58
934331	AD1-057 C O1	14.55
934332	AD1-057 E O1	7.76
934521	AD1-076 C O1	49.94
934522	AD1-076 E O1	25.43
LTF	AD1-120	3.93
LTF	AD1-121	3.91
LTF	CARR	0.11
LTF	CBM-S1	4.8
LTF	CBM-S2	9.64
LTF	CBM-W1	10.58
LTF	CBM-W2	25.91
LTF	CIN	2.38
LTF	CPLE	3.25
LTF	G-007	0.7
LTF	IPL	1.52
LTF	LGEE	0.51
LTF	MEC	5.35
LTF	MECS	2.38
LTF	O-066	2.34
LTF	RENSSELAER	0.09
LTF	ROSETON	0.65
900671	V4-068 C	0.1
900672	V4-068 E	0.29
LTF	WEC	0.65
916041	Z1-036 C	1.19
916042	Z1-036 E	40.68
917331	Z2-043 C	0.5

917332	Z2-043 E	1.08
917341	Z2-044 C	0.29
917342	Z2-044 E	0.62
917511	Z2-088 C OP1	0.93
917512	Z2-088 E OP1	3.73
917591	Z2-099 C	0.18
917592	Z2-099 E	0.41
918411	AA1-050	0.78
918491	AA1-063AC OP	2.17
918492	AA1-063AE OP	5.21
918511	AA1-065 C OP	1.68
918512	AA1-065 E OP	4.22
918532	AA1-067 E	0.64
918561	AA1-072 C	0.07
918562	AA1-072 E	0.18
919691	AA2-053 C	2.45
919692	AA2-053 E	5.36
919701	AA2-057 C	1.58
919702	AA2-057 E	4.03
919731	AA2-059 C	0.21
919732	AA2-059 E	0.5
919821	AA2-068 C	0.53
919822	AA2-068 E	1.24
LTF	AA2-074	2.21
920021	AA2-086 C	0.1
920022	AA2-086 E	0.22
920041	AA2-088 C	1.14
920042	AA2-088 E	9.49
920591	AA2-165 C	0.22
920592	AA2-165 E	0.53
920631	AA2-169 C	2.6
920632	AA2-169 E	1.19
920671	AA2-174 C	0.11
920672	AA2-174 E	0.62
920691	AA2-178 C	8.72
920692	AA2-178 E	3.74
930051	AB1-013 C	2.63
930052	AB1-013 E	17.61
930401	AB1-081 C	9.2
930402	AB1-081 E	3.94
930861	AB1-132 C	27.5
930862	AB1-132 E	11.79
931231	AB1-173 C	4.7
931232	AB1-173 E	2.19
931241	AB1-173AC	4.7

931242	*AB1-173AE*	*2.19*
923851	*AB2-025 C*	*2.01*
923852	*AB2-025 E*	*4.59*
923911	*AB2-031 C O1*	*4.67*
923912	*AB2-031 E O1*	*2.3*
923941	*AB2-035 C*	*0.33*
923942	*AB2-035 E*	*0.14*
923991	*AB2-040 C O1*	*15.33*
923992	*AB2-040 E O1*	*12.54*
924021	*AB2-043 C O1*	*2.52*
924022	*AB2-043 E O1*	*4.14*
924151	*AB2-059 C O1*	*10.84*
924152	*AB2-059 E O1*	*5.58*
924161	*AB2-060 C O1*	*7.16*
924162	*AB2-060 E O1*	*3.37*
924301	*AB2-077 C O1*	*1.58*
924302	*AB2-077 E O1*	*1.05*
924311	*AB2-078 C O1*	*1.58*
924312	*AB2-078 E O1*	*1.05*
924321	*AB2-079 C O1*	*1.58*
924322	*AB2-079 E O1*	*1.05*
924381	*AB2-087 C*	*0.59*
924382	*AB2-087 E*	*0.28*
924391	*AB2-088 C*	*0.43*
924392	*AB2-088 E*	*0.21*
924401	*AB2-089 C*	*2.14*
924402	*AB2-089 E*	*1.1*
924411	*AB2-090 C*	*3.18*
924412	*AB2-090 E*	*1.63*
924491	*AB2-098 C*	*0.5*
924492	*AB2-098 E*	*0.21*
924501	*AB2-099 C*	*0.6*
924502	*AB2-099 E*	*0.26*
924511	*AB2-100 C*	*34.93*
924512	*AB2-100 E*	*17.2*
925121	*AB2-169 C*	*5.84*
925122	*AB2-169 E*	*5.24*
925171	*AB2-174 C O1*	*15.46*
925172	*AB2-174 E O1*	*13.98*
925221	*AB2-176 C*	*1.31*
925222	*AB2-176 E*	*0.56*
925281	*AB2-186 C*	*0.54*
925282	*AB2-186 E*	*0.23*
925291	*AB2-188 C O1*	*2.15*
925292	*AB2-188 E O1*	*0.97*

925591	*AC1-034 C*	*6.79*
925592	*AC1-034 E*	*5.13*
925781	*AC1-054 C*	*7.68*
925782	*AC1-054 E*	*3.54*
926071	*AC1-086 C*	*40.5*
926072	*AC1-086 E*	*18.43*
926201	*AC1-098 C*	*7.24*
926202	*AC1-098 E*	*4.31*
926211	*AC1-099 C*	*2.43*
926212	*AC1-099 E*	*1.42*
926771	*AC1-163 C*	*1.96*
926772	*AC1-163 E*	*0.92*
927021	*AC1-189 C*	*8.08*
927022	*AC1-189 E*	*4.02*
927111	*AC1-206 C*	*31.48*
927112	*AC1-206 E*	*14.88*
927141	*AC1-208 C*	*11.81*
927142	*AC1-208 E*	*5.25*

Appendix 8

(DVP - DVP) The 3FIVE PT-3WHARTON 115 kV line (from bus 314576 to bus 314622 ckt 1) loads from 64.55% to 126.24% (**DC power flow**) of its load dump rating (91 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 25-2034_B'. This project contributes approximately 56.14 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 25-2034_B' /*REPLACED ON 4/19/2016
OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1 /* 3EVERETS 115.00 - 3POPLR C 115.00
OPEN BRANCH FROM BUS 314596 TO BUS 314614 CKT 1 /* 3POPLR C 115.00 - 3TROWBR2 115.00
OPEN BUS 314596 /* ISLAND
OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1 /* 3TROWBR2 115.00 - 6TRWBRDG 230.00
OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1 /* 6TRWBRDG 230.00 - AD1-023 TAP 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*3.18*
315292	*1DOMTR78*	*2.15*
315293	*1DOMTR9*	*1.75*
314566	*3CRESWEL*	*1.3*
314594	*6PLYMOTH*	*0.56*
934521	*AD1-076 C O1*	*37.2*
934522	*AD1-076 E O1*	*18.94*
LTF	*AMIL*	*0.06*
LTF	*BAYOU*	*0.31*
LTF	*BIG_CAJUN1*	*0.49*
LTF	*BIG_CAJUN2*	*0.97*
LTF	*BLUEG*	*0.3*
LTF	*CALDERWOOD*	*0.18*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*< 0.01*
LTF	*CATAWBA*	*0.17*
LTF	*CELEVELAND*	*0.49*
LTF	*CHEOAH*	*0.17*
LTF	*CHILHOWEE*	*0.06*
LTF	*CHOCTAW*	*0.33*
LTF	*CLIFTY*	*1.11*
LTF	*COTTONWOOD*	*1.2*
LTF	*DEARBORN*	*0.11*
LTF	*EDWARDS*	*0.09*
LTF	*ELMERSMITH*	*0.17*

LTF	*FARMERCITY*	*0.07*
LTF	*G-007A*	*0.11*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.72*
LTF	*MORGAN*	*0.53*
LTF	*NEWTON*	*0.26*
LTF	*O-066A*	*0.05*
LTF	*PRAIRIE*	*0.56*
LTF	*RENSSELAER*	*< 0.01*
LTF	*ROSETON*	*< 0.01*
LTF	*ROWAN*	*0.35*
LTF	*SANTEETLA*	*0.05*
LTF	*SMITHLAND*	*0.05*
LTF	*TATANKA*	*0.13*
LTF	*TILTON*	*0.11*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.22*
LTF	*UNIONPOWER*	*0.32*
LTF	*VFT*	*0.3*
LTF	*X1-078*	*0.09*
916042	*Z1-036 E*	*16.14*
919732	*AA2-059 E*	*0.22*
920691	*AA2-178 C*	*5.21*
920692	*AA2-178 E*	*2.23*
930051	*AB1-013 C*	*1.57*
930052	*AB1-013 E*	*10.53*
925121	*AB2-169 C*	*19.*
925122	*AB2-169 E*	*17.05*
925281	*AB2-186 C*	*0.2*
925282	*AB2-186 E*	*0.08*
925291	*AB2-188 C O1*	*1.28*
925292	*AB2-188 E O1*	*0.58*

Appendix 9

(DVP - DVP) The 3POPLR C-3EVERETS 115 kV line (from bus 314596 to bus 314573 ckt 1) loads from 75.27% to 124.71% (**DC power flow**) of its load dump rating (239 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 2014T2034'. This project contributes approximately 118.15 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 2014T2034'                    /* EARLEYS
  OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1    /* 2034
  OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1    /* 2014
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*5.01*
315292	*1DOMTR78*	*3.39*
315293	*1DOMTR9*	*2.76*
314566	*3CRESWEL*	*2.76*
314620	*6CASHIE*	*1.22*
314594	*6PLYMOTH*	*1.18*
314648	*6SUNBURY*	*0.34*
314651	*6WINFALL*	*1.05*
933451	*AC2-158 C*	*7.93*
933452	*AC2-158 E*	*7.93*
933711	*AC2-194 C*	*0.65*
933712	*AC2-194 E*	*1.05*
933991	*AD1-023 C*	*18.97*
933992	*AD1-023 E*	*10.33*
934521	*AD1-076 C O1*	*78.29*
934522	*AD1-076 E O1*	*39.86*
LTF	*AMIL*	*0.17*
LTF	*BAYOU*	*0.91*
LTF	*BIG_CAJUN1*	*1.44*
LTF	*BIG_CAJUN2*	*2.9*
LTF	*BLUEG*	*0.88*
LTF	*CALDERWOOD*	*0.53*
LTF	*CANNELTON*	*0.17*
LTF	*CATAWBA*	*0.52*
LTF	*CBM-N*	*< 0.01*
LTF	*CELEVELAND*	*1.48*
LTF	*CHEOAH*	*0.5*
LTF	*CHILHOWEE*	*0.17*
LTF	*CHOCTAW*	*0.98*
LTF	*CLIFTY*	*3.21*
LTF	*COTTONWOOD*	*3.57*
LTF	*DEARBORN*	*0.32*
LTF	*EDWARDS*	*0.27*

LTF	*ELMERSMITH*	*0.5*
LTF	*FARMERCITY*	*0.22*
LTF	*G-007A*	*0.38*
LTF	*GIBSON*	*0.31*
LTF	*HAMLET*	*2.18*
LTF	*MORGAN*	*1.58*
LTF	*NEWTON*	*0.75*
LTF	*NYISO*	*0.04*
LTF	*O-066A*	*0.17*
LTF	*PRAIRIE*	*1.64*
LTF	*ROWAN*	*1.05*
LTF	*SANTEETLA*	*0.15*
LTF	*SMITHLAND*	*0.15*
LTF	*TATANKA*	*0.37*
LTF	*TILTON*	*0.32*
LTF	*TRIMBLE*	*0.17*
LTF	*TVA*	*0.66*
LTF	*UNIONPOWER*	*0.95*
LTF	*VFT*	*1.01*
901082	*W1-029E*	*23.47*
LTF	*X1-078*	*0.29*
913392	*Y1-086 E*	*1.07*
916041	*Z1-036 C*	*1.02*
916042	*Z1-036 E*	*34.83*
917122	*Z2-027 E*	*0.52*
919731	*AA2-059 C*	*0.19*
919732	*AA2-059 E*	*0.47*
920691	*AA2-178 C*	*11.05*
920692	*AA2-178 E*	*4.74*
930051	*AB1-013 C*	*3.33*
930052	*AB1-013 E*	*22.31*
923831	*AB2-022 C*	*0.99*
923832	*AB2-022 E*	*0.53*
925121	*AB2-169 C*	*4.79*
925122	*AB2-169 E*	*4.3*
925281	*AB2-186 C*	*0.42*
925282	*AB2-186 E*	*0.18*
925291	*AB2-188 C O1*	*2.72*
925292	*AB2-188 E O1*	*1.22*

Appendix 10

(DVP - DVP) The 6TRWBRDG 230/115 kV transformer (from bus 314616 to bus 314613 ckt 1) loads from 53.5% to 113.13% (**DC power flow**) of its load dump rating (220 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-3: H272'. This project contributes approximately 131.05 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-3: H272'                                  /* TROWBRIDGE
  OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1             /* LINE 2034
  OPEN BRANCH FROM BUS 314616 TO BUS 314614 CKT 1             /* TROWBRIDGE
TX.*2
  END
```

Bus Number	*Bus Name*	*Full Contribution*
314566	*3CRESWEL*	*3.04*
314594	*6PLYMOTH*	*1.31*
314648	*6SUNBURY*	*0.35*
314651	*6WINFALL*	*1.13*
933711	*AC2-194 C*	*0.7*
933712	*AC2-194 E*	*1.13*
934521	*AD1-076 C O1*	*86.83*
934522	*AD1-076 E O1*	*44.22*
LTF	*AMIL*	*0.11*
LTF	*BAYOU*	*0.63*
LTF	*BIG_CAJUN1*	*0.99*
LTF	*BIG_CAJUN2*	*2.*
LTF	*BLUEG*	*0.56*
LTF	*CALDERWOOD*	*0.37*
LTF	*CANNELTON*	*0.11*
LTF	*CATAWBA*	*0.38*
LTF	*CBM-N*	*0.02*
LTF	*CELEVELAND*	*1.06*
LTF	*CHEOAH*	*0.35*
LTF	*CHILHOWEE*	*0.12*
LTF	*CHOCTAW*	*0.68*
LTF	*CLIFTY*	*1.99*
LTF	*COTTONWOOD*	*2.45*
LTF	*DEARBORN*	*0.18*
LTF	*EDWARDS*	*0.17*
LTF	*ELMERSMITH*	*0.32*
LTF	*FARMERCITY*	*0.14*
LTF	*G-007A*	*0.46*
LTF	*GIBSON*	*0.2*
LTF	*HAMLET*	*1.58*
LTF	*MORGAN*	*1.09*
LTF	*NEWTON*	*0.49*

LTF	*NYISO*	*0.26*
LTF	*O-066A*	*0.21*
LTF	*PRAIRIE*	*1.08*
LTF	*ROWAN*	*0.76*
LTF	*SANTEETLA*	*0.1*
LTF	*SMITHLAND*	*0.1*
LTF	*TATANKA*	*0.24*
LTF	*TILTON*	*0.21*
LTF	*TRIMBLE*	*0.11*
LTF	*TVA*	*0.46*
LTF	*UNIONPOWER*	*0.67*
LTF	*VFT*	*1.23*
901082	*W1-029E*	*24.77*
LTF	*X1-078*	*0.35*
913392	*Y1-086 E*	*1.13*
916041	*Z1-036 C*	*1.11*
916042	*Z1-036 E*	*37.78*
917122	*Z2-027 E*	*0.55*
919731	*AA2-059 C*	*0.21*
919732	*AA2-059 E*	*0.51*
920691	*AA2-178 C*	*12.18*
920692	*AA2-178 E*	*5.22*
930051	*AB1-013 C*	*3.68*
930052	*AB1-013 E*	*24.6*
923831	*AB2-022 C*	*1.04*
923832	*AB2-022 E*	*0.56*
925281	*AB2-186 C*	*0.46*
925282	*AB2-186 E*	*0.2*
925291	*AB2-188 C O1*	*3.*
925292	*AB2-188 E O1*	*1.35*

Appendix 11

(DVP - DVP) The 6S HERTFORD-6WINFALL 230 kV line (from bus 314662 to bus 314651 ckt 1) loads from 71.13% to 108.97% (**DC power flow**) of its load dump rating (897 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 2014T2034'. This project contributes approximately 339.43 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 2014T2034' /* EARLEYS
OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /* 2034
OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1 /* 2014
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*8.39*
315292	*1DOMTR78*	*5.67*
315293	*1DOMTR9*	*4.63*
314557	*3BETHELC*	*0.51*
314566	*3CRESWEL*	*10.62*
314620	*6CASHIE*	*3.51*
314574	*6EVERETS*	*2.63*
314594	*6PLYMOTH*	*3.55*
933451	*AC2-158 C*	*22.79*
933452	*AC2-158 E*	*22.79*
933991	*AD1-023 C*	*54.49*
933992	*AD1-023 E*	*29.67*
934521	*AD1-076 C O1*	*224.91*
934522	*AD1-076 E O1*	*114.52*
LTF	*CARR*	*0.05*
LTF	*CBM-S1*	*2.55*
LTF	*CBM-S2*	*5.33*
LTF	*CBM-W1*	*5.57*
LTF	*CBM-W2*	*13.78*
LTF	*CIN*	*1.25*
LTF	*CPLE*	*1.89*
LTF	*G-007*	*0.32*
LTF	*IPL*	*0.79*
LTF	*LGEE*	*0.27*
LTF	*MEC*	*2.83*
LTF	*MECS*	*1.26*
LTF	*O-066*	*1.06*
LTF	*RENSSELAER*	*0.04*
LTF	*ROSETON*	*0.27*
LTF	*WEC*	*0.34*
916041	*Z1-036 C*	*6.4*
916042	*Z1-036 E*	*218.56*
917511	*Z2-088 C OP1*	*0.7*

917512	*Z2-088 E OP1*	*2.81*
918411	*AA1-050*	*0.59*
918531	*AA1-067 C*	*0.36*
918532	*AA1-067 E*	*0.79*
919731	*AA2-059 C*	*1.1*
919732	*AA2-059 E*	*2.63*
920691	*AA2-178 C*	*42.47*
920692	*AA2-178 E*	*18.2*
930051	*AB1-013 C*	*12.82*
930052	*AB1-013 E*	*85.77*
923941	*AB2-035 C*	*0.22*
923942	*AB2-035 E*	*0.09*
924391	*AB2-088 C*	*0.28*
924392	*AB2-088 E*	*0.13*
924491	*AB2-098 C*	*0.61*
924492	*AB2-098 E*	*0.26*
925121	*AB2-169 C*	*18.*
925122	*AB2-169 E*	*16.15*
925281	*AB2-186 C*	*2.98*
925282	*AB2-186 E*	*1.28*
925291	*AB2-188 C O1*	*10.47*
925292	*AB2-188 E O1*	*4.7*
925591	*AC1-034 C*	*4.38*
925592	*AC1-034 E*	*3.3*
927021	*AC1-189 C*	*7.26*
927022	*AC1-189 E*	*3.62*

Appendix 12

(DVP - DVP) The Z1-036 TAP-6S HERTFORD 230 kV line (from bus 916040 to bus 314662 ckt 1) loads from 88.28% to 112.69% (**DC power flow**) of its load dump rating (897 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 24682'. This project contributes approximately 219.0 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 24682' /* 24682 @ SUFFOLK
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* SUFFOLK - NUCOR TAP
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* NUCOR TAP - EARLEYS
OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2 /* SUFFOLK 230-115 TX#5
OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2 /* SUFFOLK 500-230 TX#8
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*5.68*
315292	*1DOMTR78*	*3.84*
315293	*1DOMTR9*	*3.13*
315131	*1EDGECMA*	*6.42*
315132	*1EDGECMB*	*6.42*
315139	*1GASTONA*	*2.57*
315141	*1GASTONB*	*2.57*
315136	*1ROSEMG1*	*1.83*
315138	*1ROSEMG2*	*0.86*
315137	*1ROSEMS1*	*1.14*
314557	*3BETHELC*	*0.69*
314554	*3BTLEBRO*	*0.54*
314566	*3CRESWEL*	*7.79*
314578	*3HORNRTN*	*2.19*
314582	*3KELFORD*	*0.9*
314603	*3SCOT NK*	*3.1*
314617	*3TUNIS*	*0.8*
314620	*6CASHIE*	*1.83*
314574	*6EVERETS*	*2.87*
314594	*6PLYMOTH*	*2.34*
932631	*AC2-084 C*	*7.52*
932632	*AC2-084 E*	*3.7*
933451	*AC2-158 C*	*9.34*
933452	*AC2-158 E*	*9.34*
933461	*AC2-159 C*	*6.2*
933462	*AC2-159 E*	*6.2*
933991	*AD1-023 C*	*31.82*

933992	AD1-023 E	17.32
934041	AD1-029 C	9.3
934042	AD1-029 E	6.13
934331	AD1-057 C O1	7.
934332	AD1-057 E O1	3.74
934521	AD1-076 C O1	145.11
934522	AD1-076 E O1	73.89
LTF	CARR	0.06
LTF	CBM-S1	3.81
LTF	CBM-S2	7.76
LTF	CBM-W1	8.48
LTF	CBM-W2	20.64
LTF	CIN	1.9
LTF	CPLE	2.68
LTF	G-007	0.47
LTF	IPL	1.21
LTF	LGEE	0.41
LTF	MEC	4.27
LTF	MECS	1.94
LTF	O-066	1.55
LTF	RENSSELAER	0.05
LTF	ROSETON	0.38
900671	V4-068 C	0.07
900672	V4-068 E	0.21
LTF	WEC	0.52
916041	Z1-036 C	5.35
916042	Z1-036 E	182.46
917331	Z2-043 C	0.49
917332	Z2-043 E	1.08
917341	Z2-044 C	0.19
917342	Z2-044 E	0.41
917511	Z2-088 C OP1	0.89
917512	Z2-088 E OP1	3.58
918411	AA1-050	0.75
918511	AA1-065 C OP	2.57
918512	AA1-065 E OP	6.44
918531	AA1-067 C	0.39
918532	AA1-067 E	0.86
918561	AA1-072 C	0.07
918562	AA1-072 E	0.18
919691	AA2-053 C	1.32
919692	AA2-053 E	2.9
919701	AA2-057 C	1.02
919702	AA2-057 E	2.6
919731	AA2-059 C	0.9

919732	AA2-059 E	2.15
919821	AA2-068 C	0.34
919822	AA2-068 E	0.79
LTF	AA2-074	1.83
920591	AA2-165 C	0.14
920592	AA2-165 E	0.34
920671	AA2-174 C	0.06
920672	AA2-174 E	0.33
920691	AA2-178 C	31.15
920692	AA2-178 E	13.35
930051	AB1-013 C	9.4
930052	AB1-013 E	62.92
930401	AB1-081 C	6.09
930402	AB1-081 E	2.61
930861	AB1-132 C	10.01
930862	AB1-132 E	4.29
923941	AB2-035 C	0.29
923942	AB2-035 E	0.12
924151	AB2-059 C O1	7.18
924152	AB2-059 E O1	3.7
924381	AB2-087 C	0.69
924382	AB2-087 E	0.33
924391	AB2-088 C	0.37
924392	AB2-088 E	0.18
924491	AB2-098 C	0.67
924492	AB2-098 E	0.29
924501	AB2-099 C	0.64
924502	AB2-099 E	0.27
925121	AB2-169 C	13.01
925122	AB2-169 E	11.67
925291	AB2-188 C O1	7.68
925292	AB2-188 E O1	3.45
925591	AC1-034 C	5.93
925592	AC1-034 E	4.47
926071	AC1-086 C	14.73
926072	AC1-086 E	6.71
926201	AC1-098 C	5.27
926202	AC1-098 E	3.14
926211	AC1-099 C	1.77
926212	AC1-099 E	1.04
926771	AC1-163 C	2.11
926772	AC1-163 E	0.99
927021	AC1-189 C	8.71
927022	AC1-189 E	4.34
927141	AC1-208 C	6.67

927142	*AC1-208 E*	*2.96*

Appendix 13

(DVP - DVP) The AB2-169 TAP-3FIVE PT 115 kV line (from bus 925120 to bus 314576 ckt 1) loads from 75.87% to 137.56% (**DC power flow**) of its load dump rating (91 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 25-2034_B'. This project contributes approximately 56.14 MW to the thermal violation.

```
CONTINGENCY 'DVP_P7-1: LN 25-2034_B'                    /*REPLACED ON
4/19/2016
  OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1        /* 3EVERETS
115.00 - 3POPLR C 115.00
  OPEN BRANCH FROM BUS 314596 TO BUS 314614 CKT 1        /* 3POPLR C
115.00 - 3TROWBR2 115.00
  OPEN BUS 314596                                        /* ISLAND
  OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1        /* 3TROWBR2
115.00 - 6TRWBRDG 230.00
  OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1        /* 6TRWBRDG
230.00 - AD1-023 TAP 230.00
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*3.18*
315292	*1DOMTR78*	*2.15*
315293	*1DOMTR9*	*1.75*
314566	*3CRESWEL*	*1.3*
314594	*6PLYMOTH*	*0.56*
934521	*AD1-076 C O1*	*37.2*
934522	*AD1-076 E O1*	*18.94*
LTF	*AMIL*	*0.06*
LTF	*BAYOU*	*0.31*
LTF	*BIG_CAJUN1*	*0.49*
LTF	*BIG_CAJUN2*	*0.97*
LTF	*BLUEG*	*0.3*
LTF	*CALDERWOOD*	*0.18*
LTF	*CANNELTON*	*0.06*
LTF	*CARR*	*< 0.01*
LTF	*CATAWBA*	*0.17*
LTF	*CELEVELAND*	*0.49*
LTF	*CHEOAH*	*0.17*
LTF	*CHILHOWEE*	*0.06*
LTF	*CHOCTAW*	*0.33*
LTF	*CLIFTY*	*1.11*
LTF	*COTTONWOOD*	*1.2*
LTF	*DEARBORN*	*0.11*
LTF	*EDWARDS*	*0.09*
LTF	*ELMERSMITH*	*0.17*

LTF	*FARMERCITY*	*0.07*
LTF	*G-007A*	*0.11*
LTF	*GIBSON*	*0.11*
LTF	*HAMLET*	*0.72*
LTF	*MORGAN*	*0.53*
LTF	*NEWTON*	*0.26*
LTF	*O-066A*	*0.05*
LTF	*PRAIRIE*	*0.56*
LTF	*RENSSELAER*	*< 0.01*
LTF	*ROSETON*	*< 0.01*
LTF	*ROWAN*	*0.35*
LTF	*SANTEETLA*	*0.05*
LTF	*SMITHLAND*	*0.05*
LTF	*TATANKA*	*0.13*
LTF	*TILTON*	*0.11*
LTF	*TRIMBLE*	*0.06*
LTF	*TVA*	*0.22*
LTF	*UNIONPOWER*	*0.32*
LTF	*VFT*	*0.3*
LTF	*X1-078*	*0.09*
916042	*Z1-036 E*	*16.14*
919732	*AA2-059 E*	*0.22*
920691	*AA2-178 C*	*5.21*
920692	*AA2-178 E*	*2.23*
930051	*AB1-013 C*	*1.57*
930052	*AB1-013 E*	*10.53*
925121	*AB2-169 C*	*19.*
925122	*AB2-169 E*	*17.05*
925281	*AB2-186 C*	*0.2*
925282	*AB2-186 E*	*0.08*
925291	*AB2-188 C O1*	*1.28*
925292	*AB2-188 E O1*	*0.58*

Appendix 14

(DVP - CPLE) The 6MORNSTR-6ROCKYMT230T 230 kV line (from bus 313845 to bus 304222 ckt 1) loads from 146.98% to 152.17% (**DC power flow**) of its emergency rating (374 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 81-2056'. This project contributes approximately 42.99 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 81-2056'
OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /* 3CAROLNA 115.00 - 3HORNRTN 115.00
OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /* 3HORNRTN 115.00 - 3ROAN DP 115.00
OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /* 3ROAN DP 115.00 - 3DARLINGT DP115.00
OPEN BUS 314578 /* ISLAND: 3HORNRTN 115.00
OPEN BUS 314598 /* ISLAND: 3ROAN DP 115.00
OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6MORNSTR 230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 304226 TO BUS 304222 CKT 1 /* 6PA-RMOUNT#4230.00 - 6ROCKYMT230T
OPEN BUS 304226 /* ISLAND
OPEN BUS 314591 /* ISLAND: 6NASH 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315131	*1EDGECMA*	*24.8*
315132	*1EDGECMB*	*24.8*
315139	*1GASTONA*	*4.01*
315141	*1GASTONB*	*4.01*
315126	*1ROARAP2*	*1.22*
315128	*1ROARAP4*	*1.18*
315136	*1ROSEMG1*	*3.36*
315138	*1ROSEMG2*	*1.57*
315137	*1ROSEMS1*	*2.09*
314557	*3BETHELC*	*1.61*
314554	*3BTLEBRO*	*1.08*
314566	*3CRESWEL*	*1.09*
314572	*3EMPORIA*	*0.27*
314582	*3KELFORD*	*0.7*
314603	*3SCOT NK*	*3.23*
314617	*3TUNIS*	*0.55*
314541	*3WATKINS*	*0.33*
314620	*6CASHIE*	*0.49*
314574	*6EVERETS*	*1.81*

314594	6PLYMOTH	0.44
932631	AC2-084 C	9.38
932632	AC2-084 E	4.62
933451	AC2-158 C	3.44
933452	AC2-158 E	3.44
933461	AC2-159 C	4.87
933462	AC2-159 E	4.87
933991	AD1-023 C	7.25
933992	AD1-023 E	3.95
934041	AD1-029 C	11.6
934042	AD1-029 E	7.65
934201	AD1-047 C	5.53
934202	AD1-047 E	3.69
934331	AD1-057 C O1	19.78
934332	AD1-057 E O1	10.55
934521	AD1-076 C O1	28.49
934522	AD1-076 E O1	14.51
LTF	AMIL	0.38
LTF	BAYOU	1.98
LTF	BIG_CAJUN1	3.12
LTF	BIG_CAJUN2	6.28
LTF	BLUEG	1.99
LTF	CALDERWOOD	1.17
LTF	CANNELTON	0.38
LTF	CARR	< 0.01
LTF	CATAWBA	1.14
LTF	CELEVELAND	3.25
LTF	CHEOAH	1.09
LTF	CHILHOWEE	0.38
LTF	CHOCTAW	2.13
LTF	CLIFTY	7.32
LTF	COTTONWOOD	7.76
LTF	DEARBORN	0.72
LTF	EDWARDS	0.61
LTF	ELMERSMITH	1.11
LTF	FARMERCITY	0.48
LTF	G-007A	0.76
LTF	GIBSON	0.69
LTF	HAMLET	4.52
LTF	MORGAN	3.43
LTF	NEWTON	1.68
LTF	O-066A	0.35
LTF	PRAIRIE	3.62
LTF	ROWAN	2.4
LTF	SANTEETLA	0.32

LTF	*SMITHLAND*	*0.32*
LTF	*TATANKA*	*0.82*
LTF	*TILTON*	*0.73*
LTF	*TRIMBLE*	*0.38*
LTF	*TVA*	*1.45*
LTF	*UNIONPOWER*	*2.08*
900671	*V4-068 C*	*0.07*
900672	*V4-068 E*	*0.18*
LTF	*VFT*	*2.03*
LTF	*X1-078*	*0.59*
917331	*Z2-043 C*	*0.38*
917332	*Z2-043 E*	*0.84*
917341	*Z2-044 C*	*0.34*
917342	*Z2-044 E*	*0.75*
917511	*Z2-088 C OP1*	*1.68*
917512	*Z2-088 E OP1*	*6.74*
917592	*Z2-099 E*	*0.25*
918411	*AA1-050*	*1.41*
918491	*AA1-063AC OP*	*1.14*
918492	*AA1-063AE OP*	*2.74*
918511	*AA1-065 C OP*	*1.16*
918512	*AA1-065 E OP*	*2.92*
918531	*AA1-067 C*	*0.25*
918532	*AA1-067 E*	*0.54*
918561	*AA1-072 C*	*0.06*
918562	*AA1-072 E*	*0.14*
919691	*AA2-053 C*	*1.27*
919692	*AA2-053 E*	*2.78*
919701	*AA2-057 C*	*1.72*
919702	*AA2-057 E*	*4.39*
919821	*AA2-068 C*	*0.51*
919822	*AA2-068 E*	*1.19*
920022	*AA2-086 E*	*0.14*
920042	*AA2-088 E*	*5.93*
920591	*AA2-165 C*	*0.23*
920592	*AA2-165 E*	*0.58*
920671	*AA2-174 C*	*0.06*
920672	*AA2-174 E*	*0.32*
920691	*AA2-178 C*	*4.34*
920692	*AA2-178 E*	*1.86*
930051	*AB1-013 C*	*1.31*
930052	*AB1-013 E*	*8.77*
930401	*AB1-081 C*	*14.55*
930402	*AB1-081 E*	*6.23*
930861	*AB1-132 C*	*15.61*

930862	AB1-132 E	6.69
931231	AB1-173 C	1.56
931232	AB1-173 E	0.73
931241	AB1-173AC	1.56
931242	AB1-173AE	0.73
923801	AB2-015 C O1	3.93
923802	AB2-015 E O1	3.23
923911	AB2-031 C O1	1.54
923912	AB2-031 E O1	0.76
923941	AB2-035 C	0.68
923942	AB2-035 E	0.29
923991	AB2-040 C O1	5.07
923992	AB2-040 E O1	4.15
924151	AB2-059 C O1	17.14
924152	AB2-059 E O1	8.83
924381	AB2-087 C	0.4
924382	AB2-087 E	0.19
924391	AB2-088 C	0.87
924392	AB2-088 E	0.42
924491	AB2-098 C	0.42
924492	AB2-098 E	0.18
924501	AB2-099 C	0.4
924502	AB2-099 E	0.17
924511	AB2-100 C	8.29
924512	AB2-100 E	4.08
925121	AB2-169 C	4.03
925122	AB2-169 E	3.62
925171	AB2-174 C O1	4.74
925172	AB2-174 E O1	4.29
925291	AB2-188 C O1	1.07
925292	AB2-188 E O1	0.48
925591	AC1-034 C	13.75
925592	AC1-034 E	10.37
926071	AC1-086 C	22.99
926072	AC1-086 E	10.47
926201	AC1-098 C	6.58
926202	AC1-098 E	3.92
926211	AC1-099 C	2.2
926212	AC1-099 E	1.29
926771	AC1-163 C	1.32
926772	AC1-163 E	0.62
927021	AC1-189 C	12.21
927022	AC1-189 E	6.08
927111	AC1-206 C	6.69
927112	AC1-206 E	3.16

927141	*AC1-208 C*	*10.44*
927142	*AC1-208 E*	*4.63*

Appendix 15

(DVP - DVP) The 6SKIFF CREEK-6KINGS M 230 kV line (from bus 314209 to bus 314386 ckt 1) loads from 140.91% to 142.78% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 18.11 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O1*	*3.1*
934521	*AD1-076 C O1*	*18.11*
935111	*AD1-144 C*	*0.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.33*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*

LTF	WEC	0.27
916191	Z1-068 C	0.02
920691	AA2-178 C	3.37
930051	AB1-013 C	1.02
923801	AB2-015 C O1	2.75
923831	AB2-022 C	0.91
924071	AB2-051	56.36
924241	AB2-068 O1	103.03
925281	AB2-186 C	0.23
925291	AB2-188 C O1	0.83
925521	AC1-027 C	0.16
925691	AC1-045 C	0.15
926291	AC1-107	155.52
926741	AC1-159	27.18
926751	AC1-161 C	14.03

Appendix 16

(DVP - DVP) The 8ELMONT 500/230 kV transformer (from bus 314218 to bus 314908 ckt 1) loads from 124.24% to 126.9% (**DC power flow**) of its load dump rating (1051 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: H2T557'. This project contributes approximately 70.76 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: H2T557' /* ELMONT
OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557)
OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1)
OPEN BRANCH FROM BUS 314908 TO BUS 314218 CKT 2 /*ELMONT 500-230 (TX#2)
END

Bus Number	*Bus Name*	*Full Contribution*
315067	*1DARBY 1*	*4.99*
315068	*1DARBY 2*	*4.99*
315069	*1DARBY 3*	*5.01*
315070	*1DARBY 4*	*5.01*
315043	*1FOUR RIVERA*	*6.63*
315044	*1FOUR RIVERB*	*5.13*
315045	*1FOUR RIVERC*	*6.63*
315046	*1FOUR RIVERD*	*5.13*
315047	*1FOUR RIVERE*	*5.13*
315048	*1FOUR RIVERF*	*6.63*
315074	*1HOPCGN1*	*11.28*
315075	*1HOPCGN2*	*11.14*
315083	*1SPRUNCA*	*14.95*
315084	*1SPRUNCB*	*14.95*
315085	*1SPRUNCC*	*11.08*
315086	*1SPRUNCD*	*11.08*
315073	*1STONECA*	*9.36*
314566	*3CRESWEL*	*2.11*
314572	*3EMPORIA*	*0.36*
314315	*3LOCKS E*	*1.65*
314617	*3TUNIS*	*0.71*
314539	*3UNCAMP*	*2.19*
314541	*3WATKINS*	*0.61*
314620	*6CASHIE*	*0.72*
314229	*6MT RD221*	*1.41*
314236	*6NRTHEST*	*0.37*
314189	*6PAPERMILL*	*8.82*
314594	*6PLYMOTH*	*0.73*
314250	*6ROCKVILLE*	*0.4*

314256	6ROCKVILLE E	1.15
314648	6SUNBURY	0.81
314651	6WINFALL	1.59
932041	AC2-012 C	9.62
932042	AC2-012 E	15.7
932501	AC2-070 C	2.9
932502	AC2-070 E	1.2
932531	AC2-073 C	3.1
932532	AC2-073 E	1.56
932581	AC2-078 C	4.75
932582	AC2-078 E	7.75
932591	AC2-079 C	6.82
932592	AC2-079 E	11.13
932831	AC2-110 C	1.74
932832	AC2-110 E	2.84
933061	AC2-130	3.48
933071	AC2-131 1	2.36
933081	AC2-131 2	1.07
933111	AC2-132 1	1.24
933121	AC2-132 2	0.63
933261	AC2-137 C	3.16
933262	AC2-137 E	2.05
933271	AC2-138 C	0.87
933272	AC2-138 E	1.09
933291	AC2-141 C	27.16
933292	AC2-141 E	11.59
933451	AC2-158 C	4.63
933452	AC2-158 E	4.63
933471	AC2-161 C	2.47
933472	AC2-161 E	1.27
933481	AC2-162 C	4.17
933482	AC2-162 E	2.15
933711	AC2-194 C	0.98
933712	AC2-194 E	1.59
933731	AC2-196 C	1.66
933732	AC2-196 E	1.1
933991	AD1-023 C	11.29
933992	AD1-023 E	6.14
934011	AD1-025 C O1	20.82
934012	AD1-025 E O1	12.33
934061	AD1-033 C O1	6.96
934062	AD1-033 E O1	4.64
934071	AD1-034 C O1	10.6
934072	AD1-034 E O1	6.87
934141	AD1-041 C O1	6.74

934142	AD1-041 E O1	4.49
934191	AD1-046 C	4.71
934192	AD1-046 E	3.14
934201	AD1-047 C	6.75
934202	AD1-047 E	4.5
934211	AD1-048 C	3.82
934212	AD1-048 E	1.93
934391	AD1-063 C	2.1
934392	AD1-063 E	1.4
934521	AD1-076 C O1	46.88
934522	AD1-076 E O1	23.87
934571	AD1-082 C O1	8.27
934572	AD1-082 E O1	4.72
934781	AD1-105 C	8.08
934782	AD1-105 E	5.62
LTF	AD1-120	5.93
LTF	AD1-121	5.89
935111	AD1-144 C	1.68
935112	AD1-144 E	0.92
935161	AD1-151 C O1	19.89
935162	AD1-151 E O1	13.26
935211	AD1-156 C	2.56
935212	AD1-156 E	1.71
LTF	CARR	0.67
LTF	CBM-S1	3.86
LTF	CBM-S2	13.84
LTF	CBM-W1	0.21
LTF	CBM-W2	17.91
LTF	CIN	0.13
LTF	CLIFTY	1.62
LTF	CPLE	4.75
LTF	DEARBORN	0.47
LTF	G-007	2.31
LTF	IPL	0.06
LTF	LGEE	0.05
LTF	MEC	1.99
LTF	O-066	7.73
LTF	RENSSELAER	0.53
LTF	ROSETON	3.84
292791	U1-032 E	4.87
297087	V2-040	0.28
900672	V4-068 E	0.26
901082	W1-029E	41.82
LTF	WEC	0.06
907092	X1-038 E	5.47

913392	Y1-086 E	1.99
916042	Z1-036 E	40.84
916192	Z1-068 E	1.76
917122	Z2-027 E	0.96
917592	Z2-099 E	0.38
918492	AA1-063AE OP	3.35
918512	AA1-065 E OP	3.74
918691	AA1-083	1.16
919152	AA1-139 E	5.92
919211	AA1-145	19.79
919732	AA2-059 E	0.5
LTF	AA2-074	3.23
920022	AA2-086 E	0.21
920042	AA2-088 E	9.15
920691	AA2-178 C	8.43
920692	AA2-178 E	3.61
930051	AB1-013 C	2.54
930052	AB1-013 E	17.02
930121	AB1-027 C	0.87
930122	AB1-027 E	1.89
930861	AB1-132 C	11.78
930862	AB1-132 E	5.05
931231	AB1-173 C	1.9
931232	AB1-173 E	0.89
931241	AB1-173AC	1.9
931242	AB1-173AE	0.89
923801	AB2-015 C O1	7.73
923802	AB2-015 E O1	6.34
923831	AB2-022 C	2.1
923832	AB2-022 E	1.13
923842	AB2-024 E	1.49
923852	AB2-025 E	1.09
923862	AB2-026 E	0.88
923911	AB2-031 C O1	1.88
923912	AB2-031 E O1	0.93
923991	AB2-040 C O1	6.19
923992	AB2-040 E O1	5.06
924061	AB2-050	1.16
924071	AB2-051	128.86
924241	AB2-068 O1	177.95
924381	AB2-087 C	0.48
924382	AB2-087 E	0.22
924501	AB2-099 C	0.49
924502	AB2-099 E	0.21
924511	AB2-100 C	10.48

924512	AB2-100 E	5.16
924811	AB2-134 C O1	15.87
924812	AB2-134 E O1	15.6
925051	AB2-160 C O1	7.18
925052	AB2-160 E O1	11.71
925061	AB2-161 C O1	3.63
925062	AB2-161 E O1	5.92
925171	AB2-174 C O1	5.96
925172	AB2-174 E O1	5.39
925281	AB2-186 C	0.55
925282	AB2-186 E	0.24
925291	AB2-188 C O1	2.08
925292	AB2-188 E O1	0.93
925331	AB2-190 C	24.76
925332	AB2-190 E	10.61
925522	AC1-027 E	1.07
925692	AC1-045 E	0.92
925861	AC1-065 C	4.36
925862	AC1-065 E	7.11
926071	AC1-086 C	17.34
926072	AC1-086 E	7.89
926291	AC1-107	268.61
926411	AC1-112 C	0.68
926412	AC1-112 E	1.93
926441	AC1-115 C	1.01
926442	AC1-115 E	1.64
926472	AC1-118 E	1.07
926551	AC1-134	14.83
926662	AC1-147 E	1.25
926741	AC1-159	62.13
926751	AC1-161 C	27.16
926752	AC1-161 E	11.59
926771	AC1-163 C	1.63
926772	AC1-163 E	0.76
926781	AC1-164 C	58.41
926782	AC1-164 E	26.24
927041	AC1-191 C	17.46
927042	AC1-191 E	8.7
927111	AC1-206 C	9.15
927112	AC1-206 E	4.32
927221	AC1-216 C O1	12.11
927222	AC1-216 E O1	9.53

Appendix 17

(DVP - DVP) The 6CHESTF B-6BASIN 230 kV line (from bus 314287 to bus 314276 ckt 1) loads from 126.96% to 128.84% (**DC power flow**) of its emergency rating (449 MVA) for the single line contingency outage of 'DVP_P1-2: LN 563'. This project contributes approximately 18.6 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 563'
OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315065	*1CHESTF6*	*33.33*
315131	*1EDGECMA*	*3.18*
315132	*1EDGECMB*	*3.18*
315139	*1GASTONA*	*1.58*
315141	*1GASTONB*	*1.58*
315119	*1GRAVEL3*	*1.24*
315120	*1GRAVEL4*	*1.26*
315121	*1GRAVEL5*	*1.24*
315122	*1GRAVEL6*	*1.26*
315117	*1GRAVELC*	*0.43*
315074	*1HOPCGN1*	*5.63*
315075	*1HOPCGN2*	*5.56*
315077	*1HOPHCF1*	*1.78*
315078	*1HOPHCF2*	*1.78*
315079	*1HOPHCF3*	*1.78*
315080	*1HOPHCF4*	*2.7*
315076	*1HOPPOLC*	*1.27*
315116	*1SURRY 1*	*12.47*
314314	*3LOCKS*	*0.06*
314315	*3LOCKS E*	*0.77*
932041	*AC2-012 C*	*3.21*
932581	*AC2-078 C*	*2.86*
932591	*AC2-079 C*	*3.07*
932631	*AC2-084 C*	*3.22*
932701	*AC2-093 C*	*23.37*
933451	*AC2-158 C*	*1.94*
933461	*AC2-159 C*	*2.55*
933471	*AC2-161 C*	*0.89*
933711	*AC2-194 C*	*0.35*
933731	*AC2-196 C*	*0.55*
933991	*AD1-023 C*	*4.54*
934011	*AD1-025 C O1*	*9.21*
934041	*AD1-029 C*	*3.98*

934061	AD1-033 C O1	2.31
934071	AD1-034 C O1	4.93
934201	AD1-047 C	3.58
934331	AD1-057 C O1	3.86
934521	AD1-076 C O1	18.6
934571	AD1-082 C O1	4.27
935111	AD1-144 C	0.56
935161	AD1-151 C O1	8.8
935211	AD1-156 C	1.97
LTF	CARR	0.2
LTF	CBM-S1	3.34
LTF	CBM-S2	7.3
LTF	CBM-W1	6.1
LTF	CBM-W2	17.57
LTF	CIN	1.4
LTF	CPLE	2.35
LTF	IPL	0.89
LTF	LGEE	0.31
LTF	MEC	3.38
LTF	MECS	1.11
LTF	RENSSELAER	0.16
LTF	ROSETON	1.15
LTF	WEC	0.39
914231	Y2-077	0.72
LTF	AA2-074	1.6
920631	AA2-169 C	0.75
920691	AA2-178 C	3.22
930051	AB1-013 C	0.97
930401	AB1-081 C	3.05
930861	AB1-132 C	6.17
931231	AB1-173 C	1.01
931241	AB1-173AC	1.01
923801	AB2-015 C O1	3.22
923831	AB2-022 C	0.73
923851	AB2-025 C	0.31
923911	AB2-031 C O1	1.
923941	AB2-035 C	0.11
923991	AB2-040 C O1	3.28
924071	AB2-051	42.84
924151	AB2-059 C O1	3.6
924381	AB2-087 C	0.21
924391	AB2-088 C	0.15
924491	AB2-098 C	0.19
924501	AB2-099 C	0.22
924511	AB2-100 C	6.19

924811	*AB2-134 C O1*	*7.02*
925051	*AB2-160 C O1*	*3.33*
925061	*AB2-161 C O1*	*1.87*
925121	*AB2-169 C*	*2.2*
925171	*AB2-174 C O1*	*3.2*
925281	*AB2-186 C*	*0.2*
925291	*AB2-188 C O1*	*0.79*
925331	*AB2-190 C*	*10.95*
925591	*AC1-034 C*	*2.34*
925821	*AC1-061*	*< 0.01*
926071	*AC1-086 C*	*9.08*
926201	*AC1-098 C*	*2.26*
926211	*AC1-099 C*	*0.76*
926741	*AC1-159*	*20.65*
926771	*AC1-163 C*	*0.71*
927021	*AC1-189 C*	*2.92*
927111	*AC1-206 C*	*5.47*
927141	*AC1-208 C*	*3.41*
927221	*AC1-216 C O1*	*5.36*

Appendix 18

(DVP - DVP) The 6PENNIMAN-6WALR209 230 kV line (from bus 314296 to bus 314415 ckt 1) loads from 129.95% to 131.82% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 18.11 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
 OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
 OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
 END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O1*	*3.1*
934521	*AD1-076 C O1*	*18.11*
935111	*AD1-144 C*	*0.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.33*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*

LTF	WEC	0.27
916191	Z1-068 C	0.02
920691	AA2-178 C	3.37
930051	AB1-013 C	1.02
923801	AB2-015 C O1	2.75
923831	AB2-022 C	0.91
924071	AB2-051	56.36
924241	AB2-068 O1	103.03
925281	AB2-186 C	0.23
925291	AB2-188 C O1	0.83
925521	AC1-027 C	0.16
925691	AC1-045 C	0.15
926291	AC1-107	155.52
926741	AC1-159	27.18
926751	AC1-161 C	14.03

Appendix 19

(DVP - DVP) The 6KINGS M-6PENNIMAN 230 kV line (from bus 314386 to bus 314296 ckt 1) loads from 133.39% to 135.27% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 18.11 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
 OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
 OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
 END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O1*	*3.1*
934521	*AD1-076 C O1*	*18.11*
935111	*AD1-144 C*	*0.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.33*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*

LTF	WEC	0.27
916191	Z1-068 C	0.02
920691	AA2-178 C	3.37
930051	AB1-013 C	1.02
923801	AB2-015 C O1	2.75
923831	AB2-022 C	0.91
924071	AB2-051	56.36
924241	AB2-068 O1	103.03
925281	AB2-186 C	0.23
925291	AB2-188 C O1	0.83
925521	AC1-027 C	0.16
925691	AC1-045 C	0.15
926291	AC1-107	155.52
926741	AC1-159	27.18
926751	AC1-161 C	14.03

Appendix 20

(DVP - DVP) The 6WALR209-6LIGH209 230 kV line (from bus 314415 to bus 314391 ckt 1) loads from 115.83% to 117.7% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 18.11 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O1*	*3.1*
934521	*AD1-076 C O1*	*18.11*
935111	*AD1-144 C*	*0.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.33*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*

LTF	WEC	0.27
916191	Z1-068 C	0.02
920691	AA2-178 C	3.37
930051	AB1-013 C	1.02
923801	AB2-015 C O1	2.75
923831	AB2-022 C	0.91
924071	AB2-051	56.36
924241	AB2-068 O1	103.03
925281	AB2-186 C	0.23
925291	AB2-188 C O1	0.83
925521	AC1-027 C	0.16
925691	AC1-045 C	0.15
926291	AC1-107	155.52
926741	AC1-159	27.18
926751	AC1-161 C	14.03

Appendix 21

(DVP - DVP) The 6CLUBHSE-6SAPONY 230 kV line (from bus 314563 to bus 314435 ckt 1) loads from 129.7% to 134.76% (**DC power flow**) of its load dump rating (637 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 71.24 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 246T247'                          /* SUFFOLK 230 KV
  OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1        /* 6SUFFOLK
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1        /* 6EARLEYS
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1        /* 6NUCO TP
230.00 - 6NUCOR 230.00
  OPEN BUS 314575                                  /* ISLAND: 6NUCO TP 230.00
  OPEN BUS 314590                                  /* ISLAND: 6NUCOR 230.00
  OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1        /* 6SUFFOLK
230.00 - 6SUNBURY 230.00
  OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1        /* 6SUNBURY
230.00 - W1-029 230.00
  OPEN BUS 314648                                  /* ISLAND: 6SUNBURY 230.00
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315131	*1EDGECMA*	*10.81*
315132	*1EDGECMB*	*10.81*
315139	*1GASTONA*	*7.59*
315141	*1GASTONB*	*7.59*
315126	*1ROARAP2*	*2.72*
315128	*1ROARAP4*	*2.61*
315136	*1ROSEMG1*	*5.12*
315138	*1ROSEMG2*	*2.4*
315137	*1ROSEMS1*	*3.18*
314557	*3BETHELC*	*0.9*
314554	*3BTLEBRO*	*0.91*
314566	*3CRESWEL*	*1.69*
314572	*3EMPORIA*	*1.04*
314578	*3HORNRTN*	*5.4*
314582	*3KELFORD*	*1.09*
314704	*3LAWRENC*	*0.82*
314603	*3SCOT NK*	*4.39*
314617	*3TUNIS*	*1.*
314541	*3WATKINS*	*0.48*
314620	*6CASHIE*	*0.87*
314574	*6EVERETS*	*2.55*
314594	*6PLYMOTH*	*0.72*

932631	AC2-084 C	11.81
932632	AC2-084 E	5.82
933451	AC2-158 C	6.47
933452	AC2-158 E	6.47
933461	AC2-159 C	9.91
933462	AC2-159 E	9.91
933991	AD1-023 C	12.49
933992	AD1-023 E	6.8
934041	AD1-029 C	14.61
934042	AD1-029 E	9.63
934201	AD1-047 C	17.56
934202	AD1-047 E	11.71
934231	AD1-050 C	5.08
934232	AD1-050 E	2.78
934331	AD1-057 C O1	15.84
934332	AD1-057 E O1	8.45
934521	AD1-076 C O1	47.2
934522	AD1-076 E O1	24.03
LTF	AD1-120	4.44
LTF	AD1-121	4.42
LTF	CARR	0.12
LTF	CBM-S1	5.44
LTF	CBM-S2	10.91
LTF	CBM-W1	12.05
LTF	CBM-W2	29.4
LTF	CIN	2.71
LTF	CPLE	3.68
LTF	G-007	0.77
LTF	IPL	1.73
LTF	LGEE	0.58
LTF	MEC	6.08
LTF	MECS	2.73
LTF	O-066	2.57
LTF	RENSSELAER	0.1
LTF	ROSETON	0.69
900671	V4-068 C	0.12
900672	V4-068 E	0.33
LTF	WEC	0.74
917331	Z2-043 C	0.6
917332	Z2-043 E	1.31
917341	Z2-044 C	0.32
917342	Z2-044 E	0.7
917511	Z2-088 C OP1	1.07
917512	Z2-088 E OP1	4.29
917591	Z2-099 C	0.2

917592	Z2-099 E	0.44
918411	AA1-050	0.9
918491	AA1-063AC OP	2.35
918492	AA1-063AE OP	5.65
918511	AA1-065 C OP	2.24
918512	AA1-065 E OP	5.62
918531	AA1-067 C	0.35
918532	AA1-067 E	0.76
918561	AA1-072 C	0.09
918562	AA1-072 E	0.22
919691	AA2-053 C	2.72
919692	AA2-053 E	5.95
919701	AA2-057 C	1.77
919702	AA2-057 E	4.52
919821	AA2-068 C	0.6
919822	AA2-068 E	1.39
LTF	AA2-074	2.51
920021	AA2-086 C	0.1
920022	AA2-086 E	0.24
920041	AA2-088 C	1.24
920042	AA2-088 E	10.3
920591	AA2-165 C	0.24
920592	AA2-165 E	0.6
920631	AA2-169 C	2.8
920632	AA2-169 E	1.29
920671	AA2-174 C	0.12
920672	AA2-174 E	0.69
920691	AA2-178 C	6.77
920692	AA2-178 E	2.9
930051	AB1-013 C	2.04
930052	AB1-013 E	13.68
930401	AB1-081 C	10.25
930402	AB1-081 E	4.39
930861	AB1-132 C	29.52
930862	AB1-132 E	12.65
931231	AB1-173 C	4.94
931232	AB1-173 E	2.31
931241	AB1-173AC	4.94
931242	AB1-173AE	2.31
923911	AB2-031 C O1	4.9
923912	AB2-031 E O1	2.42
923941	AB2-035 C	0.38
923942	AB2-035 E	0.16
923991	AB2-040 C O1	16.1
923992	AB2-040 E O1	13.17

924021	AB2-043 C O1	2.68
924022	AB2-043 E O1	4.39
924151	AB2-059 C O1	12.09
924152	AB2-059 E O1	6.23
924161	AB2-060 C O1	7.59
924162	AB2-060 E O1	3.57
924301	AB2-077 C O1	1.68
924302	AB2-077 E O1	1.12
924311	AB2-078 C O1	1.68
924312	AB2-078 E O1	1.12
924321	AB2-079 C O1	1.68
924322	AB2-079 E O1	1.12
924381	AB2-087 C	0.74
924382	AB2-087 E	0.35
924391	AB2-088 C	0.49
924392	AB2-088 E	0.23
924401	AB2-089 C	2.31
924402	AB2-089 E	1.19
924411	AB2-090 C	3.37
924412	AB2-090 E	1.73
924491	AB2-098 C	0.59
924492	AB2-098 E	0.26
924501	AB2-099 C	0.73
924502	AB2-099 E	0.31
924511	AB2-100 C	35.91
924512	AB2-100 E	17.68
925121	AB2-169 C	6.15
925122	AB2-169 E	5.52
925171	AB2-174 C O1	16.16
925172	AB2-174 E O1	14.62
925221	AB2-176 C	1.39
925222	AB2-176 E	0.59
925291	AB2-188 C O1	1.67
925292	AB2-188 E O1	0.75
925591	AC1-034 C	7.73
925592	AC1-034 E	5.83
925781	AC1-054 C	8.28
925782	AC1-054 E	3.81
926071	AC1-086 C	43.47
926072	AC1-086 E	19.78
926201	AC1-098 C	8.29
926202	AC1-098 E	4.94
926211	AC1-099 C	2.78
926212	AC1-099 E	1.63
926771	AC1-163 C	2.41

926772	*AC1-163 E*	*1.13*
927021	*AC1-189 C*	*9.39*
927022	*AC1-189 E*	*4.68*
927111	*AC1-206 C*	*32.26*
927112	*AC1-206 E*	*15.25*
927141	*AC1-208 C*	*13.11*
927142	*AC1-208 E*	*5.82*

Appendix 22

(DVP - CPLE) The 6EVERETS-6GREENVILE T 230 kV line (from bus 314574 to bus 304451 ckt 1) loads from 121.74% to 139.02% (**DC power flow**) of its emergency rating (478 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 2058-2181'. This project contributes approximately 82.6 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 2058-2181'
OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00
OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00
OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00
OPEN BUS 314591 /* ISLAND: 6NASH 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*3.12*
315292	*1DOMTR78*	*2.11*
315293	*1DOMTR9*	*1.72*
315131	*1EDGECMA*	*9.28*
315132	*1EDGECMB*	*9.28*
315136	*1ROSEMG1*	*1.98*
315138	*1ROSEMG2*	*0.93*
315137	*1ROSEMS1*	*1.23*
314557	*3BETHELC*	*1.14*
314554	*3BTLEBRO*	*0.43*
314566	*3CRESWEL*	*2.04*
314572	*3EMPORIA*	*0.21*
314578	*3HORNRTN*	*2.04*
314582	*3KELFORD*	*0.72*
314603	*3SCOT NK*	*2.51*
314617	*3TUNIS*	*0.7*
314539	*3UNCAMP*	*1.18*
314541	*3WATKINS*	*0.36*
314620	*6CASHIE*	*0.88*
314574	*6EVERETS*	*5.39*
314594	*6PLYMOTH*	*0.83*
314648	*6SUNBURY*	*0.4*
314651	*6WINFALL*	*0.97*
932631	*AC2-084 C*	*6.16*
932632	*AC2-084 E*	*3.04*
933451	*AC2-158 C*	*5.87*
933452	*AC2-158 E*	*5.87*

933461	AC2-159 C	5.22
933462	AC2-159 E	5.22
933711	AC2-194 C	0.6
933712	AC2-194 E	0.97
933991	AD1-023 C	13.46
933992	AD1-023 E	7.33
934041	AD1-029 C	7.62
934042	AD1-029 E	5.02
934201	AD1-047 C	4.28
934202	AD1-047 E	2.86
934331	AD1-057 C O1	8.8
934332	AD1-057 E O1	4.69
934521	AD1-076 C O1	54.73
934522	AD1-076 E O1	27.87
LTF	AMIL	0.48
LTF	BAYOU	2.64
LTF	BIG_CAJUN1	4.17
LTF	BIG_CAJUN2	8.39
LTF	BLUEG	2.5
LTF	CALDERWOOD	1.54
LTF	CANNELTON	0.48
LTF	CATAWBA	1.51
LTF	CBM-N	< 0.01
LTF	CELEVELAND	4.27
LTF	CHEOAH	1.44
LTF	CHILHOWEE	0.5
LTF	CHOCTAW	2.84
LTF	CLIFTY	9.05
LTF	COTTONWOOD	10.33
LTF	DEARBORN	0.9
LTF	EDWARDS	0.78
LTF	ELMERSMITH	1.42
LTF	FARMERCITY	0.62
LTF	G-007A	1.03
LTF	GIBSON	0.88
LTF	HAMLET	6.47
LTF	MORGAN	4.57
LTF	NEWTON	2.15
LTF	NYISO	0.09
LTF	O-066A	0.47
LTF	PRAIRIE	4.69
LTF	ROWAN	2.99
LTF	SANTEETLA	0.43
LTF	SMITHLAND	0.42
LTF	TATANKA	1.05

LTF	*TILTON*	*0.92*
LTF	*TRIMBLE*	*0.47*
LTF	*TVA*	*1.92*
LTF	*UNIONPOWER*	*2.74*
900672	*V4-068 E*	*0.21*
LTF	*VFT*	*2.75*
901082	*W1-029E*	*23.36*
907092	*X1-038 E*	*2.96*
LTF	*X1-078*	*0.8*
913392	*Y1-086 E*	*1.05*
916042	*Z1-036 E*	*29.11*
917122	*Z2-027 E*	*0.51*
917331	*Z2-043 C*	*0.39*
917332	*Z2-043 E*	*0.86*
917342	*Z2-044 E*	*0.33*
917511	*Z2-088 C OP1*	*1.52*
917512	*Z2-088 E OP1*	*6.13*
917592	*Z2-099 E*	*0.26*
918411	*AA1-050*	*1.28*
918492	*AA1-063AE OP*	*2.44*
918511	*AA1-065 C OP*	*1.93*
918512	*AA1-065 E OP*	*4.84*
918531	*AA1-067 C*	*0.74*
918532	*AA1-067 E*	*1.62*
918561	*AA1-072 C*	*0.06*
918562	*AA1-072 E*	*0.14*
919692	*AA2-053 E*	*2.58*
919702	*AA2-057 E*	*2.12*
919732	*AA2-059 E*	*0.38*
919822	*AA2-068 E*	*0.66*
920022	*AA2-086 E*	*0.14*
920042	*AA2-088 E*	*6.24*
920592	*AA2-165 E*	*0.28*
920672	*AA2-174 E*	*0.3*
920691	*AA2-178 C*	*8.16*
920692	*AA2-178 E*	*3.5*
930051	*AB1-013 C*	*2.46*
930052	*AB1-013 E*	*16.47*
930401	*AB1-081 C*	*5.63*
930402	*AB1-081 E*	*2.41*
930861	*AB1-132 C*	*10.35*
930862	*AB1-132 E*	*4.44*
931231	*AB1-173 C*	*1.2*
931232	*AB1-173 E*	*0.56*
931241	*AB1-173AC*	*1.2*

931242	AB1-173AE	0.56
923801	AB2-015 C O1	4.39
923802	AB2-015 E O1	3.6
923831	AB2-022 C	1.02
923832	AB2-022 E	0.55
923911	AB2-031 C O1	1.2
923912	AB2-031 E O1	0.59
923941	AB2-035 C	0.48
923942	AB2-035 E	0.21
923991	AB2-040 C O1	3.93
923992	AB2-040 E O1	3.21
924151	AB2-059 C O1	6.64
924152	AB2-059 E O1	3.42
924381	AB2-087 C	0.54
924382	AB2-087 E	0.26
924391	AB2-088 C	0.62
924392	AB2-088 E	0.3
924491	AB2-098 C	1.26
924492	AB2-098 E	0.54
924501	AB2-099 C	0.53
924502	AB2-099 E	0.23
924511	AB2-100 C	5.85
924512	AB2-100 E	2.88
925121	AB2-169 C	10.01
925122	AB2-169 E	8.99
925171	AB2-174 C O1	3.64
925172	AB2-174 E O1	3.29
925281	AB2-186 C	0.37
925282	AB2-186 E	0.16
925291	AB2-188 C O1	2.01
925292	AB2-188 E O1	0.9
925591	AC1-034 C	9.79
925592	AC1-034 E	7.38
926071	AC1-086 C	15.25
926072	AC1-086 E	6.94
926201	AC1-098 C	4.32
926202	AC1-098 E	2.58
926211	AC1-099 C	1.45
926212	AC1-099 E	0.85
LTF	AC1-133	22.49
926771	AC1-163 C	1.74
926772	AC1-163 E	0.81
927021	AC1-189 C	15.45
927022	AC1-189 E	7.7
927111	AC1-206 C	4.78

927112	*AC1-206 E*	*2.26*
927141	*AC1-208 C*	*5.74*
927142	*AC1-208 E*	*2.55*

Appendix 23

(DVP - DVP) The 6ELIZ CT-6SHAWBRO 230 kV line (from bus 314638 to bus 314647 ckt 1) loads from 114.72% to 141.81% (**DC power flow**) of its load dump rating (699 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 189.37 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 246T247'                    /* SUFFOLK 230 KV
  OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1          /* 6SUFFOLK
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1          /* 6EARLEYS
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1          /* 6NUCO TP
230.00 - 6NUCOR 230.00
  OPEN BUS 314575                          /* ISLAND: 6NUCO TP 230.00
  OPEN BUS 314590                          /* ISLAND: 6NUCOR 230.00
  OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1          /* 6SUFFOLK
230.00 - 6SUNBURY 230.00
  OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1          /* 6SUNBURY
230.00 - W1-029 230.00
  OPEN BUS 314648                          /* ISLAND: 6SUNBURY 230.00
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.91*
315292	*1DOMTR78*	*3.32*
315293	*1DOMTR9*	*2.71*
315139	*1GASTONA*	*2.23*
315141	*1GASTONB*	*2.23*
315136	*1ROSEMG1*	*1.59*
315138	*1ROSEMG2*	*0.74*
315137	*1ROSEMS1*	*0.98*
314557	*3BETHELC*	*0.6*
314566	*3CRESWEL*	*6.73*
314582	*3KELFORD*	*0.78*
314603	*3SCOT NK*	*2.7*
314617	*3TUNIS*	*0.7*
314620	*6CASHIE*	*1.59*
314574	*6EVERETS*	*2.49*
314594	*6PLYMOTH*	*2.03*
314651	*6WINFALL*	*6.57*
932631	*AC2-084 C*	*6.53*
932632	*AC2-084 E*	*3.22*
933451	*AC2-158 C*	*8.08*
933452	*AC2-158 E*	*8.08*
933461	*AC2-159 C*	*5.4*

933462	AC2-159 E	5.4
933711	AC2-194 C	4.07
933712	AC2-194 E	6.57
933991	AD1-023 C	27.52
933992	AD1-023 E	14.98
934041	AD1-029 C	8.08
934042	AD1-029 E	5.32
934521	AD1-076 C O1	125.48
934522	AD1-076 E O1	63.89
LTF	CARR	0.07
LTF	CBM-S1	3.23
LTF	CBM-S2	6.64
LTF	CBM-W1	7.05
LTF	CBM-W2	17.41
LTF	CIN	1.58
LTF	CPLE	2.31
LTF	G-007	0.43
LTF	IPL	1.01
LTF	LGEE	0.34
LTF	MEC	3.58
LTF	MECS	1.59
LTF	O-066	1.43
LTF	RENSSELAER	0.05
LTF	ROSETON	0.38
900671	V4-068 C	0.07
900672	V4-068 E	0.18
901081	W1-029C	5.03
901082	W1-029E	171.41
LTF	WEC	0.44
913391	Y1-086 C	1.08
913392	Y1-086 E	8.99
916041	Z1-036 C	4.62
916042	Z1-036 E	157.7
917121	Z2-027 C	1.99
917122	Z2-027 E	4.35
917331	Z2-043 C	0.43
917332	Z2-043 E	0.94
917511	Z2-088 C OP1	0.77
917512	Z2-088 E OP1	3.1
918411	AA1-050	0.65
918511	AA1-065 C OP	2.22
918512	AA1-065 E OP	5.58
918531	AA1-067 C	0.34
918532	AA1-067 E	0.75
918561	AA1-072 C	0.06

918562	AA1-072 E	0.16
919691	AA2-053 C	1.15
919692	AA2-053 E	2.52
919701	AA2-057 C	0.89
919702	AA2-057 E	2.26
919731	AA2-059 C	0.77
919732	AA2-059 E	1.86
919821	AA2-068 C	0.29
919822	AA2-068 E	0.69
LTF	AA2-074	1.57
920591	AA2-165 C	0.12
920592	AA2-165 E	0.3
920671	AA2-174 C	0.05
920672	AA2-174 E	0.29
920691	AA2-178 C	26.93
920692	AA2-178 E	11.54
930051	AB1-013 C	8.13
930052	AB1-013 E	54.39
930861	AB1-132 C	8.68
930862	AB1-132 E	3.72
923831	AB2-022 C	9.92
923832	AB2-022 E	5.34
923941	AB2-035 C	0.25
923942	AB2-035 E	0.11
924381	AB2-087 C	0.6
924382	AB2-087 E	0.28
924391	AB2-088 C	0.32
924392	AB2-088 E	0.16
924491	AB2-098 C	0.58
924492	AB2-098 E	0.25
924501	AB2-099 C	0.56
924502	AB2-099 E	0.24
925121	AB2-169 C	11.25
925122	AB2-169 E	10.1
925281	AB2-186 C	2.19
925282	AB2-186 E	0.94
925291	AB2-188 C O1	6.64
925292	AB2-188 E O1	2.98
925591	AC1-034 C	5.13
925592	AC1-034 E	3.87
926071	AC1-086 C	12.79
926072	AC1-086 E	5.82
926201	AC1-098 C	4.58
926202	AC1-098 E	2.73
926211	AC1-099 C	1.54

926212	*AC1-099 E*	*0.9*
926771	*AC1-163 C*	*1.84*
926772	*AC1-163 E*	*0.86*
927021	*AC1-189 C*	*7.54*
927022	*AC1-189 E*	*3.75*
927141	*AC1-208 C*	*5.8*
927142	*AC1-208 E*	*2.58*

Appendix 24

(DVP - DVP) The 8CARSON-8MDLTHAN 500 kV line (from bus 314902 to bus 314914 ckt 1) loads from 102.64% to 104.21% (**DC power flow**) of its load dump rating (3938 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 557T574'. This project contributes approximately 133.41 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 557T574' /* ELMONT
OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557)
OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1)
OPEN BRANCH FROM BUS 314911 TO BUS 314908 CKT 1 /*ELMONT TO LADYSMITH (LINE 574)
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*19.1*
315103	*1BRUNSWICKG2*	*19.1*
315104	*1BRUNSWICKG3*	*19.1*
315105	*1BRUNSWICKS1*	*39.67*
315131	*1EDGECMA*	*13.75*
315132	*1EDGECMB*	*13.75*
315108	*1ELIZAR1*	*6.55*
315110	*1ELIZAR3*	*6.64*
315233	*1SURRY 2*	*51.71*
314557	*3BETHELC*	*1.21*
314554	*3BTLEBRO*	*1.18*
314566	*3CRESWEL*	*3.95*
314572	*3EMPORIA*	*0.62*
314578	*3HORNRTN*	*4.97*
314582	*3KELFORD*	*1.29*
314603	*3SCOT NK*	*5.05*
314617	*3TUNIS*	*1.32*
314539	*3UNCAMP*	*3.87*
314541	*3WATKINS*	*1.09*
314620	*6CASHIE*	*1.36*
314574	*6EVERETS*	*3.73*
314594	*6PLYMOTH*	*1.38*
314648	*6SUNBURY*	*1.48*
314651	*6WINFALL*	*2.94*
932041	*AC2-012 C*	*17.32*
932042	*AC2-012 E*	*28.26*
932581	*AC2-078 C*	*5.12*
932582	*AC2-078 E*	*8.35*
932591	*AC2-079 C*	*10.33*

932592	AC2-079 E	16.86
932631	AC2-084 C	13.35
932632	AC2-084 E	6.57
932701	AC2-093 C	142.12
932702	AC2-093 E	81.29
932761	AC2-100 C	7.19
932762	AC2-100 E	3.51
933291	AC2-141 C	55.11
933292	AC2-141 E	23.53
933451	AC2-158 C	8.73
933452	AC2-158 E	8.73
933461	AC2-159 C	10.23
933462	AC2-159 E	10.23
933471	AC2-161 C	3.54
933472	AC2-161 E	1.82
933711	AC2-194 C	1.82
933712	AC2-194 E	2.94
933731	AC2-196 C	3.07
933732	AC2-196 E	2.05
933991	AD1-023 C	21.27
933992	AD1-023 E	11.58
934011	AD1-025 C O1	19.13
934012	AD1-025 E O1	11.33
934041	AD1-029 C	16.51
934042	AD1-029 E	10.88
934061	AD1-033 C O1	12.91
934062	AD1-033 E O1	8.61
934201	AD1-047 C	11.92
934202	AD1-047 E	7.95
934231	AD1-050 C	6.49
934232	AD1-050 E	3.55
934311	AD1-055 C	3.36
934312	AD1-055 E	0.87
934331	AD1-057 C O1	14.95
934332	AD1-057 E O1	7.97
934341	AD1-058 C	7.83
934342	AD1-058 E	1.99
934521	AD1-076 C O1	88.4
934522	AD1-076 E O1	45.01
934571	AD1-082 C O1	10.96
934572	AD1-082 E O1	6.25
934611	AD1-087 C O1	13.59
934612	AD1-087 E O1	6.35
934621	AD1-088 C O1	19.49
934622	AD1-088 E O1	9.14

LTF	*AD1-092*	*4.22*
LTF	*AD1-093*	*7.22*
LTF	*AD1-094*	*1.35*
LTF	*AD1-120*	*17.62*
LTF	*AD1-121*	*17.54*
934911	*AD1-123 C*	*1.47*
934912	*AD1-123 E*	*0.76*
934991	*AD1-131 C*	*2.57*
934992	*AD1-131 E*	*1.71*
935111	*AD1-144 C*	*2.79*
935112	*AD1-144 E*	*1.53*
935161	*AD1-151 C O1*	*18.28*
935162	*AD1-151 E O1*	*12.18*
935171	*AD1-152 C O1*	*12.6*
935172	*AD1-152 E O1*	*8.4*
935211	*AD1-156 C*	*2.56*
935212	*AD1-156 E*	*1.71*
LTF	*CARR*	*1.17*
LTF	*CBM-S1*	*20.73*
LTF	*CBM-S2*	*41.34*
LTF	*CBM-W1*	*41.59*
LTF	*CBM-W2*	*110.06*
LTF	*CIN*	*9.57*
LTF	*CPLE*	*12.89*
LTF	*G-007*	*5.71*
LTF	*IPL*	*6.09*
LTF	*LGEE*	*2.09*
LTF	*MEC*	*22.03*
LTF	*MECS*	*8.39*
LTF	*O-066*	*19.05*
LTF	*RENSSELAER*	*0.93*
LTF	*ROSETON*	*6.74*
900672	*V4-068 E*	*0.47*
901082	*W1-029E*	*77.*
LTF	*WEC*	*2.61*
907092	*X1-038 E*	*9.66*
913392	*Y1-086 E*	*3.69*
916042	*Z1-036 E*	*75.84*
LTF	*Z1-043*	*10.29*
916191	*Z1-068 C*	*0.09*
916192	*Z1-068 E*	*3.21*
916301	*Z1-086 C*	*116.54*
916302	*Z1-086 E*	*18.58*
917122	*Z2-027 E*	*1.78*
917332	*Z2-043 E*	*1.55*

917342	Z2-044 E	0.86
917512	Z2-088 E OP1	5.82
917592	Z2-099 E	0.69
918492	AA1-063AE OP	6.13
918512	AA1-065 E OP	7.04
918532	AA1-067 E	1.12
918562	AA1-072 E	0.26
919152	AA1-139 E	10.97
919692	AA2-053 E	5.67
919702	AA2-057 E	5.33
919732	AA2-059 E	0.92
919822	AA2-068 E	1.55
LTF	AA2-074	8.77
920022	AA2-086 E	0.37
920042	AA2-088 E	16.51
920592	AA2-165 E	0.7
920631	AA2-169 C	3.16
920632	AA2-169 E	1.45
920672	AA2-174 E	0.66
920691	AA2-178 C	15.78
920692	AA2-178 E	6.76
930051	AB1-013 C	4.76
930052	AB1-013 E	31.87
930401	AB1-081 C	13.27
930402	AB1-081 E	5.69
930861	AB1-132 C	21.21
930862	AB1-132 E	9.09
931231	AB1-173 C	3.35
931232	AB1-173 E	1.56
931241	AB1-173AC	3.35
931242	AB1-173AE	1.56
LTF	AB2-013	6.02
923801	AB2-015 C O1	13.7
923802	AB2-015 E O1	11.23
923831	AB2-022 C	3.89
923832	AB2-022 E	2.1
923852	AB2-025 E	1.62
923911	AB2-031 C O1	3.33
923912	AB2-031 E O1	1.64
923941	AB2-035 C	0.51
923942	AB2-035 E	0.22
923991	AB2-040 C O1	10.93
923992	AB2-040 E O1	8.94
924021	AB2-043 C O1	3.91
924022	AB2-043 E O1	6.41

924071	*AB2-051*	*233.47*
924151	*AB2-059 C O1*	*15.64*
924152	*AB2-059 E O1*	*8.06*
924161	*AB2-060 C O1*	*11.18*
924162	*AB2-060 E O1*	*5.26*
924241	*AB2-068 O1*	*330.87*
924301	*AB2-077 C O1*	*2.49*
924302	*AB2-077 E O1*	*1.66*
924311	*AB2-078 C O1*	*2.49*
924312	*AB2-078 E O1*	*1.66*
924321	*AB2-079 C O1*	*2.49*
924322	*AB2-079 E O1*	*1.66*
924381	*AB2-087 C*	*0.89*
924382	*AB2-087 E*	*0.42*
924391	*AB2-088 C*	*0.65*
924392	*AB2-088 E*	*0.31*
924401	*AB2-089 C*	*2.94*
924402	*AB2-089 E*	*1.52*
924411	*AB2-090 C*	*4.92*
924412	*AB2-090 E*	*2.52*
924491	*AB2-098 C*	*0.87*
924492	*AB2-098 E*	*0.37*
924501	*AB2-099 C*	*0.92*
924502	*AB2-099 E*	*0.39*
924511	*AB2-100 C*	*17.14*
924512	*AB2-100 E*	*8.44*
924811	*AB2-134 C O1*	*14.58*
924812	*AB2-134 E O1*	*14.34*
925061	*AB2-161 C O1*	*4.81*
925062	*AB2-161 E O1*	*7.85*
925121	*AB2-169 C*	*10.27*
925122	*AB2-169 E*	*9.22*
925171	*AB2-174 C O1*	*10.43*
925172	*AB2-174 E O1*	*9.43*
925221	*AB2-176 C*	*2.03*
925222	*AB2-176 E*	*0.87*
925281	*AB2-186 C*	*1.02*
925282	*AB2-186 E*	*0.44*
925291	*AB2-188 C O1*	*3.89*
925292	*AB2-188 E O1*	*1.75*
925331	*AB2-190 C*	*22.74*
925332	*AB2-190 E*	*9.75*
925521	*AC1-027 C*	*0.67*
925522	*AC1-027 E*	*1.95*
925591	*AC1-034 C*	*10.31*

925592	*AC1-034 E*	*7.78*
925692	*AC1-045 E*	*1.53*
925781	*AC1-054 C*	*10.05*
925782	*AC1-054 E*	*4.63*
926071	*AC1-086 C*	*31.24*
926072	*AC1-086 E*	*14.22*
926201	*AC1-098 C*	*9.36*
926202	*AC1-098 E*	*5.58*
926211	*AC1-099 C*	*3.14*
926212	*AC1-099 E*	*1.84*
926271	*AC1-105 C*	*7.47*
926272	*AC1-105 E*	*3.72*
926291	*AC1-107*	*499.42*
926662	*AC1-147 E*	*2.25*
926741	*AC1-159*	*112.57*
926751	*AC1-161 C*	*55.11*
926752	*AC1-161 E*	*23.53*
926771	*AC1-163 C*	*3.04*
926772	*AC1-163 E*	*1.42*
927021	*AC1-189 C*	*13.06*
927022	*AC1-189 E*	*6.51*
927111	*AC1-206 C*	*14.79*
927112	*AC1-206 E*	*6.99*
927141	*AC1-208 C*	*13.66*
927142	*AC1-208 E*	*6.07*
927221	*AC1-216 C O1*	*11.13*
927222	*AC1-216 E O1*	*8.75*
927251	*AC1-221 C*	*3.12*
927252	*AC1-221 E*	*3.12*
927261	*AC1-222 C*	*4.83*
927262	*AC1-222 E*	*4.6*

Appendix 25

(DVP - DVP) The 8CHCKAHM-8ELMONT 500 kV line (from bus 314903 to bus 314908 ckt 1) loads from 121.95% to 123.51% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 563'. This project contributes approximately 82.69 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 563'
 OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00
 END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*2.27*
315131	*1EDGECMA*	*11.07*
315132	*1EDGECMB*	*11.07*
315108	*1ELIZAR1*	*6.68*
315109	*1ELIZAR2*	*6.57*
315110	*1ELIZAR3*	*6.77*
315074	*1HOPCGN1*	*9.56*
315075	*1HOPCGN2*	*9.44*
315233	*1SURRY 2*	*60.62*
315092	*1YORKTN3*	*49.87*
314315	*3LOCKS E*	*1.28*
314421	*6WINCHST*	*0.31*
932041	*AC2-012 C*	*17.68*
932531	*AC2-073 C*	*3.68*
932581	*AC2-078 C*	*5.04*
932591	*AC2-079 C*	*10.28*
932631	*AC2-084 C*	*11.34*
932701	*AC2-093 C*	*98.83*
932831	*AC2-110 C*	*2.02*
933061	*AC2-130*	*2.83*
933071	*AC2-131 1*	*1.91*
933081	*AC2-131 2*	*0.87*
933111	*AC2-132 1*	*1.01*
933121	*AC2-132 2*	*0.51*
933261	*AC2-137 C*	*2.66*
933271	*AC2-138 C*	*0.89*
933291	*AC2-141 C*	*57.04*
933451	*AC2-158 C*	*7.98*
933461	*AC2-159 C*	*8.94*
933471	*AC2-161 C*	*3.83*
933711	*AC2-194 C*	*1.79*
933731	*AC2-196 C*	*3.11*
933991	*AD1-023 C*	*19.78*

934011	AD1-025 C O1	22.79
934041	AD1-029 C	14.03
934061	AD1-033 C O1	13.06
934071	AD1-034 C O1	8.19
934141	AD1-041 C O1	8.02
934201	AD1-047 C	9.98
934211	AD1-048 C	2.45
934231	AD1-050 C	5.14
934331	AD1-057 C O1	12.29
934391	AD1-063 C	2.49
934521	AD1-076 C O1	82.69
934571	AD1-082 C O1	10.87
934611	AD1-087 C O1	9.6
LTF	AD1-120	12.02
LTF	AD1-121	11.96
935111	AD1-144 C	2.91
935161	AD1-151 C O1	21.77
935171	AD1-152 C O1	8.89
935211	AD1-156 C	2.31
LTF	CARR	0.91
LTF	CBM-S1	11.69
LTF	CBM-S2	28.19
LTF	CBM-W1	17.94
LTF	CBM-W2	60.26
LTF	CIN	4.15
LTF	CPLE	9.17
LTF	IPL	2.63
LTF	LGEE	0.92
LTF	MEC	10.87
LTF	MECS	2.46
LTF	RENSSELAER	0.73
LTF	ROSETON	5.25
LTF	WEC	1.16
916191	Z1-068 C	0.09
LTF	AA2-074	6.24
920631	AA2-169 C	2.56
920691	AA2-178 C	15.04
930051	AB1-013 C	4.54
930401	AB1-081 C	10.68
930861	AB1-132 C	17.9
931231	AB1-173 C	2.81
931241	AB1-173AC	2.81
923801	AB2-015 C O1	12.94
923831	AB2-022 C	3.87
923911	AB2-031 C O1	2.79

923941	AB2-035 C	0.42
923991	AB2-040 C O1	9.14
924071	AB2-051	238.09
924151	AB2-059 C O1	12.59
924241	AB2-068 O1	608.19
924381	AB2-087 C	0.8
924391	AB2-088 C	0.54
924401	AB2-089 C	2.33
924491	AB2-098 C	0.74
924501	AB2-099 C	0.83
924511	AB2-100 C	14.22
924811	AB2-134 C O1	17.37
925051	AB2-160 C O1	5.54
925061	AB2-161 C O1	4.77
925121	AB2-169 C	9.24
925171	AB2-174 C O1	8.7
925281	AB2-186 C	1.
925291	AB2-188 C O1	3.71
925331	AB2-190 C	27.1
925521	AC1-027 C	0.68
925591	AC1-034 C	8.47
925781	AC1-054 C	8.03
925861	AC1-065 C	5.06
926071	AC1-086 C	26.37
926201	AC1-098 C	7.96
926211	AC1-099 C	2.67
926291	AC1-107	918.02
926741	AC1-159	114.8
926751	AC1-161 C	57.04
926771	AC1-163 C	2.73
926781	AC1-164 C	64.31
927021	AC1-189 C	10.93
927111	AC1-206 C	12.24
927141	AC1-208 C	11.49
927221	AC1-216 C O1	13.26

Appendix 26

(DVP - DVP) The 8CHANCE-8BRISTER 500 kV line (from bus 314905 to bus 314900 ckt 1) loads from 121.95% to 122.8% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 594'. This project contributes approximately 54.83 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 594'
OPEN BRANCH FROM BUS 314916 TO BUS 314934 CKT 1 /* 8MORRSVL 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.68*
315054	*1BELMED2*	*3.68*
315055	*1BELMED3*	*3.06*
315060	*1CHESTF5*	*13.05*
315061	*1CHESTG7*	*5.11*
315063	*1CHESTG8*	*5.06*
315062	*1CHESTS7*	*2.32*
315064	*1CHESTS8*	*2.6*
315067	*1DARBY 1*	*3.35*
315068	*1DARBY 2*	*3.35*
315069	*1DARBY 3*	*3.36*
315070	*1DARBY 4*	*3.37*
315043	*1FOUR RIVERA*	*4.51*
315044	*1FOUR RIVERB*	*3.49*
315045	*1FOUR RIVERC*	*4.51*
315046	*1FOUR RIVERD*	*3.49*
315047	*1FOUR RIVERE*	*3.49*
315048	*1FOUR RIVERF*	*4.51*
315074	*1HOPCGN1*	*9.03*
315075	*1HOPCGN2*	*8.91*
315225	*1N ANNA1*	*47.9*
315226	*1N ANNA2*	*47.88*
315083	*1SPRUNCA*	*11.49*
315084	*1SPRUNCB*	*11.49*
315085	*1SPRUNCC*	*8.52*
315086	*1SPRUNCD*	*8.52*
314315	*3LOCKS E*	*1.35*
314309	*6IRON208*	*0.58*
314236	*6NRTHEST*	*0.24*
314250	*6ROCKVILLE*	*0.28*
932041	*AC2-012 C*	*10.8*
932501	*AC2-070 C*	*1.85*
932531	*AC2-073 C*	*2.54*

932581	AC2-078 C	4.34
932591	AC2-079 C	7.11
932701	AC2-093 C	71.07
932711	AC2-094 C	11.34
932831	AC2-110 C	1.44
933011	AC2-125	2.93
933021	AC2-126	2.95
933031	AC2-127	1.61
933041	AC2-128	1.55
933051	AC2-129	1.45
933061	AC2-130	2.61
933071	AC2-131 1	1.76
933081	AC2-131 2	0.8
933111	AC2-132 1	0.93
933121	AC2-132 2	0.47
933261	AC2-137 C	2.27
933271	AC2-138 C	0.79
933291	AC2-141 C	32.25
933451	AC2-158 C	5.44
933461	AC2-159 C	6.5
933471	AC2-161 C	2.52
933481	AC2-162 C	2.65
933501	AC2-165 C	10.51
933711	AC2-194 C	1.13
933731	AC2-196 C	1.89
933991	AD1-023 C	13.21
934011	AD1-025 C O1	18.21
934061	AD1-033 C O1	7.93
934071	AD1-034 C O1	8.67
934141	AD1-041 C O1	5.66
934201	AD1-047 C	7.82
934211	AD1-048 C	2.65
934391	AD1-063 C	1.72
934521	AD1-076 C O1	54.83
934541	AD1-078 C	2.9
934571	AD1-082 C O1	8.16
934781	AD1-105 C	9.04
LTF	AD1-120	10.32
LTF	AD1-121	10.29
935111	AD1-144 C	1.83
935161	AD1-151 C O1	17.4
935211	AD1-156 C	2.27
LTF	CARR	1.28
LTF	CBM-S1	12.63
LTF	CBM-S2	24.28

LTF	*CBM-W1*	*23.25*
LTF	*CBM-W2*	*65.87*
LTF	*CIN*	*5.61*
LTF	*CPLE*	*7.42*
LTF	*IPL*	*3.57*
LTF	*LGEE*	*1.25*
LTF	*MEC*	*12.92*
LTF	*MECS*	*3.96*
LTF	*RENSSELAER*	*1.02*
LTF	*ROSETON*	*7.34*
297087	*V2-040*	*0.16*
LTF	*WEC*	*1.5*
918691	*AA1-083*	*0.79*
919211	*AA1-145*	*13.47*
LTF	*AA2-074*	*5.05*
920691	*AA2-178 C*	*9.78*
930051	*AB1-013 C*	*2.95*
930121	*AB1-027 C*	*0.55*
930861	*AB1-132 C*	*13.64*
931231	*AB1-173 C*	*2.2*
931241	*AB1-173AC*	*2.2*
923801	*AB2-015 C O1*	*8.77*
923831	*AB2-022 C*	*2.4*
923911	*AB2-031 C O1*	*2.18*
923991	*AB2-040 C O1*	*7.17*
924061	*AB2-050*	*0.79*
924071	*AB2-051*	*145.12*
924241	*AB2-068 O1*	*217.6*
924381	*AB2-087 C*	*0.56*
924501	*AB2-099 C*	*0.58*
924511	*AB2-100 C*	*11.45*
924811	*AB2-134 C O1*	*13.88*
925051	*AB2-160 C O1*	*5.87*
925061	*AB2-161 C O1*	*3.58*
925121	*AB2-169 C*	*6.33*
925171	*AB2-174 C O1*	*6.87*
925281	*AB2-186 C*	*0.63*
925291	*AB2-188 C O1*	*2.41*
925331	*AB2-190 C*	*21.65*
925861	*AC1-065 C*	*3.61*
926001	*AC1-076 C*	*4.68*
926071	*AC1-086 C*	*20.08*
926291	*AC1-107*	*328.45*
926411	*AC1-112 C*	*0.43*
926441	*AC1-115 C*	*1.13*

926551	*AC1-134*	*10.09*
926731	*AC1-158 C*	*89.18*
926741	*AC1-159*	*69.97*
926751	*AC1-161 C*	*32.25*
926771	*AC1-163 C*	*1.91*
926781	*AC1-164 C*	*43.75*
927041	*AC1-191 C*	*10.34*
927111	*AC1-206 C*	*9.93*
927221	*AC1-216 C O1*	*10.59*

Appendix 27

(DVP - DVP) The 8ELMONT-8LADYSMITH 500 kV line (from bus 314908 to bus 314911 ckt 1) loads from 157.9% to 159.52% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 576'. This project contributes approximately 91.28 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 576'
OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315058	*1CHESTF3*	*6.41*
315059	*1CHESTF4*	*10.39*
315060	*1CHESTF5*	*22.04*
315061	*1CHESTG7*	*8.64*
315063	*1CHESTG8*	*8.54*
315062	*1CHESTS7*	*3.93*
315064	*1CHESTS8*	*4.38*
315067	*1DARBY 1*	*5.62*
315068	*1DARBY 2*	*5.63*
315069	*1DARBY 3*	*5.65*
315070	*1DARBY 4*	*5.65*
315074	*1HOPCGN1*	*15.08*
315075	*1HOPCGN2*	*14.88*
315078	*1HOPHCF2*	*4.77*
315079	*1HOPHCF3*	*4.77*
315080	*1HOPHCF4*	*7.24*
315083	*1SPRUNCA*	*18.62*
315084	*1SPRUNCB*	*18.62*
315085	*1SPRUNCC*	*13.81*
315086	*1SPRUNCD*	*13.81*
315233	*1SURRY 2*	*55.09*
315092	*1YORKTN3*	*50.67*
314315	*3LOCKS E*	*2.22*
314309	*6IRON208*	*0.98*
314236	*6NRTHEST*	*0.41*
314421	*6WINCHST*	*0.32*
932041	*AC2-012 C*	*18.08*
932501	*AC2-070 C*	*3.15*
932531	*AC2-073 C*	*4.17*
932581	*AC2-078 C*	*7.15*
932591	*AC2-079 C*	*11.82*
932631	*AC2-084 C*	*13.79*
932701	*AC2-093 C*	*113.43*

932831	AC2-110 C	2.34
933061	AC2-130	4.4
933071	AC2-131 1	2.98
933081	AC2-131 2	1.35
933111	AC2-132 1	1.57
933121	AC2-132 2	0.8
933261	AC2-137 C	3.87
933291	AC2-141 C	54.33
933451	AC2-158 C	9.04
933461	AC2-159 C	10.73
933471	AC2-161 C	4.22
933481	AC2-162 C	4.53
933711	AC2-194 C	1.88
933731	AC2-196 C	3.16
933991	AD1-023 C	21.99
934011	AD1-025 C O1	30.48
934041	AD1-029 C	17.06
934061	AD1-033 C O1	13.26
934071	AD1-034 C O1	14.26
934141	AD1-041 C O1	9.1
934201	AD1-047 C	12.81
934211	AD1-048 C	4.49
934391	AD1-063 C	2.82
934521	AD1-076 C O1	91.28
934571	AD1-082 C O1	13.52
LTF	AD1-092	5.99
LTF	AD1-093	10.26
LTF	AD1-094	1.92
LTF	AD1-120	17.84
LTF	AD1-121	17.8
935111	AD1-144 C	3.06
935161	AD1-151 C O1	29.12
935211	AD1-156 C	3.7
LTF	CARR	1.65
LTF	CBM-S1	25.74
LTF	CBM-S2	42.18
LTF	CBM-W1	59.72
LTF	CBM-W2	138.96
LTF	CIN	13.91
LTF	CPLE	12.52
LTF	IPL	8.89
LTF	LGEE	3.04
LTF	MEC	29.72
LTF	MECS	13.46
LTF	RENSSELAER	1.32

LTF	ROSETON	9.56
297087	V2-040	0.27
LTF	WEC	3.73
LTF	Y3-032	8.73
LTF	Z1-043	14.67
LTF	AA2-074	8.52
920691	AA2-178 C	16.3
930051	AB1-013 C	4.92
930121	AB1-027 C	0.94
930861	AB1-132 C	22.44
931231	AB1-173 C	3.6
931241	AB1-173AC	3.6
LTF	AB2-013	8.55
923801	AB2-015 C O1	14.56
923831	AB2-022 C	4.01
923911	AB2-031 C O1	3.58
923991	AB2-040 C O1	11.74
924071	AB2-051	242.92
924241	AB2-068 O1	417.67
924381	AB2-087 C	0.93
924501	AB2-099 C	0.96
924511	AB2-100 C	18.71
924811	AB2-134 C O1	23.23
925051	AB2-160 C O1	9.66
925061	AB2-161 C O1	5.93
925121	AB2-169 C	10.53
925171	AB2-174 C O1	11.24
925281	AB2-186 C	1.06
925291	AB2-188 C O1	4.02
925331	AB2-190 C	36.24
925861	AC1-065 C	5.85
926071	AC1-086 C	33.04
926201	AC1-098 C	9.68
926211	AC1-099 C	3.24
926291	AC1-107	630.45
926411	AC1-112 C	0.73
926741	AC1-159	117.13
926751	AC1-161 C	54.33
926771	AC1-163 C	3.17
926781	AC1-164 C	75.71
927041	AC1-191 C	16.51
927111	AC1-206 C	16.2
927141	AC1-208 C	14.19
927221	AC1-216 C O1	17.73

Appendix 28

(DVP - DVP) The 8LADYSMITH-8CHANCE 500 kV line (from bus 314911 to bus 314905 ckt 1) loads from 112.61% to 113.48% (**DC power flow**) of its emergency rating (2738 MVA) for the single line contingency outage of 'DVP_P1-2: LN 573'. This project contributes approximately 55.61 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 573'
OPEN BRANCH FROM BUS 314918 TO BUS 314934 CKT 1 /* 8NO ANNA 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.74*
315054	*1BELMED2*	*3.74*
315055	*1BELMED3*	*3.1*
315060	*1CHESTF5*	*13.27*
315061	*1CHESTG7*	*5.2*
315063	*1CHESTG8*	*5.14*
315067	*1DARBY 1*	*3.41*
315068	*1DARBY 2*	*3.41*
315069	*1DARBY 3*	*3.42*
315070	*1DARBY 4*	*3.43*
315043	*1FOUR RIVERA*	*4.6*
315044	*1FOUR RIVERB*	*3.56*
315045	*1FOUR RIVERC*	*4.6*
315046	*1FOUR RIVERD*	*3.56*
315047	*1FOUR RIVERE*	*3.56*
315048	*1FOUR RIVERF*	*4.6*
315074	*1HOPCGN1*	*9.17*
315075	*1HOPCGN2*	*9.06*
315037	*1LDYSMT1*	*5.98*
315038	*1LDYSMT2*	*5.97*
315039	*1LDYSMT3*	*6.32*
315040	*1LDYSMT4*	*6.33*
315041	*1LDYSMT5*	*6.35*
315225	*1N ANNA1*	*48.59*
315226	*1N ANNA2*	*48.56*
315083	*1SPRUNCA*	*11.67*
315084	*1SPRUNCB*	*11.67*
315085	*1SPRUNCC*	*8.65*
315086	*1SPRUNCD*	*8.65*
314315	*3LOCKS E*	*1.37*
314309	*6IRON208*	*0.59*
314236	*6NRTHEST*	*0.25*
314250	*6ROCKVILLE*	*0.28*

932041	AC2-012 C	10.97
932501	AC2-070 C	1.88
932531	AC2-073 C	2.59
932581	AC2-078 C	4.4
932591	AC2-079 C	7.22
932631	AC2-084 C	8.44
932701	AC2-093 C	71.98
932711	AC2-094 C	10.57
932831	AC2-110 C	1.47
933011	AC2-125	3.
933021	AC2-126	3.02
933031	AC2-127	1.65
933041	AC2-128	1.59
933051	AC2-129	1.49
933061	AC2-130	2.65
933071	AC2-131 1	1.79
933081	AC2-131 2	0.82
933111	AC2-132 1	0.94
933121	AC2-132 2	0.48
933261	AC2-137 C	2.3
933271	AC2-138 C	0.81
933291	AC2-141 C	32.76
933451	AC2-158 C	5.52
933461	AC2-159 C	6.58
933471	AC2-161 C	2.56
933481	AC2-162 C	2.7
933501	AC2-165 C	10.46
933711	AC2-194 C	1.14
933731	AC2-196 C	1.92
933991	AD1-023 C	13.4
934011	AD1-025 C O1	18.5
934041	AD1-029 C	10.44
934061	AD1-033 C O1	8.05
934071	AD1-034 C O1	8.81
934141	AD1-041 C O1	5.76
934201	AD1-047 C	7.92
934211	AD1-048 C	2.69
934391	AD1-063 C	1.75
934521	AD1-076 C O1	55.61
934571	AD1-082 C O1	8.28
934781	AD1-105 C	9.25
LTF	AD1-120	10.41
LTF	AD1-121	10.38
935111	AD1-144 C	1.85
935161	AD1-151 C O1	17.68

935211	AD1-156 C	2.3
LTF	CARR	1.28
LTF	CBM-S1	12.65
LTF	CBM-S2	24.47
LTF	CBM-W1	23.12
LTF	CBM-W2	65.9
LTF	CIN	5.58
LTF	CPLE	7.49
LTF	IPL	3.55
LTF	LGEE	1.25
LTF	MEC	12.89
LTF	MECS	3.9
LTF	RENSSELAER	1.02
LTF	ROSETON	7.36
297087	V2-040	0.16
LTF	WEC	1.49
918691	AA1-083	0.81
919211	AA1-145	13.74
LTF	AA2-074	5.1
920691	AA2-178 C	9.92
930051	AB1-013 C	2.99
930121	AB1-027 C	0.56
930861	AB1-132 C	13.81
931231	AB1-173 C	2.23
931241	AB1-173AC	2.23
923801	AB2-015 C O1	8.89
923831	AB2-022 C	2.44
923911	AB2-031 C O1	2.21
923991	AB2-040 C O1	7.26
924061	AB2-050	0.81
924071	AB2-051	147.36
924241	AB2-068 O1	221.55
924381	AB2-087 C	0.57
924501	AB2-099 C	0.59
924511	AB2-100 C	11.61
924811	AB2-134 C O1	14.1
925051	AB2-160 C O1	5.96
925061	AB2-161 C O1	3.63
925121	AB2-169 C	6.41
925171	AB2-174 C O1	6.95
925281	AB2-186 C	0.64
925291	AB2-188 C O1	2.45
925331	AB2-190 C	22.
925861	AC1-065 C	3.67
926071	AC1-086 C	20.34

926201	*AC1-098 C*	*5.92*
926211	*AC1-099 C*	*1.98*
926291	*AC1-107*	*334.42*
926411	*AC1-112 C*	*0.44*
926441	*AC1-115 C*	*1.16*
926551	*AC1-134*	*10.29*
926741	*AC1-159*	*71.05*
926751	*AC1-161 C*	*32.76*
926771	*AC1-163 C*	*1.94*
926781	*AC1-164 C*	*44.52*
927041	*AC1-191 C*	*10.53*
927111	*AC1-206 C*	*10.06*
927221	*AC1-216 C O1*	*10.76*

Appendix 29

(DVP - DVP) The 8LADYSMITH-8POSSUM 500 kV line (from bus 314911 to bus 314922 ckt 1) loads from 115.44% to 115.98% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 594'. This project contributes approximately 47.72 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 594'
OPEN BRANCH FROM BUS 314916 TO BUS 314934 CKT 1 /* 8MORRSVL 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.14*
315054	*1BELMED2*	*3.14*
315055	*1BELMED3*	*2.6*
315060	*1CHESTF5*	*11.1*
315061	*1CHESTG7*	*4.35*
315063	*1CHESTG8*	*4.3*
315062	*1CHESTS7*	*1.98*
315064	*1CHESTS8*	*2.21*
315067	*1DARBY 1*	*2.85*
315068	*1DARBY 2*	*2.85*
315069	*1DARBY 3*	*2.86*
315070	*1DARBY 4*	*2.86*
315043	*1FOUR RIVERA*	*3.74*
315044	*1FOUR RIVERB*	*2.9*
315045	*1FOUR RIVERC*	*3.74*
315046	*1FOUR RIVERD*	*2.9*
315047	*1FOUR RIVERE*	*2.9*
315048	*1FOUR RIVERF*	*3.74*
315074	*1HOPCGN1*	*7.71*
315075	*1HOPCGN2*	*7.61*
315225	*1N ANNA1*	*40.49*
315226	*1N ANNA2*	*40.47*
315083	*1SPRUNCA*	*9.8*
315084	*1SPRUNCB*	*9.8*
315085	*1SPRUNCC*	*7.27*
315086	*1SPRUNCD*	*7.27*
314315	*3LOCKS E*	*1.16*
314309	*6IRON208*	*0.5*
314236	*6NRTHEST*	*0.21*
314250	*6ROCKVILLE*	*0.24*
932041	*AC2-012 C*	*9.29*
932501	*AC2-070 C*	*1.57*
932531	*AC2-073 C*	*2.13*

932581	AC2-078 C	3.72
932591	AC2-079 C	6.12
932711	AC2-094 C	10.62
932831	AC2-110 C	1.21
933011	AC2-125	2.27
933021	AC2-126	2.29
933031	AC2-127	1.25
933041	AC2-128	1.2
933051	AC2-129	1.13
933061	AC2-130	2.22
933071	AC2-131 1	1.5
933081	AC2-131 2	0.68
933111	AC2-132 1	0.79
933121	AC2-132 2	0.4
933261	AC2-137 C	1.92
933291	AC2-141 C	27.72
933471	AC2-161 C	2.16
933481	AC2-162 C	2.25
933711	AC2-194 C	0.97
933731	AC2-196 C	1.62
933991	AD1-023 C	11.51
934011	AD1-025 C O1	15.57
934061	AD1-033 C O1	6.82
934071	AD1-034 C O1	7.41
934141	AD1-041 C O1	4.74
934211	AD1-048 C	2.25
934391	AD1-063 C	1.44
934521	AD1-076 C O1	47.72
934541	AD1-078 C	1.85
934571	AD1-082 C O1	7.01
LTF	AD1-092	3.44
LTF	AD1-093	5.9
LTF	AD1-094	1.1
934781	AD1-105 C	7.24
LTF	AD1-120	9.82
LTF	AD1-121	9.8
935111	AD1-144 C	1.57
935161	AD1-151 C O1	14.88
935211	AD1-156 C	1.94
LTF	CARR	1.1
LTF	CBM-S1	14.48
LTF	CBM-S2	23.22
LTF	CBM-W1	34.44
LTF	CBM-W2	78.52
LTF	CIN	8.01

LTF	*CPLE*	*6.86*
LTF	*IPL*	*5.12*
LTF	*LGEE*	*1.75*
LTF	*MEC*	*16.96*
LTF	*MECS*	*7.9*
LTF	*RENSSELAER*	*0.88*
LTF	*ROSETON*	*6.34*
297087	*V2-040*	*0.13*
LTF	*WEC*	*2.15*
LTF	*Z1-043*	*8.44*
918691	*AA1-083*	*0.66*
919211	*AA1-145*	*11.18*
LTF	*AA2-074*	*4.67*
920691	*AA2-178 C*	*8.49*
930051	*AB1-013 C*	*2.56*
930121	*AB1-027 C*	*0.47*
LTF	*AB2-013*	*4.92*
923801	*AB2-015 C O1*	*7.61*
923831	*AB2-022 C*	*2.07*
924061	*AB2-050*	*0.66*
924071	*AB2-051*	*124.78*
924241	*AB2-068 O1*	*186.21*
924511	*AB2-100 C*	*9.97*
924811	*AB2-134 C O1*	*11.87*
925021	*AB2-158 C*	*9.*
925051	*AB2-160 C O1*	*5.02*
925061	*AB2-161 C O1*	*3.08*
925281	*AB2-186 C*	*0.55*
925291	*AB2-188 C O1*	*2.09*
925331	*AB2-190 C*	*18.52*
925861	*AC1-065 C*	*3.02*
926291	*AC1-107*	*281.07*
926411	*AC1-112 C*	*0.36*
926441	*AC1-115 C*	*0.91*
926551	*AC1-134*	*8.37*
926731	*AC1-158 C*	*74.26*
926741	*AC1-159*	*60.17*
926751	*AC1-161 C*	*27.72*
926781	*AC1-164 C*	*37.16*
927041	*AC1-191 C*	*8.61*
927111	*AC1-206 C*	*8.64*
927221	*AC1-216 C O1*	*9.06*

Appendix 30

(DVP - DVP) The 8MDLTHAN-8NO ANNA 500 kV line (from bus 314914 to bus 314918 ckt 1) loads from 126.91% to 128.47% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 574'. This project contributes approximately 83.81 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 574'
OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LDYSMTH 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*16.36*
315103	*1BRUNSWICKG2*	*16.36*
315104	*1BRUNSWICKG3*	*16.36*
315105	*1BRUNSWICKS1*	*33.98*
315099	*1CHESPKB*	*2.06*
315131	*1EDGECMA*	*13.32*
315132	*1EDGECMB*	*13.32*
315108	*1ELIZAR1*	*6.07*
315109	*1ELIZAR2*	*5.97*
315110	*1ELIZAR3*	*6.15*
315074	*1HOPCGN1*	*11.87*
315075	*1HOPCGN2*	*11.72*
315083	*1SPRUNCA*	*15.71*
315084	*1SPRUNCB*	*15.71*
315085	*1SPRUNCC*	*11.64*
315086	*1SPRUNCD*	*11.64*
314315	*3LOCKS E*	*1.85*
932041	*AC2-012 C*	*16.09*
932501	*AC2-070 C*	*2.04*
932531	*AC2-073 C*	*2.99*
932581	*AC2-078 C*	*6.2*
932591	*AC2-079 C*	*10.49*
932631	*AC2-084 C*	*13.04*
932701	*AC2-093 C*	*123.19*
932831	*AC2-110 C*	*1.7*
933061	*AC2-130*	*3.23*
933071	*AC2-131 1*	*2.19*
933081	*AC2-131 2*	*0.99*
933111	*AC2-132 1*	*1.15*
933121	*AC2-132 2*	*0.59*
933261	*AC2-137 C*	*2.68*
933291	*AC2-141 C*	*48.31*
933451	*AC2-158 C*	*8.36*

933461	AC2-159 C	10.06
933471	AC2-161 C	3.62
933481	AC2-162 C	2.93
933501	AC2-165 C	16.08
933711	AC2-194 C	1.7
933731	AC2-196 C	2.83
933991	AD1-023 C	20.22
934011	AD1-025 C O1	24.76
934041	AD1-029 C	16.13
934061	AD1-033 C O1	11.87
934071	AD1-034 C O1	11.86
934141	AD1-041 C O1	6.64
934201	AD1-047 C	12.15
934211	AD1-048 C	3.14
934231	AD1-050 C	6.68
934331	AD1-057 C O1	14.69
934391	AD1-063 C	2.02
934521	AD1-076 C O1	83.81
934571	AD1-082 C O1	11.88
934611	AD1-087 C O1	12.89
934621	AD1-088 C O1	21.5
LTF	AD1-092	4.84
LTF	AD1-093	8.29
LTF	AD1-094	1.55
LTF	AD1-120	17.13
LTF	AD1-121	17.08
934911	AD1-123 C	1.45
935111	AD1-144 C	2.69
935161	AD1-151 C O1	23.66
935171	AD1-152 C O1	11.94
935211	AD1-156 C	3.27
935221	AD1-157 C	1.94
935231	AD1-160 C	1.42
LTF	CARR	1.37
LTF	CBM-S1	22.23
LTF	CBM-S2	40.33
LTF	CBM-W1	47.95
LTF	CBM-W2	118.94
LTF	CIN	11.12
LTF	CPLE	12.29
LTF	IPL	7.09
LTF	LGEE	2.43
LTF	MEC	24.61
LTF	MECS	10.23
LTF	RENSSELAER	1.1

LTF	*ROSETON*	*7.93*
LTF	*WEC*	*3.*
LTF	*Z1-043*	*11.83*
916191	*Z1-068 C*	*0.08*
916301	*Z1-086 C*	*99.51*
LTF	*AA2-074*	*8.36*
920631	*AA2-169 C*	*3.22*
920691	*AA2-178 C*	*14.88*
930051	*AB1-013 C*	*4.49*
930401	*AB1-081 C*	*12.86*
930861	*AB1-132 C*	*21.22*
931231	*AB1-173 C*	*3.42*
931241	*AB1-173AC*	*3.42*
LTF	*AB2-013*	*6.91*
923801	*AB2-015 C O1*	*13.29*
923831	*AB2-022 C*	*3.61*
923911	*AB2-031 C O1*	*3.39*
923941	*AB2-035 C*	*0.49*
923991	*AB2-040 C O1*	*11.14*
924021	*AB2-043 C O1*	*4.25*
924071	*AB2-051*	*216.38*
924151	*AB2-059 C O1*	*15.15*
924161	*AB2-060 C O1*	*12.23*
924241	*AB2-068 O1*	*241.09*
924301	*AB2-077 C O1*	*2.7*
924311	*AB2-078 C O1*	*2.7*
924321	*AB2-079 C O1*	*2.7*
924381	*AB2-087 C*	*0.86*
924391	*AB2-088 C*	*0.63*
924401	*AB2-089 C*	*3.03*
924411	*AB2-090 C*	*5.36*
924491	*AB2-098 C*	*0.83*
924501	*AB2-099 C*	*0.89*
924511	*AB2-100 C*	*17.74*
924811	*AB2-134 C O1*	*18.87*
925051	*AB2-160 C O1*	*8.03*
925061	*AB2-161 C O1*	*5.21*
925121	*AB2-169 C*	*9.78*
925171	*AB2-174 C O1*	*10.67*
925221	*AB2-176 C*	*2.21*
925281	*AB2-186 C*	*0.95*
925291	*AB2-188 C O1*	*3.67*
925331	*AB2-190 C*	*29.44*
925521	*AC1-027 C*	*0.62*
925591	*AC1-034 C*	*9.95*

925611	*AC1-036 C*	*1.26*
925781	*AC1-054 C*	*10.31*
925861	*AC1-065 C*	*4.24*
926071	*AC1-086 C*	*31.25*
926201	*AC1-098 C*	*9.15*
926211	*AC1-099 C*	*3.07*
926271	*AC1-105 C*	*7.54*
926291	*AC1-107*	*363.9*
926741	*AC1-159*	*104.33*
926751	*AC1-161 C*	*48.31*
926761	*AC1-162 C*	*37.21*
926771	*AC1-163 C*	*2.95*
926781	*AC1-164 C*	*51.59*
927021	*AC1-189 C*	*12.57*
927111	*AC1-206 C*	*15.37*
927141	*AC1-208 C*	*13.46*
927221	*AC1-216 C O1*	*14.41*

Appendix 31

(DVP - DVP) The 8NO ANNA-8SPOTSYL 500 kV line (from bus 314918 to bus 314934 ckt 1) loads from 101.85% to 102.61% (**DC power flow**) of its emergency rating (3219 MVA) for the single line contingency outage of 'DVP_P1-2: LN 581'. This project contributes approximately 60.85 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 581'
OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00
OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.94*
315054	*1BELMED2*	*3.94*
315055	*1BELMED3*	*3.27*
315108	*1ELIZAR1*	*4.49*
315109	*1ELIZAR2*	*4.41*
315110	*1ELIZAR3*	*4.55*
315074	*1HOPCGN1*	*9.64*
315075	*1HOPCGN2*	*9.52*
315225	*1N ANNA1*	*69.77*
315226	*1N ANNA2*	*69.74*
315083	*1SPRUNCA*	*12.44*
315084	*1SPRUNCB*	*12.44*
315085	*1SPRUNCC*	*9.22*
315086	*1SPRUNCD*	*9.22*
315233	*1SURRY 2*	*34.77*
314315	*3LOCKS E*	*1.46*
314309	*6IRON208*	*0.62*
314250	*6ROCKVILLE*	*0.3*
932041	*AC2-012 C*	*11.91*
932501	*AC2-070 C*	*1.89*
932531	*AC2-073 C*	*2.65*
932581	*AC2-078 C*	*4.74*
932591	*AC2-079 C*	*7.82*
932631	*AC2-084 C*	*9.31*
932701	*AC2-093 C*	*82.2*
932711	*AC2-094 C*	*15.49*
932831	*AC2-110 C*	*1.51*
933011	*AC2-125*	*2.67*
933021	*AC2-126*	*2.69*
933031	*AC2-127*	*1.47*
933041	*AC2-128*	*1.42*

933051	AC2-129	1.33
933061	AC2-130	2.74
933071	AC2-131 1	1.85
933081	AC2-131 2	0.84
933111	AC2-132 1	0.97
933121	AC2-132 2	0.5
933261	AC2-137 C	2.35
933291	AC2-141 C	35.6
933451	AC2-158 C	6.05
933461	AC2-159 C	7.24
933471	AC2-161 C	2.75
933481	AC2-162 C	2.71
933501	AC2-165 C	11.87
933711	AC2-194 C	1.25
933731	AC2-196 C	2.08
933991	AD1-023 C	14.67
934011	AD1-025 C O1	19.61
934041	AD1-029 C	11.51
934061	AD1-033 C O1	8.75
934071	AD1-034 C O1	9.37
934141	AD1-041 C O1	5.92
934201	AD1-047 C	8.73
934211	AD1-048 C	2.75
934331	AD1-057 C O1	10.43
934391	AD1-063 C	1.79
934521	AD1-076 C O1	60.85
934571	AD1-082 C O1	8.95
934611	AD1-087 C O1	8.79
934621	AD1-088 C O1	15.12
934781	AD1-105 C	8.55
LTF	AD1-120	11.53
LTF	AD1-121	11.5
935111	AD1-144 C	2.01
935161	AD1-151 C O1	18.73
935171	AD1-152 C O1	8.14
935211	AD1-156 C	2.48
LTF	CARR	1.41
LTF	CBM-S1	13.53
LTF	CBM-S2	27.08
LTF	CBM-W1	23.6
LTF	CBM-W2	70.12
LTF	CIN	5.72
LTF	CPLE	8.35
LTF	IPL	3.63
LTF	LGEE	1.28

LTF	*MEC*	*13.48*
LTF	*MECS*	*3.7*
LTF	*RENSSELAER*	*1.12*
LTF	*ROSETON*	*8.09*
LTF	*WEC*	*1.53*
LTF	*AA2-074*	*5.68*
920691	*AA2-178 C*	*10.84*
930051	*AB1-013 C*	*3.27*
930861	*AB1-132 C*	*15.22*
931231	*AB1-173 C*	*2.46*
931241	*AB1-173AC*	*2.46*
923801	*AB2-015 C O1*	*9.72*
923831	*AB2-022 C*	*2.65*
923911	*AB2-031 C O1*	*2.44*
923991	*AB2-040 C O1*	*8.*
924071	*AB2-051*	*160.07*
924241	*AB2-068 O1*	*218.81*
924381	*AB2-087 C*	*0.62*
924491	*AB2-098 C*	*0.59*
924501	*AB2-099 C*	*0.65*
924511	*AB2-100 C*	*12.79*
924811	*AB2-134 C O1*	*14.94*
925021	*AB2-158 C*	*11.69*
925051	*AB2-160 C O1*	*6.34*
925061	*AB2-161 C O1*	*3.93*
925121	*AB2-169 C*	*7.04*
925171	*AB2-174 C O1*	*7.67*
925281	*AB2-186 C*	*0.7*
925291	*AB2-188 C O1*	*2.67*
925331	*AB2-190 C*	*23.31*
925861	*AC1-065 C*	*3.77*
926071	*AC1-086 C*	*22.42*
926201	*AC1-098 C*	*6.53*
926211	*AC1-099 C*	*2.19*
926291	*AC1-107*	*330.27*
926441	*AC1-115 C*	*1.07*
926551	*AC1-134*	*9.95*
926741	*AC1-159*	*77.18*
926751	*AC1-161 C*	*35.6*
926771	*AC1-163 C*	*2.13*
926781	*AC1-164 C*	*45.31*
927041	*AC1-191 C*	*10.49*
927111	*AC1-206 C*	*11.09*
927141	*AC1-208 C*	*9.6*
927221	*AC1-216 C O1*	*11.41*

Appendix 32

(DVP - DVP) The 8SPOTSYL-8MORRSVL 500 kV line (from bus 314934 to bus 314916 ckt 1) loads from 104.12% to 104.97% (**DC power flow**) of its emergency rating (3219 MVA) for the single line contingency outage of 'DVP_P1-2: LN 552'. This project contributes approximately 60.21 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 552'
 OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 1 /* 3CHANCE 115.00 - 8CHANCE 500.00
 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00
 END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.89*
315054	*1BELMED2*	*3.89*
315055	*1BELMED3*	*3.23*
315065	*1CHESTF6*	*27.57*
315108	*1ELIZAR1*	*4.44*
315109	*1ELIZAR2*	*4.36*
315110	*1ELIZAR3*	*4.5*
315074	*1HOPCGN1*	*9.53*
315075	*1HOPCGN2*	*9.41*
315225	*1N ANNA1*	*68.38*
315226	*1N ANNA2*	*68.34*
315083	*1SPRUNCA*	*12.3*
315084	*1SPRUNCB*	*12.3*
315085	*1SPRUNCC*	*9.12*
315086	*1SPRUNCD*	*9.12*
315233	*1SURRY 2*	*34.37*
314315	*3LOCKS E*	*1.44*
314309	*6IRON208*	*0.61*
314250	*6ROCKVILLE*	*0.29*
932041	*AC2-012 C*	*11.78*
932501	*AC2-070 C*	*1.87*
932531	*AC2-073 C*	*2.62*
932581	*AC2-078 C*	*4.69*
932591	*AC2-079 C*	*7.74*
932631	*AC2-084 C*	*9.22*
932701	*AC2-093 C*	*81.31*
932711	*AC2-094 C*	*16.29*
932831	*AC2-110 C*	*1.49*
933011	*AC2-125*	*2.63*
933021	*AC2-126*	*2.65*
933031	*AC2-127*	*1.45*

933041	AC2-128	1.39
933051	AC2-129	1.31
933061	AC2-130	2.71
933071	AC2-131 1	1.83
933081	AC2-131 2	0.83
933111	AC2-132 1	0.96
933121	AC2-132 2	0.49
933261	AC2-137 C	2.32
933291	AC2-141 C	35.18
933451	AC2-158 C	5.98
933461	AC2-159 C	7.17
933471	AC2-161 C	2.72
933481	AC2-162 C	2.68
933501	AC2-165 C	11.97
933711	AC2-194 C	1.23
933731	AC2-196 C	2.06
933991	AD1-023 C	14.51
934011	AD1-025 C O1	19.38
934041	AD1-029 C	11.41
934061	AD1-033 C O1	8.65
934071	AD1-034 C O1	9.26
934141	AD1-041 C O1	5.85
934201	AD1-047 C	8.65
934211	AD1-048 C	2.72
934391	AD1-063 C	1.77
934521	AD1-076 C O1	60.21
934541	AD1-078 C	3.86
934571	AD1-082 C O1	8.85
934621	AD1-088 C O1	15.13
934781	AD1-105 C	8.44
LTF	AD1-120	11.47
LTF	AD1-121	11.43
935111	AD1-144 C	1.98
935161	AD1-151 C O1	18.52
935211	AD1-156 C	2.46
LTF	CARR	1.41
LTF	CBM-S1	13.54
LTF	CBM-S2	26.93
LTF	CBM-W1	23.75
LTF	CBM-W2	70.19
LTF	CIN	5.75
LTF	CPLE	8.29
LTF	IPL	3.66
LTF	LGEE	1.29
LTF	MEC	13.52

LTF	MECS	3.75
LTF	RENSSELAER	1.12
LTF	ROSETON	8.11
LTF	WEC	1.54
LTF	AA2-074	5.64
920691	AA2-178 C	10.73
930051	AB1-013 C	3.24
930861	AB1-132 C	15.07
931231	AB1-173 C	2.43
931241	AB1-173AC	2.43
923801	AB2-015 C O1	9.61
923831	AB2-022 C	2.62
923911	AB2-031 C O1	2.42
923991	AB2-040 C O1	7.93
924071	AB2-051	158.21
924241	AB2-068 O1	216.41
924381	AB2-087 C	0.62
924501	AB2-099 C	0.64
924511	AB2-100 C	12.66
924811	AB2-134 C O1	14.77
925021	AB2-158 C	12.97
925051	AB2-160 C O1	6.27
925061	AB2-161 C O1	3.88
925121	AB2-169 C	6.97
925171	AB2-174 C O1	7.6
925281	AB2-186 C	0.69
925291	AB2-188 C O1	2.64
925331	AB2-190 C	23.05
925861	AC1-065 C	3.73
926001	AC1-076 C	6.28
926071	AC1-086 C	22.2
926201	AC1-098 C	6.47
926211	AC1-099 C	2.17
926291	AC1-107	326.66
926441	AC1-115 C	1.06
926551	AC1-134	9.83
926731	AC1-158 C	185.39
926741	AC1-159	76.29
926751	AC1-161 C	35.18
926771	AC1-163 C	2.11
926781	AC1-164 C	44.81
927041	AC1-191 C	10.38
927111	AC1-206 C	10.97
927141	AC1-208 C	9.51
927221	AC1-216 C O1	11.28

Appendix 33

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 127.92% to 134.66% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 68.33 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 246T247'                          /* SUFFOLK 230 KV
  OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1        /* 6SUFFOLK
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1        /* 6EARLEYS
230.00 - 6NUCO TP 230.00
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1        /* 6NUCO TP
230.00 - 6NUCOR 230.00
  OPEN BUS 314575                                  /* ISLAND: 6NUCO TP 230.00
  OPEN BUS 314590                                  /* ISLAND: 6NUCOR 230.00
  OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1        /* 6SUFFOLK
230.00 - 6SUNBURY 230.00
  OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1        /* 6SUNBURY
230.00 - W1-029 230.00
  OPEN BUS 314648                                  /* ISLAND: 6SUNBURY 230.00
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*2.12*
315131	*1EDGECMA*	*10.48*
315132	*1EDGECMB*	*10.48*
315139	*1GASTONA*	*7.94*
315141	*1GASTONB*	*7.94*
315126	*1ROARAP2*	*1.63*
315128	*1ROARAP4*	*1.57*
315136	*1ROSEMG1*	*5.33*
315138	*1ROSEMG2*	*2.5*
315137	*1ROSEMS1*	*3.31*
314557	*3BETHELC*	*0.87*
314554	*3BTLEBRO*	*0.84*
314566	*3CRESWEL*	*1.64*
314578	*3HORNRTN*	*3.35*
314582	*3KELFORD*	*0.91*
314603	*3SCOT NK*	*3.55*
314617	*3TUNIS*	*0.81*
314620	*6CASHIE*	*0.83*
314574	*6EVERETS*	*2.43*
314594	*6PLYMOTH*	*0.69*
932631	*AC2-084 C*	*9.33*
932632	*AC2-084 E*	*4.6*

933451	AC2-158 C	6.16
933452	AC2-158 E	6.16
933461	AC2-159 C	7.09
933462	AC2-159 E	7.09
933991	AD1-023 C	11.95
933992	AD1-023 E	6.5
934041	AD1-029 C	11.54
934042	AD1-029 E	7.61
934331	AD1-057 C O1	16.08
934332	AD1-057 E O1	8.58
934521	AD1-076 C O1	45.28
934522	AD1-076 E O1	23.05
LTF	AD1-120	3.75
LTF	AD1-121	3.72
LTF	CARR	0.09
LTF	CBM-S1	4.51
LTF	CBM-S2	9.28
LTF	CBM-W1	9.82
LTF	CBM-W2	24.32
LTF	CIN	2.2
LTF	CPLE	3.18
LTF	G-007	0.61
LTF	IPL	1.4
LTF	LGEE	0.47
LTF	MEC	4.99
LTF	MECS	2.2
LTF	O-066	2.02
LTF	RENSSELAER	0.08
LTF	ROSETON	0.55
900672	V4-068 E	0.24
LTF	WEC	0.61
917331	Z2-043 C	0.5
917332	Z2-043 E	1.1
917341	Z2-044 C	0.28
917342	Z2-044 E	0.61
917511	Z2-088 C OP1	1.02
917512	Z2-088 E OP1	4.12
917592	Z2-099 E	0.3
918411	AA1-050	0.86
918491	AA1-063AC OP	1.46
918492	AA1-063AE OP	3.51
918511	AA1-065 C OP	2.13
918512	AA1-065 E OP	5.34
918531	AA1-067 C	0.33
918532	AA1-067 E	0.73

918561	AA1-072 C	0.08
918562	AA1-072 E	0.18
919691	AA2-053 C	1.76
919692	AA2-053 E	3.86
919701	AA2-057 C	1.46
919702	AA2-057 E	3.73
919732	AA2-059 E	0.29
919821	AA2-068 C	0.46
919822	AA2-068 E	1.08
LTF	AA2-074	2.16
920022	AA2-086 E	0.16
920042	AA2-088 E	6.95
920591	AA2-165 C	0.2
920592	AA2-165 E	0.49
920631	AA2-169 C	1.37
920632	AA2-169 E	0.63
920671	AA2-174 C	0.08
920672	AA2-174 E	0.45
920691	AA2-178 C	6.54
920692	AA2-178 E	2.8
930051	AB1-013 C	1.97
930052	AB1-013 E	13.21
930401	AB1-081 C	9.53
930402	AB1-081 E	4.08
930861	AB1-132 C	30.89
930862	AB1-132 E	13.24
923941	AB2-035 C	0.37
923942	AB2-035 E	0.16
924151	AB2-059 C O1	11.23
924152	AB2-059 E O1	5.78
924381	AB2-087 C	0.64
924382	AB2-087 E	0.3
924391	AB2-088 C	0.47
924392	AB2-088 E	0.23
924491	AB2-098 C	0.57
924492	AB2-098 E	0.24
924501	AB2-099 C	0.61
924502	AB2-099 E	0.26
924511	AB2-100 C	42.69
924512	AB2-100 E	21.03
925121	AB2-169 C	5.87
925122	AB2-169 E	5.27
925291	AB2-188 C O1	1.61
925292	AB2-188 E O1	0.72
925591	AC1-034 C	7.44

925592	*AC1-034 E*	*5.62*
926071	*AC1-086 C*	*45.49*
926072	*AC1-086 E*	*20.7*
926201	*AC1-098 C*	*6.55*
926202	*AC1-098 E*	*3.9*
926211	*AC1-099 C*	*2.19*
926212	*AC1-099 E*	*1.29*
926771	*AC1-163 C*	*2.03*
926772	*AC1-163 E*	*0.95*
927021	*AC1-189 C*	*9.*
927022	*AC1-189 E*	*4.48*
927141	*AC1-208 C*	*9.41*
927142	*AC1-208 E*	*4.18*

Appendix 34

(AEP - AEP) The 05EDAN 1-05DANVL2 138 kV line (from bus 242631 to bus 242620 ckt 1) loads from 111.36% to 114.09% (**DC power flow**) of its emergency rating (415 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#7589_05J.FERR 765'. This project contributes approximately 25.22 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#7589_05J.FERR 765'
OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1
OPEN BRANCH FROM BUS 242514 TO BUS 242684 CKT 2 / 242514 05J.FERR 765 242684 05J.FERR 138 2
OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1
END

Bus Number	*Bus Name*	*Full Contribution*
244012	*05PINNACLE*	*-2.08*
315131	*1EDGECMA*	*4.25*
315132	*1EDGECMB*	*4.25*
314557	*3BETHELC*	*0.35*
314554	*3BTLEBRO*	*0.37*
314572	*3EMPORIA*	*0.14*
314578	*3HORNRTN*	*1.21*
314582	*3KELFORD*	*0.3*
314603	*3SCOT NK*	*1.24*
314617	*3TUNIS*	*0.28*
314620	*6CASHIE*	*0.27*
314574	*6EVERETS*	*0.98*
314594	*6PLYMOTH*	*0.26*
932631	*AC2-084 C*	*3.42*
932632	*AC2-084 E*	*1.68*
932701	*AC2-093 C*	*24.4*
932702	*AC2-093 E*	*13.96*
932761	*AC2-100 C*	*3.66*
932762	*AC2-100 E*	*1.79*
932821	*AC2-107 C*	*3.48*
932822	*AC2-107 E*	*1.63*
933451	*AC2-158 C*	*1.78*
933452	*AC2-158 E*	*1.78*
933461	*AC2-159 C*	*2.33*
933462	*AC2-159 E*	*2.33*
933941	*AD1-017 C*	*0.84*
933942	*AD1-017 E*	*1.36*
933991	*AD1-023 C*	*4.1*
933992	*AD1-023 E*	*2.23*

934041	AD1-029 C	4.23
934042	AD1-029 E	2.79
934201	AD1-047 C	2.75
934202	AD1-047 E	1.83
934231	AD1-050 C	2.01
934232	AD1-050 E	1.1
934311	AD1-055 C	1.07
934312	AD1-055 E	0.28
934331	AD1-057 C O1	4.1
934332	AD1-057 E O1	2.19
934341	AD1-058 C	3.99
934342	AD1-058 E	1.01
934521	AD1-076 C O1	16.71
934522	AD1-076 E O1	8.51
934611	AD1-087 C O1	3.62
934612	AD1-087 E O1	1.69
934621	AD1-088 C O1	4.63
934622	AD1-088 E O1	2.17
LTF	AD1-120	7.55
LTF	AD1-121	7.6
934911	AD1-123 C	0.47
934912	AD1-123 E	0.24
934991	AD1-131 C	1.31
934992	AD1-131 E	0.87
935171	AD1-152 C O1	3.36
935172	AD1-152 E O1	2.24
935221	AD1-157 C	0.46
935222	AD1-157 E	0.31
935231	AD1-160 C	0.34
935232	AD1-160 E	0.47
LTF	AMIL	0.17
LTF	BLUEG	2.07
LTF	CANNELTON	0.27
LTF	CARR	0.06
LTF	CBM-S1	1.13
LTF	CBM-S2	16.92
LTF	CBM-W2	2.91
LTF	CLIFTY	10.78
LTF	CPLE	5.57
LTF	DEARBORN	0.98
LTF	EDWARDS	0.45
LTF	ELMERSMITH	0.71
LTF	FARMERCITY	0.12
LTF	G-007A	0.79
LTF	GIBSON	0.59

LTF	*NEWTON*	*0.97*
LTF	*O-066A*	*0.36*
LTF	*PRAIRIE*	*0.86*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.35*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.34*
LTF	*TILTON*	*0.61*
LTF	*TRIMBLE*	*0.41*
900672	*V4-068 E*	*0.1*
LTF	*VFT*	*2.09*
LTF	*X1-078*	*0.61*
917332	*Z2-043 E*	*0.36*
917342	*Z2-044 E*	*0.25*
917512	*Z2-088 E OP1*	*1.66*
917592	*Z2-099 E*	*0.14*
918492	*AA1-063AE OP*	*1.37*
918512	*AA1-065 E OP*	*1.46*
918532	*AA1-067 E*	*0.29*
918562	*AA1-072 E*	*0.06*
919692	*AA2-053 E*	*1.33*
919702	*AA2-057 E*	*1.51*
919822	*AA2-068 E*	*0.41*
LTF	*AA2-074*	*3.79*
920022	*AA2-086 E*	*0.07*
920042	*AA2-088 E*	*3.27*
920592	*AA2-165 E*	*0.2*
920631	*AA2-169 C*	*0.91*
920632	*AA2-169 E*	*0.42*
920672	*AA2-174 E*	*0.15*
930401	*AB1-081 C*	*4.09*
930402	*AB1-081 E*	*1.75*
930861	*AB1-132 C*	*4.93*
930862	*AB1-132 E*	*2.11*
931231	*AB1-173 C*	*0.77*
931232	*AB1-173 E*	*0.36*
931241	*AB1-173AC*	*0.77*
931242	*AB1-173AE*	*0.36*
923911	*AB2-031 C O1*	*0.77*
923912	*AB2-031 E O1*	*0.38*
923941	*AB2-035 C*	*0.15*
923942	*AB2-035 E*	*0.06*
923991	*AB2-040 C O1*	*2.52*
923992	*AB2-040 E O1*	*2.06*
924021	*AB2-043 C O1*	*1.21*

924022	AB2-043 E O1	1.99
924151	AB2-059 C O1	4.82
924152	AB2-059 E O1	2.48
924161	AB2-060 C O1	3.48
924162	AB2-060 E O1	1.64
924301	AB2-077 C O1	0.78
924302	AB2-077 E O1	0.52
924311	AB2-078 C O1	0.78
924312	AB2-078 E O1	0.52
924321	AB2-079 C O1	0.78
924322	AB2-079 E O1	0.52
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924391	AB2-088 C	0.19
924392	AB2-088 E	0.09
924401	AB2-089 C	0.91
924402	AB2-089 E	0.47
924411	AB2-090 C	1.53
924412	AB2-090 E	0.78
924491	AB2-098 C	0.23
924492	AB2-098 E	0.1
924501	AB2-099 C	0.2
924502	AB2-099 E	0.08
924511	AB2-100 C	3.5
924512	AB2-100 E	1.72
925121	AB2-169 C	2.26
925122	AB2-169 E	2.03
925171	AB2-174 C O1	2.38
925172	AB2-174 E O1	2.15
925221	AB2-176 C	0.63
925222	AB2-176 E	0.27
925591	AC1-034 C	3.01
925592	AC1-034 E	2.27
925611	AC1-036 C	0.33
925612	AC1-036 E	0.54
925781	AC1-054 C	3.03
925782	AC1-054 E	1.4
925991	AC1-075 C	1.96
925992	AC1-075 E	1.11
926021	AC1-080 C	0.65
926022	AC1-080 E	0.37
926051	AC1-083 C	4.18
926052	AC1-083 E	6.82
926071	AC1-086 C	7.26
926072	AC1-086 E	3.31

926201	*AC1-098 C*	*2.4*
926202	*AC1-098 E*	*1.43*
926211	*AC1-099 C*	*0.8*
926212	*AC1-099 E*	*0.47*
926271	*AC1-105 C*	*2.39*
926272	*AC1-105 E*	*1.19*
926771	*AC1-163 C*	*0.65*
926772	*AC1-163 E*	*0.3*
927021	*AC1-189 C*	*3.63*
927022	*AC1-189 E*	*1.81*
927111	*AC1-206 C*	*2.97*
927112	*AC1-206 E*	*1.4*
927141	*AC1-208 C*	*3.54*
927142	*AC1-208 E*	*1.57*
927251	*AC1-221 C*	*1.59*
927252	*AC1-221 E*	*1.59*
927261	*AC1-222 C*	*1.54*
927262	*AC1-222 E*	*1.46*

OPTION 2

Appendix 1

(DVP - DVP) The 6EARLEYS-6NUCO TP 230 kV line (from bus 314569 to bus 314575 ckt 1) loads from 86.74% to 104.79% (**DC power flow**) of its emergency rating (572 MVA) for the single line contingency outage of 'DVP_P1-2: LN 2131A'. This project contributes approximately 103.01 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 2131A'
OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00
OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00
OPEN BUS 314662 /* ISLAND
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.77*
315292	*1DOMTR78*	*3.23*
315293	*1DOMTR9*	*2.63*
315131	*1EDGECMA*	*9.03*
315132	*1EDGECMB*	*9.03*
315139	*1GASTONA*	*3.89*
315141	*1GASTONB*	*3.89*
315159	*1KERR 2*	*0.85*
315163	*1KERR 6*	*0.84*
315164	*1KERR 7*	*0.84*
315126	*1ROARAP2*	*1.58*
315128	*1ROARAP4*	*1.52*
315136	*1ROSEMG1*	*2.75*
315138	*1ROSEMG2*	*1.29*
315137	*1ROSEMS1*	*1.7*
314704	*3LAWRENC*	*0.23*

932631	*AC2-084 C*	*11.32*
933451	*AC2-158 C*	*12.21*
933461	*AC2-159 C*	*9.55*
933991	*AD1-023 C*	*27.83*
934041	*AD1-029 C*	*14.*
934201	*AD1-047 C*	*6.39*
934231	*AD1-050 C*	*2.75*
934331	*AD1-057 C O2*	*11.08*
934521	*AD1-076 C O2*	*103.01*
LTF	*AD1-120*	*4.28*
LTF	*AD1-121*	*4.25*
LTF	*CARR*	*0.09*
LTF	*CBM-S1*	*5.29*
LTF	*CBM-S2*	*10.69*
LTF	*CBM-W1*	*11.81*
LTF	*CBM-W2*	*28.65*
LTF	*CIN*	*2.65*
LTF	*CPLE*	*3.68*
LTF	*IPL*	*1.69*
LTF	*LGEE*	*0.57*
LTF	*MEC*	*5.94*
LTF	*MECS*	*2.71*
LTF	*RENSSELAER*	*0.07*
LTF	*ROSETON*	*0.5*
900671	*V4-068 C*	*0.11*
LTF	*WEC*	*0.73*

916041	*Z1-036 C*	*2.69*
917331	*Z2-043 C*	*0.76*
917341	*Z2-044 C*	*0.27*
917511	*Z2-088 C OP1*	*1.21*
917591	*Z2-099 C*	*0.13*
918411	*AA1-050*	*1.02*
918491	*AA1-063AC OP*	*1.44*
918511	*AA1-065 C OP*	*4.02*
918531	*AA1-067 C*	*0.52*
918561	*AA1-072 C*	*0.11*
919691	*AA2-053 C*	*2.02*
919701	*AA2-057 C*	*1.49*
919731	*AA2-059 C*	*0.47*
919821	*AA2-068 C*	*0.5*
LTF	*AA2-074*	*2.51*
920021	*AA2-086 C*	*0.07*
920041	*AA2-088 C*	*0.83*
920591	*AA2-165 C*	*0.2*
920631	*AA2-169 C*	*1.56*
920671	*AA2-174 C*	*0.09*
920691	*AA2-178 C*	*19.71*
930051	*AB1-013 C*	*5.95*
930401	*AB1-081 C*	*8.64*
930861	*AB1-132 C*	*15.15*
931231	*AB1-173 C*	*1.8*
931241	*AB1-173AC*	*1.8*

923911	*AB2-031 C O1*	*1.78*
923941	*AB2-035 C*	*0.4*
923991	*AB2-040 C O1*	*5.86*
924151	*AB2-059 C O1*	*10.18*
924381	*AB2-087 C*	*1.08*
924391	*AB2-088 C*	*0.51*
924401	*AB2-089 C*	*1.25*
924491	*AB2-098 C*	*0.88*
924501	*AB2-099 C*	*0.99*
924511	*AB2-100 C*	*7.31*
925121	*AB2-169 C*	*11.96*
925171	*AB2-174 C O1*	*5.33*
925291	*AB2-188 C O1*	*4.86*
925591	*AC1-034 C*	*8.09*
925781	*AC1-054 C*	*4.54*
926071	*AC1-086 C*	*22.31*
926201	*AC1-098 C*	*7.94*
926211	*AC1-099 C*	*2.66*
926771	*AC1-163 C*	*3.28*
927021	*AC1-189 C*	*11.67*
927111	*AC1-206 C*	*5.79*
927141	*AC1-208 C*	*9.96*

Appendix 2

(DVP - DVP) The 6NUCO TP-6SUFFOLK 230 kV line (from bus 314575 to bus 314537 ckt 1) loads from 80.7% to 98.75% (**DC power flow**) of its emergency rating (572 MVA) for the single line contingency outage of 'DVP_P1-2: LN 2131A'. This project contributes approximately 103.01 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 2131A'
OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1 /* 6S HERTFORD 230.00 - Z1-036 TAP 230.00
OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1 /* 6WINFALL 230.00 - 6S HERTFORD 230.00
OPEN BUS 314662 /* ISLAND
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.77*
315292	*1DOMTR78*	*3.23*
315293	*1DOMTR9*	*2.63*
315131	*1EDGECMA*	*9.03*
315132	*1EDGECMB*	*9.03*
315139	*1GASTONA*	*3.89*
315141	*1GASTONB*	*3.89*
315159	*1KERR 2*	*0.85*
315163	*1KERR 6*	*0.84*
315164	*1KERR 7*	*0.84*
315126	*1ROARAP2*	*1.58*
315128	*1ROARAP4*	*1.52*
315136	*1ROSEMG1*	*2.75*
315138	*1ROSEMG2*	*1.29*
315137	*1ROSEMS1*	*1.7*
314704	*3LAWRENC*	*0.23*

932631	*AC2-084 C*	*11.32*
933451	*AC2-158 C*	*12.21*
933461	*AC2-159 C*	*9.55*
933991	*AD1-023 C*	*27.83*
934041	*AD1-029 C*	*14.*
934201	*AD1-047 C*	*6.39*
934231	*AD1-050 C*	*2.75*
934331	*AD1-057 C O2*	*11.08*
934521	*AD1-076 C O2*	*103.01*
LTF	*AD1-120*	*4.28*
LTF	*AD1-121*	*4.25*
LTF	*CARR*	*0.09*
LTF	*CBM-S1*	*5.29*
LTF	*CBM-S2*	*10.69*
LTF	*CBM-W1*	*11.81*
LTF	*CBM-W2*	*28.65*
LTF	*CIN*	*2.65*
LTF	*CPLE*	*3.68*
LTF	*IPL*	*1.69*
LTF	*LGEE*	*0.57*
LTF	*MEC*	*5.94*
LTF	*MECS*	*2.71*
LTF	*RENSSELAER*	*0.07*
LTF	*ROSETON*	*0.5*
900671	*V4-068 C*	*0.11*
LTF	*WEC*	*0.73*

916041	*Z1-036 C*	*2.69*
917331	*Z2-043 C*	*0.76*
917341	*Z2-044 C*	*0.27*
917511	*Z2-088 C OP1*	*1.21*
917591	*Z2-099 C*	*0.13*
918411	*AA1-050*	*1.02*
918491	*AA1-063AC OP*	*1.44*
918511	*AA1-065 C OP*	*4.02*
918531	*AA1-067 C*	*0.52*
918561	*AA1-072 C*	*0.11*
919691	*AA2-053 C*	*2.02*
919701	*AA2-057 C*	*1.49*
919731	*AA2-059 C*	*0.47*
919821	*AA2-068 C*	*0.5*
LTF	*AA2-074*	*2.51*
920021	*AA2-086 C*	*0.07*
920041	*AA2-088 C*	*0.83*
920591	*AA2-165 C*	*0.2*
920631	*AA2-169 C*	*1.56*
920671	*AA2-174 C*	*0.09*
920691	*AA2-178 C*	*19.71*
930051	*AB1-013 C*	*5.95*
930401	*AB1-081 C*	*8.64*
930861	*AB1-132 C*	*15.15*
931231	*AB1-173 C*	*1.8*
931241	*AB1-173AC*	*1.8*

923911	*AB2-031 C O1*	*1.78*
923941	*AB2-035 C*	*0.4*
923991	*AB2-040 C O1*	*5.86*
924151	*AB2-059 C O1*	*10.18*
924381	*AB2-087 C*	*1.08*
924391	*AB2-088 C*	*0.51*
924401	*AB2-089 C*	*1.25*
924491	*AB2-098 C*	*0.88*
924501	*AB2-099 C*	*0.99*
924511	*AB2-100 C*	*7.31*
925121	*AB2-169 C*	*11.96*
925171	*AB2-174 C O1*	*5.33*
925291	*AB2-188 C O1*	*4.86*
925591	*AC1-034 C*	*8.09*
925781	*AC1-054 C*	*4.54*
926071	*AC1-086 C*	*22.31*
926201	*AC1-098 C*	*7.94*
926211	*AC1-099 C*	*2.66*
926771	*AC1-163 C*	*3.28*
927021	*AC1-189 C*	*11.67*
927111	*AC1-206 C*	*5.79*
927141	*AC1-208 C*	*9.96*

Appendix 3

(DVP - DVP) The 3FIVE PT-3WHARTON 115 kV line (from bus 314576 to bus 314622 ckt 1) loads from 1.35% to 430.51% (**DC power flow**) of its emergency rating (74 MVA) for the single line contingency outage of 'DVP_P1-2: LN 1020-B'. This project contributes approximately 320.7 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 1020-B' /*ADDED ON 4/19/2016
OPEN BRANCH FROM BUS 934520 TO BUS 314613 CKT 1 /* AD1-076 TAP 115.00 - 3TRWBRDG 115.00
END

Bus Number	*Bus Name*	*Full Contribution*
934521	*AD1-076 C O2*	*320.7*
925121	*AB2-169 C*	*39.*

Appendix 4

(DVP - DVP) The 3PANTEGO-AB2-169 TAP 115 kV line (from bus 314592 to bus 925120 ckt 1) loads from 39.99% to 391.87% (**DC power flow**) of its emergency rating (74 MVA) for the single line contingency outage of 'DVP_P1-2: LN 1020-B'. This project contributes approximately 320.7 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 1020-B' /*ADDED ON 4/19/2016
OPEN BRANCH FROM BUS 934520 TO BUS 314613 CKT 1 /* AD1-076 TAP 115.00 - 3TRWBRDG 115.00
END

Bus Number	*Bus Name*	*Full Contribution*
934521	*AD1-076 C O2*	*320.7*

Appendix 5

(DVP - DVP) The AB2-169 TAP-3FIVE PT 115 kV line (from bus 925120 to bus 314576 ckt 1) loads from 12.52% to 444.38% (**DC power flow**) of its emergency rating (74 MVA) for the single line contingency outage of 'DVP_P1-2: LN 1020-B'. This project contributes approximately 320.7 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 1020-B' /*ADDED ON 4/19/2016
OPEN BRANCH FROM BUS 934520 TO BUS 314613 CKT 1 /* AD1-076 TAP 115.00 - 3TRWBRDG 115.00
END

Bus Number	*Bus Name*	*Full Contribution*
934521	*AD1-076 C O2*	*320.7*
925121	*AB2-169 C*	*39.*

Appendix 6

(DVP - DVP) The 6EVERETS 230/115 kV transformer (from bus 314573 to bus 314574 ckt 2) loads from 47.0% to 102.56% (**DC power flow**) of its load dump rating (289 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: H2T2014'. This project contributes approximately 160.76 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: H2T2014'                          /* EVERETTS
  OPEN BRANCH FROM BUS 314569 TO BUS 314574 CKT 1        /* 2014
  OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 1        /* EVERETTS
TX.*2
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.2*
315292	*1DOMTR78*	*2.84*
315293	*1DOMTR9*	*2.32*
314566	*3CRESWEL*	*1.8*
314620	*6CASHIE*	*0.59*
314594	*6PLYMOTH*	*0.76*
314648	*6SUNBURY*	*0.26*
314651	*6WINFALL*	*0.74*
933451	*AC2-158 C*	*2.65*
933452	*AC2-158 E*	*2.65*
933711	*AC2-194 C*	*0.46*
933712	*AC2-194 E*	*0.74*
933991	*AD1-023 C*	*10.62*
933992	*AD1-023 E*	*5.78*
934521	*AD1-076 C O2*	*106.52*
934522	*AD1-076 E O2*	*54.24*
LTF	*AMIL*	*0.19*

LTF	*BAYOU*	*1.03*
LTF	*BIG_CAJUN1*	*1.63*
LTF	*BIG_CAJUN2*	*3.28*
LTF	*BLUEG*	*0.99*
LTF	*CALDERWOOD*	*0.61*
LTF	*CANNELTON*	*0.19*
LTF	*CATAWBA*	*0.59*
LTF	*CBM-N*	*< 0.01*
LTF	*CELEVELAND*	*1.68*
LTF	*CHEOAH*	*0.56*
LTF	*CHILHOWEE*	*0.2*
LTF	*CHOCTAW*	*1.11*
LTF	*CLIFTY*	*3.59*
LTF	*COTTONWOOD*	*4.04*
LTF	*DEARBORN*	*0.35*
LTF	*EDWARDS*	*0.31*
LTF	*ELMERSMITH*	*0.56*
LTF	*FARMERCITY*	*0.24*
LTF	*G-007A*	*0.43*
LTF	*GIBSON*	*0.35*
LTF	*HAMLET*	*2.49*
LTF	*MORGAN*	*1.79*
LTF	*NEWTON*	*0.85*
LTF	*NYISO*	*0.06*
LTF	*O-066A*	*0.2*
LTF	*PRAIRIE*	*1.84*

LTF	*ROWAN*	*1.19*
LTF	*SANTEETLA*	*0.17*
LTF	*SMITHLAND*	*0.16*
LTF	*TATANKA*	*0.41*
LTF	*TILTON*	*0.36*
LTF	*TRIMBLE*	*0.19*
LTF	*TVA*	*0.75*
LTF	*UNIONPOWER*	*1.07*
LTF	*VFT*	*1.15*
901082	*W1-029E*	*16.99*
LTF	*X1-078*	*0.33*
913392	*Y1-086 E*	*0.77*
916042	*Z1-036 E*	*23.61*
917122	*Z2-027 E*	*0.37*
918512	*AA1-065 E OP*	*1.64*
919732	*AA2-059 E*	*0.31*
920691	*AA2-178 C*	*7.18*
920692	*AA2-178 E*	*3.08*
930051	*AB1-013 C*	*2.17*
930052	*AB1-013 E*	*14.5*
923831	*AB2-022 C*	*0.72*
923832	*AB2-022 E*	*0.39*
925121	*AB2-169 C*	*16.19*
925122	*AB2-169 E*	*14.53*
925281	*AB2-186 C*	*0.29*
925282	*AB2-186 E*	*0.12*

925291	*AB2-188 C O1*	*1.77*
925292	*AB2-188 E O1*	*0.8*

Appendix 7

(DVP - DVP) The 3POPLR C-3EVERETS 115 kV line (from bus 314596 to bus 314573 ckt 1) loads from 20.59% to 162.38% (**DC power flow**) of its load dump rating (239 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 2034T2126'. This project contributes approximately 338.87 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 2034T2126'                    /* TROWBRIDGE
  OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1          /* LINE 2126
  OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1          /* LINE 2126
  OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1          /* LINE 2034
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1          /* TROWBRIDGE
TX.*1
  OPEN BRANCH FROM BUS 314616 TO BUS 314614 CKT 1          /* TROWBRIDGE
TX.*2
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*11.89*
315292	*1DOMTR78*	*8.04*
315293	*1DOMTR9*	*6.56*
934521	*AD1-076 C O2*	*224.54*
934522	*AD1-076 E O2*	*114.33*
LTF	*AMIL*	*0.02*
LTF	*BAYOU*	*0.07*
LTF	*BIG_CAJUN1*	*0.11*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.12*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.03*
LTF	*CATAWBA*	*0.02*
LTF	*CELEVELAND*	*0.07*

LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.5*
LTF	*COTTONWOOD*	*0.29*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.07*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.12*
LTF	*NEWTON*	*0.09*
LTF	*O-066*	*0.25*
LTF	*PRAIRIE*	*0.18*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.15*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.04*
LTF	*TILTON*	*0.04*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.05*
LTF	*UNIONPOWER*	*0.05*

925121	*AB2-169 C*	*19.55*
925122	*AB2-169 E*	*17.54*

Appendix 8

(DVP - DVP) The 6TRWBRDG 230/115 kV transformer (from bus 314613 to bus 314616 ckt 1) loads from 32.44% to 193.9% (**DC power flow**) of its load dump rating (220 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 25T168'. This project contributes approximately 354.88 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 25T168'                    /* TROWBRIDGE
/*REPLACED ON 4/19/2016
  OPEN BRANCH FROM BUS 314614 TO BUS 314621 CKT 1          /* LINE 168
  OPEN BRANCH FROM BUS 314614 TO BUS 314616 CKT 1          /* TROWBRIDGE
TX.*2
  OPEN BRANCH FROM BUS 314614 TO BUS 314596 CKT 1          /* LINE 25
BREAKER
  OPEN BRANCH FROM BUS 314596 TO BUS 314573 CKT 1          /* LINE 25
  OPEN BUS 314614
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*12.19*
315292	*1DOMTR78*	*8.24*
315293	*1DOMTR9*	*6.72*
934521	*AD1-076 C O2*	*235.15*
934522	*AD1-076 E O2*	*119.74*
LTF	*CARR*	*0.03*
LTF	*CBM-S1*	*0.29*
LTF	*CBM-S2*	*0.82*
LTF	*CBM-W1*	*0.36*
LTF	*CBM-W2*	*1.47*
LTF	*CIN*	*0.08*
LTF	*CPLE*	*0.31*
LTF	*G-007*	*0.12*
LTF	*IPL*	*0.05*

LTF	*LGEE*	*0.02*
LTF	*MEC*	*0.24*
LTF	*MECS*	*0.02*
LTF	*O-066*	*0.4*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.17*
LTF	*WEC*	*0.02*
925121	*AB2-169 C*	*21.28*
925122	*AB2-169 E*	*19.1*

Appendix 9

(DVP - DVP) The 3TRWBRDG-3WEYRHAEUSER 115 kV line (from bus 314613 to bus 314621 ckt 1) loads from 4.45% to 112.74% (**DC power flow**) of its load dump rating (349 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-3: H172'. This project contributes approximately 377.94 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-3: H172'                                    /* TROWBRIDGE
  OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1               /* LINE 2126
  OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1               /* LINE 2126
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1               /* TROWBRIDGE
TX.*1
  END
```

Bus Number	*Bus Name*	*Full Contribution*
934521	*AD1-076 C O2*	*250.42*
934522	*AD1-076 E O2*	*127.51*
LTF	*CBM-N*	*< 0.01*
LTF	*CBM-S1*	*0.17*
LTF	*CBM-S2*	*0.32*
LTF	*CBM-W1*	*0.43*
LTF	*CBM-W2*	*0.95*
LTF	*CIN*	*0.1*
LTF	*CPLE*	*0.11*
LTF	*G-007*	*< 0.01*
LTF	*IPL*	*0.06*
LTF	*LGEE*	*0.02*
LTF	*MEC*	*0.2*
LTF	*MECS*	*0.11*
LTF	*NYISO*	*0.02*
LTF	*O-066*	*0.01*
LTF	*WEC*	*0.03*

925121	*AB2-169 C*	*22.13*
925122	*AB2-169 E*	*19.86*

Appendix 10

(DVP - DVP) The 3TRWBRDG2-3POPLR C 115 kV line (from bus 314614 to bus 314596 ckt 1) loads from 18.18% to 121.18% (**DC power flow**) of its load dump rating (329 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 2034T2126'. This project contributes approximately 338.87 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 2034T2126'                    /* TROWBRIDGE
  OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1          /* LINE 2126
  OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1          /* LINE 2126
  OPEN BRANCH FROM BUS 314616 TO BUS 933990 CKT 1          /* LINE 2034
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1          /* TROWBRIDGE
TX.*1
  OPEN BRANCH FROM BUS 314616 TO BUS 314614 CKT 1          /* TROWBRIDGE
TX.*2
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*11.89*
315292	*1DOMTR78*	*8.04*
315293	*1DOMTR9*	*6.56*
934521	*AD1-076 C O2*	*224.54*
934522	*AD1-076 E O2*	*114.33*
LTF	*AMIL*	*0.02*
LTF	*BAYOU*	*0.07*
LTF	*BIG_CAJUN1*	*0.11*
LTF	*BIG_CAJUN2*	*0.23*
LTF	*BLUEG*	*0.12*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.03*
LTF	*CATAWBA*	*0.02*
LTF	*CELEVELAND*	*0.07*

LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*CHOCTAW*	*0.08*
LTF	*CLIFTY*	*0.5*
LTF	*COTTONWOOD*	*0.29*
LTF	*DEARBORN*	*0.06*
LTF	*EDWARDS*	*0.04*
LTF	*ELMERSMITH*	*0.06*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.07*
LTF	*GIBSON*	*0.04*
LTF	*HAMLET*	*0.08*
LTF	*MORGAN*	*0.12*
LTF	*NEWTON*	*0.09*
LTF	*O-066*	*0.25*
LTF	*PRAIRIE*	*0.18*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.15*
LTF	*ROWAN*	*0.05*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.01*
LTF	*TATANKA*	*0.04*
LTF	*TILTON*	*0.04*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.05*
LTF	*UNIONPOWER*	*0.05*

925121	*AB2-169 C*	*19.55*
925122	*AB2-169 E*	*17.54*

Appendix 11

(DVP - DVP) The 6TRWBRDG 230/115 kV transformer (from bus 314614 to bus 314616 ckt 1) loads from 19.29% to 137.51% (**DC power flow**) of its load dump rating (200 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-3: L262'. This project contributes approximately 236.2 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-3: L262'                                  /* EVERETTS
  OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 1             /* EVERETTS
TX.*2
  OPEN BRANCH FROM BUS 314573 TO BUS 314622 CKT 1             /* 82
  OPEN BRANCH FROM BUS 314622 TO BUS 314618 CKT 1             /* 82
  OPEN BRANCH FROM BUS 314622 TO BUS 314867 CKT 1             /* WHARTON CAP
1
  OPEN BRANCH FROM BUS 314622 TO BUS 314876 CKT 1             /* WHARTON CAP
2
  OPEN BRANCH FROM BUS 314622 TO BUS 314576 CKT 1             /* 189
  OPEN BRANCH FROM BUS 314573 TO BUS 314596 CKT 1             /* 25
  OPEN BRANCH FROM BUS 314573 TO BUS 314624 CKT 1             /* 96
  OPEN BRANCH FROM BUS 314624 TO BUS 314601 CKT 1             /* 96
  OPEN BRANCH FROM BUS 314601 TO BUS 314629 CKT 1             /* 96
  OPEN BRANCH FROM BUS 314629 TO BUS 314593 CKT 1             /* 96
  OPEN BUS 314864                                  /* EVERETTS 115KV CAP
  OPEN BRANCH FROM BUS 314574 TO BUS 314573 CKT 2             /* EVERETTS
TX.*4
  OPEN BRANCH FROM BUS 314573 TO BUS 314552 CKT 1             /* 139
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*7.46*
315292	*1DOMTR78*	*5.04*
315293	*1DOMTR9*	*4.11*
934521	*AD1-076 C O2*	*156.5*
934522	*AD1-076 E O2*	*79.69*
LTF	*AMIL*	*0.01*
LTF	*BAYOU*	*0.05*
LTF	*BIG_CAJUN1*	*0.07*
LTF	*BIG_CAJUN2*	*0.14*

LTF	*BLUEG*	*0.08*
LTF	*CALDERWOOD*	*0.02*
LTF	*CANNELTON*	*0.01*
LTF	*CARR*	*0.02*
LTF	*CATAWBA*	*0.02*
LTF	*CELEVELAND*	*0.04*
LTF	*CHEOAH*	*0.02*
LTF	*CHILHOWEE*	*< 0.01*
LTF	*CHOCTAW*	*0.05*
LTF	*CLIFTY*	*0.32*
LTF	*COTTONWOOD*	*0.18*
LTF	*DEARBORN*	*0.04*
LTF	*EDWARDS*	*0.02*
LTF	*ELMERSMITH*	*0.04*
LTF	*FARMERCITY*	*0.02*
LTF	*G-007*	*0.05*
LTF	*GIBSON*	*0.03*
LTF	*HAMLET*	*0.05*
LTF	*MORGAN*	*0.08*
LTF	*NEWTON*	*0.06*
LTF	*O-066*	*0.16*
LTF	*PRAIRIE*	*0.11*
LTF	*RENSSELAER*	*0.01*
LTF	*ROSETON*	*0.09*
LTF	*ROWAN*	*0.03*
LTF	*SANTEETLA*	*< 0.01*

LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.03*
LTF	*TILTON*	*0.03*
LTF	*TRIMBLE*	*0.01*
LTF	*TVA*	*0.03*
LTF	*UNIONPOWER*	*0.03*
925121	*AB2-169 C*	*19.03*
925122	*AB2-169 E*	*17.08*

Appendix 12

(DVP - DVP) The 3WEYRHAEUSER-3TRWBRDG2 115 kV line (from bus 314621 to bus 314614 ckt 1) loads from 17.87% to 126.04% (**DC power flow**) of its load dump rating (349 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-3: H172'. This project contributes approximately 377.52 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-3: H172'                                  /* TROWBRIDGE
  OPEN BRANCH FROM BUS 314616 TO BUS 314594 CKT 1             /* LINE 2126
  OPEN BRANCH FROM BUS 314594 TO BUS 314203 CKT 1             /* LINE 2126
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1             /* TROWBRIDGE
TX.*1
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*13.18*
315292	*1DOMTR78*	*8.9*
315293	*1DOMTR9*	*7.27*
934521	*AD1-076 C O2*	*250.15*
934522	*AD1-076 E O2*	*127.38*
LTF	*AMIL*	*0.01*
LTF	*BAYOU*	*0.02*
LTF	*BIG_CAJUN1*	*0.03*
LTF	*BIG_CAJUN2*	*0.07*
LTF	*BLUEG*	*0.08*
LTF	*CALDERWOOD*	*< 0.01*
LTF	*CANNELTON*	*0.01*
LTF	*CARR*	*0.03*
LTF	*CBM-S2*	*0.09*
LTF	*CHEOAH*	*< 0.01*
LTF	*CHILHOWEE*	*< 0.01*
LTF	*CHOCTAW*	*0.02*

LTF	*CLIFTY*	*0.36*
LTF	*COTTONWOOD*	*0.1*
LTF	*CPLE*	*0.05*
LTF	*DEARBORN*	*0.05*
LTF	*EDWARDS*	*0.02*
LTF	*ELMERSMITH*	*0.04*
LTF	*FARMERCITY*	*0.01*
LTF	*G-007*	*0.09*
LTF	*GIBSON*	*0.03*
LTF	*MORGAN*	*0.04*
LTF	*NEWTON*	*0.06*
LTF	*O-066*	*0.31*
LTF	*PRAIRIE*	*0.1*
LTF	*RENSSELAER*	*0.02*
LTF	*ROSETON*	*0.17*
LTF	*SANTEETLA*	*< 0.01*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.03*
LTF	*TILTON*	*0.03*
LTF	*TRIMBLE*	*0.02*
LTF	*TVA*	*0.02*
LTF	*UNIONPOWER*	*< 0.01*
925121	*AB2-169 C*	*22.1*
925122	*AB2-169 E*	*19.83*

Appendix 13

(DVP - DVP) The 6S HERTFORD-6WINFALL 230 kV line (from bus 314662 to bus 314651 ckt 1) loads from 84.27% to 104.32% (**DC power flow**) of its load dump rating (897 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 24682'. This project contributes approximately 179.84 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 24682' /* 24682 @ SUFFOLK
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* SUFFOLK - NUCOR TAP
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* NUCOR TAP - EARLEYS
OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2 /* SUFFOLK 230-115 TX#5
OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2 /* SUFFOLK 500-230 TX#8
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*5.68*
315292	*1DOMTR78*	*3.84*
315293	*1DOMTR9*	*3.13*
315132	*1EDGECMB*	*6.42*
315139	*1GASTONA*	*2.57*
315141	*1GASTONB*	*2.57*
315136	*1ROSEMG1*	*1.83*
315138	*1ROSEMG2*	*0.86*
315137	*1ROSEMS1*	*1.14*
314557	*3BETHELC*	*0.69*
314566	*3CRESWEL*	*7.79*
314582	*3KELFORD*	*0.9*
314603	*3SCOT NK*	*3.1*
314617	*3TUNIS*	*0.8*

314620	*6CASHIE*	*1.83*
314574	*6EVERETS*	*2.87*
314594	*6PLYMOTH*	*2.34*
932631	*AC2-084 C*	*7.52*
932632	*AC2-084 E*	*3.7*
933451	*AC2-158 C*	*9.34*
933452	*AC2-158 E*	*9.34*
933461	*AC2-159 C*	*6.2*
933462	*AC2-159 E*	*6.2*
933991	*AD1-023 C*	*31.82*
933992	*AD1-023 E*	*17.32*
934041	*AD1-029 C*	*9.3*
934042	*AD1-029 E*	*6.13*
934331	*AD1-057 C O2*	*7.5*
934332	*AD1-057 E O2*	*4.*
934521	*AD1-076 C O2*	*119.17*
934522	*AD1-076 E O2*	*60.68*
LTF	*CARR*	*0.06*
LTF	*CBM-S1*	*3.82*
LTF	*CBM-S2*	*7.76*
LTF	*CBM-W1*	*8.47*
LTF	*CBM-W2*	*20.64*
LTF	*CIN*	*1.9*
LTF	*CPLE*	*2.68*
LTF	*G-007*	*0.47*
LTF	*IPL*	*1.21*

LTF	*LGEE*	*0.41*
LTF	*MEC*	*4.27*
LTF	*MECS*	*1.94*
LTF	*O-066*	*1.55*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.38*
900671	*V4-068 C*	*0.07*
900672	*V4-068 E*	*0.21*
LTF	*WEC*	*0.52*
916041	*Z1-036 C*	*5.35*
916042	*Z1-036 E*	*182.46*
917331	*Z2-043 C*	*0.49*
917332	*Z2-043 E*	*1.08*
917341	*Z2-044 C*	*0.19*
917342	*Z2-044 E*	*0.41*
917511	*Z2-088 C OP1*	*0.89*
917512	*Z2-088 E OP1*	*3.58*
918411	*AA1-050*	*0.75*
918511	*AA1-065 C OP*	*2.57*
918512	*AA1-065 E OP*	*6.44*
918531	*AA1-067 C*	*0.39*
918532	*AA1-067 E*	*0.86*
918561	*AA1-072 C*	*0.07*
918562	*AA1-072 E*	*0.18*
919691	*AA2-053 C*	*1.32*
919692	*AA2-053 E*	*2.9*

919701	*AA2-057 C*	*1.02*
919702	*AA2-057 E*	*2.6*
919731	*AA2-059 C*	*0.9*
919732	*AA2-059 E*	*2.15*
919821	*AA2-068 C*	*0.34*
919822	*AA2-068 E*	*0.79*
LTF	*AA2-074*	*1.83*
920591	*AA2-165 C*	*0.14*
920592	*AA2-165 E*	*0.34*
920671	*AA2-174 C*	*0.06*
920672	*AA2-174 E*	*0.33*
920691	*AA2-178 C*	*31.15*
920692	*AA2-178 E*	*13.35*
930051	*AB1-013 C*	*9.4*
930052	*AB1-013 E*	*62.92*
930861	*AB1-132 C*	*10.01*
930862	*AB1-132 E*	*4.29*
923941	*AB2-035 C*	*0.29*
923942	*AB2-035 E*	*0.12*
924381	*AB2-087 C*	*0.69*
924382	*AB2-087 E*	*0.33*
924391	*AB2-088 C*	*0.37*
924392	*AB2-088 E*	*0.18*
924491	*AB2-098 C*	*0.67*
924492	*AB2-098 E*	*0.29*
924501	*AB2-099 C*	*0.64*

924502	*AB2-099 E*	*0.27*
925121	*AB2-169 C*	*13.01*
925122	*AB2-169 E*	*11.67*
925281	*AB2-186 C*	*2.54*
925282	*AB2-186 E*	*1.09*
925291	*AB2-188 C O1*	*7.68*
925292	*AB2-188 E O1*	*3.45*
925591	*AC1-034 C*	*5.93*
925592	*AC1-034 E*	*4.47*
926071	*AC1-086 C*	*14.73*
926072	*AC1-086 E*	*6.71*
926201	*AC1-098 C*	*5.27*
926202	*AC1-098 E*	*3.14*
926211	*AC1-099 C*	*1.77*
926212	*AC1-099 E*	*1.04*
926771	*AC1-163 C*	*2.11*
926772	*AC1-163 E*	*0.99*
927021	*AC1-189 C*	*8.71*
927022	*AC1-189 E*	*4.34*
927141	*AC1-208 C*	*6.67*
927142	*AC1-208 E*	*2.96*

Appendix 14

(DVP - DVP) The Z1-036 TAP-6S HERTFORD 230 kV line (from bus 916040 to bus 314662 ckt 1) loads from 88.37% to 108.42% (**DC power flow**) of its load dump rating (897 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 24682'. This project contributes approximately 179.84 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 24682'                          /* 24682 @ SUFFOLK
  OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1      /* SUFFOLK -
NUCOR TAP
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1      /* NUCOR TAP -
EARLEYS
  OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2      /* SUFFOLK 230-
115 TX#5
  OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2      /* SUFFOLK 500-
230 TX#8
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*5.68*
315292	*1DOMTR78*	*3.84*
315293	*1DOMTR9*	*3.13*
315131	*1EDGECMA*	*6.42*
315132	*1EDGECMB*	*6.42*
315139	*1GASTONA*	*2.57*
315141	*1GASTONB*	*2.57*
315136	*1ROSEMG1*	*1.83*
315138	*1ROSEMG2*	*0.86*
315137	*1ROSEMS1*	*1.14*
314557	*3BETHELC*	*0.69*
314554	*3BTLEBRO*	*0.54*
314566	*3CRESWEL*	*7.79*
314578	*3HORNRTN*	*2.19*

314582	*3KELFORD*	*0.9*
314603	*3SCOT NK*	*3.1*
314617	*3TUNIS*	*0.8*
314620	*6CASHIE*	*1.83*
314574	*6EVERETS*	*2.87*
314594	*6PLYMOTH*	*2.34*
932631	*AC2-084 C*	*7.52*
932632	*AC2-084 E*	*3.7*
933451	*AC2-158 C*	*9.34*
933452	*AC2-158 E*	*9.34*
933461	*AC2-159 C*	*6.2*
933462	*AC2-159 E*	*6.2*
933991	*AD1-023 C*	*31.82*
933992	*AD1-023 E*	*17.32*
934041	*AD1-029 C*	*9.3*
934042	*AD1-029 E*	*6.13*
934331	*AD1-057 C O2*	*7.5*
934332	*AD1-057 E O2*	*4.*
934521	*AD1-076 C O2*	*119.17*
934522	*AD1-076 E O2*	*60.68*
LTF	*CARR*	*0.06*
LTF	*CBM-S1*	*3.82*
LTF	*CBM-S2*	*7.76*
LTF	*CBM-W1*	*8.47*
LTF	*CBM-W2*	*20.64*
LTF	*CIN*	*1.9*

LTF	*CPLE*	*2.68*
LTF	*G-007*	*0.47*
LTF	*IPL*	*1.21*
LTF	*LGEE*	*0.41*
LTF	*MEC*	*4.27*
LTF	*MECS*	*1.94*
LTF	*O-066*	*1.55*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.38*
900671	*V4-068 C*	*0.07*
900672	*V4-068 E*	*0.21*
LTF	*WEC*	*0.52*
916041	*Z1-036 C*	*5.35*
916042	*Z1-036 E*	*182.46*
917331	*Z2-043 C*	*0.49*
917332	*Z2-043 E*	*1.08*
917341	*Z2-044 C*	*0.19*
917342	*Z2-044 E*	*0.41*
917511	*Z2-088 C OP1*	*0.89*
917512	*Z2-088 E OP1*	*3.58*
918411	*AA1-050*	*0.75*
918511	*AA1-065 C OP*	*2.57*
918512	*AA1-065 E OP*	*6.44*
918531	*AA1-067 C*	*0.39*
918532	*AA1-067 E*	*0.86*
918561	*AA1-072 C*	*0.07*

918562	*AA1-072 E*	*0.18*
919691	*AA2-053 C*	*1.32*
919692	*AA2-053 E*	*2.9*
919701	*AA2-057 C*	*1.02*
919702	*AA2-057 E*	*2.6*
919731	*AA2-059 C*	*0.9*
919732	*AA2-059 E*	*2.15*
919821	*AA2-068 C*	*0.34*
919822	*AA2-068 E*	*0.79*
LTF	*AA2-074*	*1.83*
920591	*AA2-165 C*	*0.14*
920592	*AA2-165 E*	*0.34*
920671	*AA2-174 C*	*0.06*
920672	*AA2-174 E*	*0.33*
920691	*AA2-178 C*	*31.15*
920692	*AA2-178 E*	*13.35*
930051	*AB1-013 C*	*9.4*
930052	*AB1-013 E*	*62.92*
930401	*AB1-081 C*	*6.09*
930402	*AB1-081 E*	*2.61*
930861	*AB1-132 C*	*10.01*
930862	*AB1-132 E*	*4.29*
923941	*AB2-035 C*	*0.29*
923942	*AB2-035 E*	*0.12*
924151	*AB2-059 C O1*	*7.18*
924152	*AB2-059 E O1*	*3.7*

924381	*AB2-087 C*	*0.69*
924382	*AB2-087 E*	*0.33*
924391	*AB2-088 C*	*0.37*
924392	*AB2-088 E*	*0.18*
924491	*AB2-098 C*	*0.67*
924492	*AB2-098 E*	*0.29*
924501	*AB2-099 C*	*0.64*
924502	*AB2-099 E*	*0.27*
925121	*AB2-169 C*	*13.01*
925122	*AB2-169 E*	*11.67*
925291	*AB2-188 C O1*	*7.68*
925292	*AB2-188 E O1*	*3.45*
925591	*AC1-034 C*	*5.93*
925592	*AC1-034 E*	*4.47*
926071	*AC1-086 C*	*14.73*
926072	*AC1-086 E*	*6.71*
926201	*AC1-098 C*	*5.27*
926202	*AC1-098 E*	*3.14*
926211	*AC1-099 C*	*1.77*
926212	*AC1-099 E*	*1.04*
926771	*AC1-163 C*	*2.11*
926772	*AC1-163 E*	*0.99*
927021	*AC1-189 C*	*8.71*
927022	*AC1-189 E*	*4.34*
927141	*AC1-208 C*	*6.67*
927142	*AC1-208 E*	*2.96*

Appendix 15

(DVP - CPLE) The 6MORNSTR-6ROCKYMT230T 230 kV line (from bus 313845 to bus 304222 ckt 1) loads from 144.38% to 150.15% (**DC power flow**) of its emergency rating (374 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 81-2056'. This project contributes approximately 47.78 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 81-2056'
OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /* 3CAROLNA 115.00 - 3HORNRTN 115.00
OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /* 3HORNRTN 115.00 - 3ROAN DP 115.00
OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /* 3ROAN DP 115.00 - 3DARLINGT DP115.00
OPEN BUS 314578 /* ISLAND: 3HORNRTN 115.00
OPEN BUS 314598 /* ISLAND: 3ROAN DP 115.00
OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6MORNSTR 230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 304226 TO BUS 304222 CKT 1 /* 6PA-RMOUNT#4230.00 - 6ROCKYMT230T
OPEN BUS 304226 /* ISLAND
OPEN BUS 314591 /* ISLAND: 6NASH 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315131	*1EDGECMA*	*24.8*
315132	*1EDGECMB*	*24.8*
315139	*1GASTONA*	*4.01*
315141	*1GASTONB*	*4.01*
315126	*1ROARAP2*	*1.22*
315128	*1ROARAP4*	*1.18*
315136	*1ROSEMG1*	*3.36*
315138	*1ROSEMG2*	*1.57*
315137	*1ROSEMS1*	*2.09*
314557	*3BETHELC*	*1.61*

314554	*3BTLEBRO*	*1.08*
314566	*3CRESWEL*	*1.09*
314572	*3EMPORIA*	*0.27*
314582	*3KELFORD*	*0.7*
314603	*3SCOT NK*	*3.23*
314617	*3TUNIS*	*0.55*
314541	*3WATKINS*	*0.33*
314620	*6CASHIE*	*0.49*
314574	*6EVERETS*	*1.81*
314594	*6PLYMOTH*	*0.44*
932631	*AC2-084 C*	*9.38*
932632	*AC2-084 E*	*4.62*
933451	*AC2-158 C*	*3.44*
933452	*AC2-158 E*	*3.44*
933461	*AC2-159 C*	*4.87*
933462	*AC2-159 E*	*4.87*
933991	*AD1-023 C*	*7.25*
933992	*AD1-023 E*	*3.95*
934041	*AD1-029 C*	*11.6*
934042	*AD1-029 E*	*7.65*
934071	*AD1-034 C O2*	*3.43*
934072	*AD1-034 E O2*	*2.22*
934201	*AD1-047 C*	*5.53*
934202	*AD1-047 E*	*3.69*
934331	*AD1-057 C O2*	*11.83*
934332	*AD1-057 E O2*	*6.31*

934521	*AD1-076 C O2*	*31.66*
934522	*AD1-076 E O2*	*16.12*
LTF	*AMIL*	*0.38*
LTF	*BAYOU*	*1.98*
LTF	*BIG_CAJUN1*	*3.12*
LTF	*BIG_CAJUN2*	*6.28*
LTF	*BLUEG*	*1.99*
LTF	*CALDERWOOD*	*1.17*
LTF	*CANNELTON*	*0.38*
LTF	*CARR*	*< 0.01*
LTF	*CATAWBA*	*1.14*
LTF	*CELEVELAND*	*3.25*
LTF	*CHEOAH*	*1.09*
LTF	*CHILHOWEE*	*0.38*
LTF	*CHOCTAW*	*2.13*
LTF	*CLIFTY*	*7.32*
LTF	*COTTONWOOD*	*7.76*
LTF	*DEARBORN*	*0.72*
LTF	*EDWARDS*	*0.61*
LTF	*ELMERSMITH*	*1.11*
LTF	*FARMERCITY*	*0.48*
LTF	*G-007A*	*0.76*
LTF	*GIBSON*	*0.69*
LTF	*HAMLET*	*4.52*
LTF	*MORGAN*	*3.43*
LTF	*NEWTON*	*1.68*

LTF	*O-066A*	*0.35*
LTF	*PRAIRIE*	*3.62*
LTF	*ROWAN*	*2.4*
LTF	*SANTEETLA*	*0.32*
LTF	*SMITHLAND*	*0.32*
LTF	*TATANKA*	*0.82*
LTF	*TILTON*	*0.73*
LTF	*TRIMBLE*	*0.38*
LTF	*TVA*	*1.45*
LTF	*UNIONPOWER*	*2.08*
900671	*V4-068 C*	*0.07*
900672	*V4-068 E*	*0.18*
LTF	*VFT*	*2.03*
LTF	*X1-078*	*0.59*
917331	*Z2-043 C*	*0.38*
917332	*Z2-043 E*	*0.84*
917341	*Z2-044 C*	*0.34*
917342	*Z2-044 E*	*0.75*
917511	*Z2-088 C OP1*	*1.68*
917512	*Z2-088 E OP1*	*6.74*
917592	*Z2-099 E*	*0.25*
918411	*AA1-050*	*1.41*
918491	*AA1-063AC OP*	*1.14*
918492	*AA1-063AE OP*	*2.74*
918511	*AA1-065 C OP*	*1.16*
918512	*AA1-065 E OP*	*2.92*

918531	*AA1-067 C*	*0.25*
918532	*AA1-067 E*	*0.54*
918561	*AA1-072 C*	*0.06*
918562	*AA1-072 E*	*0.14*
919691	*AA2-053 C*	*1.27*
919692	*AA2-053 E*	*2.78*
919701	*AA2-057 C*	*1.72*
919702	*AA2-057 E*	*4.39*
919821	*AA2-068 C*	*0.51*
919822	*AA2-068 E*	*1.19*
920022	*AA2-086 E*	*0.14*
920042	*AA2-088 E*	*5.93*
920591	*AA2-165 C*	*0.23*
920592	*AA2-165 E*	*0.58*
920671	*AA2-174 C*	*0.06*
920672	*AA2-174 E*	*0.32*
920691	*AA2-178 C*	*4.34*
920692	*AA2-178 E*	*1.86*
930051	*AB1-013 C*	*1.31*
930052	*AB1-013 E*	*8.77*
930401	*AB1-081 C*	*14.55*
930402	*AB1-081 E*	*6.23*
930861	*AB1-132 C*	*15.61*
930862	*AB1-132 E*	*6.69*
931231	*AB1-173 C*	*1.56*
931232	*AB1-173 E*	*0.73*

931241	*AB1-173AC*	*1.56*
931242	*AB1-173AE*	*0.73*
923801	*AB2-015 C O1*	*3.93*
923802	*AB2-015 E O1*	*3.23*
923911	*AB2-031 C O1*	*1.54*
923912	*AB2-031 E O1*	*0.76*
923941	*AB2-035 C*	*0.68*
923942	*AB2-035 E*	*0.29*
923991	*AB2-040 C O1*	*5.07*
923992	*AB2-040 E O1*	*4.15*
924151	*AB2-059 C O1*	*17.14*
924152	*AB2-059 E O1*	*8.83*
924381	*AB2-087 C*	*0.4*
924382	*AB2-087 E*	*0.19*
924391	*AB2-088 C*	*0.87*
924392	*AB2-088 E*	*0.42*
924491	*AB2-098 C*	*0.42*
924492	*AB2-098 E*	*0.18*
924501	*AB2-099 C*	*0.4*
924502	*AB2-099 E*	*0.17*
924511	*AB2-100 C*	*8.29*
924512	*AB2-100 E*	*4.08*
925121	*AB2-169 C*	*4.03*
925122	*AB2-169 E*	*3.62*
925171	*AB2-174 C O1*	*4.74*
925172	*AB2-174 E O1*	*4.29*

925291	*AB2-188 C O1*	*1.07*
925292	*AB2-188 E O1*	*0.48*
925591	*AC1-034 C*	*13.75*
925592	*AC1-034 E*	*10.37*
926071	*AC1-086 C*	*22.99*
926072	*AC1-086 E*	*10.47*
926201	*AC1-098 C*	*6.58*
926202	*AC1-098 E*	*3.92*
926211	*AC1-099 C*	*2.2*
926212	*AC1-099 E*	*1.29*
926771	*AC1-163 C*	*1.32*
926772	*AC1-163 E*	*0.62*
927021	*AC1-189 C*	*12.21*
927022	*AC1-189 E*	*6.08*
927111	*AC1-206 C*	*6.69*
927112	*AC1-206 E*	*3.16*
927141	*AC1-208 C*	*10.44*
927142	*AC1-208 E*	*4.63*

Appendix 16

(DVP - DVP) The 6SKIFF CREEK-6KINGS M 230 kV line (from bus 314209 to bus 314386 ckt 1) loads from 140.92% to 142.64% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 16.69 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O2*	*3.1*
934521	*AD1-076 C O2*	*16.69*

935111	*AD1-144 C*	*0.75*
935161	*AD1-151 C O2*	*8.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.32*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*
LTF	*WEC*	*0.27*
916191	*Z1-068 C*	*0.02*
920691	*AA2-178 C*	*3.37*
930051	*AB1-013 C*	*1.02*
923801	*AB2-015 C O1*	*2.75*
923831	*AB2-022 C*	*0.91*
924071	*AB2-051*	*56.36*
924241	*AB2-068 O1*	*103.03*
925281	*AB2-186 C*	*0.23*
925291	*AB2-188 C O1*	*0.83*
925521	*AC1-027 C*	*0.16*

925691	*AC1-045 C*	*0.15*
926291	*AC1-107*	*155.52*
926741	*AC1-159*	*27.18*
926751	*AC1-161 C*	*14.03*

Appendix 17

(DVP - DVP) The 8ELMONT 500/230 kV transformer (from bus 314218 to bus 314908 ckt 1) loads from 124.07% to 126.57% (**DC power flow**) of its load dump rating (1051 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: H2T557'. This project contributes approximately 67.16 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: H2T557' /* ELMONT
OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557)
OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1)
OPEN BRANCH FROM BUS 314908 TO BUS 314218 CKT 2 /*ELMONT 500-230 (TX#2)
END

Bus Number	*Bus Name*	*Full Contribution*
315067	*1DARBY 1*	*4.99*
315068	*1DARBY 2*	*4.99*
315069	*1DARBY 3*	*5.01*
315070	*1DARBY 4*	*5.01*
315043	*1FOUR RIVERA*	*6.63*
315044	*1FOUR RIVERB*	*5.13*
315045	*1FOUR RIVERC*	*6.63*
315046	*1FOUR RIVERD*	*5.13*
315047	*1FOUR RIVERE*	*5.13*
315048	*1FOUR RIVERF*	*6.63*
315074	*1HOPCGN1*	*11.28*
315075	*1HOPCGN2*	*11.14*
315083	*1SPRUNCA*	*14.95*
315084	*1SPRUNCB*	*14.95*
315085	*1SPRUNCC*	*11.08*

315086	*1SPRUNCD*	*11.08*
315073	*1STONECA*	*9.36*
314566	*3CRESWEL*	*2.11*
314572	*3EMPORIA*	*0.36*
314315	*3LOCKS E*	*1.65*
314617	*3TUNIS*	*0.71*
314539	*3UNCAMP*	*2.19*
314541	*3WATKINS*	*0.61*
314620	*6CASHIE*	*0.72*
314229	*6MT RD221*	*1.41*
314236	*6NRTHEST*	*0.37*
314189	*6PAPERMILL*	*8.82*
314594	*6PLYMOTH*	*0.73*
314250	*6ROCKVILLE*	*0.4*
314256	*6ROCKVILLE E*	*1.15*
314648	*6SUNBURY*	*0.81*
314651	*6WINFALL*	*1.59*
932041	*AC2-012 C*	*9.62*
932042	*AC2-012 E*	*15.7*
932501	*AC2-070 C*	*2.9*
932502	*AC2-070 E*	*1.2*
932531	*AC2-073 C*	*3.1*
932532	*AC2-073 E*	*1.56*
932581	*AC2-078 C*	*4.75*
932582	*AC2-078 E*	*7.75*
932591	*AC2-079 C*	*6.82*

932592	*AC2-079 E*	*11.13*
932831	*AC2-110 C*	*1.74*
932832	*AC2-110 E*	*2.84*
933061	*AC2-130*	*3.48*
933071	*AC2-131 1*	*2.36*
933081	*AC2-131 2*	*1.07*
933111	*AC2-132 1*	*1.24*
933121	*AC2-132 2*	*0.63*
933261	*AC2-137 C*	*3.16*
933262	*AC2-137 E*	*2.05*
933271	*AC2-138 C*	*0.87*
933272	*AC2-138 E*	*1.09*
933291	*AC2-141 C*	*27.16*
933292	*AC2-141 E*	*11.59*
933451	*AC2-158 C*	*4.63*
933452	*AC2-158 E*	*4.63*
933471	*AC2-161 C*	*2.47*
933472	*AC2-161 E*	*1.27*
933481	*AC2-162 C*	*4.17*
933482	*AC2-162 E*	*2.15*
933711	*AC2-194 C*	*0.98*
933712	*AC2-194 E*	*1.59*
933731	*AC2-196 C*	*1.66*
933732	*AC2-196 E*	*1.1*
933991	*AD1-023 C*	*11.29*
933992	*AD1-023 E*	*6.14*

934011	*AD1-025 C O2*	*20.82*
934012	*AD1-025 E O2*	*12.33*
934061	*AD1-033 C O2*	*6.97*
934062	*AD1-033 E O2*	*4.65*
934071	*AD1-034 C O2*	*7.83*
934072	*AD1-034 E O2*	*5.07*
934141	*AD1-041 C O2*	*7.07*
934142	*AD1-041 E O2*	*4.71*
934191	*AD1-046 C*	*4.71*
934192	*AD1-046 E*	*3.14*
934201	*AD1-047 C*	*6.75*
934202	*AD1-047 E*	*4.5*
934211	*AD1-048 C*	*3.82*
934212	*AD1-048 E*	*1.93*
934391	*AD1-063 C*	*2.1*
934392	*AD1-063 E*	*1.4*
934521	*AD1-076 C O2*	*44.5*
934522	*AD1-076 E O2*	*22.66*
934571	*AD1-082 C O2*	*8.78*
934572	*AD1-082 E O2*	*5.01*
934781	*AD1-105 C*	*8.08*
934782	*AD1-105 E*	*5.62*
LTF	*AD1-120*	*5.93*
LTF	*AD1-121*	*5.89*
935111	*AD1-144 C*	*1.68*
935112	*AD1-144 E*	*0.92*

935161	*AD1-151 C O2*	*15.11*
935162	*AD1-151 E O2*	*10.07*
935211	*AD1-156 C*	*2.56*
935212	*AD1-156 E*	*1.71*
LTF	*CARR*	*0.67*
LTF	*CBM-S1*	*3.86*
LTF	*CBM-S2*	*13.84*
LTF	*CBM-W1*	*0.21*
LTF	*CBM-W2*	*17.92*
LTF	*CIN*	*0.13*
LTF	*CLIFTY*	*1.61*
LTF	*CPLE*	*4.75*
LTF	*DEARBORN*	*0.47*
LTF	*G-007*	*2.31*
LTF	*IPL*	*0.06*
LTF	*LGEE*	*0.05*
LTF	*MEC*	*1.99*
LTF	*O-066*	*7.73*
LTF	*RENSSELAER*	*0.53*
LTF	*ROSETON*	*3.84*
292791	*U1-032 E*	*4.87*
297087	*V2-040*	*0.28*
900672	*V4-068 E*	*0.26*
901082	*W1-029E*	*41.82*
LTF	*WEC*	*0.06*
907092	*X1-038 E*	*5.47*

913392	*Y1-086 E*	*1.99*
916042	*Z1-036 E*	*40.84*
916192	*Z1-068 E*	*1.76*
917122	*Z2-027 E*	*0.96*
917592	*Z2-099 E*	*0.38*
918492	*AA1-063AE OP*	*3.35*
918512	*AA1-065 E OP*	*3.74*
918691	*AA1-083*	*1.16*
919152	*AA1-139 E*	*5.92*
919211	*AA1-145*	*19.79*
919732	*AA2-059 E*	*0.5*
LTF	*AA2-074*	*3.23*
920022	*AA2-086 E*	*0.21*
920042	*AA2-088 E*	*9.15*
920691	*AA2-178 C*	*8.43*
920692	*AA2-178 E*	*3.61*
930051	*AB1-013 C*	*2.54*
930052	*AB1-013 E*	*17.02*
930121	*AB1-027 C*	*0.87*
930122	*AB1-027 E*	*1.89*
930861	*AB1-132 C*	*11.78*
930862	*AB1-132 E*	*5.05*
931231	*AB1-173 C*	*1.9*
931232	*AB1-173 E*	*0.89*
931241	*AB1-173AC*	*1.9*
931242	*AB1-173AE*	*0.89*

923801	*AB2-015 C O1*	*7.73*
923802	*AB2-015 E O1*	*6.34*
923831	*AB2-022 C*	*2.1*
923832	*AB2-022 E*	*1.13*
923842	*AB2-024 E*	*1.49*
923852	*AB2-025 E*	*1.09*
923862	*AB2-026 E*	*0.88*
923911	*AB2-031 C O1*	*1.88*
923912	*AB2-031 E O1*	*0.93*
923991	*AB2-040 C O1*	*6.19*
923992	*AB2-040 E O1*	*5.06*
924061	*AB2-050*	*1.16*
924071	*AB2-051*	*128.86*
924241	*AB2-068 O1*	*177.95*
924381	*AB2-087 C*	*0.48*
924382	*AB2-087 E*	*0.22*
924501	*AB2-099 C*	*0.49*
924502	*AB2-099 E*	*0.21*
924511	*AB2-100 C*	*10.48*
924512	*AB2-100 E*	*5.16*
924811	*AB2-134 C O1*	*15.87*
924812	*AB2-134 E O1*	*15.6*
925051	*AB2-160 C O1*	*7.18*
925052	*AB2-160 E O1*	*11.71*
925061	*AB2-161 C O1*	*3.63*
925062	*AB2-161 E O1*	*5.92*

925171	*AB2-174 C O1*	*5.96*
925172	*AB2-174 E O1*	*5.39*
925281	*AB2-186 C*	*0.55*
925282	*AB2-186 E*	*0.24*
925291	*AB2-188 C O1*	*2.08*
925292	*AB2-188 E O1*	*0.93*
925331	*AB2-190 C*	*24.76*
925332	*AB2-190 E*	*10.61*
925522	*AC1-027 E*	*1.07*
925692	*AC1-045 E*	*0.92*
925861	*AC1-065 C*	*4.36*
925862	*AC1-065 E*	*7.11*
926071	*AC1-086 C*	*17.34*
926072	*AC1-086 E*	*7.89*
926291	*AC1-107*	*268.61*
926411	*AC1-112 C*	*0.68*
926412	*AC1-112 E*	*1.93*
926441	*AC1-115 C*	*1.01*
926442	*AC1-115 E*	*1.64*
926472	*AC1-118 E*	*1.07*
926551	*AC1-134*	*14.83*
926662	*AC1-147 E*	*1.25*
926741	*AC1-159*	*62.13*
926751	*AC1-161 C*	*27.16*
926752	*AC1-161 E*	*11.59*
926771	*AC1-163 C*	*1.63*

926772	*AC1-163 E*	*0.76*
926781	*AC1-164 C*	*58.41*
926782	*AC1-164 E*	*26.24*
927041	*AC1-191 C*	*17.46*
927042	*AC1-191 E*	*8.7*
927111	*AC1-206 C*	*9.15*
927112	*AC1-206 E*	*4.32*
927221	*AC1-216 C O1*	*12.11*
927222	*AC1-216 E O1*	*9.53*

Appendix 18

(DVP - DVP) The 6CARSON-6CHRL249 230 kV line (from bus 314282 to bus 314285 ckt 1) loads from 112.05% to 113.9% (**DC power flow**) of its load dump rating (684 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 562T563'. This project contributes approximately 29.4 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 562T563' /*CARSON
OPEN BRANCH FROM BUS 314902 TO BUS 314923 CKT 1 /*CARSON TO MIDLOTHIAN
OPEN BRANCH FROM BUS 314914 TO BUS 314902 CKT 1 /*CARSON 500.00 - 8SEPTA 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315105	*1BRUNSWICKS1*	*11.25*
315131	*1EDGECMA*	*4.76*
315132	*1EDGECMB*	*4.76*
315139	*1GASTONA*	*2.46*
315141	*1GASTONB*	*2.46*
315136	*1ROSEMG1*	*1.7*
315138	*1ROSEMG2*	*0.8*
315137	*1ROSEMS1*	*1.06*
315073	*1STONECA*	*-2.58*
314557	*3BETHELC*	*0.39*
314554	*3BTLEBRO*	*0.41*
314572	*3EMPORIA*	*0.33*
314578	*3HORNRTN*	*1.92*
314582	*3KELFORD*	*0.39*
314704	*3LAWRENC*	*0.28*
314603	*3SCOT NK*	*1.62*
314617	*3TUNIS*	*0.36*

314541	*3WATKINS*	*0.24*
314620	*6CASHIE*	*0.31*
314574	*6EVERETS*	*1.06*
932631	*AC2-084 C*	*4.46*
932632	*AC2-084 E*	*2.2*
932701	*AC2-093 C*	*40.58*
932702	*AC2-093 E*	*23.21*
932761	*AC2-100 C*	*2.16*
932762	*AC2-100 E*	*1.05*
933451	*AC2-158 C*	*2.15*
933452	*AC2-158 E*	*2.15*
933461	*AC2-159 C*	*3.44*
933462	*AC2-159 E*	*3.44*
933991	*AD1-023 C*	*4.58*
933992	*AD1-023 E*	*2.49*
934041	*AD1-029 C*	*5.52*
934042	*AD1-029 E*	*3.64*
934071	*AD1-034 C O2*	*9.22*
934072	*AD1-034 E O2*	*5.97*
934201	*AD1-047 C*	*5.74*
934202	*AD1-047 E*	*3.83*
934231	*AD1-050 C*	*2.37*
934232	*AD1-050 E*	*1.3*
934311	*AD1-055 C*	*1.03*
934312	*AD1-055 E*	*0.27*
934331	*AD1-057 C O2*	*5.2*

934332	*AD1-057 E O2*	*2.77*
934341	*AD1-058 C*	*2.35*
934342	*AD1-058 E*	*0.6*
934521	*AD1-076 C O2*	*19.48*
934522	*AD1-076 E O2*	*9.92*
934611	*AD1-087 C O2*	*3.75*
934612	*AD1-087 E O2*	*1.75*
934621	*AD1-088 C O2*	*6.62*
934622	*AD1-088 E O2*	*3.11*
LTF	*AD1-120*	*5.26*
LTF	*AD1-121*	*5.24*
934911	*AD1-123 C*	*0.45*
934912	*AD1-123 E*	*0.23*
934991	*AD1-131 C*	*0.77*
934992	*AD1-131 E*	*0.51*
935171	*AD1-152 C O2*	*3.36*
935172	*AD1-152 E O2*	*2.24*
935211	*AD1-156 C*	*1.*
935212	*AD1-156 E*	*0.67*
LTF	*CARR*	*0.18*
LTF	*CBM-S1*	*6.32*
LTF	*CBM-S2*	*12.36*
LTF	*CBM-W1*	*13.64*
LTF	*CBM-W2*	*33.99*
LTF	*CIN*	*3.08*
LTF	*CPLE*	*3.87*

LTF	*G-007*	*1.04*
LTF	*IPL*	*1.96*
LTF	*LGEE*	*0.67*
LTF	*MEC*	*6.97*
LTF	*MECS*	*3.01*
LTF	*O-066*	*3.47*
LTF	*RENSSELAER*	*0.14*
LTF	*ROSETON*	*1.04*
292791	*U1-032 E*	*-1.34*
900672	*V4-068 E*	*0.13*
LTF	*WEC*	*0.84*
916301	*Z1-086 C*	*33.*
916302	*Z1-086 E*	*5.26*
917332	*Z2-043 E*	*0.46*
917342	*Z2-044 E*	*0.3*
917512	*Z2-088 E OP1*	*1.84*
917592	*Z2-099 E*	*0.18*
918492	*AA1-063AE OP*	*2.09*
918512	*AA1-065 E OP*	*1.82*
918532	*AA1-067 E*	*0.32*
918562	*AA1-072 E*	*0.08*
919692	*AA2-053 E*	*2.08*
919702	*AA2-057 E*	*1.84*
919822	*AA2-068 E*	*0.54*
LTF	*AA2-074*	*2.63*
920022	*AA2-086 E*	*0.1*

920042	*AA2-088 E*	*4.33*
920592	*AA2-165 E*	*0.24*
920631	*AA2-169 C*	*1.18*
920632	*AA2-169 E*	*0.54*
920672	*AA2-174 E*	*0.24*
930401	*AB1-081 C*	*4.55*
930402	*AB1-081 E*	*1.95*
930861	*AB1-132 C*	*9.57*
930862	*AB1-132 E*	*4.1*
931231	*AB1-173 C*	*1.61*
931232	*AB1-173 E*	*0.75*
931241	*AB1-173AC*	*1.61*
931242	*AB1-173AE*	*0.75*
923851	*AB2-025 C*	*0.57*
923852	*AB2-025 E*	*1.3*
923911	*AB2-031 C O1*	*1.6*
923912	*AB2-031 E O1*	*0.79*
923941	*AB2-035 C*	*0.16*
923942	*AB2-035 E*	*0.07*
923991	*AB2-040 C O1*	*5.26*
923992	*AB2-040 E O1*	*4.3*
924021	*AB2-043 C O1*	*1.43*
924022	*AB2-043 E O1*	*2.34*
924151	*AB2-059 C O1*	*5.37*
924152	*AB2-059 E O1*	*2.76*
924161	*AB2-060 C O1*	*4.07*

924162	*AB2-060 E O1*	*1.92*
924301	*AB2-077 C O1*	*0.91*
924302	*AB2-077 E O1*	*0.6*
924311	*AB2-078 C O1*	*0.91*
924312	*AB2-078 E O1*	*0.6*
924321	*AB2-079 C O1*	*0.91*
924322	*AB2-079 E O1*	*0.6*
924381	*AB2-087 C*	*0.25*
924382	*AB2-087 E*	*0.12*
924391	*AB2-088 C*	*0.21*
924392	*AB2-088 E*	*0.1*
924401	*AB2-089 C*	*1.08*
924402	*AB2-089 E*	*0.55*
924411	*AB2-090 C*	*1.8*
924412	*AB2-090 E*	*0.92*
924491	*AB2-098 C*	*0.25*
924492	*AB2-098 E*	*0.11*
924501	*AB2-099 C*	*0.26*
924502	*AB2-099 E*	*0.11*
924511	*AB2-100 C*	*10.65*
924512	*AB2-100 E*	*5.25*
925121	*AB2-169 C*	*2.45*
925122	*AB2-169 E*	*2.2*
925171	*AB2-174 C O1*	*5.22*
925172	*AB2-174 E O1*	*4.72*
925221	*AB2-176 C*	*0.74*

925222	*AB2-176 E*	*0.32*
925591	*AC1-034 C*	*3.33*
925592	*AC1-034 E*	*2.52*
925611	*AC1-036 C*	*0.37*
925612	*AC1-036 E*	*0.61*
925781	*AC1-054 C*	*3.71*
925782	*AC1-054 E*	*1.71*
926071	*AC1-086 C*	*14.1*
926072	*AC1-086 E*	*6.42*
926201	*AC1-098 C*	*3.13*
926202	*AC1-098 E*	*1.86*
926211	*AC1-099 C*	*1.05*
926212	*AC1-099 E*	*0.62*
926271	*AC1-105 C*	*2.38*
926272	*AC1-105 E*	*1.19*
926771	*AC1-163 C*	*0.84*
926772	*AC1-163 E*	*0.39*
927021	*AC1-189 C*	*3.98*
927022	*AC1-189 E*	*1.98*
927111	*AC1-206 C*	*9.5*
927112	*AC1-206 E*	*4.49*
927141	*AC1-208 C*	*4.92*
927142	*AC1-208 E*	*2.19*
927251	*AC1-221 C*	*0.94*
927252	*AC1-221 E*	*0.94*
927261	*AC1-222 C*	*1.48*

927262	*AC1-222 E*	*1.41*

Appendix 19

(DVP - DVP) The 6CHRL249-6LOCKS 230 kV line (from bus 314285 to bus 314316 ckt 1) loads from 109.24% to 111.09% (**DC power flow**) of its load dump rating (684 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 562T563'. This project contributes approximately 29.4 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 562T563' /*CARSON
OPEN BRANCH FROM BUS 314902 TO BUS 314923 CKT 1 /*CARSON TO MIDLOTHIAN
OPEN BRANCH FROM BUS 314914 TO BUS 314902 CKT 1 /*CARSON 500.00 - 8SEPTA 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315105	*1BRUNSWICKS1*	*11.25*
315131	*1EDGECMA*	*4.76*
315132	*1EDGECMB*	*4.76*
315139	*1GASTONA*	*2.46*
315141	*1GASTONB*	*2.46*
315136	*1ROSEMG1*	*1.7*
315138	*1ROSEMG2*	*0.8*
315137	*1ROSEMS1*	*1.06*
315073	*1STONECA*	*-2.58*
314557	*3BETHELC*	*0.39*
314554	*3BTLEBRO*	*0.41*
314572	*3EMPORIA*	*0.33*
314578	*3HORNRTN*	*1.92*
314582	*3KELFORD*	*0.39*
314704	*3LAWRENC*	*0.28*
314603	*3SCOT NK*	*1.62*
314617	*3TUNIS*	*0.36*

314541	*3WATKINS*	*0.24*
314620	*6CASHIE*	*0.31*
314574	*6EVERETS*	*1.06*
932631	*AC2-084 C*	*4.46*
932632	*AC2-084 E*	*2.2*
932701	*AC2-093 C*	*40.58*
932702	*AC2-093 E*	*23.21*
932761	*AC2-100 C*	*2.16*
932762	*AC2-100 E*	*1.05*
933451	*AC2-158 C*	*2.15*
933452	*AC2-158 E*	*2.15*
933461	*AC2-159 C*	*3.44*
933462	*AC2-159 E*	*3.44*
933991	*AD1-023 C*	*4.58*
933992	*AD1-023 E*	*2.49*
934041	*AD1-029 C*	*5.52*
934042	*AD1-029 E*	*3.64*
934071	*AD1-034 C O2*	*9.22*
934072	*AD1-034 E O2*	*5.97*
934201	*AD1-047 C*	*5.74*
934202	*AD1-047 E*	*3.83*
934231	*AD1-050 C*	*2.37*
934232	*AD1-050 E*	*1.3*
934311	*AD1-055 C*	*1.03*
934312	*AD1-055 E*	*0.27*
934331	*AD1-057 C O2*	*5.2*

934332	*AD1-057 E O2*	*2.77*
934341	*AD1-058 C*	*2.35*
934342	*AD1-058 E*	*0.6*
934521	*AD1-076 C O2*	*19.48*
934522	*AD1-076 E O2*	*9.92*
934611	*AD1-087 C O2*	*3.75*
934612	*AD1-087 E O2*	*1.75*
934621	*AD1-088 C O2*	*6.62*
934622	*AD1-088 E O2*	*3.11*
LTF	*AD1-120*	*5.26*
LTF	*AD1-121*	*5.24*
934911	*AD1-123 C*	*0.45*
934912	*AD1-123 E*	*0.23*
934991	*AD1-131 C*	*0.77*
934992	*AD1-131 E*	*0.51*
935171	*AD1-152 C O2*	*3.36*
935172	*AD1-152 E O2*	*2.24*
935211	*AD1-156 C*	*1.*
935212	*AD1-156 E*	*0.67*
LTF	*CARR*	*0.18*
LTF	*CBM-S1*	*6.32*
LTF	*CBM-S2*	*12.36*
LTF	*CBM-W1*	*13.64*
LTF	*CBM-W2*	*33.99*
LTF	*CIN*	*3.08*
LTF	*CPLE*	*3.87*

LTF	*G-007*	*1.04*
LTF	*IPL*	*1.96*
LTF	*LGEE*	*0.67*
LTF	*MEC*	*6.97*
LTF	*MECS*	*3.01*
LTF	*O-066*	*3.47*
LTF	*RENSSELAER*	*0.14*
LTF	*ROSETON*	*1.04*
292791	*U1-032 E*	*-1.34*
900672	*V4-068 E*	*0.13*
LTF	*WEC*	*0.84*
916301	*Z1-086 C*	*33.*
916302	*Z1-086 E*	*5.26*
917332	*Z2-043 E*	*0.46*
917342	*Z2-044 E*	*0.3*
917512	*Z2-088 E OP1*	*1.84*
917592	*Z2-099 E*	*0.18*
918492	*AA1-063AE OP*	*2.09*
918512	*AA1-065 E OP*	*1.82*
918532	*AA1-067 E*	*0.32*
918562	*AA1-072 E*	*0.08*
919692	*AA2-053 E*	*2.08*
919702	*AA2-057 E*	*1.84*
919822	*AA2-068 E*	*0.54*
LTF	*AA2-074*	*2.63*
920022	*AA2-086 E*	*0.1*

920042	*AA2-088 E*	*4.33*
920592	*AA2-165 E*	*0.24*
920631	*AA2-169 C*	*1.18*
920632	*AA2-169 E*	*0.54*
920672	*AA2-174 E*	*0.24*
930401	*AB1-081 C*	*4.55*
930402	*AB1-081 E*	*1.95*
930861	*AB1-132 C*	*9.57*
930862	*AB1-132 E*	*4.1*
931231	*AB1-173 C*	*1.61*
931232	*AB1-173 E*	*0.75*
931241	*AB1-173AC*	*1.61*
931242	*AB1-173AE*	*0.75*
923851	*AB2-025 C*	*0.57*
923852	*AB2-025 E*	*1.3*
923911	*AB2-031 C O1*	*1.6*
923912	*AB2-031 E O1*	*0.79*
923941	*AB2-035 C*	*0.16*
923942	*AB2-035 E*	*0.07*
923991	*AB2-040 C O1*	*5.26*
923992	*AB2-040 E O1*	*4.3*
924021	*AB2-043 C O1*	*1.43*
924022	*AB2-043 E O1*	*2.34*
924151	*AB2-059 C O1*	*5.37*
924152	*AB2-059 E O1*	*2.76*
924161	*AB2-060 C O1*	*4.07*

924162	*AB2-060 E O1*	*1.92*
924301	*AB2-077 C O1*	*0.91*
924302	*AB2-077 E O1*	*0.6*
924311	*AB2-078 C O1*	*0.91*
924312	*AB2-078 E O1*	*0.6*
924321	*AB2-079 C O1*	*0.91*
924322	*AB2-079 E O1*	*0.6*
924381	*AB2-087 C*	*0.25*
924382	*AB2-087 E*	*0.12*
924391	*AB2-088 C*	*0.21*
924392	*AB2-088 E*	*0.1*
924401	*AB2-089 C*	*1.08*
924402	*AB2-089 E*	*0.55*
924411	*AB2-090 C*	*1.8*
924412	*AB2-090 E*	*0.92*
924491	*AB2-098 C*	*0.25*
924492	*AB2-098 E*	*0.11*
924501	*AB2-099 C*	*0.26*
924502	*AB2-099 E*	*0.11*
924511	*AB2-100 C*	*10.65*
924512	*AB2-100 E*	*5.25*
925121	*AB2-169 C*	*2.45*
925122	*AB2-169 E*	*2.2*
925171	*AB2-174 C O1*	*5.22*
925172	*AB2-174 E O1*	*4.72*
925221	*AB2-176 C*	*0.74*

925222	*AB2-176 E*	*0.32*
925591	*AC1-034 C*	*3.33*
925592	*AC1-034 E*	*2.52*
925611	*AC1-036 C*	*0.37*
925612	*AC1-036 E*	*0.61*
925781	*AC1-054 C*	*3.71*
925782	*AC1-054 E*	*1.71*
926071	*AC1-086 C*	*14.1*
926072	*AC1-086 E*	*6.42*
926201	*AC1-098 C*	*3.13*
926202	*AC1-098 E*	*1.86*
926211	*AC1-099 C*	*1.05*
926212	*AC1-099 E*	*0.62*
926271	*AC1-105 C*	*2.38*
926272	*AC1-105 E*	*1.19*
926771	*AC1-163 C*	*0.84*
926772	*AC1-163 E*	*0.39*
927021	*AC1-189 C*	*3.98*
927022	*AC1-189 E*	*1.98*
927111	*AC1-206 C*	*9.5*
927112	*AC1-206 E*	*4.49*
927141	*AC1-208 C*	*4.92*
927142	*AC1-208 E*	*2.19*
927251	*AC1-221 C*	*0.94*
927252	*AC1-221 E*	*0.94*
927261	*AC1-222 C*	*1.48*

927262	*AC1-222 E*	*1.41*

Appendix 20

(DVP - DVP) The 6CHESTF B-6BASIN 230 kV line (from bus 314287 to bus 314276 ckt 1) loads from 127.01% to 128.86% (**DC power flow**) of its emergency rating (449 MVA) for the single line contingency outage of 'DVP_P1-2: LN 563'. This project contributes approximately 18.25 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 563'
OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315065	*1CHESTF6*	*33.34*
315131	*1EDGECMA*	*3.18*
315132	*1EDGECMB*	*3.18*
315139	*1GASTONA*	*1.58*
315141	*1GASTONB*	*1.58*
315119	*1GRAVEL3*	*1.24*
315120	*1GRAVEL4*	*1.26*
315121	*1GRAVEL5*	*1.24*
315122	*1GRAVEL6*	*1.26*
315117	*1GRAVELC*	*0.43*
315074	*1HOPCGN1*	*5.63*
315075	*1HOPCGN2*	*5.56*
315077	*1HOPHCF1*	*1.78*
315078	*1HOPHCF2*	*1.78*
315079	*1HOPHCF3*	*1.78*
315080	*1HOPHCF4*	*2.7*
315076	*1HOPPOLC*	*1.27*
315116	*1SURRY 1*	*12.47*

314314	*3LOCKS*	*0.06*
314315	*3LOCKS E*	*0.77*
932041	*AC2-012 C*	*3.21*
932581	*AC2-078 C*	*2.86*
932591	*AC2-079 C*	*3.07*
932631	*AC2-084 C*	*3.22*
932701	*AC2-093 C*	*23.37*
933451	*AC2-158 C*	*1.94*
933461	*AC2-159 C*	*2.55*
933471	*AC2-161 C*	*0.89*
933711	*AC2-194 C*	*0.35*
933731	*AC2-196 C*	*0.55*
933991	*AD1-023 C*	*4.54*
934011	*AD1-025 C O2*	*9.21*
934041	*AD1-029 C*	*3.98*
934061	*AD1-033 C O2*	*2.31*
934071	*AD1-034 C O2*	*5.06*
934201	*AD1-047 C*	*3.58*
934331	*AD1-057 C O2*	*3.61*
934521	*AD1-076 C O2*	*18.25*
934571	*AD1-082 C O2*	*5.05*
935111	*AD1-144 C*	*0.56*
935211	*AD1-156 C*	*1.97*
LTF	*CARR*	*0.2*
LTF	*CBM-S1*	*3.35*
LTF	*CBM-S2*	*7.31*

LTF	*CBM-W1*	*6.11*
LTF	*CBM-W2*	*17.58*
LTF	*CIN*	*1.4*
LTF	*CPLE*	*2.35*
LTF	*IPL*	*0.89*
LTF	*LGEE*	*0.31*
LTF	*MEC*	*3.38*
LTF	*MECS*	*1.12*
LTF	*RENSSELAER*	*0.16*
LTF	*ROSETON*	*1.14*
LTF	*WEC*	*0.39*
914231	*Y2-077*	*0.72*
LTF	*AA2-074*	*1.6*
920631	*AA2-169 C*	*0.75*
920691	*AA2-178 C*	*3.22*
930051	*AB1-013 C*	*0.97*
930401	*AB1-081 C*	*3.05*
930861	*AB1-132 C*	*6.17*
931231	*AB1-173 C*	*1.01*
931241	*AB1-173AC*	*1.01*
923801	*AB2-015 C O1*	*3.22*
923831	*AB2-022 C*	*0.73*
923851	*AB2-025 C*	*0.31*
923911	*AB2-031 C O1*	*1.*
923941	*AB2-035 C*	*0.11*
923991	*AB2-040 C O1*	*3.28*

924071	*AB2-051*	*42.84*
924151	*AB2-059 C O1*	*3.6*
924381	*AB2-087 C*	*0.21*
924391	*AB2-088 C*	*0.15*
924491	*AB2-098 C*	*0.19*
924501	*AB2-099 C*	*0.22*
924511	*AB2-100 C*	*6.19*
924811	*AB2-134 C O1*	*7.02*
925051	*AB2-160 C O1*	*3.33*
925061	*AB2-161 C O1*	*1.87*
925121	*AB2-169 C*	*2.2*
925171	*AB2-174 C O1*	*3.2*
925281	*AB2-186 C*	*0.2*
925291	*AB2-188 C O1*	*0.79*
925331	*AB2-190 C*	*10.95*
925591	*AC1-034 C*	*2.34*
925821	*AC1-061*	*< 0.01*
926071	*AC1-086 C*	*9.08*
926201	*AC1-098 C*	*2.26*
926211	*AC1-099 C*	*0.76*
926741	*AC1-159*	*20.65*
926771	*AC1-163 C*	*0.71*
927021	*AC1-189 C*	*2.92*
927111	*AC1-206 C*	*5.47*
927141	*AC1-208 C*	*3.41*
927221	*AC1-216 C O1*	*5.36*

Appendix 21

(DVP - DVP) The 6PENNIMAN-6WALR209 230 kV line (from bus 314296 to bus 314415 ckt 1) loads from 129.94% to 131.66% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 16.69 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O2*	*3.1*
934521	*AD1-076 C O2*	*16.69*

935111	*AD1-144 C*	*0.75*
935161	*AD1-151 C O2*	*8.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.32*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*
LTF	*WEC*	*0.27*
916191	*Z1-068 C*	*0.02*
920691	*AA2-178 C*	*3.37*
930051	*AB1-013 C*	*1.02*
923801	*AB2-015 C O1*	*2.75*
923831	*AB2-022 C*	*0.91*
924071	*AB2-051*	*56.36*
924241	*AB2-068 O1*	*103.03*
925281	*AB2-186 C*	*0.23*
925291	*AB2-188 C O1*	*0.83*
925521	*AC1-027 C*	*0.16*

925691	*AC1-045 C*	*0.15*
926291	*AC1-107*	*155.52*
926741	*AC1-159*	*27.18*
926751	*AC1-161 C*	*14.03*

Appendix 22

(DVP - DVP) The 6KINGS M-6PENNIMAN 230 kV line (from bus 314386 to bus 314296 ckt 1) loads from 133.4% to 135.12% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 16.69 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O2*	*3.1*
934521	*AD1-076 C O2*	*16.69*

935111	*AD1-144 C*	*0.75*
935161	*AD1-151 C O2*	*8.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.32*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*
LTF	*WEC*	*0.27*
916191	*Z1-068 C*	*0.02*
920691	*AA2-178 C*	*3.37*
930051	*AB1-013 C*	*1.02*
923801	*AB2-015 C O1*	*2.75*
923831	*AB2-022 C*	*0.91*
924071	*AB2-051*	*56.36*
924241	*AB2-068 O1*	*103.03*
925281	*AB2-186 C*	*0.23*
925291	*AB2-188 C O1*	*0.83*
925521	*AC1-027 C*	*0.16*

925691	*AC1-045 C*	*0.15*
926291	*AC1-107*	*155.52*
926741	*AC1-159*	*27.18*
926751	*AC1-161 C*	*14.03*

Appendix 23

(DVP - DVP) The 6WALR209-6LIGH209 230 kV line (from bus 314415 to bus 314391 ckt 1) loads from 115.84% to 117.56% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 557'. This project contributes approximately 16.69 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 557'
OPEN BRANCH FROM BUS 314214 TO BUS 314903 CKT 1 /* 6CHCKAHM 230.00 - 8CHCKAHM 500.00
OPEN BRANCH FROM BUS 314903 TO BUS 314908 CKT 1 /* 8CHCKAHM 500.00 - 8ELMONT 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*0.54*
315108	*1ELIZAR1*	*1.58*
315109	*1ELIZAR2*	*1.55*
315110	*1ELIZAR3*	*1.6*
315233	*1SURRY 2*	*16.1*
315092	*1YORKTN3*	*22.59*
314421	*6WINCHST*	*0.14*
932041	*AC2-012 C*	*4.18*
932591	*AC2-079 C*	*2.01*
933291	*AC2-141 C*	*14.03*
933451	*AC2-158 C*	*1.68*
933471	*AC2-161 C*	*0.87*
933711	*AC2-194 C*	*0.42*
933731	*AC2-196 C*	*0.74*
933991	*AD1-023 C*	*4.29*
934061	*AD1-033 C O2*	*3.1*
934521	*AD1-076 C O2*	*16.69*

935111	*AD1-144 C*	*0.75*
935161	*AD1-151 C O2*	*8.75*
LTF	*CARR*	*0.13*
LTF	*CBM-S1*	*2.34*
LTF	*CBM-S2*	*5.11*
LTF	*CBM-W1*	*4.32*
LTF	*CBM-W2*	*12.33*
LTF	*CIN*	*0.99*
LTF	*CPLE*	*1.64*
LTF	*IPL*	*0.63*
LTF	*LGEE*	*0.22*
LTF	*MEC*	*2.38*
LTF	*MECS*	*0.81*
LTF	*RENSSELAER*	*0.11*
LTF	*ROSETON*	*0.76*
LTF	*WEC*	*0.27*
916191	*Z1-068 C*	*0.02*
920691	*AA2-178 C*	*3.37*
930051	*AB1-013 C*	*1.02*
923801	*AB2-015 C O1*	*2.75*
923831	*AB2-022 C*	*0.91*
924071	*AB2-051*	*56.36*
924241	*AB2-068 O1*	*103.03*
925281	*AB2-186 C*	*0.23*
925291	*AB2-188 C O1*	*0.83*
925521	*AC1-027 C*	*0.16*

925691	*AC1-045 C*	*0.15*
926291	*AC1-107*	*155.52*
926741	*AC1-159*	*27.18*
926751	*AC1-161 C*	*14.03*

Appendix 24

(DVP - DVP) The 6CLUBHSE-AD1-034 TAP 230 kV line (from bus 314563 to bus 934070 ckt 1) loads from 122.27% to 127.07% (**DC power flow**) of its load dump rating (637 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 24662'. This project contributes approximately 67.54 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 24662'                          /* EARLEYS
  OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 1      /* TX. #3
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1      /* 246
  OPEN BRANCH FROM BUS 314575 TO BUS 314537 CKT 1      /* 246
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1      /* 246 - NUCOR
  END
```

Bus Number	*Bus Name*	*Full Contribution*
315131	*1EDGECMA*	*10.57*
315132	*1EDGECMB*	*10.57*
315139	*1GASTONA*	*7.49*
315141	*1GASTONB*	*7.49*
315126	*1ROARAP2*	*2.68*
315128	*1ROARAP4*	*2.58*
315136	*1ROSEMG1*	*5.06*
315138	*1ROSEMG2*	*2.37*
315137	*1ROSEMS1*	*3.14*
314557	*3BETHELC*	*0.88*
314554	*3BTLEBRO*	*0.89*
314572	*3EMPORIA*	*1.03*
314578	*3HORNRTN*	*5.33*
314582	*3KELFORD*	*1.07*
314704	*3LAWRENC*	*0.82*
314603	*3SCOT NK*	*4.31*
314617	*3TUNIS*	*0.98*

314541	*3WATKINS*	*0.48*
314620	*6CASHIE*	*0.8*
314574	*6EVERETS*	*2.44*
314594	*6PLYMOTH*	*0.62*
932631	*AC2-084 C*	*11.6*
932632	*AC2-084 E*	*5.71*
933451	*AC2-158 C*	*6.1*
933452	*AC2-158 E*	*6.1*
933461	*AC2-159 C*	*9.75*
933462	*AC2-159 E*	*9.75*
933991	*AD1-023 C*	*11.22*
933992	*AD1-023 E*	*6.11*
934041	*AD1-029 C*	*14.34*
934042	*AD1-029 E*	*9.45*
934201	*AD1-047 C*	*17.43*
934202	*AD1-047 E*	*11.62*
934231	*AD1-050 C*	*5.02*
934232	*AD1-050 E*	*2.74*
934331	*AD1-057 C O2*	*12.92*
934332	*AD1-057 E O2*	*6.89*
934521	*AD1-076 C O2*	*44.75*
934522	*AD1-076 E O2*	*22.79*
934621	*AD1-088 C O2*	*12.23*
934622	*AD1-088 E O2*	*5.74*
LTF	*AD1-120*	*4.32*
LTF	*AD1-121*	*4.3*

LTF	*CARR*	*0.12*
LTF	*CBM-S1*	*5.3*
LTF	*CBM-S2*	*10.62*
LTF	*CBM-W1*	*11.75*
LTF	*CBM-W2*	*28.65*
LTF	*CIN*	*2.65*
LTF	*CPLE*	*3.58*
LTF	*G-007*	*0.75*
LTF	*IPL*	*1.69*
LTF	*LGEE*	*0.57*
LTF	*MEC*	*5.93*
LTF	*MECS*	*2.66*
LTF	*O-066*	*2.5*
LTF	*RENSSELAER*	*0.09*
LTF	*ROSETON*	*0.67*
900671	*V4-068 C*	*0.12*
900672	*V4-068 E*	*0.32*
LTF	*WEC*	*0.72*
917331	*Z2-043 C*	*0.59*
917332	*Z2-043 E*	*1.28*
917341	*Z2-044 C*	*0.31*
917342	*Z2-044 E*	*0.68*
917511	*Z2-088 C OP1*	*1.03*
917512	*Z2-088 E OP1*	*4.15*
917591	*Z2-099 C*	*0.2*
917592	*Z2-099 E*	*0.44*

918411	*AA1-050*	*0.87*
918491	*AA1-063AC OP*	*2.33*
918492	*AA1-063AE OP*	*5.6*
918511	*AA1-065 C OP*	*2.13*
918512	*AA1-065 E OP*	*5.36*
918531	*AA1-067 C*	*0.33*
918532	*AA1-067 E*	*0.73*
918561	*AA1-072 C*	*0.09*
918562	*AA1-072 E*	*0.21*
919691	*AA2-053 C*	*2.68*
919692	*AA2-053 E*	*5.87*
919701	*AA2-057 C*	*1.74*
919702	*AA2-057 E*	*4.43*
919821	*AA2-068 C*	*0.58*
919822	*AA2-068 E*	*1.37*
LTF	*AA2-074*	*2.44*
920021	*AA2-086 C*	*0.1*
920022	*AA2-086 E*	*0.24*
920041	*AA2-088 C*	*1.23*
920042	*AA2-088 E*	*10.25*
920591	*AA2-165 C*	*0.24*
920592	*AA2-165 E*	*0.58*
920631	*AA2-169 C*	*2.77*
920632	*AA2-169 E*	*1.27*
920671	*AA2-174 C*	*0.12*
920672	*AA2-174 E*	*0.68*

930401	*AB1-081 C*	*10.03*
930402	*AB1-081 E*	*4.3*
930861	*AB1-132 C*	*29.15*
930862	*AB1-132 E*	*12.49*
931231	*AB1-173 C*	*4.9*
931232	*AB1-173 E*	*2.29*
931241	*AB1-173AC*	*4.9*
931242	*AB1-173AE*	*2.29*
923911	*AB2-031 C O1*	*4.87*
923912	*AB2-031 E O1*	*2.4*
923941	*AB2-035 C*	*0.37*
923942	*AB2-035 E*	*0.16*
923991	*AB2-040 C O1*	*15.98*
923992	*AB2-040 E O1*	*13.07*
924021	*AB2-043 C O1*	*2.65*
924022	*AB2-043 E O1*	*4.35*
924151	*AB2-059 C O1*	*11.82*
924152	*AB2-059 E O1*	*6.09*
924161	*AB2-060 C O1*	*7.52*
924162	*AB2-060 E O1*	*3.54*
924301	*AB2-077 C O1*	*1.66*
924302	*AB2-077 E O1*	*1.11*
924311	*AB2-078 C O1*	*1.66*
924312	*AB2-078 E O1*	*1.11*
924321	*AB2-079 C O1*	*1.66*
924322	*AB2-079 E O1*	*1.11*

924381	*AB2-087 C*	*0.72*
924382	*AB2-087 E*	*0.34*
924391	*AB2-088 C*	*0.47*
924392	*AB2-088 E*	*0.23*
924401	*AB2-089 C*	*2.28*
924402	*AB2-089 E*	*1.17*
924411	*AB2-090 C*	*3.34*
924412	*AB2-090 E*	*1.71*
924491	*AB2-098 C*	*0.57*
924492	*AB2-098 E*	*0.24*
924501	*AB2-099 C*	*0.72*
924502	*AB2-099 E*	*0.31*
924511	*AB2-100 C*	*35.73*
924512	*AB2-100 E*	*17.6*
925121	*AB2-169 C*	*5.63*
925122	*AB2-169 E*	*5.05*
925171	*AB2-174 C O1*	*16.05*
925172	*AB2-174 E O1*	*14.52*
925221	*AB2-176 C*	*1.37*
925222	*AB2-176 E*	*0.59*
925591	*AC1-034 C*	*7.5*
925592	*AC1-034 E*	*5.66*
925781	*AC1-054 C*	*8.18*
925782	*AC1-054 E*	*3.77*
926071	*AC1-086 C*	*42.92*
926072	*AC1-086 E*	*19.54*

926201	*AC1-098 C*	*8.13*
926202	*AC1-098 E*	*4.85*
926211	*AC1-099 C*	*2.73*
926212	*AC1-099 E*	*1.6*
926771	*AC1-163 C*	*2.36*
926772	*AC1-163 E*	*1.11*
927021	*AC1-189 C*	*9.04*
927022	*AC1-189 E*	*4.5*
927111	*AC1-206 C*	*32.12*
927112	*AC1-206 E*	*15.19*
927141	*AC1-208 C*	*12.91*
927142	*AC1-208 E*	*5.73*

Appendix 25

(DVP - CPLE) The 6EVERETS-6GREENVILE T 230 kV line (from bus 314574 to bus 304451 ckt 1) loads from 119.79% to 143.0% (**DC power flow**) of its emergency rating (478 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 2058-2181'. This project contributes approximately 110.93 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 2058-2181'
OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00
OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00
OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-RMOUNT#4230.00 - 6NASH 230.00
OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00
OPEN BUS 314591 /* ISLAND: 6NASH 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*3.12*
315292	*1DOMTR78*	*2.11*
315293	*1DOMTR9*	*1.72*
315131	*1EDGECMA*	*9.28*
315132	*1EDGECMB*	*9.28*
315136	*1ROSEMG1*	*1.98*
315138	*1ROSEMG2*	*0.93*
315137	*1ROSEMS1*	*1.23*
314557	*3BETHELC*	*1.14*
314554	*3BTLEBRO*	*0.43*
314566	*3CRESWEL*	*2.04*
314572	*3EMPORIA*	*0.21*
314578	*3HORNRTN*	*2.04*
314582	*3KELFORD*	*0.72*

314603	*3SCOT NK*	*2.51*
314617	*3TUNIS*	*0.7*
314539	*3UNCAMP*	*1.18*
314541	*3WATKINS*	*0.36*
314620	*6CASHIE*	*0.88*
314574	*6EVERETS*	*5.39*
314594	*6PLYMOTH*	*0.83*
314648	*6SUNBURY*	*0.4*
314651	*6WINFALL*	*0.97*
932631	*AC2-084 C*	*6.16*
932632	*AC2-084 E*	*3.04*
933451	*AC2-158 C*	*5.87*
933452	*AC2-158 E*	*5.87*
933461	*AC2-159 C*	*5.22*
933462	*AC2-159 E*	*5.22*
933711	*AC2-194 C*	*0.6*
933712	*AC2-194 E*	*0.97*
933991	*AD1-023 C*	*13.46*
933992	*AD1-023 E*	*7.33*
934041	*AD1-029 C*	*7.62*
934042	*AD1-029 E*	*5.02*
934201	*AD1-047 C*	*4.28*
934202	*AD1-047 E*	*2.86*
934331	*AD1-057 C O2*	*6.19*
934332	*AD1-057 E O2*	*3.3*
934521	*AD1-076 C O2*	*73.5*

934522	*AD1-076 E O2*	*37.43*
LTF	*AMIL*	*0.48*
LTF	*BAYOU*	*2.64*
LTF	*BIG_CAJUN1*	*4.17*
LTF	*BIG_CAJUN2*	*8.39*
LTF	*BLUEG*	*2.5*
LTF	*CALDERWOOD*	*1.54*
LTF	*CANNELTON*	*0.48*
LTF	*CATAWBA*	*1.51*
LTF	*CBM-N*	*< 0.01*
LTF	*CELEVELAND*	*4.27*
LTF	*CHEOAH*	*1.44*
LTF	*CHILHOWEE*	*0.5*
LTF	*CHOCTAW*	*2.84*
LTF	*CLIFTY*	*9.05*
LTF	*COTTONWOOD*	*10.33*
LTF	*DEARBORN*	*0.89*
LTF	*EDWARDS*	*0.78*
LTF	*ELMERSMITH*	*1.42*
LTF	*FARMERCITY*	*0.62*
LTF	*G-007A*	*1.03*
LTF	*GIBSON*	*0.88*
LTF	*HAMLET*	*6.47*
LTF	*MORGAN*	*4.57*
LTF	*NEWTON*	*2.15*
LTF	*NYISO*	*0.09*

LTF	*O-066A*	*0.47*
LTF	*PRAIRIE*	*4.69*
LTF	*ROWAN*	*2.99*
LTF	*SANTEETLA*	*0.43*
LTF	*SMITHLAND*	*0.42*
LTF	*TATANKA*	*1.05*
LTF	*TILTON*	*0.92*
LTF	*TRIMBLE*	*0.47*
LTF	*TVA*	*1.92*
LTF	*UNIONPOWER*	*2.74*
900672	*V4-068 E*	*0.21*
LTF	*VFT*	*2.75*
901082	*W1-029E*	*23.36*
907092	*X1-038 E*	*2.96*
LTF	*X1-078*	*0.8*
913392	*Y1-086 E*	*1.05*
916042	*Z1-036 E*	*29.11*
917122	*Z2-027 E*	*0.51*
917331	*Z2-043 C*	*0.39*
917332	*Z2-043 E*	*0.86*
917342	*Z2-044 E*	*0.33*
917511	*Z2-088 C OP1*	*1.52*
917512	*Z2-088 E OP1*	*6.13*
917592	*Z2-099 E*	*0.26*
918411	*AA1-050*	*1.28*
918492	*AA1-063AE OP*	*2.44*

918511	*AA1-065 C OP*	*1.93*
918512	*AA1-065 E OP*	*4.84*
918531	*AA1-067 C*	*0.74*
918532	*AA1-067 E*	*1.62*
918561	*AA1-072 C*	*0.06*
918562	*AA1-072 E*	*0.14*
919692	*AA2-053 E*	*2.58*
919702	*AA2-057 E*	*2.12*
919732	*AA2-059 E*	*0.38*
919822	*AA2-068 E*	*0.66*
920022	*AA2-086 E*	*0.14*
920042	*AA2-088 E*	*6.24*
920592	*AA2-165 E*	*0.28*
920672	*AA2-174 E*	*0.3*
920691	*AA2-178 C*	*8.16*
920692	*AA2-178 E*	*3.5*
930051	*AB1-013 C*	*2.46*
930052	*AB1-013 E*	*16.47*
930401	*AB1-081 C*	*5.63*
930402	*AB1-081 E*	*2.41*
930861	*AB1-132 C*	*10.35*
930862	*AB1-132 E*	*4.44*
931231	*AB1-173 C*	*1.2*
931232	*AB1-173 E*	*0.56*
931241	*AB1-173AC*	*1.2*
931242	*AB1-173AE*	*0.56*

923801	*AB2-015 C O1*	*4.39*
923802	*AB2-015 E O1*	*3.6*
923831	*AB2-022 C*	*1.02*
923832	*AB2-022 E*	*0.55*
923911	*AB2-031 C O1*	*1.2*
923912	*AB2-031 E O1*	*0.59*
923941	*AB2-035 C*	*0.48*
923942	*AB2-035 E*	*0.21*
923991	*AB2-040 C O1*	*3.93*
923992	*AB2-040 E O1*	*3.21*
924151	*AB2-059 C O1*	*6.64*
924152	*AB2-059 E O1*	*3.42*
924381	*AB2-087 C*	*0.54*
924382	*AB2-087 E*	*0.26*
924391	*AB2-088 C*	*0.62*
924392	*AB2-088 E*	*0.3*
924491	*AB2-098 C*	*1.26*
924492	*AB2-098 E*	*0.54*
924501	*AB2-099 C*	*0.53*
924502	*AB2-099 E*	*0.23*
924511	*AB2-100 C*	*5.85*
924512	*AB2-100 E*	*2.88*
925121	*AB2-169 C*	*10.01*
925122	*AB2-169 E*	*8.99*
925171	*AB2-174 C O1*	*3.64*
925172	*AB2-174 E O1*	*3.29*

925281	*AB2-186 C*	*0.37*
925282	*AB2-186 E*	*0.16*
925291	*AB2-188 C O1*	*2.01*
925292	*AB2-188 E O1*	*0.9*
925591	*AC1-034 C*	*9.79*
925592	*AC1-034 E*	*7.38*
926071	*AC1-086 C*	*15.24*
926072	*AC1-086 E*	*6.94*
926201	*AC1-098 C*	*4.32*
926202	*AC1-098 E*	*2.58*
926211	*AC1-099 C*	*1.45*
926212	*AC1-099 E*	*0.85*
LTF	*AC1-133*	*22.49*
926771	*AC1-163 C*	*1.74*
926772	*AC1-163 E*	*0.81*
927021	*AC1-189 C*	*15.45*
927022	*AC1-189 E*	*7.7*
927111	*AC1-206 C*	*4.78*
927112	*AC1-206 E*	*2.26*
927141	*AC1-208 C*	*5.74*
927142	*AC1-208 E*	*2.55*

Appendix 26

(DVP - DVP) The 6LAKEVEW-AB2-100 TAP 230 kV line (from bus 314583 to bus 924510 ckt 1) loads from 117.3% to 132.89% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 71.43 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK 230 KV
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00
OPEN BUS 314575 /* ISLAND: 6NUCO TP 230.00
OPEN BUS 314590 /* ISLAND: 6NUCOR 230.00
OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00
OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00
OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*2.12*
315131	*1EDGECMA*	*10.48*
315132	*1EDGECMB*	*10.48*
315139	*1GASTONA*	*7.94*
315141	*1GASTONB*	*7.94*
315126	*1ROARAP2*	*1.63*
315128	*1ROARAP4*	*1.57*
315136	*1ROSEMG1*	*5.33*
315138	*1ROSEMG2*	*2.5*
315137	*1ROSEMS1*	*3.31*
314557	*3BETHELC*	*0.87*

314554	*3BTLEBRO*	*0.84*
314566	*3CRESWEL*	*1.64*
314578	*3HORNRTN*	*3.35*
314582	*3KELFORD*	*0.91*
314603	*3SCOT NK*	*3.55*
314617	*3TUNIS*	*0.81*
314541	*3WATKINS*	*0.32*
314620	*6CASHIE*	*0.83*
314574	*6EVERETS*	*2.43*
314594	*6PLYMOTH*	*0.69*
932631	*AC2-084 C*	*9.33*
932632	*AC2-084 E*	*4.6*
933451	*AC2-158 C*	*6.16*
933452	*AC2-158 E*	*6.16*
933461	*AC2-159 C*	*7.09*
933462	*AC2-159 E*	*7.09*
933991	*AD1-023 C*	*11.95*
933992	*AD1-023 E*	*6.5*
934041	*AD1-029 C*	*11.54*
934042	*AD1-029 E*	*7.61*
934331	*AD1-057 C O2*	*10.44*
934332	*AD1-057 E O2*	*5.57*
934521	*AD1-076 C O2*	*47.33*
934522	*AD1-076 E O2*	*24.1*
LTF	*AD1-120*	*3.75*
LTF	*AD1-121*	*3.72*

LTF	*CARR*	*0.09*
LTF	*CBM-S1*	*4.51*
LTF	*CBM-S2*	*9.28*
LTF	*CBM-W1*	*9.81*
LTF	*CBM-W2*	*24.32*
LTF	*CIN*	*2.2*
LTF	*CPLE*	*3.18*
LTF	*G-007*	*0.61*
LTF	*IPL*	*1.4*
LTF	*LGEE*	*0.47*
LTF	*MEC*	*4.99*
LTF	*MECS*	*2.2*
LTF	*O-066*	*2.02*
LTF	*RENSSELAER*	*0.08*
LTF	*ROSETON*	*0.55*
900672	*V4-068 E*	*0.24*
LTF	*WEC*	*0.61*
916042	*Z1-036 E*	*21.81*
917331	*Z2-043 C*	*0.5*
917332	*Z2-043 E*	*1.1*
917341	*Z2-044 C*	*0.28*
917342	*Z2-044 E*	*0.61*
917511	*Z2-088 C OP1*	*1.02*
917512	*Z2-088 E OP1*	*4.12*
917592	*Z2-099 E*	*0.3*
918411	*AA1-050*	*0.86*

918491	*AA1-063AC OP*	*1.46*
918492	*AA1-063AE OP*	*3.51*
918511	*AA1-065 C OP*	*2.13*
918512	*AA1-065 E OP*	*5.34*
918531	*AA1-067 C*	*0.33*
918532	*AA1-067 E*	*0.73*
918561	*AA1-072 C*	*0.08*
918562	*AA1-072 E*	*0.18*
919691	*AA2-053 C*	*1.76*
919692	*AA2-053 E*	*3.86*
919701	*AA2-057 C*	*1.46*
919702	*AA2-057 E*	*3.73*
919732	*AA2-059 E*	*0.29*
919821	*AA2-068 C*	*0.46*
919822	*AA2-068 E*	*1.08*
LTF	*AA2-074*	*2.16*
920022	*AA2-086 E*	*0.16*
920042	*AA2-088 E*	*6.95*
920591	*AA2-165 C*	*0.2*
920592	*AA2-165 E*	*0.49*
920631	*AA2-169 C*	*1.37*
920632	*AA2-169 E*	*0.63*
920671	*AA2-174 C*	*0.08*
920672	*AA2-174 E*	*0.45*
920691	*AA2-178 C*	*6.54*
920692	*AA2-178 E*	*2.8*

930051	*AB1-013 C*	*1.97*
930052	*AB1-013 E*	*13.21*
930401	*AB1-081 C*	*9.53*
930402	*AB1-081 E*	*4.08*
930861	*AB1-132 C*	*30.89*
930862	*AB1-132 E*	*13.24*
923941	*AB2-035 C*	*0.37*
923942	*AB2-035 E*	*0.16*
924151	*AB2-059 C O1*	*11.23*
924152	*AB2-059 E O1*	*5.78*
924381	*AB2-087 C*	*0.64*
924382	*AB2-087 E*	*0.3*
924391	*AB2-088 C*	*0.47*
924392	*AB2-088 E*	*0.23*
924491	*AB2-098 C*	*0.57*
924492	*AB2-098 E*	*0.24*
924501	*AB2-099 C*	*0.61*
924502	*AB2-099 E*	*0.26*
925121	*AB2-169 C*	*5.87*
925122	*AB2-169 E*	*5.27*
925291	*AB2-188 C O1*	*1.61*
925292	*AB2-188 E O1*	*0.72*
925591	*AC1-034 C*	*7.44*
925592	*AC1-034 E*	*5.62*
925781	*AC1-054 C*	*3.71*
925782	*AC1-054 E*	*1.71*

926071	*AC1-086 C*	*45.49*
926072	*AC1-086 E*	*20.7*
926201	*AC1-098 C*	*6.55*
926202	*AC1-098 E*	*3.9*
926211	*AC1-099 C*	*2.19*
926212	*AC1-099 E*	*1.29*
926771	*AC1-163 C*	*2.03*
926772	*AC1-163 E*	*0.95*
927021	*AC1-189 C*	*9.*
927022	*AC1-189 E*	*4.48*
927141	*AC1-208 C*	*9.41*
927142	*AC1-208 E*	*4.18*

Appendix 27

(DVP - DVP) The 6ELIZ CT-6SHAWBRO 230 kV line (from bus 314638 to bus 314647 ckt 1) loads from 116.15% to 138.4% (**DC power flow**) of its load dump rating (699 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 155.54 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK 230 KV
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00
OPEN BUS 314575 /* ISLAND: 6NUCO TP 230.00
OPEN BUS 314590 /* ISLAND: 6NUCOR 230.00
OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00
OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00
OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*4.91*
315292	*1DOMTR78*	*3.32*
315293	*1DOMTR9*	*2.71*
315139	*1GASTONA*	*2.23*
315141	*1GASTONB*	*2.23*
315136	*1ROSEMG1*	*1.59*
315138	*1ROSEMG2*	*0.74*
315137	*1ROSEMS1*	*0.98*
314557	*3BETHELC*	*0.6*
314566	*3CRESWEL*	*6.73*
314582	*3KELFORD*	*0.78*

314603	*3SCOT NK*	*2.7*
314617	*3TUNIS*	*0.7*
314620	*6CASHIE*	*1.59*
314574	*6EVERETS*	*2.49*
314594	*6PLYMOTH*	*2.03*
314651	*6WINFALL*	*6.57*
932631	*AC2-084 C*	*6.53*
932632	*AC2-084 E*	*3.22*
933451	*AC2-158 C*	*8.08*
933452	*AC2-158 E*	*8.08*
933461	*AC2-159 C*	*5.4*
933462	*AC2-159 E*	*5.4*
933711	*AC2-194 C*	*4.07*
933712	*AC2-194 E*	*6.57*
933991	*AD1-023 C*	*27.52*
933992	*AD1-023 E*	*14.98*
934041	*AD1-029 C*	*8.08*
934042	*AD1-029 E*	*5.32*
934331	*AD1-057 C O2*	*6.51*
934332	*AD1-057 E O2*	*3.48*
934521	*AD1-076 C O2*	*103.06*
934522	*AD1-076 E O2*	*52.48*
LTF	*CARR*	*0.07*
LTF	*CBM-S1*	*3.23*
LTF	*CBM-S2*	*6.64*
LTF	*CBM-W1*	*7.04*

LTF	*CBM-W2*	*17.41*
LTF	*CIN*	*1.58*
LTF	*CPLE*	*2.31*
LTF	*G-007*	*0.43*
LTF	*IPL*	*1.01*
LTF	*LGEE*	*0.34*
LTF	*MEC*	*3.58*
LTF	*MECS*	*1.59*
LTF	*O-066*	*1.43*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.38*
900671	*V4-068 C*	*0.07*
900672	*V4-068 E*	*0.18*
901081	*W1-029C*	*5.03*
901082	*W1-029E*	*171.41*
LTF	*WEC*	*0.43*
913391	*Y1-086 C*	*1.08*
913392	*Y1-086 E*	*8.99*
916041	*Z1-036 C*	*4.62*
916042	*Z1-036 E*	*157.7*
917121	*Z2-027 C*	*1.99*
917122	*Z2-027 E*	*4.35*
917331	*Z2-043 C*	*0.43*
917332	*Z2-043 E*	*0.94*
917511	*Z2-088 C OP1*	*0.77*
917512	*Z2-088 E OP1*	*3.1*

918411	*AA1-050*	*0.65*
918511	*AA1-065 C OP*	*2.22*
918512	*AA1-065 E OP*	*5.58*
918531	*AA1-067 C*	*0.34*
918532	*AA1-067 E*	*0.75*
918561	*AA1-072 C*	*0.06*
918562	*AA1-072 E*	*0.16*
919691	*AA2-053 C*	*1.15*
919692	*AA2-053 E*	*2.52*
919701	*AA2-057 C*	*0.89*
919702	*AA2-057 E*	*2.26*
919731	*AA2-059 C*	*0.77*
919732	*AA2-059 E*	*1.86*
919821	*AA2-068 C*	*0.29*
919822	*AA2-068 E*	*0.69*
LTF	*AA2-074*	*1.57*
920591	*AA2-165 C*	*0.12*
920592	*AA2-165 E*	*0.3*
920671	*AA2-174 C*	*0.05*
920672	*AA2-174 E*	*0.29*
920691	*AA2-178 C*	*26.93*
920692	*AA2-178 E*	*11.54*
930051	*AB1-013 C*	*8.13*
930052	*AB1-013 E*	*54.39*
930861	*AB1-132 C*	*8.68*
930862	*AB1-132 E*	*3.72*

923831	*AB2-022 C*	*9.92*
923832	*AB2-022 E*	*5.34*
923941	*AB2-035 C*	*0.25*
923942	*AB2-035 E*	*0.11*
924381	*AB2-087 C*	*0.6*
924382	*AB2-087 E*	*0.28*
924391	*AB2-088 C*	*0.32*
924392	*AB2-088 E*	*0.16*
924491	*AB2-098 C*	*0.58*
924492	*AB2-098 E*	*0.25*
924501	*AB2-099 C*	*0.56*
924502	*AB2-099 E*	*0.24*
925121	*AB2-169 C*	*11.25*
925122	*AB2-169 E*	*10.1*
925281	*AB2-186 C*	*2.19*
925282	*AB2-186 E*	*0.94*
925291	*AB2-188 C O1*	*6.64*
925292	*AB2-188 E O1*	*2.98*
925591	*AC1-034 C*	*5.13*
925592	*AC1-034 E*	*3.87*
926071	*AC1-086 C*	*12.79*
926072	*AC1-086 E*	*5.82*
926201	*AC1-098 C*	*4.58*
926202	*AC1-098 E*	*2.73*
926211	*AC1-099 C*	*1.54*
926212	*AC1-099 E*	*0.9*

926771	*AC1-163 C*	*1.84*
926772	*AC1-163 E*	*0.86*
927021	*AC1-189 C*	*7.54*
927022	*AC1-189 E*	*3.75*
927141	*AC1-208 C*	*5.8*
927142	*AC1-208 E*	*2.58*

Appendix 28

(DVP - DVP) The 8CARSON-8MDLTHAN 500 kV line (from bus 314902 to bus 314914 ckt 1) loads from 102.86% to 104.38% (**DC power flow**) of its load dump rating (3938 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 557T574'. This project contributes approximately 129.37 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 557T574' /* ELMONT
OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557)
OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1)
OPEN BRANCH FROM BUS 314911 TO BUS 314908 CKT 1 /*ELMONT TO LADYSMITH (LINE 574)
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*19.1*
315103	*1BRUNSWICKG2*	*19.1*
315104	*1BRUNSWICKG3*	*19.1*
315105	*1BRUNSWICKS1*	*39.67*
315131	*1EDGECMA*	*13.75*
315132	*1EDGECMB*	*13.75*
315108	*1ELIZAR1*	*6.55*
315110	*1ELIZAR3*	*6.64*
315233	*1SURRY 2*	*51.71*
314557	*3BETHELC*	*1.21*
314554	*3BTLEBRO*	*1.18*
314566	*3CRESWEL*	*3.95*
314572	*3EMPORIA*	*0.62*
314578	*3HORNRTN*	*4.97*
314582	*3KELFORD*	*1.29*

314603	*3SCOT NK*	*5.05*
314617	*3TUNIS*	*1.32*
314539	*3UNCAMP*	*3.87*
314541	*3WATKINS*	*1.09*
314620	*6CASHIE*	*1.36*
314574	*6EVERETS*	*3.73*
314594	*6PLYMOTH*	*1.38*
314648	*6SUNBURY*	*1.48*
314651	*6WINFALL*	*2.94*
932041	*AC2-012 C*	*17.32*
932042	*AC2-012 E*	*28.26*
932581	*AC2-078 C*	*5.12*
932582	*AC2-078 E*	*8.35*
932591	*AC2-079 C*	*10.33*
932592	*AC2-079 E*	*16.86*
932631	*AC2-084 C*	*13.35*
932632	*AC2-084 E*	*6.57*
932701	*AC2-093 C*	*142.13*
932702	*AC2-093 E*	*81.29*
932761	*AC2-100 C*	*7.19*
932762	*AC2-100 E*	*3.51*
933291	*AC2-141 C*	*55.11*
933292	*AC2-141 E*	*23.53*
933451	*AC2-158 C*	*8.73*
933452	*AC2-158 E*	*8.73*
933461	*AC2-159 C*	*10.23*

933462	*AC2-159 E*	*10.23*
933471	*AC2-161 C*	*3.54*
933472	*AC2-161 E*	*1.82*
933711	*AC2-194 C*	*1.82*
933712	*AC2-194 E*	*2.94*
933731	*AC2-196 C*	*3.07*
933732	*AC2-196 E*	*2.05*
933991	*AD1-023 C*	*21.27*
933992	*AD1-023 E*	*11.58*
934011	*AD1-025 C O2*	*19.13*
934012	*AD1-025 E O2*	*11.33*
934041	*AD1-029 C*	*16.51*
934042	*AD1-029 E*	*10.88*
934061	*AD1-033 C O2*	*12.9*
934062	*AD1-033 E O2*	*8.6*
934071	*AD1-034 C O2*	*11.73*
934072	*AD1-034 E O2*	*7.61*
934201	*AD1-047 C*	*11.92*
934202	*AD1-047 E*	*7.95*
934231	*AD1-050 C*	*6.49*
934232	*AD1-050 E*	*3.55*
934311	*AD1-055 C*	*3.36*
934312	*AD1-055 E*	*0.87*
934331	*AD1-057 C O2*	*14.97*
934332	*AD1-057 E O2*	*7.99*
934341	*AD1-058 C*	*7.83*

934342	*AD1-058 E*	*1.99*
934521	*AD1-076 C O2*	*85.72*
934522	*AD1-076 E O2*	*43.65*
934571	*AD1-082 C O2*	*10.13*
934572	*AD1-082 E O2*	*5.78*
934611	*AD1-087 C O2*	*11.07*
934612	*AD1-087 E O2*	*5.17*
934621	*AD1-088 C O2*	*18.19*
934622	*AD1-088 E O2*	*8.53*
LTF	*AD1-092*	*4.21*
LTF	*AD1-093*	*7.22*
LTF	*AD1-094*	*1.34*
LTF	*AD1-120*	*17.62*
LTF	*AD1-121*	*17.54*
934911	*AD1-123 C*	*1.47*
934912	*AD1-123 E*	*0.76*
934991	*AD1-131 C*	*2.57*
934992	*AD1-131 E*	*1.71*
935111	*AD1-144 C*	*2.79*
935112	*AD1-144 E*	*1.53*
935161	*AD1-151 C O2*	*28.1*
935162	*AD1-151 E O2*	*18.73*
935171	*AD1-152 C O2*	*10.53*
935172	*AD1-152 E O2*	*7.02*
935211	*AD1-156 C*	*2.56*
935212	*AD1-156 E*	*1.71*

LTF	*CARR*	*1.17*
LTF	*CBM-S1*	*20.73*
LTF	*CBM-S2*	*41.34*
LTF	*CBM-W1*	*41.58*
LTF	*CBM-W2*	*110.1*
LTF	*CIN*	*9.57*
LTF	*CPLE*	*12.89*
LTF	*G-007*	*5.71*
LTF	*IPL*	*6.09*
LTF	*LGEE*	*2.09*
LTF	*MEC*	*22.03*
LTF	*MECS*	*8.39*
LTF	*O-066*	*19.05*
LTF	*RENSSELAER*	*0.93*
LTF	*ROSETON*	*6.74*
900672	*V4-068 E*	*0.47*
901082	*W1-029E*	*77.01*
LTF	*WEC*	*2.61*
907092	*X1-038 E*	*9.66*
913392	*Y1-086 E*	*3.69*
916042	*Z1-036 E*	*75.84*
LTF	*Z1-043*	*10.28*
916191	*Z1-068 C*	*0.09*
916192	*Z1-068 E*	*3.21*
916301	*Z1-086 C*	*116.54*
916302	*Z1-086 E*	*18.58*

917122	*Z2-027 E*	*1.78*
917332	*Z2-043 E*	*1.55*
917342	*Z2-044 E*	*0.86*
917512	*Z2-088 E OP1*	*5.82*
917592	*Z2-099 E*	*0.69*
918492	*AA1-063AE OP*	*6.13*
918512	*AA1-065 E OP*	*7.04*
918532	*AA1-067 E*	*1.12*
918562	*AA1-072 E*	*0.26*
919152	*AA1-139 E*	*10.97*
919692	*AA2-053 E*	*5.67*
919702	*AA2-057 E*	*5.33*
919732	*AA2-059 E*	*0.92*
919822	*AA2-068 E*	*1.55*
LTF	*AA2-074*	*8.77*
920022	*AA2-086 E*	*0.37*
920042	*AA2-088 E*	*16.51*
920592	*AA2-165 E*	*0.7*
920631	*AA2-169 C*	*3.16*
920632	*AA2-169 E*	*1.45*
920672	*AA2-174 E*	*0.66*
920691	*AA2-178 C*	*15.78*
920692	*AA2-178 E*	*6.76*
930051	*AB1-013 C*	*4.76*
930052	*AB1-013 E*	*31.87*
930401	*AB1-081 C*	*13.27*

930402	*AB1-081 E*	*5.69*
930861	*AB1-132 C*	*21.22*
930862	*AB1-132 E*	*9.09*
931231	*AB1-173 C*	*3.35*
931232	*AB1-173 E*	*1.56*
931241	*AB1-173AC*	*3.35*
931242	*AB1-173AE*	*1.56*
LTF	*AB2-013*	*6.02*
923801	*AB2-015 C O1*	*13.7*
923802	*AB2-015 E O1*	*11.24*
923831	*AB2-022 C*	*3.89*
923832	*AB2-022 E*	*2.1*
923852	*AB2-025 E*	*1.62*
923911	*AB2-031 C O1*	*3.33*
923912	*AB2-031 E O1*	*1.64*
923941	*AB2-035 C*	*0.51*
923942	*AB2-035 E*	*0.22*
923991	*AB2-040 C O1*	*10.93*
923992	*AB2-040 E O1*	*8.94*
924021	*AB2-043 C O1*	*3.91*
924022	*AB2-043 E O1*	*6.41*
924071	*AB2-051*	*233.47*
924151	*AB2-059 C O1*	*15.64*
924152	*AB2-059 E O1*	*8.06*
924161	*AB2-060 C O1*	*11.18*
924162	*AB2-060 E O1*	*5.26*

924241	*AB2-068 O1*	*330.88*
924301	*AB2-077 C O1*	*2.49*
924302	*AB2-077 E O1*	*1.66*
924311	*AB2-078 C O1*	*2.49*
924312	*AB2-078 E O1*	*1.66*
924321	*AB2-079 C O1*	*2.49*
924322	*AB2-079 E O1*	*1.66*
924381	*AB2-087 C*	*0.89*
924382	*AB2-087 E*	*0.42*
924391	*AB2-088 C*	*0.65*
924392	*AB2-088 E*	*0.31*
924401	*AB2-089 C*	*2.94*
924402	*AB2-089 E*	*1.52*
924411	*AB2-090 C*	*4.92*
924412	*AB2-090 E*	*2.52*
924491	*AB2-098 C*	*0.87*
924492	*AB2-098 E*	*0.37*
924501	*AB2-099 C*	*0.92*
924502	*AB2-099 E*	*0.4*
924511	*AB2-100 C*	*17.14*
924512	*AB2-100 E*	*8.44*
924811	*AB2-134 C O1*	*14.58*
924812	*AB2-134 E O1*	*14.34*
925061	*AB2-161 C O1*	*4.81*
925062	*AB2-161 E O1*	*7.85*
925121	*AB2-169 C*	*10.27*

925122	*AB2-169 E*	*9.22*
925171	*AB2-174 C O1*	*10.43*
925172	*AB2-174 E O1*	*9.43*
925221	*AB2-176 C*	*2.03*
925222	*AB2-176 E*	*0.87*
925281	*AB2-186 C*	*1.02*
925282	*AB2-186 E*	*0.44*
925291	*AB2-188 C O1*	*3.89*
925292	*AB2-188 E O1*	*1.75*
925331	*AB2-190 C*	*22.74*
925332	*AB2-190 E*	*9.75*
925521	*AC1-027 C*	*0.67*
925522	*AC1-027 E*	*1.95*
925591	*AC1-034 C*	*10.31*
925592	*AC1-034 E*	*7.78*
925692	*AC1-045 E*	*1.53*
925781	*AC1-054 C*	*10.05*
925782	*AC1-054 E*	*4.63*
926071	*AC1-086 C*	*31.24*
926072	*AC1-086 E*	*14.22*
926201	*AC1-098 C*	*9.36*
926202	*AC1-098 E*	*5.58*
926211	*AC1-099 C*	*3.14*
926212	*AC1-099 E*	*1.84*
926271	*AC1-105 C*	*7.47*
926272	*AC1-105 E*	*3.72*

926291	*AC1-107*	*499.44*
926662	*AC1-147 E*	*2.25*
926741	*AC1-159*	*112.57*
926751	*AC1-161 C*	*55.11*
926752	*AC1-161 E*	*23.53*
926771	*AC1-163 C*	*3.04*
926772	*AC1-163 E*	*1.42*
927021	*AC1-189 C*	*13.06*
927022	*AC1-189 E*	*6.51*
927111	*AC1-206 C*	*14.79*
927112	*AC1-206 E*	*6.99*
927141	*AC1-208 C*	*13.66*
927142	*AC1-208 E*	*6.07*
927221	*AC1-216 C O1*	*11.13*
927222	*AC1-216 E O1*	*8.75*
927251	*AC1-221 C*	*3.12*
927252	*AC1-221 E*	*3.12*
927261	*AC1-222 C*	*4.83*
927262	*AC1-222 E*	*4.6*

Appendix 29

(DVP - DVP) The 8CHCKAHM-8ELMONT 500 kV line (from bus 314903 to bus 314908 ckt 1) loads from 121.99% to 123.45% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 563'. This project contributes approximately 78.15 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 563'
OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315099	*1CHESPKB*	*2.27*
315131	*1EDGECMA*	*11.07*
315132	*1EDGECMB*	*11.07*
315108	*1ELIZAR1*	*6.68*
315109	*1ELIZAR2*	*6.57*
315110	*1ELIZAR3*	*6.77*
315074	*1HOPCGN1*	*9.56*
315075	*1HOPCGN2*	*9.44*
315233	*1SURRY 2*	*60.62*
315092	*1YORKTN3*	*49.87*
314315	*3LOCKS E*	*1.28*
314421	*6WINCHST*	*0.31*
932041	*AC2-012 C*	*17.68*
932531	*AC2-073 C*	*3.68*
932581	*AC2-078 C*	*5.05*
932591	*AC2-079 C*	*10.28*
932631	*AC2-084 C*	*11.34*
932701	*AC2-093 C*	*98.84*

932831	*AC2-110 C*	*2.02*
933061	*AC2-130*	*2.83*
933071	*AC2-131 1*	*1.91*
933081	*AC2-131 2*	*0.87*
933111	*AC2-132 1*	*1.01*
933121	*AC2-132 2*	*0.51*
933261	*AC2-137 C*	*2.66*
933271	*AC2-138 C*	*0.89*
933291	*AC2-141 C*	*57.04*
933451	*AC2-158 C*	*7.98*
933461	*AC2-159 C*	*8.94*
933471	*AC2-161 C*	*3.83*
933711	*AC2-194 C*	*1.79*
933731	*AC2-196 C*	*3.11*
933991	*AD1-023 C*	*19.78*
934011	*AD1-025 C O2*	*22.79*
934041	*AD1-029 C*	*14.03*
934061	*AD1-033 C O2*	*13.05*
934071	*AD1-034 C O2*	*9.61*
934141	*AD1-041 C O2*	*8.35*
934201	*AD1-047 C*	*9.98*
934211	*AD1-048 C*	*2.45*
934231	*AD1-050 C*	*5.14*
934331	*AD1-057 C O2*	*12.47*
934391	*AD1-063 C*	*2.49*
934521	*AD1-076 C O2*	*78.15*

934571	*AD1-082 C O2*	*10.01*
LTF	*AD1-120*	*12.02*
LTF	*AD1-121*	*11.96*
935111	*AD1-144 C*	*2.91*
935161	*AD1-151 C O2*	*43.12*
935211	*AD1-156 C*	*2.31*
LTF	*CARR*	*0.91*
LTF	*CBM-S1*	*11.69*
LTF	*CBM-S2*	*28.19*
LTF	*CBM-W1*	*17.93*
LTF	*CBM-W2*	*60.28*
LTF	*CIN*	*4.16*
LTF	*CPLE*	*9.17*
LTF	*IPL*	*2.63*
LTF	*LGEE*	*0.92*
LTF	*MEC*	*10.87*
LTF	*MECS*	*2.47*
LTF	*RENSSELAER*	*0.73*
LTF	*ROSETON*	*5.25*
LTF	*WEC*	*1.16*
916191	*Z1-068 C*	*0.09*
LTF	*AA2-074*	*6.24*
920631	*AA2-169 C*	*2.56*
920691	*AA2-178 C*	*15.04*
930051	*AB1-013 C*	*4.54*
930401	*AB1-081 C*	*10.68*

930861	*AB1-132 C*	*17.9*
931231	*AB1-173 C*	*2.81*
931241	*AB1-173AC*	*2.81*
923801	*AB2-015 C O1*	*12.94*
923831	*AB2-022 C*	*3.87*
923911	*AB2-031 C O1*	*2.79*
923941	*AB2-035 C*	*0.42*
923991	*AB2-040 C O1*	*9.14*
924071	*AB2-051*	*238.1*
924151	*AB2-059 C O1*	*12.59*
924241	*AB2-068 O1*	*608.2*
924381	*AB2-087 C*	*0.8*
924391	*AB2-088 C*	*0.54*
924401	*AB2-089 C*	*2.33*
924491	*AB2-098 C*	*0.74*
924501	*AB2-099 C*	*0.83*
924511	*AB2-100 C*	*14.22*
924811	*AB2-134 C O1*	*17.37*
925051	*AB2-160 C O1*	*5.54*
925061	*AB2-161 C O1*	*4.77*
925121	*AB2-169 C*	*9.24*
925171	*AB2-174 C O1*	*8.7*
925281	*AB2-186 C*	*1.*
925291	*AB2-188 C O1*	*3.71*
925331	*AB2-190 C*	*27.1*
925521	*AC1-027 C*	*0.68*

925591	*AC1-034 C*	*8.47*
925781	*AC1-054 C*	*8.03*
925861	*AC1-065 C*	*5.06*
926071	*AC1-086 C*	*26.37*
926201	*AC1-098 C*	*7.96*
926211	*AC1-099 C*	*2.67*
926291	*AC1-107*	*918.03*
926741	*AC1-159*	*114.8*
926751	*AC1-161 C*	*57.04*
926771	*AC1-163 C*	*2.73*
926781	*AC1-164 C*	*64.31*
927021	*AC1-189 C*	*10.93*
927111	*AC1-206 C*	*12.24*
927141	*AC1-208 C*	*11.49*
927221	*AC1-216 C O1*	*13.26*

Appendix 30

(DVP - DVP) The 8CHANCE-8BRISTER 500 kV line (from bus 314905 to bus 314900 ckt 1) loads from 121.97% to 122.81% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 594'. This project contributes approximately 52.94 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 594'
OPEN BRANCH FROM BUS 314916 TO BUS 314934 CKT 1 /* 8MORRSVL 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.68*
315054	*1BELMED2*	*3.68*
315055	*1BELMED3*	*3.06*
315060	*1CHESTF5*	*13.05*
315061	*1CHESTG7*	*5.11*
315063	*1CHESTG8*	*5.06*
315062	*1CHESTS7*	*2.32*
315064	*1CHESTS8*	*2.6*
315067	*1DARBY 1*	*3.35*
315068	*1DARBY 2*	*3.35*
315069	*1DARBY 3*	*3.36*
315070	*1DARBY 4*	*3.37*
315043	*1FOUR RIVERA*	*4.51*
315044	*1FOUR RIVERB*	*3.49*
315045	*1FOUR RIVERC*	*4.51*
315046	*1FOUR RIVERD*	*3.49*
315047	*1FOUR RIVERE*	*3.49*
315048	*1FOUR RIVERF*	*4.51*

315074	*1HOPCGN1*	*9.03*
315075	*1HOPCGN2*	*8.91*
315225	*1N ANNA1*	*47.9*
315226	*1N ANNA2*	*47.88*
315083	*1SPRUNCA*	*11.49*
315084	*1SPRUNCB*	*11.49*
315085	*1SPRUNCC*	*8.52*
315086	*1SPRUNCD*	*8.52*
314315	*3LOCKS E*	*1.35*
314309	*6IRON208*	*0.58*
314236	*6NRTHEST*	*0.24*
314250	*6ROCKVILLE*	*0.28*
932041	*AC2-012 C*	*10.8*
932501	*AC2-070 C*	*1.85*
932531	*AC2-073 C*	*2.54*
932581	*AC2-078 C*	*4.34*
932591	*AC2-079 C*	*7.11*
932701	*AC2-093 C*	*71.07*
932711	*AC2-094 C*	*11.34*
932831	*AC2-110 C*	*1.44*
933011	*AC2-125*	*2.93*
933021	*AC2-126*	*2.95*
933031	*AC2-127*	*1.61*
933041	*AC2-128*	*1.55*
933051	*AC2-129*	*1.45*
933061	*AC2-130*	*2.61*

933071	*AC2-131 1*	*1.76*
933081	*AC2-131 2*	*0.8*
933111	*AC2-132 1*	*0.93*
933121	*AC2-132 2*	*0.47*
933261	*AC2-137 C*	*2.27*
933271	*AC2-138 C*	*0.79*
933291	*AC2-141 C*	*32.25*
933451	*AC2-158 C*	*5.44*
933461	*AC2-159 C*	*6.5*
933471	*AC2-161 C*	*2.52*
933481	*AC2-162 C*	*2.65*
933501	*AC2-165 C*	*10.51*
933711	*AC2-194 C*	*1.13*
933731	*AC2-196 C*	*1.89*
933991	*AD1-023 C*	*13.21*
934011	*AD1-025 C O2*	*18.21*
934061	*AD1-033 C O2*	*7.93*
934071	*AD1-034 C O2*	*8.1*
934141	*AD1-041 C O2*	*5.75*
934201	*AD1-047 C*	*7.82*
934211	*AD1-048 C*	*2.65*
934391	*AD1-063 C*	*1.72*
934521	*AD1-076 C O2*	*52.94*
934541	*AD1-078 C*	*2.9*
934571	*AD1-082 C O2*	*8.21*
934781	*AD1-105 C*	*9.04*

LTF	*AD1-120*	*10.32*
LTF	*AD1-121*	*10.3*
935111	*AD1-144 C*	*1.83*
935161	*AD1-151 C O2*	*17.99*
935211	*AD1-156 C*	*2.27*
LTF	*CARR*	*1.28*
LTF	*CBM-S1*	*12.63*
LTF	*CBM-S2*	*24.28*
LTF	*CBM-W1*	*23.25*
LTF	*CBM-W2*	*65.89*
LTF	*CIN*	*5.61*
LTF	*CPLE*	*7.42*
LTF	*IPL*	*3.57*
LTF	*LGEE*	*1.25*
LTF	*MEC*	*12.92*
LTF	*MECS*	*3.96*
LTF	*RENSSELAER*	*1.02*
LTF	*ROSETON*	*7.34*
297087	*V2-040*	*0.16*
LTF	*WEC*	*1.5*
918691	*AA1-083*	*0.79*
919211	*AA1-145*	*13.47*
LTF	*AA2-074*	*5.05*
920691	*AA2-178 C*	*9.78*
930051	*AB1-013 C*	*2.95*
930121	*AB1-027 C*	*0.55*

930861	*AB1-132 C*	*13.64*
931231	*AB1-173 C*	*2.2*
931241	*AB1-173AC*	*2.2*
923801	*AB2-015 C O1*	*8.77*
923831	*AB2-022 C*	*2.4*
923911	*AB2-031 C O1*	*2.18*
923991	*AB2-040 C O1*	*7.17*
924061	*AB2-050*	*0.79*
924071	*AB2-051*	*145.12*
924241	*AB2-068 O1*	*217.6*
924381	*AB2-087 C*	*0.56*
924501	*AB2-099 C*	*0.58*
924511	*AB2-100 C*	*11.45*
924811	*AB2-134 C O1*	*13.88*
925051	*AB2-160 C O1*	*5.87*
925061	*AB2-161 C O1*	*3.58*
925121	*AB2-169 C*	*6.33*
925171	*AB2-174 C O1*	*6.87*
925281	*AB2-186 C*	*0.63*
925291	*AB2-188 C O1*	*2.41*
925331	*AB2-190 C*	*21.65*
925861	*AC1-065 C*	*3.61*
926001	*AC1-076 C*	*4.68*
926071	*AC1-086 C*	*20.08*
926291	*AC1-107*	*328.45*
926411	*AC1-112 C*	*0.43*

926441	*AC1-115 C*	*1.13*
926551	*AC1-134*	*10.09*
926731	*AC1-158 C*	*89.18*
926741	*AC1-159*	*69.97*
926751	*AC1-161 C*	*32.25*
926771	*AC1-163 C*	*1.91*
926781	*AC1-164 C*	*43.76*
927041	*AC1-191 C*	*10.34*
927111	*AC1-206 C*	*9.93*
927221	*AC1-216 C O1*	*10.59*

Appendix 31

(DVP - DVP) The 8ELMONT-8LADYSMITH 500 kV line (from bus 314908 to bus 314911 ckt 1) loads from 157.92% to 159.48% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 576'. This project contributes approximately 88.09 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 576'
OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /* 8MDLTHAN 500.00 - 8NO ANNA 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315058	*1CHESTF3*	*6.41*
315059	*1CHESTF4*	*10.39*
315060	*1CHESTF5*	*22.04*
315061	*1CHESTG7*	*8.64*
315063	*1CHESTG8*	*8.54*
315062	*1CHESTS7*	*3.93*
315064	*1CHESTS8*	*4.38*
315067	*1DARBY 1*	*5.62*
315068	*1DARBY 2*	*5.63*
315069	*1DARBY 3*	*5.65*
315070	*1DARBY 4*	*5.65*
315074	*1HOPCGN1*	*15.08*
315075	*1HOPCGN2*	*14.88*
315078	*1HOPHCF2*	*4.77*
315079	*1HOPHCF3*	*4.77*
315080	*1HOPHCF4*	*7.24*
315083	*1SPRUNCA*	*18.62*
315084	*1SPRUNCB*	*18.62*

315085	*1SPRUNCC*	*13.81*
315086	*1SPRUNCD*	*13.81*
315233	*1SURRY 2*	*55.09*
315092	*1YORKTN3*	*50.67*
314315	*3LOCKS E*	*2.22*
314309	*6IRON208*	*0.98*
314236	*6NRTHEST*	*0.41*
314421	*6WINCHST*	*0.32*
932041	*AC2-012 C*	*18.09*
932501	*AC2-070 C*	*3.15*
932531	*AC2-073 C*	*4.17*
932581	*AC2-078 C*	*7.15*
932591	*AC2-079 C*	*11.82*
932631	*AC2-084 C*	*13.79*
932701	*AC2-093 C*	*113.43*
932831	*AC2-110 C*	*2.34*
933061	*AC2-130*	*4.4*
933071	*AC2-131 1*	*2.98*
933081	*AC2-131 2*	*1.35*
933111	*AC2-132 1*	*1.57*
933121	*AC2-132 2*	*0.8*
933261	*AC2-137 C*	*3.87*
933291	*AC2-141 C*	*54.33*
933451	*AC2-158 C*	*9.04*
933461	*AC2-159 C*	*10.73*
933471	*AC2-161 C*	*4.22*

933481	*AC2-162 C*	*4.53*
933711	*AC2-194 C*	*1.88*
933731	*AC2-196 C*	*3.16*
933991	*AD1-023 C*	*21.99*
934011	*AD1-025 C O2*	*30.48*
934041	*AD1-029 C*	*17.06*
934061	*AD1-033 C O2*	*13.27*
934071	*AD1-034 C O2*	*13.15*
934141	*AD1-041 C O2*	*9.49*
934201	*AD1-047 C*	*12.81*
934211	*AD1-048 C*	*4.49*
934391	*AD1-063 C*	*2.82*
934521	*AD1-076 C O2*	*88.09*
934571	*AD1-082 C O2*	*13.56*
LTF	*AD1-092*	*5.99*
LTF	*AD1-093*	*10.26*
LTF	*AD1-094*	*1.92*
LTF	*AD1-120*	*17.84*
LTF	*AD1-121*	*17.8*
935111	*AD1-144 C*	*3.06*
935161	*AD1-151 C O2*	*32.95*
935211	*AD1-156 C*	*3.7*
LTF	*CARR*	*1.65*
LTF	*CBM-S1*	*25.74*
LTF	*CBM-S2*	*42.19*
LTF	*CBM-W1*	*59.72*

LTF	*CBM-W2*	*138.99*
LTF	*CIN*	*13.92*
LTF	*CPLE*	*12.52*
LTF	*IPL*	*8.89*
LTF	*LGEE*	*3.04*
LTF	*MEC*	*29.72*
LTF	*MECS*	*13.46*
LTF	*RENSSELAER*	*1.32*
LTF	*ROSETON*	*9.55*
297087	*V2-040*	*0.27*
LTF	*WEC*	*3.73*
LTF	*Y3-032*	*8.73*
LTF	*Z1-043*	*14.67*
LTF	*AA2-074*	*8.52*
920691	*AA2-178 C*	*16.3*
930051	*AB1-013 C*	*4.92*
930121	*AB1-027 C*	*0.94*
930861	*AB1-132 C*	*22.44*
931231	*AB1-173 C*	*3.6*
931241	*AB1-173AC*	*3.6*
LTF	*AB2-013*	*8.55*
923801	*AB2-015 C O1*	*14.56*
923831	*AB2-022 C*	*4.01*
923911	*AB2-031 C O1*	*3.58*
923991	*AB2-040 C O1*	*11.74*
924071	*AB2-051*	*242.92*

924241	*AB2-068 O1*	*417.68*
924381	*AB2-087 C*	*0.93*
924501	*AB2-099 C*	*0.96*
924511	*AB2-100 C*	*18.71*
924811	*AB2-134 C O1*	*23.23*
925051	*AB2-160 C O1*	*9.66*
925061	*AB2-161 C O1*	*5.93*
925121	*AB2-169 C*	*10.53*
925171	*AB2-174 C O1*	*11.24*
925281	*AB2-186 C*	*1.06*
925291	*AB2-188 C O1*	*4.02*
925331	*AB2-190 C*	*36.24*
925861	*AC1-065 C*	*5.85*
926071	*AC1-086 C*	*33.04*
926201	*AC1-098 C*	*9.68*
926211	*AC1-099 C*	*3.24*
926291	*AC1-107*	*630.46*
926411	*AC1-112 C*	*0.73*
926741	*AC1-159*	*117.13*
926751	*AC1-161 C*	*54.33*
926771	*AC1-163 C*	*3.17*
926781	*AC1-164 C*	*75.71*
927041	*AC1-191 C*	*16.51*
927111	*AC1-206 C*	*16.2*
927141	*AC1-208 C*	*14.19*
927221	*AC1-216 C O1*	*17.73*

Appendix 32

(DVP - DVP) The 8LADYSMITH-8CHANCE 500 kV line (from bus 314911 to bus 314905 ckt 1) loads from 112.7% to 113.61% (**DC power flow**) of its emergency rating (2738 MVA) for the single line contingency outage of 'DVP_P1-2: LN 573'. This project contributes approximately 53.67 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 573'
OPEN BRANCH FROM BUS 314918 TO BUS 314934 CKT 1 /* 8NO ANNA 500.00 - 8SPOTSYL 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.74*
315054	*1BELMED2*	*3.74*
315055	*1BELMED3*	*3.1*
315060	*1CHESTF5*	*13.27*
315061	*1CHESTG7*	*5.2*
315063	*1CHESTG8*	*5.14*
315067	*1DARBY 1*	*3.41*
315068	*1DARBY 2*	*3.41*
315069	*1DARBY 3*	*3.42*
315070	*1DARBY 4*	*3.43*
315043	*1FOUR RIVERA*	*4.6*
315044	*1FOUR RIVERB*	*3.56*
315045	*1FOUR RIVERC*	*4.6*
315046	*1FOUR RIVERD*	*3.56*
315047	*1FOUR RIVERE*	*3.56*
315048	*1FOUR RIVERF*	*4.6*
315074	*1HOPCGN1*	*9.17*
315075	*1HOPCGN2*	*9.06*

315037	*1LDYSMT1*	*5.98*
315038	*1LDYSMT2*	*5.98*
315039	*1LDYSMT3*	*6.32*
315040	*1LDYSMT4*	*6.34*
315041	*1LDYSMT5*	*6.36*
315225	*1N ANNA1*	*48.59*
315226	*1N ANNA2*	*48.57*
315083	*1SPRUNCA*	*11.67*
315084	*1SPRUNCB*	*11.67*
315085	*1SPRUNCC*	*8.65*
315086	*1SPRUNCD*	*8.65*
314315	*3LOCKS E*	*1.37*
314309	*6IRON208*	*0.59*
314236	*6NRTHEST*	*0.25*
314250	*6ROCKVILLE*	*0.28*
932041	*AC2-012 C*	*10.97*
932501	*AC2-070 C*	*1.88*
932531	*AC2-073 C*	*2.59*
932581	*AC2-078 C*	*4.4*
932591	*AC2-079 C*	*7.22*
932631	*AC2-084 C*	*8.44*
932701	*AC2-093 C*	*71.98*
932711	*AC2-094 C*	*10.57*
932831	*AC2-110 C*	*1.47*
933011	*AC2-125*	*3.*
933021	*AC2-126*	*3.02*

933031	*AC2-127*	*1.65*
933041	*AC2-128*	*1.59*
933051	*AC2-129*	*1.49*
933061	*AC2-130*	*2.65*
933071	*AC2-131 1*	*1.79*
933081	*AC2-131 2*	*0.82*
933111	*AC2-132 1*	*0.94*
933121	*AC2-132 2*	*0.48*
933261	*AC2-137 C*	*2.3*
933271	*AC2-138 C*	*0.81*
933291	*AC2-141 C*	*32.76*
933451	*AC2-158 C*	*5.52*
933461	*AC2-159 C*	*6.58*
933471	*AC2-161 C*	*2.56*
933481	*AC2-162 C*	*2.7*
933501	*AC2-165 C*	*10.46*
933711	*AC2-194 C*	*1.14*
933731	*AC2-196 C*	*1.92*
933991	*AD1-023 C*	*13.4*
934011	*AD1-025 C O2*	*18.5*
934041	*AD1-029 C*	*10.44*
934061	*AD1-033 C O2*	*8.05*
934071	*AD1-034 C O2*	*8.21*
934141	*AD1-041 C O2*	*5.85*
934201	*AD1-047 C*	*7.92*
934211	*AD1-048 C*	*2.69*

934391	*AD1-063 C*	*1.75*
934521	*AD1-076 C O2*	*53.67*
934571	*AD1-082 C O2*	*8.34*
934781	*AD1-105 C*	*9.25*
LTF	*AD1-120*	*10.41*
LTF	*AD1-121*	*10.38*
935111	*AD1-144 C*	*1.85*
935161	*AD1-151 C O2*	*18.3*
935211	*AD1-156 C*	*2.3*
LTF	*CARR*	*1.28*
LTF	*CBM-S1*	*12.65*
LTF	*CBM-S2*	*24.46*
LTF	*CBM-W1*	*23.1*
LTF	*CBM-W2*	*65.9*
LTF	*CIN*	*5.58*
LTF	*CPLE*	*7.49*
LTF	*IPL*	*3.55*
LTF	*LGEE*	*1.25*
LTF	*MEC*	*12.89*
LTF	*MECS*	*3.89*
LTF	*RENSSELAER*	*1.02*
LTF	*ROSETON*	*7.36*
297087	*V2-040*	*0.16*
LTF	*WEC*	*1.49*
918691	*AA1-083*	*0.81*
919211	*AA1-145*	*13.74*

LTF	*AA2-074*	*5.1*
920691	*AA2-178 C*	*9.92*
930051	*AB1-013 C*	*2.99*
930121	*AB1-027 C*	*0.56*
930861	*AB1-132 C*	*13.82*
931231	*AB1-173 C*	*2.23*
931241	*AB1-173AC*	*2.23*
923801	*AB2-015 C O1*	*8.89*
923831	*AB2-022 C*	*2.44*
923911	*AB2-031 C O1*	*2.21*
923991	*AB2-040 C O1*	*7.26*
924061	*AB2-050*	*0.81*
924071	*AB2-051*	*147.36*
924241	*AB2-068 O1*	*221.55*
924381	*AB2-087 C*	*0.57*
924501	*AB2-099 C*	*0.59*
924511	*AB2-100 C*	*11.61*
924811	*AB2-134 C O1*	*14.1*
925051	*AB2-160 C O1*	*5.96*
925061	*AB2-161 C O1*	*3.63*
925121	*AB2-169 C*	*6.42*
925171	*AB2-174 C O1*	*6.95*
925281	*AB2-186 C*	*0.64*
925291	*AB2-188 C O1*	*2.45*
925331	*AB2-190 C*	*22.*
925861	*AC1-065 C*	*3.67*

926071	*AC1-086 C*	*20.34*
926201	*AC1-098 C*	*5.92*
926211	*AC1-099 C*	*1.99*
926291	*AC1-107*	*334.42*
926411	*AC1-112 C*	*0.44*
926441	*AC1-115 C*	*1.16*
926551	*AC1-134*	*10.29*
926741	*AC1-159*	*71.05*
926751	*AC1-161 C*	*32.76*
926771	*AC1-163 C*	*1.94*
926781	*AC1-164 C*	*44.52*
927041	*AC1-191 C*	*10.53*
927111	*AC1-206 C*	*10.06*
927141	*AC1-208 C*	*8.7*
927221	*AC1-216 C O1*	*10.76*

Appendix 33

(DVP - DVP) The 8MDLTHAN-8NO ANNA 500 kV line (from bus 314914 to bus 314918 ckt 1) loads from 126.95% to 128.46% (**DC power flow**) of its emergency rating (2442 MVA) for the single line contingency outage of 'DVP_P1-2: LN 574'. This project contributes approximately 81.53 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 574'
OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /* 8ELMONT 500.00 - 8LDYSMTH 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315102	*1BRUNSWICKG1*	*16.36*
315103	*1BRUNSWICKG2*	*16.36*
315104	*1BRUNSWICKG3*	*16.36*
315105	*1BRUNSWICKS1*	*33.98*
315099	*1CHESPKB*	*2.06*
315131	*1EDGECMA*	*13.32*
315132	*1EDGECMB*	*13.32*
315108	*1ELIZAR1*	*6.07*
315109	*1ELIZAR2*	*5.97*
315110	*1ELIZAR3*	*6.15*
315074	*1HOPCGN1*	*11.87*
315075	*1HOPCGN2*	*11.72*
315083	*1SPRUNCA*	*15.71*
315084	*1SPRUNCB*	*15.71*
315085	*1SPRUNCC*	*11.64*
315086	*1SPRUNCD*	*11.64*
314315	*3LOCKS E*	*1.85*
932041	*AC2-012 C*	*16.1*

932501	*AC2-070 C*	*2.04*
932531	*AC2-073 C*	*2.99*
932581	*AC2-078 C*	*6.2*
932591	*AC2-079 C*	*10.49*
932631	*AC2-084 C*	*13.04*
932701	*AC2-093 C*	*123.19*
932831	*AC2-110 C*	*1.7*
933061	*AC2-130*	*3.23*
933071	*AC2-131 1*	*2.19*
933081	*AC2-131 2*	*0.99*
933111	*AC2-132 1*	*1.15*
933121	*AC2-132 2*	*0.59*
933261	*AC2-137 C*	*2.68*
933291	*AC2-141 C*	*48.31*
933451	*AC2-158 C*	*8.36*
933461	*AC2-159 C*	*10.06*
933471	*AC2-161 C*	*3.62*
933481	*AC2-162 C*	*2.93*
933501	*AC2-165 C*	*16.08*
933711	*AC2-194 C*	*1.7*
933731	*AC2-196 C*	*2.83*
933991	*AD1-023 C*	*20.22*
934011	*AD1-025 C O2*	*24.76*
934041	*AD1-029 C*	*16.13*
934061	*AD1-033 C O2*	*11.87*
934071	*AD1-034 C O2*	*12.48*

934141	*AD1-041 C O2*	*6.77*
934201	*AD1-047 C*	*12.15*
934211	*AD1-048 C*	*3.14*
934231	*AD1-050 C*	*6.68*
934331	*AD1-057 C O2*	*14.64*
934391	*AD1-063 C*	*2.02*
934521	*AD1-076 C O2*	*81.53*
934571	*AD1-082 C O2*	*11.81*
934611	*AD1-087 C O2*	*11.55*
934621	*AD1-088 C O2*	*19.9*
LTF	*AD1-092*	*4.84*
LTF	*AD1-093*	*8.29*
LTF	*AD1-094*	*1.55*
LTF	*AD1-120*	*17.13*
LTF	*AD1-121*	*17.08*
934911	*AD1-123 C*	*1.45*
935111	*AD1-144 C*	*2.69*
935161	*AD1-151 C O2*	*22.42*
935171	*AD1-152 C O2*	*10.62*
935211	*AD1-156 C*	*3.27*
935221	*AD1-157 C*	*1.94*
935231	*AD1-160 C*	*1.42*
LTF	*CARR*	*1.37*
LTF	*CBM-S1*	*22.24*
LTF	*CBM-S2*	*40.34*
LTF	*CBM-W1*	*47.95*

LTF	*CBM-W2*	*119.*
LTF	*CIN*	*11.13*
LTF	*CPLE*	*12.29*
LTF	*IPL*	*7.1*
LTF	*LGEE*	*2.43*
LTF	*MEC*	*24.62*
LTF	*MECS*	*10.23*
LTF	*RENSSELAER*	*1.1*
LTF	*ROSETON*	*7.93*
LTF	*WEC*	*3.*
LTF	*Z1-043*	*11.82*
916191	*Z1-068 C*	*0.08*
916301	*Z1-086 C*	*99.51*
LTF	*AA2-074*	*8.36*
920631	*AA2-169 C*	*3.22*
920691	*AA2-178 C*	*14.88*
930051	*AB1-013 C*	*4.49*
930401	*AB1-081 C*	*12.86*
930861	*AB1-132 C*	*21.22*
931231	*AB1-173 C*	*3.42*
931241	*AB1-173AC*	*3.42*
LTF	*AB2-013*	*6.91*
923801	*AB2-015 C O1*	*13.29*
923831	*AB2-022 C*	*3.61*
923911	*AB2-031 C O1*	*3.39*
923941	*AB2-035 C*	*0.49*

923991	*AB2-040 C O1*	*11.14*
924021	*AB2-043 C O1*	*4.25*
924071	*AB2-051*	*216.39*
924151	*AB2-059 C O1*	*15.15*
924161	*AB2-060 C O1*	*12.23*
924241	*AB2-068 O1*	*241.09*
924301	*AB2-077 C O1*	*2.7*
924311	*AB2-078 C O1*	*2.7*
924321	*AB2-079 C O1*	*2.7*
924381	*AB2-087 C*	*0.86*
924391	*AB2-088 C*	*0.63*
924401	*AB2-089 C*	*3.03*
924411	*AB2-090 C*	*5.36*
924491	*AB2-098 C*	*0.83*
924501	*AB2-099 C*	*0.89*
924511	*AB2-100 C*	*17.74*
924811	*AB2-134 C O1*	*18.87*
925051	*AB2-160 C O1*	*8.03*
925061	*AB2-161 C O1*	*5.21*
925121	*AB2-169 C*	*9.78*
925171	*AB2-174 C O1*	*10.67*
925221	*AB2-176 C*	*2.21*
925281	*AB2-186 C*	*0.95*
925291	*AB2-188 C O1*	*3.67*
925331	*AB2-190 C*	*29.44*
925521	*AC1-027 C*	*0.62*

925591	*AC1-034 C*	*9.95*
925611	*AC1-036 C*	*1.26*
925781	*AC1-054 C*	*10.31*
925861	*AC1-065 C*	*4.24*
926071	*AC1-086 C*	*31.25*
926201	*AC1-098 C*	*9.15*
926211	*AC1-099 C*	*3.07*
926271	*AC1-105 C*	*7.54*
926291	*AC1-107*	*363.9*
926741	*AC1-159*	*104.34*
926751	*AC1-161 C*	*48.31*
926761	*AC1-162 C*	*37.21*
926771	*AC1-163 C*	*2.95*
926781	*AC1-164 C*	*51.59*
927021	*AC1-189 C*	*12.57*
927111	*AC1-206 C*	*15.37*
927141	*AC1-208 C*	*13.46*
927221	*AC1-216 C O1*	*14.41*

Appendix 34

(DVP - DVP) The 8NO ANNA-8SPOTSYL 500 kV line (from bus 314918 to bus 314934 ckt 1) loads from 101.83% to 102.56% (**DC power flow**) of its emergency rating (3219 MVA) for the single line contingency outage of 'DVP_P1-2: LN 581'. This project contributes approximately 58.85 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 581'
OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00
OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.94*
315054	*1BELMED2*	*3.94*
315055	*1BELMED3*	*3.27*
315108	*1ELIZAR1*	*4.49*
315109	*1ELIZAR2*	*4.41*
315110	*1ELIZAR3*	*4.55*
315074	*1HOPCGN1*	*9.64*
315075	*1HOPCGN2*	*9.52*
315225	*1N ANNA1*	*69.77*
315226	*1N ANNA2*	*69.74*
315083	*1SPRUNCA*	*12.44*
315084	*1SPRUNCB*	*12.44*
315085	*1SPRUNCC*	*9.22*
315086	*1SPRUNCD*	*9.22*
315233	*1SURRY 2*	*34.77*
314315	*3LOCKS E*	*1.46*
314309	*6IRON208*	*0.62*

314250	*6ROCKVILLE*	*0.3*
932041	*AC2-012 C*	*11.91*
932501	*AC2-070 C*	*1.89*
932531	*AC2-073 C*	*2.65*
932581	*AC2-078 C*	*4.74*
932591	*AC2-079 C*	*7.83*
932631	*AC2-084 C*	*9.31*
932701	*AC2-093 C*	*82.21*
932711	*AC2-094 C*	*15.49*
932831	*AC2-110 C*	*1.51*
933011	*AC2-125*	*2.67*
933021	*AC2-126*	*2.69*
933031	*AC2-127*	*1.47*
933041	*AC2-128*	*1.42*
933051	*AC2-129*	*1.33*
933061	*AC2-130*	*2.74*
933071	*AC2-131 1*	*1.85*
933081	*AC2-131 2*	*0.84*
933111	*AC2-132 1*	*0.97*
933121	*AC2-132 2*	*0.5*
933261	*AC2-137 C*	*2.35*
933291	*AC2-141 C*	*35.6*
933451	*AC2-158 C*	*6.05*
933461	*AC2-159 C*	*7.24*
933471	*AC2-161 C*	*2.75*
933481	*AC2-162 C*	*2.71*

933501	*AC2-165 C*	*11.87*
933711	*AC2-194 C*	*1.25*
933731	*AC2-196 C*	*2.08*
933991	*AD1-023 C*	*14.67*
934011	*AD1-025 C O2*	*19.61*
934041	*AD1-029 C*	*11.51*
934061	*AD1-033 C O2*	*8.76*
934071	*AD1-034 C O2*	*9.04*
934141	*AD1-041 C O2*	*6.*
934201	*AD1-047 C*	*8.73*
934211	*AD1-048 C*	*2.75*
934331	*AD1-057 C O2*	*10.4*
934391	*AD1-063 C*	*1.79*
934521	*AD1-076 C O2*	*58.85*
934571	*AD1-082 C O2*	*8.98*
934781	*AD1-105 C*	*8.55*
LTF	*AD1-120*	*11.53*
LTF	*AD1-121*	*11.5*
935111	*AD1-144 C*	*2.01*
935161	*AD1-151 C O2*	*18.73*
935211	*AD1-156 C*	*2.48*
LTF	*CARR*	*1.41*
LTF	*CBM-S1*	*13.54*
LTF	*CBM-S2*	*27.08*
LTF	*CBM-W1*	*23.6*
LTF	*CBM-W2*	*70.14*

LTF	*CIN*	*5.72*
LTF	*CPLE*	*8.35*
LTF	*IPL*	*3.64*
LTF	*LGEE*	*1.28*
LTF	*MEC*	*13.48*
LTF	*MECS*	*3.7*
LTF	*RENSSELAER*	*1.12*
LTF	*ROSETON*	*8.09*
LTF	*WEC*	*1.53*
LTF	*AA2-074*	*5.68*
920691	*AA2-178 C*	*10.84*
930051	*AB1-013 C*	*3.27*
930861	*AB1-132 C*	*15.22*
931231	*AB1-173 C*	*2.46*
931241	*AB1-173AC*	*2.46*
923801	*AB2-015 C O1*	*9.72*
923831	*AB2-022 C*	*2.65*
923911	*AB2-031 C O1*	*2.44*
923991	*AB2-040 C O1*	*8.*
924071	*AB2-051*	*160.07*
924241	*AB2-068 O1*	*218.82*
924381	*AB2-087 C*	*0.62*
924491	*AB2-098 C*	*0.59*
924501	*AB2-099 C*	*0.65*
924511	*AB2-100 C*	*12.79*
924811	*AB2-134 C O1*	*14.94*

925021	*AB2-158 C*	*11.69*
925051	*AB2-160 C O1*	*6.34*
925061	*AB2-161 C O1*	*3.93*
925121	*AB2-169 C*	*7.04*
925171	*AB2-174 C O1*	*7.67*
925281	*AB2-186 C*	*0.7*
925291	*AB2-188 C O1*	*2.67*
925331	*AB2-190 C*	*23.31*
925861	*AC1-065 C*	*3.77*
926071	*AC1-086 C*	*22.42*
926201	*AC1-098 C*	*6.53*
926211	*AC1-099 C*	*2.19*
926291	*AC1-107*	*330.29*
926441	*AC1-115 C*	*1.07*
926551	*AC1-134*	*9.95*
926741	*AC1-159*	*77.18*
926751	*AC1-161 C*	*35.6*
926771	*AC1-163 C*	*2.13*
926781	*AC1-164 C*	*45.32*
927041	*AC1-191 C*	*10.5*
927111	*AC1-206 C*	*11.09*
927141	*AC1-208 C*	*9.6*
927221	*AC1-216 C O1*	*11.41*

Appendix 35

(DVP - DVP) The 8SPOTSYL-8MORRSVL 500 kV line (from bus 314934 to bus 314916 ckt 1) loads from 104.12% to 104.94% (**DC power flow**) of its emergency rating (3219 MVA) for the single line contingency outage of 'DVP_P1-2: LN 552'. This project contributes approximately 58.24 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2: LN 552'
OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 1 /* 3CHANCE 115.00 - 8CHANCE 500.00
OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00
END

Bus Number	*Bus Name*	*Full Contribution*
315053	*1BELMED1*	*3.89*
315054	*1BELMED2*	*3.89*
315055	*1BELMED3*	*3.23*
315065	*1CHESTF6*	*27.57*
315108	*1ELIZAR1*	*4.44*
315109	*1ELIZAR2*	*4.36*
315110	*1ELIZAR3*	*4.5*
315074	*1HOPCGN1*	*9.53*
315075	*1HOPCGN2*	*9.41*
315225	*1N ANNA1*	*68.38*
315226	*1N ANNA2*	*68.34*
315083	*1SPRUNCA*	*12.31*
315084	*1SPRUNCB*	*12.31*
315085	*1SPRUNCC*	*9.12*
315086	*1SPRUNCD*	*9.12*
315233	*1SURRY 2*	*34.37*
314315	*3LOCKS E*	*1.44*

314309	*6IRON208*	*0.61*
314250	*6ROCKVILLE*	*0.29*
932041	*AC2-012 C*	*11.78*
932501	*AC2-070 C*	*1.87*
932531	*AC2-073 C*	*2.62*
932581	*AC2-078 C*	*4.69*
932591	*AC2-079 C*	*7.74*
932631	*AC2-084 C*	*9.22*
932701	*AC2-093 C*	*81.31*
932711	*AC2-094 C*	*16.3*
932831	*AC2-110 C*	*1.49*
933011	*AC2-125*	*2.63*
933021	*AC2-126*	*2.65*
933031	*AC2-127*	*1.45*
933041	*AC2-128*	*1.4*
933051	*AC2-129*	*1.31*
933061	*AC2-130*	*2.71*
933071	*AC2-131 1*	*1.83*
933081	*AC2-131 2*	*0.83*
933111	*AC2-132 1*	*0.96*
933121	*AC2-132 2*	*0.49*
933261	*AC2-137 C*	*2.32*
933291	*AC2-141 C*	*35.18*
933451	*AC2-158 C*	*5.98*
933461	*AC2-159 C*	*7.17*
933471	*AC2-161 C*	*2.72*

933481	*AC2-162 C*	*2.68*
933501	*AC2-165 C*	*11.97*
933711	*AC2-194 C*	*1.23*
933731	*AC2-196 C*	*2.06*
933991	*AD1-023 C*	*14.51*
934011	*AD1-025 C O2*	*19.38*
934041	*AD1-029 C*	*11.41*
934061	*AD1-033 C O2*	*8.65*
934071	*AD1-034 C O2*	*8.94*
934141	*AD1-041 C O2*	*5.93*
934201	*AD1-047 C*	*8.65*
934211	*AD1-048 C*	*2.72*
934391	*AD1-063 C*	*1.77*
934521	*AD1-076 C O2*	*58.24*
934541	*AD1-078 C*	*3.86*
934571	*AD1-082 C O2*	*8.88*
934781	*AD1-105 C*	*8.44*
LTF	*AD1-120*	*11.47*
LTF	*AD1-121*	*11.44*
935111	*AD1-144 C*	*1.98*
935161	*AD1-151 C O2*	*18.52*
935211	*AD1-156 C*	*2.46*
LTF	*CARR*	*1.41*
LTF	*CBM-S1*	*13.54*
LTF	*CBM-S2*	*26.94*
LTF	*CBM-W1*	*23.74*

LTF	*CBM-W2*	*70.21*
LTF	*CIN*	*5.76*
LTF	*CPLE*	*8.29*
LTF	*IPL*	*3.66*
LTF	*LGEE*	*1.29*
LTF	*MEC*	*13.52*
LTF	*MECS*	*3.75*
LTF	*RENSSELAER*	*1.12*
LTF	*ROSETON*	*8.1*
LTF	*WEC*	*1.54*
LTF	*AA2-074*	*5.64*
920691	*AA2-178 C*	*10.73*
930051	*AB1-013 C*	*3.24*
930861	*AB1-132 C*	*15.07*
931231	*AB1-173 C*	*2.43*
931241	*AB1-173AC*	*2.43*
923801	*AB2-015 C O1*	*9.61*
923831	*AB2-022 C*	*2.62*
923911	*AB2-031 C O1*	*2.42*
923991	*AB2-040 C O1*	*7.93*
924071	*AB2-051*	*158.21*
924241	*AB2-068 O1*	*216.41*
924381	*AB2-087 C*	*0.62*
924501	*AB2-099 C*	*0.64*
924511	*AB2-100 C*	*12.66*
924811	*AB2-134 C O1*	*14.78*

925021	*AB2-158 C*	*12.97*
925051	*AB2-160 C O1*	*6.27*
925061	*AB2-161 C O1*	*3.88*
925121	*AB2-169 C*	*6.97*
925171	*AB2-174 C O1*	*7.6*
925281	*AB2-186 C*	*0.69*
925291	*AB2-188 C O1*	*2.64*
925331	*AB2-190 C*	*23.05*
925861	*AC1-065 C*	*3.73*
926001	*AC1-076 C*	*6.28*
926071	*AC1-086 C*	*22.2*
926201	*AC1-098 C*	*6.47*
926211	*AC1-099 C*	*2.17*
926291	*AC1-107*	*326.66*
926441	*AC1-115 C*	*1.06*
926551	*AC1-134*	*9.83*
926731	*AC1-158 C*	*185.39*
926741	*AC1-159*	*76.29*
926751	*AC1-161 C*	*35.18*
926771	*AC1-163 C*	*2.11*
926781	*AC1-164 C*	*44.81*
927041	*AC1-191 C*	*10.38*
927111	*AC1-206 C*	*10.97*
927141	*AC1-208 C*	*9.51*
927221	*AC1-216 C O1*	*11.28*

Appendix 36

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 126.01% to 141.6% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of 'DVP_P4-2: 246T247'. This project contributes approximately 71.43 MW to the thermal violation.

CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK 230 KV
OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /* 6SUFFOLK 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 6EARLEYS 230.00 - 6NUCO TP 230.00
OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 6NUCO TP 230.00 - 6NUCOR 230.00
OPEN BUS 314575 /* ISLAND: 6NUCO TP 230.00
OPEN BUS 314590 /* ISLAND: 6NUCOR 230.00
OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /* 6SUFFOLK 230.00 - 6SUNBURY 230.00
OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /* 6SUNBURY 230.00 - W1-029 230.00
OPEN BUS 314648 /* ISLAND: 6SUNBURY 230.00
END

Bus Number	*Bus Name*	*Full Contribution*
315294	*1DOMTR10*	*2.12*
315131	*1EDGECMA*	*10.48*
315132	*1EDGECMB*	*10.48*
315139	*1GASTONA*	*7.94*
315141	*1GASTONB*	*7.94*
315126	*1ROARAP2*	*1.63*
315128	*1ROARAP4*	*1.57*
315136	*1ROSEMG1*	*5.33*
315138	*1ROSEMG2*	*2.5*
315137	*1ROSEMS1*	*3.31*
314557	*3BETHELC*	*0.87*

314554	*3BTLEBRO*	*0.84*
314566	*3CRESWEL*	*1.64*
314578	*3HORNRTN*	*3.35*
314582	*3KELFORD*	*0.91*
314603	*3SCOT NK*	*3.55*
314617	*3TUNIS*	*0.81*
314620	*6CASHIE*	*0.83*
314574	*6EVERETS*	*2.43*
314594	*6PLYMOTH*	*0.69*
932631	*AC2-084 C*	*9.33*
932632	*AC2-084 E*	*4.6*
933451	*AC2-158 C*	*6.16*
933452	*AC2-158 E*	*6.16*
933461	*AC2-159 C*	*7.09*
933462	*AC2-159 E*	*7.09*
933991	*AD1-023 C*	*11.95*
933992	*AD1-023 E*	*6.5*
934041	*AD1-029 C*	*11.54*
934042	*AD1-029 E*	*7.61*
934331	*AD1-057 C O2*	*10.44*
934332	*AD1-057 E O2*	*5.57*
934521	*AD1-076 C O2*	*47.33*
934522	*AD1-076 E O2*	*24.1*
LTF	*AD1-120*	*3.75*
LTF	*AD1-121*	*3.72*
LTF	*CARR*	*0.09*

LTF	*CBM-S1*	*4.51*
LTF	*CBM-S2*	*9.28*
LTF	*CBM-W1*	*9.81*
LTF	*CBM-W2*	*24.32*
LTF	*CIN*	*2.2*
LTF	*CPLE*	*3.18*
LTF	*G-007*	*0.61*
LTF	*IPL*	*1.4*
LTF	*LGEE*	*0.47*
LTF	*MEC*	*4.99*
LTF	*MECS*	*2.2*
LTF	*O-066*	*2.02*
LTF	*RENSSELAER*	*0.08*
LTF	*ROSETON*	*0.55*
900672	*V4-068 E*	*0.24*
LTF	*WEC*	*0.61*
917331	*Z2-043 C*	*0.5*
917332	*Z2-043 E*	*1.1*
917341	*Z2-044 C*	*0.28*
917342	*Z2-044 E*	*0.61*
917511	*Z2-088 C OP1*	*1.02*
917512	*Z2-088 E OP1*	*4.12*
917592	*Z2-099 E*	*0.3*
918411	*AA1-050*	*0.86*
918491	*AA1-063AC OP*	*1.46*
918492	*AA1-063AE OP*	*3.51*

918511	*AA1-065 C OP*	*2.13*
918512	*AA1-065 E OP*	*5.34*
918531	*AA1-067 C*	*0.33*
918532	*AA1-067 E*	*0.73*
918561	*AA1-072 C*	*0.08*
918562	*AA1-072 E*	*0.18*
919691	*AA2-053 C*	*1.76*
919692	*AA2-053 E*	*3.86*
919701	*AA2-057 C*	*1.46*
919702	*AA2-057 E*	*3.73*
919732	*AA2-059 E*	*0.29*
919821	*AA2-068 C*	*0.46*
919822	*AA2-068 E*	*1.08*
LTF	*AA2-074*	*2.16*
920022	*AA2-086 E*	*0.16*
920042	*AA2-088 E*	*6.95*
920591	*AA2-165 C*	*0.2*
920592	*AA2-165 E*	*0.49*
920631	*AA2-169 C*	*1.37*
920632	*AA2-169 E*	*0.63*
920671	*AA2-174 C*	*0.08*
920672	*AA2-174 E*	*0.45*
920691	*AA2-178 C*	*6.54*
920692	*AA2-178 E*	*2.8*
930051	*AB1-013 C*	*1.97*
930052	*AB1-013 E*	*13.21*

930401	*AB1-081 C*	*9.53*
930402	*AB1-081 E*	*4.08*
930861	*AB1-132 C*	*30.89*
930862	*AB1-132 E*	*13.24*
923941	*AB2-035 C*	*0.37*
923942	*AB2-035 E*	*0.16*
924151	*AB2-059 C O1*	*11.23*
924152	*AB2-059 E O1*	*5.78*
924381	*AB2-087 C*	*0.64*
924382	*AB2-087 E*	*0.3*
924391	*AB2-088 C*	*0.47*
924392	*AB2-088 E*	*0.23*
924491	*AB2-098 C*	*0.57*
924492	*AB2-098 E*	*0.24*
924501	*AB2-099 C*	*0.61*
924502	*AB2-099 E*	*0.26*
924511	*AB2-100 C*	*42.69*
924512	*AB2-100 E*	*21.03*
925121	*AB2-169 C*	*5.87*
925122	*AB2-169 E*	*5.27*
925291	*AB2-188 C O1*	*1.61*
925292	*AB2-188 E O1*	*0.72*
925591	*AC1-034 C*	*7.44*
925592	*AC1-034 E*	*5.62*
926071	*AC1-086 C*	*45.49*
926072	*AC1-086 E*	*20.7*

926201	*AC1-098 C*	*6.55*
926202	*AC1-098 E*	*3.9*
926211	*AC1-099 C*	*2.19*
926212	*AC1-099 E*	*1.29*
926771	*AC1-163 C*	*2.03*
926772	*AC1-163 E*	*0.95*
927021	*AC1-189 C*	*9.*
927022	*AC1-189 E*	*4.48*
927141	*AC1-208 C*	*9.41*
927142	*AC1-208 E*	*4.18*

Appendix 37

(AEP - AEP) The 05EDAN 1-05DANVL2 138 kV line (from bus 242631 to bus 242620 ckt 1) loads from 111.38% to 114.33% (**DC power flow**) of its emergency rating (415 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#7589_05J.FERR 765'. This project contributes approximately 27.16 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#7589_05J.FERR 765'
OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 / 242514 05J.FERR 765 242520 05J.FERR 500 1
OPEN BRANCH FROM BUS 242514 TO BUS 242684 CKT 2 / 242514 05J.FERR 765 242684 05J.FERR 138 2
OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 / 242520 05J.FERR 500 306719 8ANTIOCH 500 1
END

Bus Number	*Bus Name*	*Full Contribution*
244012	*05PINNACLE*	*-2.08*
315131	*1EDGECMA*	*4.25*
315132	*1EDGECMB*	*4.25*
314557	*3BETHELC*	*0.35*
314554	*3BTLEBRO*	*0.37*
314572	*3EMPORIA*	*0.14*
314578	*3HORNRTN*	*1.21*
314582	*3KELFORD*	*0.3*
314603	*3SCOT NK*	*1.24*
314617	*3TUNIS*	*0.28*
314620	*6CASHIE*	*0.27*
314574	*6EVERETS*	*0.98*
314594	*6PLYMOTH*	*0.26*
932631	*AC2-084 C*	*3.42*
932632	*AC2-084 E*	*1.68*

932701	*AC2-093 C*	*24.4*
932702	*AC2-093 E*	*13.96*
932761	*AC2-100 C*	*3.66*
932762	*AC2-100 E*	*1.79*
932821	*AC2-107 C*	*3.48*
932822	*AC2-107 E*	*1.63*
933451	*AC2-158 C*	*1.78*
933452	*AC2-158 E*	*1.78*
933461	*AC2-159 C*	*2.33*
933462	*AC2-159 E*	*2.33*
933941	*AD1-017 C*	*0.84*
933942	*AD1-017 E*	*1.36*
933991	*AD1-023 C*	*4.1*
933992	*AD1-023 E*	*2.23*
934041	*AD1-029 C*	*4.23*
934042	*AD1-029 E*	*2.79*
934201	*AD1-047 C*	*2.75*
934202	*AD1-047 E*	*1.83*
934231	*AD1-050 C*	*2.01*
934232	*AD1-050 E*	*1.1*
934311	*AD1-055 C*	*1.07*
934312	*AD1-055 E*	*0.28*
934331	*AD1-057 C O2*	*4.1*
934332	*AD1-057 E O2*	*2.18*
934341	*AD1-058 C*	*3.99*
934342	*AD1-058 E*	*1.01*

934521	*AD1-076 C O2*	*18.*
934522	*AD1-076 E O2*	*9.16*
934611	*AD1-087 C O2*	*3.5*
934612	*AD1-087 E O2*	*1.63*
934621	*AD1-088 C O2*	*5.65*
934622	*AD1-088 E O2*	*2.65*
LTF	*AD1-120*	*7.55*
LTF	*AD1-121*	*7.6*
934911	*AD1-123 C*	*0.47*
934912	*AD1-123 E*	*0.24*
934991	*AD1-131 C*	*1.31*
934992	*AD1-131 E*	*0.87*
935171	*AD1-152 C O2*	*3.37*
935172	*AD1-152 E O2*	*2.25*
935221	*AD1-157 C*	*0.46*
935222	*AD1-157 E*	*0.31*
935231	*AD1-160 C*	*0.34*
935232	*AD1-160 E*	*0.47*
LTF	*AMIL*	*0.17*
LTF	*BLUEG*	*2.07*
LTF	*CANNELTON*	*0.27*
LTF	*CARR*	*0.06*
LTF	*CBM-S1*	*1.13*
LTF	*CBM-S2*	*16.92*
LTF	*CBM-W2*	*2.91*
LTF	*CLIFTY*	*10.78*

LTF	*CPLE*	*5.57*
LTF	*DEARBORN*	*0.99*
LTF	*EDWARDS*	*0.45*
LTF	*ELMERSMITH*	*0.71*
LTF	*FARMERCITY*	*0.12*
LTF	*G-007A*	*0.79*
LTF	*GIBSON*	*0.59*
LTF	*NEWTON*	*0.97*
LTF	*O-066A*	*0.36*
LTF	*PRAIRIE*	*0.86*
LTF	*RENSSELAER*	*0.05*
LTF	*ROSETON*	*0.35*
LTF	*SMITHLAND*	*< 0.01*
LTF	*TATANKA*	*0.34*
LTF	*TILTON*	*0.61*
LTF	*TRIMBLE*	*0.41*
900672	*V4-068 E*	*0.1*
LTF	*VFT*	*2.09*
LTF	*X1-078*	*0.61*
917332	*Z2-043 E*	*0.36*
917342	*Z2-044 E*	*0.25*
917512	*Z2-088 E OP1*	*1.66*
917592	*Z2-099 E*	*0.14*
918492	*AA1-063AE OP*	*1.37*
918512	*AA1-065 E OP*	*1.46*
918532	*AA1-067 E*	*0.29*

918562	*AA1-072 E*	*0.06*
919692	*AA2-053 E*	*1.33*
919702	*AA2-057 E*	*1.51*
919822	*AA2-068 E*	*0.41*
LTF	*AA2-074*	*3.79*
920022	*AA2-086 E*	*0.07*
920042	*AA2-088 E*	*3.27*
920592	*AA2-165 E*	*0.2*
920631	*AA2-169 C*	*0.91*
920632	*AA2-169 E*	*0.42*
920672	*AA2-174 E*	*0.15*
930401	*AB1-081 C*	*4.09*
930402	*AB1-081 E*	*1.75*
930861	*AB1-132 C*	*4.93*
930862	*AB1-132 E*	*2.11*
931231	*AB1-173 C*	*0.77*
931232	*AB1-173 E*	*0.36*
931241	*AB1-173AC*	*0.77*
931242	*AB1-173AE*	*0.36*
923911	*AB2-031 C O1*	*0.77*
923912	*AB2-031 E O1*	*0.38*
923941	*AB2-035 C*	*0.15*
923942	*AB2-035 E*	*0.06*
923991	*AB2-040 C O1*	*2.52*
923992	*AB2-040 E O1*	*2.06*
924021	*AB2-043 C O1*	*1.21*

924022	*AB2-043 E O1*	*1.99*
924151	*AB2-059 C O1*	*4.82*
924152	*AB2-059 E O1*	*2.48*
924161	*AB2-060 C O1*	*3.48*
924162	*AB2-060 E O1*	*1.64*
924301	*AB2-077 C O1*	*0.78*
924302	*AB2-077 E O1*	*0.52*
924311	*AB2-078 C O1*	*0.78*
924312	*AB2-078 E O1*	*0.52*
924321	*AB2-079 C O1*	*0.78*
924322	*AB2-079 E O1*	*0.52*
924381	*AB2-087 C*	*0.19*
924382	*AB2-087 E*	*0.09*
924391	*AB2-088 C*	*0.19*
924392	*AB2-088 E*	*0.09*
924401	*AB2-089 C*	*0.91*
924402	*AB2-089 E*	*0.47*
924411	*AB2-090 C*	*1.53*
924412	*AB2-090 E*	*0.78*
924491	*AB2-098 C*	*0.23*
924492	*AB2-098 E*	*0.1*
924501	*AB2-099 C*	*0.2*
924502	*AB2-099 E*	*0.08*
924511	*AB2-100 C*	*3.5*
924512	*AB2-100 E*	*1.72*
925121	*AB2-169 C*	*2.26*

925122	*AB2-169 E*	*2.03*
925171	*AB2-174 C O1*	*2.38*
925172	*AB2-174 E O1*	*2.15*
925221	*AB2-176 C*	*0.63*
925222	*AB2-176 E*	*0.27*
925591	*AC1-034 C*	*3.01*
925592	*AC1-034 E*	*2.27*
925611	*AC1-036 C*	*0.33*
925612	*AC1-036 E*	*0.54*
925781	*AC1-054 C*	*3.03*
925782	*AC1-054 E*	*1.4*
925991	*AC1-075 C*	*1.96*
925992	*AC1-075 E*	*1.11*
926021	*AC1-080 C*	*0.65*
926022	*AC1-080 E*	*0.37*
926051	*AC1-083 C*	*4.18*
926052	*AC1-083 E*	*6.82*
926071	*AC1-086 C*	*7.26*
926072	*AC1-086 E*	*3.31*
926201	*AC1-098 C*	*2.4*
926202	*AC1-098 E*	*1.43*
926211	*AC1-099 C*	*0.8*
926212	*AC1-099 E*	*0.47*
926271	*AC1-105 C*	*2.39*
926272	*AC1-105 E*	*1.19*
926771	*AC1-163 C*	*0.65*

926772	*AC1-163 E*	*0.3*
927021	*AC1-189 C*	*3.63*
927022	*AC1-189 E*	*1.81*
927111	*AC1-206 C*	*2.97*
927112	*AC1-206 E*	*1.4*
927141	*AC1-208 C*	*3.54*
927142	*AC1-208 E*	*1.57*
927251	*AC1-221 C*	*1.59*
927252	*AC1-221 E*	*1.59*
927261	*AC1-222 C*	*1.54*
927262	*AC1-222 E*	*1.46*