

***Generation Interconnection  
Feasibility Study Report***

***For***

***PJM Generation Interconnection Request  
Queue Position AD1-029***

***Scotland Neck – South Justice 115kV  
66.3 MW Capacity / 110.0 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 hybrid Solar and battery generating facility located in Halifax County, North Carolina. The installed facilities will have a total capability of 110 MW with 66.3 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is December 1, 2019. **This study does not imply an ITO commitment to this in-service date.**

## Point of Interconnection

AD1-029 will interconnect with the ITO transmission system via a new three breaker ring bus that connects the Scotland Neck – South Justice Branch 115kV line.

## Cost Summary

The AD1-029 project will be responsible for the following costs:

| Description                            | Total Cost          |
|----------------------------------------|---------------------|
| Attachment Facilities                  | \$ 1,550,000        |
| Direct Connection Network Upgrades     | \$ 5,500,000        |
| Non Direct Connection Network Upgrades | \$ 800,000          |
| <b>Total Costs</b>                     | <b>\$ 7,850,000</b> |

In addition, the AD1-029 project may be responsible for a contribution to the following costs:

| Description                    | Total Cost            |
|--------------------------------|-----------------------|
| New System Upgrades            | \$ 45,970,000         |
| Previously Identified Upgrades | \$ 179,320,000        |
| <b>Total Costs</b>             | <b>\$ 225,290,000</b> |

PJM Open Access Transmission Tariff (OATT) section 217.3A outline 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, determined in accordance with Section 217 of the Tariff,

- (a) the costs 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 Reinforcement

| Violation #                | Upgrade Description                                                                                                                                                                                                                                                                                                         | Upgrade Cost                              |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
|                            | <b>*NEW SYSTEM REINFORCEMENTS</b>                                                                                                                                                                                                                                                                                           |                                           |
| 2                          | 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, 4, 16-20<br>(48, 61-63) | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct.                                       | Included in<br>“Previously<br>Identified” |
| 9, 12, 13<br>(68)          | Line #126 Scott Neck – Sams HD – Kelford – Earleys 115 kV: wreck and rebuild the line of 25 miles to increase its line rating to 353 MVA (normal), 353 MVA (emergency), and 406 MVA (load dump). It is estimated to cost \$50,340,000 and 32-38 months to engineer, permit, and construct.                                  | Included in<br>“Previously<br>Identified” |
| 23, 24, 26-<br>29, 32-37   | Line #81 Carolina – Hornertown – Roan DP – Darlington – AC1-208 Tap – South Justice 115 kV: wreck and rebuild the line of 22 miles to increase its line rating to 353 MVA (normal), 353 MVA (emergency), and 406 MVA (load dump). It is estimated to cost \$43,520,000 and 32-38 months to engineer, permit, and construct. | \$43,520,000                              |
| 25                         | 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.               | \$200,000                                 |
| <b>Sub Total</b>           |                                                                                                                                                                                                                                                                                                                             | <b>\$45,970,000</b>                       |
|                            | <b>CONTRIBUTIONS TO PREVIOUS SYSTEM REINFORCEMENTS</b>                                                                                                                                                                                                                                                                      |                                           |
| 38-46, 73-81               | Line #1001 Chestnut – Whitakers – Battleboro 115 kV: wreck and rebuild the line of 9 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$18,520,000 and 30-36 months to engineer, permit, and construct.                                         | \$18,520,000                              |
| 47                         | 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                                       |
| 48 (3)                     | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct.                                       | \$12,860,000                              |

| Violation #    | Upgrade Description                                                                                                                                                                                                                                                                               | Upgrade Cost |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 49,50          | 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. | \$25,875,000 |
| 51-54          | 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          |
| 55,56          | Line #238 Clubhouse to Sapony 230 kV: replace wave trap at Clubhouse Substation to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$150,000 and 12-16 months to engineer and construct.                                      | \$150,000    |
| 57             | Clubhouse 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 14-16 months to engineer and construct.                                              | \$5,500,000  |
| 58             | Earleys 230 – 115 kV Tx#1: replace existing transformer to increase its rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). Estimated cost \$5,500,000 and it is estimated to 14-16 months to engineer and construct.                                                 | \$5,500,000  |
| 59             | Earleys 230 – 115 kV Tx#2: replace existing transformer to increase its rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). Estimated cost \$5,500,000 and it is estimated to 14-16 months to engineer and construct.                                                 | \$5,500,000  |
| 60             | 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          |
| 61-67 (3)      | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct.             | \$12,860,000 |
| 68, 71, 72 (9) | Line #126 Scott Neck – Sams HD – Kelford – Earleys 115 kV: wreck and rebuild the line of 25 miles to increase its line rating to 353 MVA (normal), 353 MVA (emergency), and 406 MVA (load dump). It is estimated to cost \$50,340,000 and 32-38 months to engineer, permit, and construct.        | \$50,340,000 |

| Violation #                   | Upgrade Description                                                                                                                                                                                                                                                                                                       | Upgrade Cost         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 69, 70                        | Line #2141 Lakeview – Carolina 230 kV: wreck and rebuild the line of 1.5 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$3,625,000 and 30-36 months to engineer, permit, and construct.                                                    | \$3,625,000          |
| 82                            | Line #2021 Elizabeth City– Shawboro 230 kV: wreck and rebuild the line of 11 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$25,700,000 and 44-48 months to engineer, permit and construct.                                                | \$25,700,000         |
| 83-85                         | 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          |
| 86                            | AEP upgrades items 1 – 10 outlined in the reinforcements for violation #15 later in the report. It is estimated to cost \$7,890,000 and estimated to take 24 to 36 months to construct after signing the Interconnection Service Agreement.                                                                               | \$7,890,000          |
| <b>Sub Total</b>              |                                                                                                                                                                                                                                                                                                                           | <b>\$179,320,000</b> |
| <b>Total Network Upgrades</b> |                                                                                                                                                                                                                                                                                                                           | <b>\$225,290,000</b> |

\*Note:

For New System Reinforcements, only violations in which the AD1-029 overloads the facility and violations in which the upgrade cost is less than \$5,000,000 are included in the table above. Costs for new system reinforcement for which AD1-029 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. Estimated Cost \$550,000.

Transmission: Construct approximately one span of 115 kV Attachment line between the generation substation and a new AD1-029 Switching Station. The estimated cost for this work is \$1,000,000.

The estimated total cost of the Attachment Facilities is \$1,550,000. 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

Substation: Establish the new 115 kV AD1-029 Switching Substation (interconnection substation). The estimated cost of this work scope is \$5,500,000. It is estimated to take 24-36 months to complete this work upon execution of an Interconnection Construction Service Agreement.

## Non-Direct Connection Cost Estimate

Transmission: Install transmission structure in-line with transmission line to allow the proposed interconnection switching station to be interconnected with the transmission system. Estimated cost is \$800,000 and is estimated to take 24-30 months to complete

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

## Network Impacts

PJM assessed the impact of the proposed Queue Project as an injection into the ITO, 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 AD1-029 was evaluated as a 110.0 MW (Capacity 66.3 MW) injection tapping South Justice to Scotland Neck 115kV line in the ITO area. Project AD1-029 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AD1-029 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                                                                                                                           |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 927140 AC1-208 TAP 314628<br>3DARLINGT DP 1 115/115-B | CONTINGENCY '927140 AC1-208 TAP 314628 3DARLINGT DP 1<br>115/115-B'<br><br>OPEN BRANCH FROM BUS 927140 TO BUS 314628 CKT 1<br><br>END |

| Contingency Name          | Description                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AEP_P1-2_#1377            | <p>CONTINGENCY 'AEP_P1-2_#1377'</p> <p>OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 /<br/>242514 05J.FERR 765 242520 05J.FERR 500 1</p> <p>OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 /<br/>242520 05J.FERR 500 306719 8ANTIOCH 500 1</p> <p>END</p>                                                                                                                                                         |
| AEP_P4_#7589_05J.FERR 765 | <p>CONTINGENCY 'AEP_P4_#7589_05J.FERR 765'</p> <p>OPEN BRANCH FROM BUS 242514 TO BUS 242520 CKT 1 /<br/>242514 05J.FERR 765 242520 05J.FERR 500 1</p> <p>OPEN BRANCH FROM BUS 242514 TO BUS 242684 CKT 2 /<br/>242514 05J.FERR 765 242684 05J.FERR 138 2</p> <p>OPEN BRANCH FROM BUS 242520 TO BUS 306719 CKT 1 /<br/>242520 05J.FERR 500 306719 8ANTIOCH 500 1</p> <p>END</p>                                       |
| DVP_P1-2: LN 1001         | <p>CONTINGENCY 'DVP_P1-2: LN 1001'</p> <p>OPEN BRANCH FROM BUS 313719 TO BUS 314623 CKT 1 /*<br/>3CHESTNUT 115.00 - 3WITAKRS 115.00</p> <p>OPEN BRANCH FROM BUS 314554 TO BUS 314623 CKT 1 /*<br/>3BTLEBRO 115.00 - 3WITAKRS 115.00</p> <p>OPEN BUS 314623 /* ISLAND: 3WITAKRS<br/>115.00</p> <p>OPEN BUS 917341 /* ISLAND: Z2-044 C<br/>115.00</p> <p>OPEN BUS 917342 /* ISLAND: Z2-044 E<br/>115.00</p> <p>END</p> |
| DVP_P1-2: LN 1014         | <p>CONTINGENCY 'DVP_P1-2: LN 1014'</p> <p>OPEN BRANCH FROM BUS 314554 TO BUS 313844 CKT 1 /*<br/>3BTLEBRO 115.00 - 3MORNSTR 115.00</p> <p>END</p>                                                                                                                                                                                                                                                                    |
| DVP_P1-2: LN 1015-A       | <p>CONTINGENCY 'DVP_P1-2: LN 1015-A'</p> <p>OPEN BRANCH FROM BUS 313858 TO BUS 926200 CKT 1 /*<br/>3SO JUSTICE 115.00 - AC1-098 TAP 115.00</p>                                                                                                                                                                                                                                                                       |

| Contingency Name    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DVP_P1-2: LN 130-A  | <p>CONTINGENCY 'DVP_P1-2: LN 130-A'</p> <p>OPEN BRANCH FROM BUS 314562 TO BUS 314570 CKT 1 /*<br/>3CLUBHSE 115.00 - 3METCATP 115.00</p> <p>OPEN BRANCH FROM BUS 314570 TO BUS 314572 CKT 1 /*<br/>3METCATP 115.00 - 3EMPORIA 115.00</p> <p>OPEN BRANCH FROM BUS 314570 TO BUS 314588 CKT 1 /*<br/>3METCATP 115.00 - 3METCALF 115.00</p> <p>OPEN BRANCH FROM BUS 314572 TO BUS 925170 CKT 1 /*<br/>3EMPORIA 115.00 - AB2-174 TAP 115.00</p> <p>OPEN BRANCH FROM BUS 314572 TO BUS 314863 CKT 1 /*<br/>3EMPORIA 115.00 - 3EMPOR_1 115.00</p> <p>OPEN BUS 314570 /* ISLAND</p> <p>OPEN BUS 314572 /* ISLAND</p> <p>OPEN BUS 314588 /* ISLAND</p> <p>END</p> |
| DVP_P1-2: LN 2056-A | <p>CONTINGENCY 'DVP_P1-2: LN 2056-A'</p> <p>OPEN BRANCH FROM BUS 313845 TO BUS 934330 CKT 1 /*<br/>6HATHAWAY 230.00 - AD1-057 TAP 230.00</p> <p>END</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DVP_P1-2: LN 2056-B | <p>CONTINGENCY 'DVP_P1-2: LN 2056-B'</p> <p>OPEN BRANCH FROM BUS 934330 TO BUS 314579 CKT 1 /*<br/>AD1-057 TAP 230.00 - 6HORNRTN 230.00</p> <p>END</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DVP_P1-2: LN 2058   | <p>CONTINGENCY 'DVP_P1-2: LN 2058'</p> <p>OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*<br/>6ROCKYMT230T230.00 - 6MORNSTR 230.00</p> <p>END</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Contingency Name      | Description                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DVP_P1-2: LN 2126     | <p>CONTINGENCY 'DVP_P1-2: LN 2126'</p> <p>OPEN BRANCH FROM BUS 314203 TO BUS 314594 CKT 1<br/>6MACKEYS 230.00 - 6PLYMOTH 230.00 /*</p> <p>OPEN BRANCH FROM BUS 314594 TO BUS 314616 CKT 1<br/>6PLYMOTH 230.00 - 6TRWBRDG 230.00 /*</p> <p>OPEN BUS 314594 /* ISLAND</p> <p>END</p>                                                                                                          |
| DVP_P1-2: LN 2131_FSA | <p>CONTINGENCY 'DVP_P1-2: LN 2131_FSA'</p> <p>OPEN BRANCH FROM BUS 314203 TO BUS 314637 CKT 1<br/>6MACKEYS 230.00 - 6EDENTON 230.00 /*</p> <p>OPEN BRANCH FROM BUS 314637 TO BUS 916040 CKT 1<br/>6EDENTON 230.00 - Z1-036 TAP 230.00 /*</p> <p>OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1<br/>ADDED BY JT FOR FULL FSA TAP REMOVAL /*</p> <p>OPEN BUS 314637 /* ISLAND</p> <p>END</p> |
| DVP_P1-2: LN 2131A    | <p>CONTINGENCY 'DVP_P1-2: LN 2131A'</p> <p>OPEN BRANCH FROM BUS 314662 TO BUS 916040 CKT 1<br/>6S HERTFORD 230.00 - Z1-036 TAP 230.00 /*</p> <p>OPEN BRANCH FROM BUS 314651 TO BUS 314662 CKT 1<br/>6WINFALL 230.00 - 6S HERTFORD 230.00 /*</p> <p>OPEN BUS 314662 /* ISLAND</p> <p>END</p>                                                                                                 |
| DVP_P1-2: LN 2141     | <p>CONTINGENCY 'DVP_P1-2: LN 2141'</p> <p>OPEN BRANCH FROM BUS 314561 TO BUS 314583 CKT 1<br/>6CAROLNA 230.00 - 6LAKEVIEW 230.00 /*</p> <p>END</p>                                                                                                                                                                                                                                          |

| Contingency Name  | Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DVP_P1-2: LN 2181 | <p>CONTINGENCY 'DVP_P1-2: LN 2181'</p> <p>OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00</p> <p>OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /*<br/>6PA-RMOUNT#4230.00 - 6NASH 230.00</p> <p>OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /*<br/>6HATHAWAY 230.00 - 6NASH 230.00</p> <p>OPEN BUS 314591 /* ISLAND: 6NASH<br/>230.00</p> <p>END</p>                                                           |
| DVP_P1-2: LN 239  | <p>CONTINGENCY 'DVP_P1-2: LN 239'</p> <p>OPEN BRANCH FROM BUS 314579 TO BUS 314583 CKT 1 /*<br/>6HORNRTN 230.00 - 6LAKEVIEW 230.00</p> <p>END</p>                                                                                                                                                                                                                                                                 |
| DVP_P1-2: LN 246  | <p>CONTINGENCY 'DVP_P1-2: LN 246'</p> <p>OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /*<br/>6SUFFOLK 230.00 - 6NUCO TP 230.00</p> <p>OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /*<br/>6GEARLEYS 230.00 - 6NUCO TP 230.00</p> <p>OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /*<br/>6NUCO TP 230.00 - 6NUCOR 230.00</p> <p>OPEN BUS 314575 /* ISLAND</p> <p>OPEN BUS 314590 /* ISLAND</p> <p>END</p> |
| DVP_P1-2: LN 563  | <p>CONTINGENCY 'DVP_P1-2: LN 563'</p> <p>OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /*<br/>8CARSON 500.00 - 8MDLTHAN 500.00</p> <p>END</p>                                                                                                                                                                                                                                                                   |
| DVP_P1-2: LN 574  | <p>CONTINGENCY 'DVP_P1-2: LN 574'</p> <p>OPEN BRANCH FROM BUS 314908 TO BUS 314911 CKT 1 /*<br/>8BELMONT 500.00 - 8LDYSMTH 500.00</p>                                                                                                                                                                                                                                                                             |

| Contingency Name              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| DVP_P1-2: LN 576              | CONTINGENCY 'DVP_P1-2: LN 576'<br><br>OPEN BRANCH FROM BUS 314914 TO BUS 314918 CKT 1 /*<br>8MDLTHAN 500.00 - 8NO ANNA 500.00<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| DVP_P1-3: 3CAROLNA-6CAROLNA   | CONTINGENCY 'DVP_P1-3: 3CAROLNA-6CAROLNA'<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DVP_P1-3: 3EARLEYS-6EARLEYS   | CONTINGENCY 'DVP_P1-3: 3EARLEYS-6EARLEYS'<br><br>OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 2<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DVP_P1-3: 3EARLEYS-6EARLEYS A | CONTINGENCY 'DVP_P1-3: 3EARLEYS-6EARLEYS A'<br><br>OPEN BRANCH FROM BUS 314568 TO BUS 314569 CKT 2<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| DVP_P4-2: 101002              | CONTINGENCY 'DVP_P4-2: 101002' /* CAROLINA<br>115 KV<br><br>OPEN BRANCH FROM BUS 313723 TO BUS 314259 CKT 1 /*<br>3PECAN 115.00 - 3CAROL56_1 115.00<br><br>OPEN BRANCH FROM BUS 314259 TO BUS 314559 CKT Z1 /*<br>3CAROL56_1 115.00 - 3CAROLNA 115.00<br><br>OPEN BRANCH FROM BUS 314259 TO BUS 314835 CKT 1 /*<br>3CAROL56_1 115.00 - 3CAROL_1 115.00<br><br>OPEN BUS 314259 /* ISLAND:<br>3CAROL56_1 115.00<br><br>OPEN BUS 314835 /* ISLAND: 3CAROL_1<br>115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /*<br>3CAROLNA 115.00 - 3EATON F 115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /*<br>3CAROLNA 115.00 - AA2-053 TAP 115.00 |

| Contingency Name | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1 /*<br>3CAROLNA 115.00 - 3PLHITP 115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /*<br>3CAROLNA 115.00 - 6CAROLNA 230.00<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DVP_P4-2: 12342  | CONTINGENCY 'DVP_P4-2: 12342' /*BATTLEBORO<br><br>OPEN BUS 314554 /*BATTLEBORO 115KV<br>BUS<br><br>OPEN BUS 314834 /*BATTLEBORO 115KV<br>CAP<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| DVP_P4-2: 13002  | CONTINGENCY 'DVP_P4-2: 13002' /* CAROLINA<br><br>OPEN BUS 314600 /* LINE 130<br><br>OPEN BUS 314595 /* LINE 130<br><br>OPEN BUS 314612 /* LINE 130<br><br>OPEN BUS 314615 /* LINE 130<br><br>OPEN BUS 314572 /* LINE 130<br><br>OPEN BUS 314863 /* LINE 130<br><br>OPEN BUS 314570 /* LINE 130<br><br>OPEN BUS 314588 /* LINE 130<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /*<br>TX. #4<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314259 CKT Z1 /*<br>LINE 56<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /*<br>LINE 54<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /*<br>LINE 22<br><br>DECREASE BUS 314559 LOAD BY 100 PERCENT /*<br>REMOVE ALL LOAD AT CAROLINA<br><br>END |

| Contingency Name    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DVP_P4-2: 201262    | CONTINGENCY 'DVP_P4-2: 201262' /* EARLEYS<br>OPEN BRANCH FROM BUS 314569 TO BUS 314266 CKT 1 2012 /*<br>OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 2012 /*<br>OPEN BRANCH FROM BUS 314569 TO BUS 314568 CKT 1 TX. #3 /*<br>END                                                                                                                                                                                                                                                                                                                                                                                   |
| DVP_P4-2: 2012TH4   | CONTINGENCY 'DVP_P4-2: 2012TH4' /* EARLEYS<br>OPEN BRANCH FROM BUS 314569 TO BUS 314266 CKT 1 2012 /*<br>OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 2012 /*<br>OPEN BRANCH FROM BUS 314569 TO BUS 314568 CKT 2 TX. #4 /*<br>END                                                                                                                                                                                                                                                                                                                                                                                  |
| DVP_P4-2: 2020T2144 | CONTINGENCY 'DVP_P4-2: 2020T2144' /*<br>WINFALL 230 KV<br>OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 6ECITYDP2 230.00 - 6ELIZ CT 230.00 /*<br>OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 6ECITYDP2 230.00 - 6TANGLEW 230.00 /*<br>OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 6TANGLEW 230.00 - 6WINFALL 230.00 /*<br>OPEN BUS 313851 230.00 /* ISLAND: 6ECITYDP2<br>OPEN BUS 314639 230.00 /* ISLAND: 6TANGLEW<br>OPEN BUS 913391 230.00 /* ISLAND: Y1-086 C<br>OPEN BUS 913392 230.00 /* ISLAND: Y1-086 E<br>OPEN BUS 917121 230.00 /* ISLAND: Z2-027 C<br>OPEN BUS 917122 230.00 /* ISLAND: Z2-027 E |

| Contingency Name   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | OPEN BRANCH FROM BUS 314651 TO BUS 901080 CKT 1 /*<br>6WINFALL 230.00 - W1-029 230.00<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| DVP_P4-2: 2202     | CONTINGENCY 'DVP_P4-2: 2202' /* CAROLINA<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /*<br>LINE 22<br><br>OPEN BRANCH FROM BUS 314571 TO BUS 925780 CKT 1 /*<br>LINE 22<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314259 CKT Z1 /*<br>LINE 56<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /*<br>LINE 54<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1 /*<br>LINE 130<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /*<br>TX. #4<br><br>DECREASE BUS 314559 LOAD BY 100 PERCENT /*<br>REMOVE ALL LOAD AT CAROLINA<br><br>END |
| DVP_P4-2: 239T2141 | CONTINGENCY 'DVP_P4-2: 239T2141' /*<br>LAKEVIEW<br><br>OPEN BRANCH FROM BUS 314583 TO BUS 314579 CKT 1 /*<br>239<br><br>OPEN BRANCH FROM BUS 314579 TO BUS 314605 CKT 1 /*<br>2057<br><br>OPEN BRANCH FROM BUS 314583 TO BUS 314561 CKT 1 /*<br>2141<br><br>END                                                                                                                                                                                                                                                                                                     |
| DVP_P4-2: 24682    | CONTINGENCY 'DVP_P4-2: 24682' /* 24682 @<br>SUFFOLK<br><br>OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /*<br>SUFFOLK - NUCOR TAP<br><br>OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /*<br>NUCOR TAP - EARLEYS<br><br>OPEN BRANCH FROM BUS 314536 TO BUS 314537 CKT 2 /*                                                                                                                                                                                                                                                                                     |

| Contingency Name   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | SUFFOLK 230-115 TX#5<br><br>OPEN BRANCH FROM BUS 314928 TO BUS 314537 CKT 2 /*<br>SUFFOLK 500-230 TX#8<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DVP_P4-2: 246T2034 | CONTINGENCY 'DVP_P4-2: 246T2034' /* EARLEYS<br><br>OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /*<br>246<br><br>OPEN BRANCH FROM BUS 314575 TO BUS 314537 CKT 1 /*<br>246<br><br>OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /*<br>246 - NUCOR<br><br>OPEN BRANCH FROM BUS 314569 TO BUS 933450 CKT 1 /*<br>2034<br><br>END                                                                                                                                                                                                                                                                                                                                                                                 |
| DVP_P4-2: 246T247  | CONTINGENCY 'DVP_P4-2: 246T247' /* SUFFOLK<br>230 KV<br><br>OPEN BRANCH FROM BUS 314537 TO BUS 314575 CKT 1 /*<br>6SUFFOLK 230.00 - 6NUCO TP 230.00<br><br>OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /*<br>6EARLEYS 230.00 - 6NUCO TP 230.00<br><br>OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /*<br>6NUCO TP 230.00 - 6NUCOR 230.00<br><br>OPEN BUS 314575 /* ISLAND: 6NUCO TP<br>230.00<br><br>OPEN BUS 314590 /* ISLAND: 6NUCOR<br>230.00<br><br>OPEN BRANCH FROM BUS 314537 TO BUS 314648 CKT 1 /*<br>6SUFFOLK 230.00 - 6SUNBURY 230.00<br><br>OPEN BRANCH FROM BUS 314648 TO BUS 901080 CKT 1 /*<br>6SUNBURY 230.00 - W1-029 230.00<br><br>OPEN BUS 314648 /* ISLAND: 6SUNBURY<br>230.00<br><br>END |

| Contingency Name   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DVP_P4-2: 254T2141 | CONTINGENCY 'DVP_P4-2: 254T2141' /*<br>LAKEVIEW<br><br>OPEN BRANCH FROM BUS 314583 TO BUS 314561 CKT 1 /*<br>2141<br><br>OPEN BRANCH FROM BUS 314583 TO BUS 924510 CKT 1 /*<br>254<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                    |
| DVP_P4-2: 5402     | CONTINGENCY 'DVP_P4-2: 5402' /* CAROLINA<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /*<br>LINE 54<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /*<br>LINE 22<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314259 CKT Z1 /*<br>LINE 56<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1 /*<br>LINE 130<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /*<br>TX. #4<br><br>DECREASE BUS 314559 LOAD BY 100 PERCENT /*<br>REMOVE ALL LOAD AT CAROLINA<br><br>END                                                                                                                   |
| DVP_P4-2: 5602     | CONTINGENCY 'DVP_P4-2: 5602' /* CAROLINA<br>115 KV<br><br>OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1 /*<br>3PECAN 115.00 - 3SEABORD 115.00<br><br>OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1 /*<br>3BOYKINS 115.00 - 3MARGTSV 115.00<br><br>OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1 /*<br>3MARGTSV 115.00 - 3SEABORD 115.00<br><br>OPEN BUS 314587 /* ISLAND: 3MARGTSV<br>115.00<br><br>OPEN BUS 314604 /* ISLAND: 3SEABORD<br>115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /*<br>3CAROLNA 115.00 - 3EATON F 115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /* |

| Contingency Name  | Description                                                                                                                                                                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | 3CAROLNA 115.00 - AA2-053 TAP 115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1 /*<br>3CAROLNA 115.00 - 3PLHITP 115.00<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /*<br>3CAROLNA 115.00 - 6CAROLNA 230.00<br><br>END                                                                         |
| DVP_P4-2: 562T563 | CONTINGENCY 'DVP_P4-2: 562T563' /*CARSON<br><br>OPEN BRANCH FROM BUS 314902 TO BUS 314923 CKT 1<br>/*CARSON TO MIDLOTHIAN<br><br>OPEN BRANCH FROM BUS 314914 TO BUS 314902 CKT 1<br>/*CARSON 500.00 - 8SEPTA 500.00<br><br>END                                                                                       |
| DVP_P4-2: 8042    | CONTINGENCY 'DVP_P4-2: 8042' /*<br>BATTLEBORO<br><br>OPEN BUS 314554 /*BATTLEBORO 115KV<br>BUS<br><br>OPEN BUS 314556 /*LINE 80<br><br>OPEN BUS 314567 /*LINE 80<br><br>OPEN BUS 314205 /*LINE 80<br><br>OPEN BUS 314834 /*BATTLEBORO 115KV<br>CAP<br><br>END                                                        |
| DVP_P4-2: 8142    | CONTINGENCY 'DVP_P4-2: 8142' /*<br>BATTLEBORO<br><br>OPEN BUS 314554 /*BATTLEBORO 115KV<br>BUS<br><br>OPEN BUS 314556 /*LINE 80<br><br>OPEN BUS 314567 /*LINE 80<br><br>OPEN BUS 314205 /*LINE 80<br><br>OPEN BUS 314834 /*BATTLEBORO 115KV<br>CAP<br><br>OPEN BUS 314623 /*LINE 81<br><br>OPEN BUS 314577 /*LINE 81 |

| Contingency Name       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | OPEN BUS 314628 /*LINE 81<br>OPEN BUS 314598 /*LINE 81<br>OPEN BUS 314578 /*LINE 81<br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| DVP_P7-1: LN 2058-2181 | CONTINGENCY 'DVP_P7-1: LN 2058-2181'<br>OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*<br>6ROCKYMT230T230.00 - 6HATHAWAY 230.00<br>OPEN BUS 304226 /* ISLAND: 6PA-<br>RMOUNT#4115.00<br>OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /*<br>6PA-RMOUNT#4230.00 - 6NASH 230.00<br>OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /*<br>6HATHAWAY 230.00 - 6NASH 230.00<br>OPEN BUS 314591 /* ISLAND: 6NASH<br>230.00<br>END                                                                                                                                                                                                                                                                                                   |
| DVP_P7-1: LN 81-2056   | CONTINGENCY 'DVP_P7-1: LN 81-2056'<br>OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /*<br>3CAROLNA 115.00 - 3HORNRTN 115.00<br>OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /*<br>3HORNRTN 115.00 - 3ROAN DP 115.00<br>OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /*<br>3ROAN DP 115.00 - 3DARLINGT DP115.00<br>OPEN BUS 314578 /* ISLAND: 3HORNRTN<br>115.00<br>OPEN BUS 314598 /* ISLAND: 3ROAN DP<br>115.00<br>OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /*<br>6PA-RMOUNT#4230.00 - 6NASH 230.00<br>OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /*<br>6MORNSTR 230.00 - 6NASH 230.00<br>OPEN BRANCH FROM BUS 304226 TO BUS 304222 CKT 1 /*<br>6PA-RMOUNT#4230.00 - 6ROCKYMT230T<br>OPEN BUS 304226 /* ISLAND |

| Contingency Name    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | OPEN BUS 314591 /* ISLAND: 6NASH<br>230.00<br><br>END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| DVP_P7-1: LN 81-239 | CONTINGENCY 'DVP_P7-1: LN 81-239'<br><br>OPEN BRANCH FROM BUS 314559 TO BUS 314578 CKT 1 /*<br>3CAROLNA 115.00 - 3HORNRTN 115.00<br><br>OPEN BRANCH FROM BUS 314578 TO BUS 314598 CKT 1 /*<br>3HORNRTN 115.00 - 3ROAN DP 115.00<br><br>OPEN BRANCH FROM BUS 314598 TO BUS 314628 CKT 1 /*<br>3ROAN DP 115.00 - 3DARLNGT DP115.00<br><br>OPEN BUS 314578 /* ISLAND: 3HORNRTN<br>115.00<br><br>OPEN BUS 314598 /* ISLAND: 3ROAN DP<br>115.00<br><br>OPEN BRANCH FROM BUS 314579 TO BUS 314583 CKT 1 /*<br>6HORNRTN 230.00 - 6LAKEVIEW 230.00<br><br>END |

## Summer Peak Analysis - 2021

### Generator Deliverability

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

| # | Contingency |                             | Affected Area | Facility Description                     | Bus    |        | Ckt | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|---|-------------|-----------------------------|---------------|------------------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|-----------------|-----|
|   | Type        | Name                        |               |                                          | From   | To     |     |            | Initial   | Final  | Type   | MVA |                 |     |
| 1 | N-1         | DVP_P1-2:<br>LN 2181        | DVP - CPLE    | 6MORNSTR-<br>6ROCKYMT230T 230<br>kV line | 313845 | 304222 | 1   | DC         | 94.75     | 97.53  | ER     | 374 | 10.39           |     |
| 2 | N-1         | DVP_P1-2:<br>LN 2058        | DVP - DVP     | 6MORNSTR-6NASH<br>230 kV line            | 313845 | 314591 | 1   | DC         | 85.21     | 87.57  | ER     | 449 | 10.6            | 1   |
| 3 | N-1         | DVP_P1-2:<br>LN 2056-A      | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line       | 313858 | 314577 | 1   | DC         | 91.55     | 106.6  | ER     | 165 | 24.89           |     |
| 4 | N-1         | DVP_P1-2:<br>LN 2056-B      | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line       | 313858 | 314577 | 1   | DC         | 91.62     | 106.66 | ER     | 165 | 24.89           |     |
| 5 | N-1         | DVP_P1-2:<br>LN 2131A       | DVP - DVP     | 6EARLEYS-6NUCO TP<br>230 kV line         | 314569 | 314575 | 1   | DC         | 80.72     | 83.18  | ER     | 572 | 14              | 2   |
| 6 | N-1         | DVP_P1-2:<br>LN<br>2131_FSA | DVP - DVP     | 6EARLEYS-6NUCO TP<br>230 kV line         | 314569 | 314575 | 1   | DC         | 80.03     | 82.49  | ER     | 572 | 14.01           |     |
| 7 | N-1         | DVP_P1-2:<br>LN 2131A       | DVP - DVP     | 6NUCO TP-6SUFFOLK<br>230 kV line         | 314575 | 314537 | 1   | DC         | 74.7      | 77.16  | ER     | 572 | 14              | 3   |
| 8 | N-1         | DVP_P1-2:<br>LN<br>2131_FSA | DVP - DVP     | 6NUCO TP-6SUFFOLK<br>230 kV line         | 314575 | 314537 | 1   | DC         | 74        | 76.45  | ER     | 572 | 14.01           |     |
| 9 | N-1         | DVP_P1-2:<br>LN 1015-A      | DVP - DVP     | 3KELFORD-3EARLEYS<br>115 kV line         | 314582 | 314568 | 1   | DC         | 75.13     | 121.52 | ER     | 143 | 66.29           |     |

| #  | Contingency |                        | Affected Area | Facility Description                 | Bus    |        | Ckt | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|------------------------|---------------|--------------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                   |               |                                      | From   | To     |     |            | Initial   | Final  | Type   | MVA |                 |     |
| 10 | N-1         | DVP_P1-2:<br>LN 246    | DVP - DVP     | 6LAKEVEW-AB2-100<br>TAP 230 kV line  | 314583 | 924510 | 1   | DC         | 89.26     | 92.26  | ER     | 375 | 11.22           | 4   |
| 11 | N-1         | DVP_P1-2:<br>LN 2141   | DVP - DVP     | 6LAKEVEW-AB2-100<br>TAP 230 kV line  | 314583 | 924510 | 1   | DC         | 98.67     | 99.93  | ER     | 375 | 4.72            |     |
| 12 | N-1         | DVP_P1-2:<br>LN 1015-A | DVP - DVP     | 3SAMS HD-3KELFORD<br>115 kV line     | 314602 | 314582 | 1   | DC         | 75.88     | 125.2  | ER     | 134 | 66.3            |     |
| 13 | N-1         | DVP_P1-2:<br>LN 1015-A | DVP - DVP     | 3SCOT NK-3SAMS HD<br>115 kV line     | 314603 | 314602 | 1   | DC         | 77.37     | 126.69 | ER     | 134 | 66.3            |     |
| 14 | N-1         | DVP_P1-2:<br>LN 2141   | DVP - DVP     | AD1-057 TAP-<br>6MORNSTR 230 kV line | 934330 | 313845 | 1   | DC         | 96.57     | 98.39  | ER     | 442 | 8.06            | 5   |
| 15 | N-1         | AEP_P1-<br>2_#1377     | AEP - AEP     | 05EDAN 1-05DANVL2<br>138 kV line     | 242631 | 242620 | 1   | DC         | 92.5      | 92.96  | ER     | 415 | 4.23            |     |

### **Multiple Facility Contingency**

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

| #  | Contingency |                       | Affected Area | Facility Description               | Bus    |        | Cir. | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|-----------------------|---------------|------------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                  |               |                                    | From   | To     |      |            | Initial   | Final  | Type   | MVA |                 |     |
| 16 | LFFB        | DVP_P4-2:<br>254T2141 | DVP - DVP     | 3CHESTNUT-3COX DP<br>115 kV line   | 313719 | 314577 | 1    | DC         | 80.91     | 102.75 | LD     | 174 | 42.11           | 6   |
| 17 | LFFB        | DVP_P4-2:<br>2202     | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line | 313858 | 314577 | 1    | DC         | 99.62     | 125.39 | LD     | 202 | 52.06           |     |
| 18 | LFFB        | DVP_P4-2:<br>13002    | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line | 313858 | 314577 | 1    | DC         | 99.08     | 124.85 | LD     | 202 | 52.06           |     |
| 19 | LFFB        | DVP_P4-2:<br>5402     | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line | 313858 | 314577 | 1    | DC         | 98.98     | 124.75 | LD     | 202 | 52.06           |     |

| #  | Contingency |                     | Affected Area | Facility Description                | Bus    |        |      | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|---------------------|---------------|-------------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                |               |                                     | From   | To     | Cir. |            | Initial   | Final  | Type   | MVA |                 |     |
| 20 | LFFB        | DVP_P4-2: 101002    | DVP - DVP     | 3SO JUSTICE-3COX DP 115 kV line     | 313858 | 314577 | 1    | DC         | 91.95     | 117.72 | LD     | 202 | 52.06           |     |
| 21 | LFFB        | DVP_P4-2: 2020T2144 | DVP - DVP     | 6SAPONY-6CARSON 230 kV line         | 314435 | 314282 | 1    | DC         | 88.94     | 91.49  | LD     | 830 | 21.17           | 7   |
| 22 | LFFB        | DVP_P4-2: 2020T2144 | DVP - CPLE    | 6EVERETS-6GREENVILE T 230 kV line   | 314574 | 304451 | 1    | DC         | 93.35     | 94.24  | ER     | 478 | 9.42            |     |
| 23 | LFFB        | DVP_P4-2: 12342     | DVP - DVP     | 3HORNRTN-3CAROLNA 115 kV line       | 314578 | 314559 | 1    | DC         | 89.36     | 118.33 | LD     | 202 | 58.53           | 8   |
| 24 | LFFB        | DVP_P4-2: 8042      | DVP - DVP     | 3HORNRTN-3CAROLNA 115 kV line       | 314578 | 314559 | 1    | DC         | 89.36     | 118.33 | LD     | 202 | 58.53           |     |
| 25 | LFFB        | DVP_P4-2: 246T2034  | DVP - DVP     | 3POPLR C-3EVERETS 115 kV line       | 314596 | 314573 | 1    | DC         | 69.43     | 70.74  | LD     | 239 | 5.91            | 9   |
| 26 | LFFB        | DVP_P4-2: 12342     | DVP - DVP     | 3ROAN DP-3HORNRTN 115 kV line       | 314598 | 314578 | 1    | DC         | 85.37     | 114.34 | LD     | 202 | 58.53           | 10  |
| 27 | LFFB        | DVP_P4-2: 8042      | DVP - DVP     | 3ROAN DP-3HORNRTN 115 kV line       | 314598 | 314578 | 1    | DC         | 85.32     | 114.29 | LD     | 202 | 58.53           |     |
| 28 | LFFB        | DVP_P4-2: 8042      | DVP - DVP     | 3DARLNGT DP-3ROAN DP 115 kV line    | 314628 | 314598 | 1    | DC         | 88.44     | 117.41 | LD     | 202 | 58.53           | 11  |
| 29 | LFFB        | DVP_P4-2: 12342     | DVP - DVP     | 3DARLNGT DP-3ROAN DP 115 kV line    | 314628 | 314598 | 1    | DC         | 88.44     | 117.41 | LD     | 202 | 58.53           |     |
| 30 | LFFB        | DVP_P4-2: 24682     | DVP - DVP     | 6S HERTFORD-6WINFALL 230 kV line    | 314662 | 314651 | 1    | DC         | 81.27     | 82.99  | LD     | 897 | 15.43           | 12  |
| 31 | LFFB        | DVP_P4-2: 24682     | DVP - DVP     | Z1-036 TAP-6S HERTFORD 230 kV line  | 916040 | 314662 | 1    | DC         | 85.36     | 87.08  | LD     | 897 | 15.43           | 13  |
| 32 | LFFB        | DVP_P4-2: 5602      | DVP - DVP     | AC1-208 TAP-3SO JUSTICE 115 kV line | 927140 | 313858 | 1    | DC         | 94        | 102.22 | LD     | 202 | 16.6            | 14  |
| 33 | LFFB        | DVP_P4-2: 2202      | DVP - DVP     | AC1-208 TAP-3SO JUSTICE 115 kV line | 927140 | 313858 | 1    | DC         | 90.38     | 98.59  | LD     | 202 | 16.58           |     |
| 34 | LFFB        | DVP_P4-2: 13002     | DVP - DVP     | AC1-208 TAP-3SO JUSTICE 115 kV line | 927140 | 313858 | 1    | DC         | 89.54     | 97.75  | LD     | 202 | 16.58           |     |
| 35 | LFFB        | DVP_P4-2: 5402      | DVP - DVP     | AC1-208 TAP-3SO JUSTICE 115 kV line | 927140 | 313858 | 1    | DC         | 89.39     | 97.6   | LD     | 202 | 16.58           |     |
| 36 | LFFB        | DVP_P4-2: 12342     | DVP - DVP     | AC1-208 TAP-3DARLNGT DP 115 kV line | 927140 | 314628 | 1    | DC         | 91.16     | 120.13 | LD     | 202 | 58.53           | 15  |

| Contingency |      |                | Affected Area | Facility Description                 | Bus    |        | Power Flow | Loading % |         | Rating |      | MW  |              | Ref |
|-------------|------|----------------|---------------|--------------------------------------|--------|--------|------------|-----------|---------|--------|------|-----|--------------|-----|
| #           | Type | Name           |               |                                      | From   | To     |            | Cir.      | Initial | Final  | Type | MVA | Contribution |     |
| 37          | LFFB | DVP_P4-2: 8042 | DVP - DVP     | AC1-208 TAP-3DARLINGT DP 115 kV line | 927140 | 314628 | 1          | DC        | 91.11   | 120.08 | LD   | 202 | 58.53        |     |

## **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 Area | Facility Description           | Bus    |        |     | Power Flow | Loading % |        | Rating |     | MW           |    | Ref |
|----|-------------|---------------------|---------------|--------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|--------------|----|-----|
|    | Type        | Name                |               |                                | From   | To     | Ckt |            | Initial   | Final  | Type   | MVA | Contribution |    |     |
| 38 | LFFB        | DVP_P4-2: 5602      | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 150.96    | 180.86 | LD     | 174 | 52.02        | 16 |     |
| 39 | LFFB        | DVP_P4-2: 2202      | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 143.65    | 173.55 | LD     | 174 | 52.03        |    |     |
| 40 | LFFB        | DVP_P4-2: 13002     | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 143.02    | 172.92 | LD     | 174 | 52.03        |    |     |
| 41 | LFFB        | DVP_P4-2: 5402      | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 142.9     | 172.8  | LD     | 174 | 52.03        |    |     |
| 42 | LFFB        | DVP_P4-2: 101002    | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 134.74    | 164.64 | LD     | 174 | 52.03        |    |     |
| 43 | N-1         | DVP_P1-2: LN 2056-A | DVP - DVP     | 3CHESTNUT-3WITAKRS 115 kV line | 313719 | 314623 | 1   | DC         | 138.89    | 157.4  | ER     | 134 | 24.87        |    |     |

| #  | Contingency |                               | Affected Area | Facility Description                     | Bus    |        |     | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|-------------------------------|---------------|------------------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                          |               |                                          | From   | To     | Ckt |            | Initial   | Final  | Type   | MVA |                 |     |
| 44 | DCTL        | DVP_P7-1:<br>LN 81-239        | DVP - DVP     | 3CHESTNUT-<br>3WITAKRS 115 kV line       | 313719 | 314623 | 1   | DC         | 126.89    | 162.52 | LD     | 174 | 61.99           |     |
| 45 | N-1         | DVP_P1-2:<br>LN 2056-B        | DVP - DVP     | 3CHESTNUT-<br>3WITAKRS 115 kV line       | 313719 | 314623 | 1   | DC         | 138.97    | 157.47 | ER     | 134 | 24.87           |     |
| 46 | Non         | Non                           | DVP - DVP     | 3CHESTNUT-<br>3WITAKRS 115 kV line       | 313719 | 314623 | 1   | DC         | 107.45    | 127.8  | NR     | 123 | 25.06           |     |
| 47 | DCTL        | DVP_P7-1:<br>LN 81-<br>2056   | DVP - CPLE    | 6MORNSTR-<br>6ROCKYMT230T 230<br>kV line | 313845 | 304222 | 1   | DC         | 131.23    | 136.38 | ER     | 374 | 19.24           | 17  |
| 48 | LFFB        | DVP_P4-2:<br>5602             | DVP - DVP     | 3SO JUSTICE-3COX DP<br>115 kV line       | 313858 | 314577 | 1   | DC         | 105.95    | 129.75 | LD     | 202 | 52.05           | 18  |
| 49 | LFFB        | DVP_P4-2:<br>562T563          | DVP - DVP     | 6CARSON-6CHRL249<br>230 kV line          | 314282 | 314285 | 1   | DC         | 106.56    | 107.11 | LD     | 684 | 9.16            | 19  |
| 50 | LFFB        | DVP_P4-2:<br>562T563          | DVP - DVP     | 6CHRL249-6LOCKS 230<br>kV line           | 314285 | 314316 | 1   | DC         | 103.75    | 104.3  | LD     | 684 | 9.16            | 20  |
| 51 | DCTL        | DVP_P7-1:<br>LN 2058-<br>2181 | DVP - CPLE    | 3BTLEBRO-<br>3ROCKYMT115T 115<br>kV line | 314554 | 304223 | 1   | DC         | 413.46    | 438.46 | ER     | 93  | 23.25           | 21  |
| 52 | N-1         | DVP_P1-2:<br>LN 1014          | DVP - CPLE    | 3BTLEBRO-<br>3ROCKYMT115T 115<br>kV line | 314554 | 304223 | 1   | DC         | 123.93    | 146.39 | ER     | 93  | 20.89           |     |
| 53 | N-1         | DVP_P1-2:<br>LN 2181          | DVP - CPLE    | 3BTLEBRO-<br>3ROCKYMT115T 115<br>kV line | 314554 | 304223 | 1   | DC         | 124.94    | 135.75 | ER     | 93  | 10.06           |     |
| 54 | Non         | Non                           | DVP - CPLE    | 3BTLEBRO-<br>3ROCKYMT115T 115<br>kV line | 314554 | 304223 | 1   | DC         | 100.1     | 110.33 | NR     | 93  | 9.51            |     |
| 55 | LFFB        | DVP_P4-2:<br>246T247          | DVP - DVP     | 6CLUBHSE-6SAPONY<br>230 kV line          | 314563 | 314435 | 1   | DC         | 116.21    | 120.03 | LD     | 637 | 24.24           | 22  |
| 56 | LFFB        | DVP_P4-2:<br>246T2034         | DVP - DVP     | 6CLUBHSE-6SAPONY<br>230 kV line          | 314563 | 314435 | 1   | DC         | 118.36    | 122.55 | LD     | 637 | 26.63           |     |
| 57 | LFFB        | DVP_P4-2:<br>239T2141         | DVP - DVP     | 6CLUBHSE 230/115 kV<br>transformer       | 314563 | 314562 | 1   | DC         | 106.92    | 109.32 | LD     | 209 | 9.45            | 23  |
| 58 | LFFB        | DVP_P4-2:<br>2012TH4          | DVP - DVP     | 6EARLEYS 230/115 kV<br>transformer       | 314568 | 314569 | 1   | DC         | 112.99    | 125.95 | LD     | 208 | 26.93           | 24  |
| 59 | LFFB        | DVP_P4-2:                     | DVP - DVP     | 6EARLEYS 230/115 kV                      | 314568 | 314569 | 2   | DC         | 102.91    | 114.72 | LD     | 228 | 26.93           | 25  |

| #  | Contingency |                               | Affected Area | Facility Description                     | Bus    |        | Ckt | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|-------------------------------|---------------|------------------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                          |               |                                          | From   | To     |     |            | Initial   | Final  | Type   | MVA |                 |     |
|    |             | 201262                        |               | transformer                              |        |        |     |            |           |        |        |     |                 |     |
| 60 | DCTL        | DVP_P7-1:<br>LN 2058-<br>2181 | DVP - CPLE    | 6EVERETS-<br>6GREENVILE T 230 kV<br>line | 314574 | 304451 | 1   | DC         | 117.05    | 118.24 | ER     | 478 | 12.65           | 26  |
| 61 | LFFB        | DVP_P4-2:<br>5602             | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 116.85    | 144.48 | LD     | 174 | 52.05           | 27  |
| 62 | LFFB        | DVP_P4-2:<br>2202             | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 109.51    | 139.42 | LD     | 174 | 52.06           |     |
| 63 | LFFB        | DVP_P4-2:<br>13002            | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 108.87    | 138.79 | LD     | 174 | 52.06           |     |
| 64 | LFFB        | DVP_P4-2:<br>5402             | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 108.76    | 138.68 | LD     | 174 | 52.06           |     |
| 65 | LFFB        | DVP_P4-2:<br>101002           | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 100.6     | 130.52 | LD     | 174 | 52.06           |     |
| 66 | N-1         | DVP_P1-2:<br>LN 2056-A        | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 104.72    | 123.24 | ER     | 134 | 24.89           |     |
| 67 | N-1         | DVP_P1-2:<br>LN 2056-B        | DVP - DVP     | 3COX DP-3CHESTNUT<br>115 kV line         | 314577 | 313719 | 1   | DC         | 104.8     | 123.31 | ER     | 134 | 24.89           |     |
| 68 | LFFB        | DVP_P4-2:<br>8142             | DVP - DVP     | 3KELFORD-3EARLEYS<br>115 kV line         | 314582 | 314568 | 1   | DC         | 160.85    | 223.7  | LD     | 175 | 109.98          | 28  |
| 69 | N-1         | DVP_P1-2:<br>LN 2056-A        | DVP - DVP     | 6LAKEVEW-<br>6CAROLNA 230 kV line        | 314583 | 314561 | 1   | DC         | 123.1     | 126.91 | ER     | 375 | 14.31           | 29  |
| 70 | N-1         | DVP_P1-2:<br>LN 2056-B        | DVP - DVP     | 6LAKEVEW-<br>6CAROLNA 230 kV line        | 314583 | 314561 | 1   | DC         | 123.15    | 126.97 | ER     | 375 | 14.31           |     |
| 71 | LFFB        | DVP_P4-2:<br>8142             | DVP - DVP     | 3SAMS HD-3KELFORD<br>115 kV line         | 314602 | 314582 | 1   | DC         | 151.82    | 215.03 | LD     | 174 | 109.99          | 30  |
| 72 | LFFB        | DVP_P4-2:<br>8142             | DVP - DVP     | 3SCOT NK-3SAMS HD<br>115 kV line         | 314603 | 314602 | 1   | DC         | 152.97    | 216.18 | LD     | 174 | 109.99          | 31  |
| 73 | LFFB        | DVP_P4-2:<br>5602             | DVP - DVP     | 3WITAKRS-3BTLEBRO<br>115 kV line         | 314623 | 314554 | 1   | DC         | 153.3     | 183.19 | LD     | 174 | 52.01           | 32  |
| 74 | LFFB        | DVP_P4-2:<br>2202             | DVP - DVP     | 3WITAKRS-3BTLEBRO<br>115 kV line         | 314623 | 314554 | 1   | DC         | 145.97    | 175.87 | LD     | 174 | 52.02           |     |
| 75 | LFFB        | DVP_P4-2:<br>13002            | DVP - DVP     | 3WITAKRS-3BTLEBRO<br>115 kV line         | 314623 | 314554 | 1   | DC         | 145.33    | 175.23 | LD     | 174 | 52.02           |     |
| 76 | LFFB        | DVP_P4-2:<br>5402             | DVP - DVP     | 3WITAKRS-3BTLEBRO<br>115 kV line         | 314623 | 314554 | 1   | DC         | 145.22    | 175.12 | LD     | 174 | 52.02           |     |

| #  | Contingency |                             | Affected Area | Facility Description             | Bus    |        |     | Power Flow | Loading % |        | Rating |     | MW Contribution | Ref |
|----|-------------|-----------------------------|---------------|----------------------------------|--------|--------|-----|------------|-----------|--------|--------|-----|-----------------|-----|
|    | Type        | Name                        |               |                                  | From   | To     | Ckt |            | Initial   | Final  | Type   | MVA |                 |     |
| 77 | LFFB        | DVP_P4-2: 101002            | DVP - DVP     | 3WITAKRS-3BTLEBRO 115 kV line    | 314623 | 314554 | 1   | DC         | 137.06    | 166.96 | LD     | 174 | 52.02           |     |
| 78 | DCTL        | DVP_P7-1: LN 81-239         | DVP - DVP     | 3WITAKRS-3BTLEBRO 115 kV line    | 314623 | 314554 | 1   | DC         | 129.34    | 164.97 | LD     | 174 | 61.99           |     |
| 79 | N-1         | DVP_P1-2: LN 2056-A         | DVP - DVP     | 3WITAKRS-3BTLEBRO 115 kV line    | 314623 | 314554 | 1   | DC         | 139.68    | 158.18 | ER     | 134 | 24.87           |     |
| 80 | N-1         | DVP_P1-2: LN 2056-B         | DVP - DVP     | 3WITAKRS-3BTLEBRO 115 kV line    | 314623 | 314554 | 1   | DC         | 139.76    | 158.26 | ER     | 134 | 24.87           |     |
| 81 | Non         | Non                         | DVP - DVP     | 3WITAKRS-3BTLEBRO 115 kV line    | 314623 | 314554 | 1   | DC         | 108.35    | 128.7  | NR     | 123 | 25.05           |     |
| 82 | LFFB        | DVP_P4-2: 246T247           | DVP - DVP     | 6ELIZ CT-6SHAWBRO 230 kV line    | 314638 | 314647 | 1   | DC         | 112.81    | 114.72 | LD     | 699 | 13.4            | 33  |
| 83 | LFFB        | DVP_P4-2: 246T247           | DVP - DVP     | AB2-100 TAP-6CLUBHSE 230 kV line | 924510 | 314563 | 1   | DC         | 118.33    | 122.52 | LD     | 459 | 19.15           | 34  |
| 84 | N-1         | DVP_P1-2: LN 246            | DVP - DVP     | AB2-100 TAP-6CLUBHSE 230 kV line | 924510 | 314563 | 1   | DC         | 100.6     | 103.6  | ER     | 375 | 11.22           |     |
| 85 | N-1         | DVP_P1-2: LN 2141           | DVP - DVP     | AB2-100 TAP-6CLUBHSE 230 kV line | 924510 | 314563 | 1   | DC         | 111.74    | 113    | ER     | 375 | 4.72            |     |
| 86 | LFFB        | AEP_P4_# 7589_05J.F ERR 765 | AEP - AEP     | 05EDAN 1-05DANVL2 138 kV line    | 242631 | 242620 | 1   | DC         | 107.73    | 108.49 | ER     | 415 | 7.02            | 35  |

## **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-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 not evaluate this violation until the impact study phase.                                                                                               | Pending                | TBD           |
| 2                       | The 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   |
| 3, 4, 16-20 (48, 61-63) | 3SO JUSTICE-3COX DP 115 kV line; 3CHESTNUT-3COX DP 115 kV line; 3SO JUSTICE-3COX DP 115 kV line | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct.   | Pending                | \$12,860,000  |
| 5, 6,7,8                | 6EARLEYS-6NUCO TP 230 kV line; 6NUCO TP-6SUFFOLK 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.         | Pending                | \$110,950,000 |

|                   |                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |              |
|-------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| 9, 12,<br>13 (68) | 3KELFORD-3EARLEYS 115 kV line; 3SAMS HD-3KELFORD 115 kV line; 3SCOT NK-3SAMS HD 115 kV line | Line #126 Scott Neck – Sams HD – Kelford – Earleys 115 kV: wreck and rebuild the line of 25 miles to increase its line rating to 353 MVA (normal), 353 MVA (emergency), and 406 MVA (load dump). It is estimated to cost \$50,340,000 and 32-38 months to engineer, permit, and construct.                                                                                                                                                                                                                                                                                                                                                  | Pending | \$50,340,000 |
| 10,11             | 6LAKEVIEW-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 |
| 14                | The AD1-057 TAP-6MORNSTR 230 kV                                                             | Line #2056 AD1-057 – Morning Star 230 kV: wreck and rebuild the line of 15 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$36,000,000 and 30-36 months to engineer, permit, and construct.                                                                                                                                                                                                                                                                                                                                                                   | Pending | \$36,000,000 |
| 15                | 05EDAN 1-05DANVL2 138 kV line                                                               | <p>Total Costs for AEP scope Outlined in items 1-10 below. It is estimated to take 24 to 36 months to construct after signing the Interconnection Service Agreement.</p> <p>Limiting Element: AEP Records show ratings S/N: 275 MVA S/E: 361 MVA<br/> (1) Switch (1200A) - Danville Sw. CB M --- Danville CB M needs to be replaced, Estimated cost: \$1, 000,000.</p> <p>(2) Sub Cond 1590 AAC 61 Str - Danville Risers --- Replace Danville risers, Estimated cost: \$100,000.</p> <p>(3) ACSR ~ 336/556 six wire - conductor section 2 --- 2.81 miles of conductor will need to reconducted/rebuild, expected cost of \$4.2 million.</p> | Pending | \$7,890,000  |

|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  |  | <p>(4) Relay Thermal limit 1795 Amps - E Danville 1 --- An Engineering study need to be conducted to determine if the relay thermal limit settings can be adjusted to mitigate the overload, Estimated Cost: \$25,000.New relay packages will be required if the settings cannot be adjusted, Estimated cost:\$600,000.</p> <p>(5) Relay Thermal limit 1795 Amps- Danville2 --- An Engineering study need to be conducted to determine if the relay thermal limit settings can be adjusted to mitigate the overload, Estimated Cost: \$25,000.New relay packages will be required if the settings cannot be adjusted, Estimated cost:\$600,000.</p> <p>(6) Relay compliance trip limit 1916 Amps- E Danville(RCTL) --- An Engineering study need to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload, Estimated Cost: \$25,000.New relay packages will be required if the settings cannot be adjusted, Estimated cost:\$600,000.</p> <p>(7) Relay compliance trip limit 1916 Amps- Danville2 (RCTL) --- An Engineering study need to be conducted to determine if the relay compliance trip limits settings can be adjusted to mitigate the overload, Estimated Cost: \$25,000.New relay packages will be required if the settings cannot be adjusted, Estimated cost:\$600,000.</p> <p>(8) ACSR ~ 1351.5 ~ 45/7 ~ DIPPER - Conductor Section 3 --- 0.03 miles of conductor will need to be reconducted/rebuilt , Estimated cost : \$ 0.045 million.</p> |  |  |
|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

|                      |                                   |                                                                                                                                                                                                                                                                                                                                                        |         |              |
|----------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|
|                      |                                   | <p>(9) ACSR ~ 1351.5 ~ 45/7 ~ DIPPER - Conductor Section 1 --- 0.03 miles of conductor will need to be reconducted/rebuilt, Estimated cost : \$ 0.045 million.</p> <p>(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</p> |         |              |
| 21                   | 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 |
| 22                   | 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 not evaluate this violation until the impact study phase.                                                                                                                                                              | Pending | TBD          |
| 23, 24, 26-29, 32-37 | 3HORNRTN-3CAROLNA 115 kV line     | Line #81 Carolina – Hornertown – Roan DP – Darlington – AC1-208 Tap – South Justice 115 kV: wreck and rebuild the line of 22 miles to increase its line rating to 353 MVA (normal), 353 MVA (emergency), and 406 MVA (load dump). It is estimated to cost \$43,520,000 and 32-38 months to engineer, permit, and construct.                            | Pending | \$43,520,000 |
| 25                   | 3POPLR C-3EVERETS 115 kV line     | 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    |

|                            |                                                                      |                                                                                                                                                                                                                                                                                                               |         |                      |
|----------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------|
| 30,31                      | 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         |
| Total New Network Upgrades |                                                                      |                                                                                                                                                                                                                                                                                                               |         | <b>\$353,310,000</b> |

### **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 |
|--------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|
| 38-46, 73-81 | 3CHESTNUT-3WITAKRS 115 kV       | Line #1001 Chestnut – Whitakers – Battleboro 115 kV: wreck and rebuild the line of 9 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$18,520,000 and 30-36 months to engineer, permit, and construct.   | Pending                | \$18,520,000 |
| 47           | 6MORNSTR-6ROCKYMT230T 230 kV    | 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          |
| 48(3)        | 3SO JUSTICE-3COX DP 115 kV line | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct. | Pending                | \$12,860,000 |

| #     | Overloaded Facility                      | Upgrade Description                                                                                                                                                                                                                                                                               | Network Upgrade Number | Upgrade Cost |
|-------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|
| 49,50 | 6CARSON-6CHRL249<br>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 |
| 51-54 | 3BTLEBRO-<br>3ROCKYMT115T 115 kV<br>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          |
| 55,56 | 6CLUBHSE-6SAPONY<br>230 kV line          | Line #238 Clubhouse to Sapony 230 kV: replace wave trap at Clubhouse Substation to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$150,000 and 12-16 months to engineer and construct.                                      | Pending                | \$150,000    |
| 57    | 6CLUBHSE 230/115 kV<br>transformer       | Clubhouse 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 14-16 months to engineer and construct.                                              | Pending                | \$5,500,000  |
| 58    | 6EARLEYS 230/115 kV<br>transformer 1     | Earleys 230 – 115 kV Tx#1: replace existing transformer to increase its rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). Estimated cost \$5,500,000 and it is estimated to 14-16 months to engineer and construct.                                                 | Pending                | \$5,500,000  |
| 59    | 6EARLEYS 230/115 kV<br>transformer 2     | Earleys 230 – 115 kV Tx#2: replace existing transformer to increase its rating to 276.8 MVA (normal), 292.4 MVA (emergency), and 328.7 MVA (load dump). Estimated cost \$5,500,000 and it is estimated to 14-16 months to engineer and construct.                                                 | Pending                | \$5,500,000  |

| #                                 | Overloaded Facility               | Upgrade Description                                                                                                                                                                                                                                                                                                       | Network Upgrade Number | Upgrade Cost     |
|-----------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------|
| 60                                | 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              |
| 61-67 (3)                         | 3COX DP-3CHESTNUT 115 kV line     | Line #1024 South Justice – Cox DP – Chestnut 115 kV: wreck and rebuild the line of 6.5 miles to increase its line rating to 262 MVA (normal), 287 MVA (emergency), and 349 MVA (load dump). It is estimated to cost \$12,860,000 and 30-36 months to engineer, permit, and construct.                                     | Pending                | \$12,860,000     |
| 69, 70                            | 6LAKEVIEW-6CAROLNA 230 kV line    | Line #2141 Lakeview – Carolina 230 kV: wreck and rebuild the line of 1.5 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$3,625,000 and 30-36 months to engineer, permit, and construct.                                                    | Pending                | \$3,625,000      |
| 82                                | 6ELIZ CT-6SHAWBRO 230 kV line     | Line #2021 Elizabeth City– Shawboro 230 kV: wreck and rebuild the line of 11 miles to increase its line rating to 722 MVA (normal), 722 MVA (emergency), and 830 MVA (load dump). It is estimated to cost \$25,700,000 and 44-48 months to engineer, permit and construct.                                                | Pending                | \$25,700,000     |
| 83-85                             | 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      |
| 86                                | 05EDAN 1-05DANVL2 138 kV line     | AEP upgrades items 1 – 10 outlined in the reinforcements for violation #15. It is estimated to cost \$7,890,000 and estimated to take 24 to 36 months to construct after signing the Interconnection Service Agreement.                                                                                                   | Pending                | \$7,890,000      |
| <b>Total New Network Upgrades</b> |                                   |                                                                                                                                                                                                                                                                                                                           |                        | <b>\$179,320</b> |

## **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 Area | Facility Description                     | Bus    |        | Cir. | Power Flow | Loading % |        | Rating |     | MW Contribution |
|----|-------------|--------------------------------------------------------------------|---------------|------------------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|
|    | Type        | Name                                                               |               |                                          | From   | To     |      |            | Initial   | Final  | Type   | MVA |                 |
| 87 | N-1         | DVP_P1-2:<br>LN 239                                                | DVP -<br>DVP  | 3CHESTNUT-3COX DP<br>115 kV line         | 313719 | 314577 | 1    | DC         | 68.32     | 99.05  | ER     | 134 | 41.31           |
| 88 | N-1         | 927140<br>AC1-208<br>TAP 314628<br>3DARLING<br>T DP 1<br>115/115-B | DVP -<br>DVP  | 3CHESTNUT-3WITAKRS<br>115 kV line        | 313719 | 314623 | 1    | DC         | 163.19    | 209.95 | ER     | 134 | 62.87           |
| 89 | Non         | Non                                                                | DVP -<br>DVP  | 3CHESTNUT-3WITAKRS<br>115 kV line        | 313719 | 314623 | 1    | DC         | 147.65    | 181.15 | NR     | 123 | 41.57           |
| 90 | N-1         | DVP_P1-2:<br>LN 2181                                               | DVP -<br>CPLE | 6MORNSTR-<br>6ROCKYMT230T 230 kV<br>line | 313845 | 304222 | 1    | DC         | 131.7     | 136.14 | ER     | 374 | 17.24           |
| 91 | N-1         | DVP_P1-2:<br>LN 2058                                               | DVP -<br>DVP  | 6MORNSTR-6NASH 230<br>kV line            | 313845 | 314591 | 1    | DC         | 116.95    | 120.72 | ER     | 449 | 17.58           |
| 92 | N-1         | DVP_P1-2:<br>LN 2056-B                                             | DVP -<br>DVP  | 3SO JUSTICE-3COX DP<br>115 kV line       | 313858 | 314577 | 1    | DC         | 112.58    | 136.9  | ER     | 165 | 41.29           |
| 93 | Non         | Non                                                                | DVP -<br>DVP  | 3SO JUSTICE-3COX DP<br>115 kV line       | 313858 | 314577 | 1    | DC         | 80.15     | 105.3  | NR     | 165 | 41.6            |
| 94 | N-1         | DVP_P1-2:<br>LN 1001                                               | DVP -<br>DVP  | 3SO JUSTICE-AC1-208<br>TAP 115 kV line   | 313858 | 927140 | 1    | DC         | 74.36     | 109.74 | ER     | 165 | 58.53           |
| 95 | N-1         | DVP_P1-2:<br>LN 246                                                | DVP -<br>DVP  | 6MACKEYS-6EDENTON<br>230 kV line         | 314203 | 314637 | 1    | DC         | 77.62     | 79.72  | ER     | 731 | 15.5            |
| 96 | N-1         | DVP_P1-2:<br>LN 563                                                | DVP -<br>DVP  | 6CARSON-6CHRL249 230<br>kV line          | 314282 | 314285 | 1    | DC         | 96.84     | 97.38  | ER     | 559 | 8.66            |

| #   | Contingency |                                 | Affected Area | Facility Description              | Bus    |        |      | Power Flow | Loading % |        | Rating |     | MW Contribution |
|-----|-------------|---------------------------------|---------------|-----------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|
|     | Type        | Name                            |               |                                   | From   | To     | Cir. |            | Initial   | Final  | Type   | MVA |                 |
| 97  | N-1         | DVP_P1-2: LN 563                | DVP - DVP     | 6CHESTF B-6BASIN 230 kV line      | 314287 | 314276 | 1    | DC         | 147.62    | 148.29 | ER     | 449 | 6.6             |
| 98  | N-1         | DVP_P1-2: LN 2131A              | DVP - DVP     | 6SAPONY-6CARSON 230 kV line       | 314435 | 314282 | 1    | DC         | 108.52    | 111.64 | ER     | 679 | 21.15           |
| 99  | N-1         | DVP_P1-3: 3CAROLN A-6CAROLN A   | DVP - DVP     | 3UNCAMP-3HOLLAND 115 kV line      | 314539 | 314527 | 1    | DC         | 102.5     | 104.15 | ER     | 225 | 8.19            |
| 100 | N-1         | DVP_P1-2: LN 1014               | DVP - CPLE    | 3BTLEBRO-3ROCKYMT115T 115 kV line | 314554 | 304223 | 1    | DC         | 174.92    | 212.19 | ER     | 93  | 34.66           |
| 101 | Non         | Non                             | DVP - CPLE    | 3BTLEBRO-3ROCKYMT115T 115 kV line | 314554 | 304223 | 1    | DC         | 141.88    | 158.84 | NR     | 93  | 15.77           |
| 102 | N-1         | DVP_P1-2: LN 130-A              | DVP - DVP     | 6CAROLNA 230/115 kV transformer   | 314559 | 314561 | 1    | DC         | 127.04    | 134.14 | ER     | 240 | 17.03           |
| 103 | Non         | Non                             | DVP - DVP     | 6CAROLNA 230/115 kV transformer   | 314559 | 314561 | 1    | DC         | 95.07     | 97.76  | NR     | 227 | 13.53           |
| 104 | N-1         | DVP_P1-3: 3CAROLN A-6CAROLN A   | DVP - DVP     | 6CLUBHSE 230/115 kV transformer   | 314562 | 314563 | 1    | DC         | 108.87    | 110.94 | ER     | 183 | 8.45            |
| 105 | N-1         | DVP_P1-2: LN 2126               | DVP - DVP     | 6CLUBHSE-6SAPONY 230 kV line      | 314563 | 314435 | 1    | DC         | 112.47    | 116.01 | ER     | 599 | 21.16           |
| 106 | Non         | Non                             | DVP - DVP     | 6CLUBHSE-6SAPONY 230 kV line      | 314563 | 314435 | 1    | DC         | 100.49    | 103.77 | NR     | 599 | 19.62           |
| 107 | N-1         | DVP_P1-3: 3EARLEYS - 6EARLEYS A | DVP - DVP     | 6EARLEYS 230/115 kV transformer   | 314568 | 314569 | 1    | DC         | 102.92    | 117.98 | ER     | 176 | 26.47           |

| #   | Contingency |                                        | Affected Area | Facility Description                  | Bus    |        |      | Power Flow | Loading % |        | Rating |     | MW Contribution |
|-----|-------------|----------------------------------------|---------------|---------------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|
|     | Type        | Name                                   |               |                                       | From   | To     | Cir. |            | Initial   | Final  | Type   | MVA |                 |
| 108 | N-1         | DVP_P1-3:<br>3EARLEYS<br>-<br>6EARLEYS | DVP -<br>DVP  | 6EARLEYS 230/115 kV<br>transformer    | 314568 | 314569 | 2    | DC         | 92.28     | 105.81 | ER     | 196 | 26.47           |
| 109 | N-1         | DVP_P1-2:<br>LN 2131A                  | DVP -<br>DVP  | 6EARLEYS-6NUCO TP<br>230 kV line      | 314569 | 314575 | 1    | DC         | 133.5     | 137.49 | ER     | 572 | 23.24           |
| 110 | Non         | Non                                    | DVP -<br>DVP  | 6EARLEYS-6NUCO TP<br>230 kV line      | 314569 | 314575 | 1    | DC         | 81.83     | 85.16  | NR     | 572 | 18.99           |
| 111 | N-1         | DVP_P1-2:<br>LN 2131A                  | DVP -<br>CPL  | 6EVERETS-6GREENVILLE<br>T 230 kV line | 314574 | 304451 | 1    | DC         | 93.18     | 94.07  | ER     | 478 | 9.4             |
| 112 | N-1         | DVP_P1-2:<br>LN 2131A                  | DVP -<br>DVP  | 6NUCO TP-6SUFFOLK<br>230 kV line      | 314575 | 314537 | 1    | DC         | 127.49    | 131.47 | ER     | 572 | 23.24           |
| 113 | N-1         | DVP_P1-2:<br>LN 2056-B                 | DVP -<br>DVP  | 3COX DP-3CHESTNUT<br>115 kV line      | 314577 | 313719 | 1    | DC         | 130.6     | 160.53 | ER     | 134 | 41.29           |
| 114 | Non         | Non                                    | DVP -<br>DVP  | 3COX DP-3CHESTNUT<br>115 kV line      | 314577 | 313719 | 1    | DC         | 99        | 132.78 | NR     | 123 | 41.6            |
| 115 | N-1         | DVP_P1-2:<br>LN 1001                   | DVP -<br>DVP  | 3HORNRTN-3CAROLNA<br>115 kV line      | 314578 | 314559 | 1    | DC         | 107.16    | 142.54 | ER     | 165 | 58.53           |
| 116 | N-1         | DVP_P1-2:<br>LN 2141                   | DVP -<br>DVP  | 6HORNRTN-AD1-057<br>TAP 230 kV line   | 314579 | 934330 | 1    | DC         | 111.39    | 112.36 | ER     | 442 | 8.06            |
| 117 | N-1         | DVP_P1-2:<br>LN 1015-A                 | DVP -<br>DVP  | 3KELFORD-3EARLEYS<br>115 kV line      | 314582 | 314568 | 1    | DC         | 136.85    | 213.83 | ER     | 143 | 109.99          |
| 118 | Non         | Non                                    | DVP -<br>DVP  | 3KELFORD-3EARLEYS<br>115 kV line      | 314582 | 314568 | 1    | DC         | 81.77     | 107.34 | NR     | 143 | 36.53           |
| 119 | N-1         | DVP_P1-2:<br>LN 2056-A                 | DVP -<br>DVP  | 6LAKEVIEW-6CAROLNA<br>230 kV line     | 314583 | 314561 | 1    | DC         | 141.26    | 145.08 | ER     | 375 | 14.31           |
| 120 | Non         | Non                                    | DVP -<br>DVP  | 6LAKEVIEW-6CAROLNA<br>230 kV line     | 314583 | 314561 | 1    | DC         | 101.11    | 104.82 | NR     | 352 | 13.03           |
| 121 | N-1         | DVP_P1-2:<br>LN 2131A                  | DVP -<br>DVP  | 6LAKEVIEW-AB2-100<br>TAP 230 kV line  | 314583 | 924510 | 1    | DC         | 129.84    | 134.18 | ER     | 375 | 16.27           |
| 122 | Non         | Non                                    | DVP -<br>DVP  | 6LAKEVIEW-AB2-100<br>TAP 230 kV line  | 314583 | 924510 | 1    | DC         | 100.29    | 104.26 | NR     | 375 | 14.84           |
| 123 | N-1         | DVP_P1-2:<br>LN 2058                   | DVP -<br>CPL  | 6NASH-6PA-RMOUNT#4<br>230 kV line     | 314591 | 304226 | 1    | DC         | 106.78    | 110.39 | ER     | 470 | 17.58           |

| #   | Contingency |                                                                    | Affected Area | Facility Description                  | Bus    |        | Cir. | Power Flow | Loading % |        | Rating |      | MW Contribution |
|-----|-------------|--------------------------------------------------------------------|---------------|---------------------------------------|--------|--------|------|------------|-----------|--------|--------|------|-----------------|
|     | Type        | Name                                                               |               |                                       | From   | To     |      |            | Initial   | Final  | Type   | MVA  |                 |
| 124 | N-1         | DVP_P1-2:<br>LN 1001                                               | DVP -<br>DVP  | 3ROAN DP-3HORNRTN<br>115 kV line      | 314598 | 314578 | 1    | DC         | 102.23    | 137.61 | ER     | 165  | 58.53           |
| 125 | N-1         | DVP_P1-2:<br>LN 1015-A                                             | DVP -<br>DVP  | 3SAMS HD-3KELFORD<br>115 kV line      | 314602 | 314582 | 1    | DC         | 132.57    | 214.4  | ER     | 134  | 110             |
| 126 | Non         | Non                                                                | DVP -<br>DVP  | 3SAMS HD-3KELFORD<br>115 kV line      | 314602 | 314582 | 1    | DC         | 84.88     | 114.55 | NR     | 123  | 36.54           |
| 127 | N-1         | DVP_P1-2:<br>LN 1015-A                                             | DVP -<br>DVP  | 3SCOT NK-3SAMS HD<br>115 kV line      | 314603 | 314602 | 1    | DC         | 134.06    | 215.89 | ER     | 134  | 110             |
| 128 | Non         | Non                                                                | DVP -<br>DVP  | 3SCOT NK-3SAMS HD<br>115 kV line      | 314603 | 314602 | 1    | DC         | 86.5      | 116.18 | NR     | 123  | 36.54           |
| 129 | N-1         | 927140<br>AC1-208<br>TAP 314628<br>3DARLING<br>T DP 1<br>115/115-B | DVP -<br>DVP  | 3WITAKRS-3BTLEBRO<br>115 kV line      | 314623 | 314554 | 1    | DC         | 166.41    | 213.18 | ER     | 134  | 62.86           |
| 130 | Non         | Non                                                                | DVP -<br>DVP  | 3WITAKRS-3BTLEBRO<br>115 kV line      | 314623 | 314554 | 1    | DC         | 149.11    | 182.87 | NR     | 123  | 41.57           |
| 131 | N-1         | DVP_P1-2:<br>LN 1001                                               | DVP -<br>DVP  | 3DARLINGT DP-3ROAN<br>DP 115 kV line  | 314628 | 314598 | 1    | DC         | 106.04    | 141.41 | ER     | 165  | 58.53           |
| 132 | N-1         | DVP_P1-2:<br>LN 246                                                | DVP -<br>DVP  | 6EDENTON-Z1-036 TAP<br>230 kV line    | 314637 | 916040 | 1    | DC         | 74.2      | 76.32  | ER     | 733  | 15.5            |
| 133 | N-1         | DVP_P1-2:<br>LN 246                                                | DVP -<br>DVP  | 6S HERTFORD-<br>6WINFALL 230 kV line  | 314662 | 314651 | 1    | DC         | 99.09     | 101.2  | ER     | 733  | 15.48           |
| 134 | N-1         | DVP_P1-2:<br>LN 576                                                | DVP -<br>DVP  | 8ELMONT-8LADYSMITH<br>500 kV line     | 314908 | 314911 | 1    | DC         | 180.94    | 181.41 | ER     | 2442 | 28.31           |
| 135 | N-1         | DVP_P1-2:<br>LN 574                                                | DVP -<br>DVP  | 8MDLTHAN-8NO ANNA<br>500 kV line      | 314914 | 314918 | 1    | DC         | 155.55    | 156.04 | ER     | 2442 | 26.76           |
| 136 | N-1         | DVP_P1-2:<br>LN 563                                                | DVP -<br>DVP  | 8SURREY-8CHCKAHM<br>500 kV line       | 314924 | 314903 | 1    | DC         | 101.78    | 102.24 | ER     | 1809 | 20.92           |
| 137 | N-1         | DVP_P1-2:<br>LN 246                                                | DVP -<br>DVP  | Z1-036 TAP-6S<br>HERTFORD 230 kV line | 916040 | 314662 | 1    | DC         | 104.1     | 106.21 | ER     | 733  | 15.48           |
| 138 | N-1         | DVP_P1-2:<br>LN 246                                                | DVP -<br>DVP  | AB2-100 TAP-6CLUBHSE<br>230 kV line   | 924510 | 314563 | 1    | DC         | 142.32    | 147.3  | ER     | 375  | 18.62           |

| #   | Contingency |                               | Affected Area | Facility Description                 | Bus    |        | Cir. | Power Flow | Loading % |        | Rating |     | MW Contribution |
|-----|-------------|-------------------------------|---------------|--------------------------------------|--------|--------|------|------------|-----------|--------|--------|-----|-----------------|
|     | Type        | Name                          |               |                                      | From   | To     |      |            | Initial   | Final  | Type   | MVA |                 |
| 139 | Non         | Non                           | DVP - DVP     | AB2-100 TAP-6CLUBHSE 230 kV line     | 924510 | 314563 | 1    | DC         | 112.99    | 117.94 | NR     | 375 | 14.84           |
| 140 | N-1         | DVP_P1-3: 3CAROLN A-6CAROLN A | DVP - DVP     | AC1-208 TAP-3SO JUSTICE 115 kV line  | 927140 | 313858 | 1    | DC         | 85.47     | 103.14 | ER     | 165 | 29.23           |
| 141 | N-1         | DVP_P1-2: LN 1001             | DVP - DVP     | AC1-208 TAP-3DARLINGT DP 115 kV line | 927140 | 314628 | 1    | DC         | 109.3     | 144.68 | ER     | 165 | 58.53           |
| 142 | N-1         | DVP_P1-2: LN 2141             | DVP - DVP     | AD1-057 TAP-6MORNSTR 230 kV line     | 934330 | 313845 | 1    | DC         | 111.3     | 112.27 | ER     | 442 | 8.06            |
| 143 | N-1         | AEP_P1-2_#1377                | AEP - AEP     | 05EDAN 1-05DANVL2 138 kV line        | 242631 | 242620 | 1    | DC         | 107.7     | 108.46 | ER     | 415 | 7.02            |

### **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. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

## Appendix 1

(DVP - DVP) The 6MORNSTR-6NASH 230 kV line (from bus 313845 to bus 314591 ckt 1) loads from 85.21% to 87.57% (**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 10.6 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 1.42                     |
| 315292            | 1DOMTR78        | 0.96                     |
| 315293            | 1DOMTR9         | 0.78                     |
| 315131            | 1EDGECEMA       | 25.16                    |
| 315132            | 1EDGECEMB       | 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   |

|            |                   |      |
|------------|-------------------|------|
| <i>LTF</i> | <i>HAMLET</i>     | 4.66 |
| <i>LTF</i> | <i>MORGAN</i>     | 3.53 |
| <i>LTF</i> | <i>NEWTON</i>     | 1.73 |
| <i>LTF</i> | <i>O-066A</i>     | 0.36 |
| <i>LTF</i> | <i>PRAIRIE</i>    | 3.73 |
| <i>LTF</i> | <i>ROWAN</i>      | 2.47 |
| <i>LTF</i> | <i>SANTEETLA</i>  | 0.33 |
| <i>LTF</i> | <i>SMITHLAND</i>  | 0.33 |
| <i>LTF</i> | <i>TATANKA</i>    | 0.84 |
| <i>LTF</i> | <i>TILTON</i>     | 0.75 |
| <i>LTF</i> | <i>TRIMBLE</i>    | 0.39 |
| <i>LTF</i> | <i>TVA</i>        | 1.49 |
| <i>LTF</i> | <i>UNIONPOWER</i> | 2.14 |
| 900671     | V4-068 C          | 0.07 |
| <i>LTF</i> | <i>VFT</i>        | 2.08 |
| 901081     | W1-029C           | 0.41 |
| <i>LTF</i> | <i>X1-078</i>     | 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 6EARLEYS-6NUCO TP 230 kV line (from bus 314569 to bus 314575 ckt 1) loads from 80.72% to 83.18% (**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 14.0 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 4.77                     |
| 315292            | 1DOMTR78        | 3.23                     |
| 315293            | 1DOMTR9         | 2.63                     |
| 315131            | 1EDGECEMA       | 9.02                     |
| 315132            | 1EDGECEMB       | 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    | CPL          | 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 6NUCO TP-6SUFFOLK 230 kV line (from bus 314575 to bus 314537 ckt 1) loads from 74.7% to 77.16% (**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 14.0 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 4.77                     |
| 315292            | 1DOMTR78        | 3.23                     |
| 315293            | 1DOMTR9         | 2.63                     |
| 315131            | 1EDGECEMA       | 9.02                     |
| 315132            | 1EDGECEMB       | 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    | CPL          | 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 6LAKEVEW-AB2-100 TAP 230 kV line (from bus 314583 to bus 924510 ckt 1) loads from 89.26% to 92.26% (**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 11.22 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 1.91                     |
| 315292            | 1DOMTR78        | 1.29                     |
| 315293            | 1DOMTR9         | 1.06                     |
| 315131            | 1EDGECEMA       | 10.25                    |
| 315132            | 1EDGECEMB       | 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    | CPL          | 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  |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>WEC</i>          | <i>0.59</i>  |
| <i>916041</i> | <i>Z1-036 C</i>     | <i>0.44</i>  |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.48</i>  |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>0.27</i>  |
| <i>917511</i> | <i>Z2-088 C OP1</i> | <i>0.99</i>  |
| <i>917591</i> | <i>Z2-099 C</i>     | <i>0.13</i>  |
| <i>918411</i> | <i>AA1-050</i>      | <i>0.84</i>  |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>1.43</i>  |
| <i>918511</i> | <i>AA1-065 C OP</i> | <i>2.04</i>  |
| <i>918531</i> | <i>AA1-067 C</i>    | <i>0.32</i>  |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.07</i>  |
| <i>919691</i> | <i>AA2-053 C</i>    | <i>1.72</i>  |
| <i>919701</i> | <i>AA2-057 C</i>    | <i>1.43</i>  |
| <i>919731</i> | <i>AA2-059 C</i>    | <i>0.09</i>  |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>0.45</i>  |
| <i>LTF</i>    | <i>AA2-074</i>      | <i>2.1</i>   |
| <i>920021</i> | <i>AA2-086 C</i>    | <i>0.07</i>  |
| <i>920041</i> | <i>AA2-088 C</i>    | <i>0.82</i>  |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.19</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>1.34</i>  |
| <i>920671</i> | <i>AA2-174 C</i>    | <i>0.08</i>  |
| <i>920691</i> | <i>AA2-178 C</i>    | <i>5.4</i>   |
| <i>930051</i> | <i>AB1-013 C</i>    | <i>1.63</i>  |
| <i>930401</i> | <i>AB1-081 C</i>    | <i>9.31</i>  |
| <i>930861</i> | <i>AB1-132 C</i>    | <i>30.54</i> |
| <i>923801</i> | <i>AB2-015 C O1</i> | <i>3.7</i>   |

|        |              |       |
|--------|--------------|-------|
| 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 5

(DVP - DVP) The AD1-057 TAP-6MORNSTR 230 kV line (from bus 934330 to bus 313845 ckt 1) loads from 96.57% to 98.39% (**DC power flow**) of its emergency rating (442 MVA) for the single line contingency outage of 'DVP\_P1-2: LN 2141'. This project contributes approximately 8.06 MW to the thermal violation.

CONTINGENCY 'DVP\_P1-2: LN 2141'

OPEN BRANCH FROM BUS 314561 TO BUS 314583 CKT 1

/\* 6CAROLNA

230.00 - 6LAKEVEW 230.00

END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315139            | 1GASTONA        | 9.67                     |
| 315141            | 1GASTONB        | 9.67                     |
| 315136            | 1ROSEMG1        | 7.63                     |
| 315138            | 1ROSEMG2        | 3.58                     |
| 315137            | 1ROSEMS1        | 4.73                     |
| 314704            | 3LAWRENC        | 0.27                     |
| 934043            | AD1-029 BAT     | 8.06                     |
| 934201            | AD1-047 C       | 4.21                     |
| 934331            | AD1-057 C O1    | 39.54                    |
| 935211            | AD1-156 C       | 0.61                     |
| LTF               | AMIL            | 0.32                     |
| LTF               | BAYOU           | 1.71                     |
| LTF               | BIG_CAJUN1      | 2.69                     |
| LTF               | BIG_CAJUN2      | 5.42                     |
| LTF               | BLUEG           | 1.68                     |
| LTF               | CALDERWOOD      | 1.                       |
| LTF               | CANNELTON       | 0.32                     |
| LTF               | CATAWBA         | 0.98                     |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CBM-N</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>2.79</i>      |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.94</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.33</i>      |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>1.83</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>6.12</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>6.68</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.6</i>       |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.52</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.94</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.41</i>      |
| <i>LTF</i> | <i>G-007A</i>     | <i>0.68</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.59</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>4.01</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>2.96</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>1.43</i>      |
| <i>LTF</i> | <i>NYISO</i>      | <i>0.04</i>      |
| <i>LTF</i> | <i>O-066A</i>     | <i>0.31</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>3.08</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>2.02</i>      |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>0.28</i>      |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>0.27</i>      |
| <i>LTF</i> | <i>TATANKA</i>    | <i>0.69</i>      |
| <i>LTF</i> | <i>TILTON</i>     | <i>0.61</i>      |
| <i>LTF</i> | <i>TRIMBLE</i>    | <i>0.32</i>      |
| <i>LTF</i> | <i>TVA</i>        | <i>1.24</i>      |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>1.79</i>  |
| <i>LTF</i>    | <i>VFT</i>          | <i>1.81</i>  |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.53</i>  |
| <i>930861</i> | <i>AB1-132 C</i>    | <i>37.6</i>  |
| <i>931231</i> | <i>AB1-173 C</i>    | <i>1.18</i>  |
| <i>931241</i> | <i>AB1-173AC</i>    | <i>1.18</i>  |
| <i>923851</i> | <i>AB2-025 C</i>    | <i>0.38</i>  |
| <i>923911</i> | <i>AB2-031 C O1</i> | <i>1.17</i>  |
| <i>923991</i> | <i>AB2-040 C O1</i> | <i>3.85</i>  |
| <i>924511</i> | <i>AB2-100 C</i>    | <i>17.83</i> |
| <i>925171</i> | <i>AB2-174 C O1</i> | <i>4.45</i>  |
| <i>926071</i> | <i>AC1-086 C</i>    | <i>55.37</i> |
| <i>927111</i> | <i>AC1-206 C</i>    | <i>14.05</i> |

## Appendix 6

(DVP - DVP) The 3CHESTNUT-3COX DP 115 kV line (from bus 313719 to bus 314577 ckt 1) loads from 80.91% to 102.75% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 254T2141'. This project contributes approximately 42.11 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 254T2141' /\* LAKEVIEW  
 OPEN BRANCH FROM BUS 314583 TO BUS 314561 CKT 1 /\* 2141  
 OPEN BRANCH FROM BUS 314583 TO BUS 924510 CKT 1 /\* 254  
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315131            | 1EDGECEMA       | 5.26                     |
| 315132            | 1EDGECEMB       | 5.26                     |
| 314554            | 3BTLEBRO        | 0.87                     |
| 934043            | AD1-029 BAT     | 42.11                    |
| 934331            | AD1-057 C O1    | 5.57                     |
| 934332            | AD1-057 E O1    | 2.97                     |
| LTF               | CARR            | 0.01                     |
| LTF               | CBM-S1          | 1.77                     |
| LTF               | CBM-S2          | 3.47                     |
| LTF               | CBM-W1          | 4.06                     |
| LTF               | CBM-W2          | 9.61                     |
| LTF               | CIN             | 0.91                     |
| LTF               | CPL             | 1.16                     |
| LTF               | G-007           | 0.15                     |
| LTF               | IPL             | 0.58                     |
| LTF               | LGEE            | 0.19                     |
| LTF               | MEC             | 2.01                     |
| LTF               | MECS            | 0.96                     |

|               |                     |                  |
|---------------|---------------------|------------------|
| <i>LTF</i>    | <i>O-066</i>        | <i>0.49</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.07</i>      |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.25</i>      |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>0.47</i>      |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>1.03</i>      |
| <i>919701</i> | <i>AA2-057 C</i>    | <i>3.41</i>      |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>8.68</i>      |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.46</i>      |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>1.14</i>      |
| <i>930401</i> | <i>AB1-081 C</i>    | <i>8.77</i>      |
| <i>930402</i> | <i>AB1-081 E</i>    | <i>3.76</i>      |
| <i>930861</i> | <i>AB1-132 C</i>    | <i>7.64</i>      |
| <i>930862</i> | <i>AB1-132 E</i>    | <i>3.27</i>      |
| <i>924151</i> | <i>AB2-059 C O1</i> | <i>10.34</i>     |
| <i>924152</i> | <i>AB2-059 E O1</i> | <i>5.33</i>      |
| <i>926071</i> | <i>AC1-086 C</i>    | <i>11.25</i>     |
| <i>926072</i> | <i>AC1-086 E</i>    | <i>5.12</i>      |

## Appendix 7

(DVP - DVP) The 6SAPONY-6CARSON 230 kV line (from bus 314435 to bus 314282 ckt 1) loads from 88.94% to 91.49% (**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 21.17 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

```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315131            | 1EDGECEMA       | 9.72                     |
| 315132            | 1EDGECEMB       | 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            | 3BETHEL C       | 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    | CPL          | 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  |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>AA2-074</i>      | <i>2.21</i>  |
| <i>920021</i> | <i>AA2-086 C</i>    | <i>0.1</i>   |
| <i>920022</i> | <i>AA2-086 E</i>    | <i>0.22</i>  |
| <i>920041</i> | <i>AA2-088 C</i>    | <i>1.14</i>  |
| <i>920042</i> | <i>AA2-088 E</i>    | <i>9.49</i>  |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.22</i>  |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>0.53</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>2.6</i>   |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>1.19</i>  |
| <i>920671</i> | <i>AA2-174 C</i>    | <i>0.11</i>  |
| <i>920672</i> | <i>AA2-174 E</i>    | <i>0.62</i>  |
| <i>920691</i> | <i>AA2-178 C</i>    | <i>8.72</i>  |
| <i>920692</i> | <i>AA2-178 E</i>    | <i>3.74</i>  |
| <i>930051</i> | <i>AB1-013 C</i>    | <i>2.63</i>  |
| <i>930052</i> | <i>AB1-013 E</i>    | <i>17.61</i> |
| <i>930401</i> | <i>AB1-081 C</i>    | <i>9.2</i>   |
| <i>930402</i> | <i>AB1-081 E</i>    | <i>3.94</i>  |
| <i>930861</i> | <i>AB1-132 C</i>    | <i>27.5</i>  |
| <i>930862</i> | <i>AB1-132 E</i>    | <i>11.79</i> |
| <i>931231</i> | <i>AB1-173 C</i>    | <i>4.7</i>   |
| <i>931232</i> | <i>AB1-173 E</i>    | <i>2.19</i>  |
| <i>931241</i> | <i>AB1-173AC</i>    | <i>4.7</i>   |
| <i>931242</i> | <i>AB1-173AE</i>    | <i>2.19</i>  |
| <i>923851</i> | <i>AB2-025 C</i>    | <i>2.01</i>  |
| <i>923852</i> | <i>AB2-025 E</i>    | <i>4.59</i>  |
| <i>923911</i> | <i>AB2-031 C O1</i> | <i>4.67</i>  |

|        |              |       |
|--------|--------------|-------|
| 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  |

|               |                  |              |
|---------------|------------------|--------------|
| <i>926772</i> | <i>AC1-163 E</i> | <i>0.92</i>  |
| <i>927021</i> | <i>AC1-189 C</i> | <i>8.08</i>  |
| <i>927022</i> | <i>AC1-189 E</i> | <i>4.02</i>  |
| <i>927111</i> | <i>AC1-206 C</i> | <i>31.48</i> |
| <i>927112</i> | <i>AC1-206 E</i> | <i>14.88</i> |
| <i>927141</i> | <i>AC1-208 C</i> | <i>11.81</i> |
| <i>927142</i> | <i>AC1-208 E</i> | <i>5.25</i>  |

## Appendix 8

(DVP - DVP) The 3HORNRTN-3CAROLNA 115 kV line (from bus 314578 to bus 314559 ckt 1) loads from 89.36% to 118.33% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 12342'. This project contributes approximately 58.53 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 12342'

OPEN BUS 314554

OPEN BUS 314834

END

/\*BATTLEBORO

/\*BATTLEBORO 115KV BUS

/\*BATTLEBORO 115KV CAP

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314578            | 3HORNRTN        | 18.06                    |
| 314582            | 3KELFORD        | 1.21                     |
| 314603            | 3SCOT NK        | 8.46                     |
| 932631            | AC2-084 C       | 28.52                    |
| 932632            | AC2-084 E       | 14.05                    |
| 934041            | AD1-029 C       | 35.27                    |
| 934042            | AD1-029 E       | 23.25                    |
| LTF               | AMIL            | 0.01                     |
| LTF               | BAYOU           | 0.04                     |
| LTF               | BIG_CAJUN1      | 0.06                     |
| LTF               | BIG_CAJUN2      | 0.12                     |
| LTF               | BLUEG           | 0.06                     |
| LTF               | CALDERWOOD      | 0.02                     |
| LTF               | CANNELTON       | 0.01                     |
| LTF               | CARR            | < 0.01                   |
| LTF               | CATAWBA         | 0.02                     |
| LTF               | CELEVELAND      | 0.05                     |
| LTF               | CHEOAH          | 0.02                     |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>CHILHOWEE</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>CHOCTAW</i>    | <i>0.04</i>      |
| <i>LTF</i>    | <i>CLIFTY</i>     | <i>0.24</i>      |
| <i>LTF</i>    | <i>COTTONWOOD</i> | <i>0.15</i>      |
| <i>LTF</i>    | <i>DEARBORN</i>   | <i>0.03</i>      |
| <i>LTF</i>    | <i>EDWARDS</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>ELMERSMITH</i> | <i>0.03</i>      |
| <i>LTF</i>    | <i>FARMERCITY</i> | <i>0.01</i>      |
| <i>LTF</i>    | <i>G-007</i>      | <i>0.01</i>      |
| <i>LTF</i>    | <i>GIBSON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>HAMLET</i>     | <i>0.04</i>      |
| <i>LTF</i>    | <i>MORGAN</i>     | <i>0.07</i>      |
| <i>LTF</i>    | <i>NEWTON</i>     | <i>0.05</i>      |
| <i>LTF</i>    | <i>O-066</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>0.09</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>    | <i>0.03</i>      |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.01</i>      |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.03</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.03</i>      |
| <i>917331</i> | <i>Z2-043 C</i>   | <i>0.66</i>      |

|        |           |       |
|--------|-----------|-------|
| 917332 | Z2-043 E  | 1.45  |
| 917341 | Z2-044 C  | 1.06  |
| 917342 | Z2-044 E  | 2.31  |
| 918561 | AA1-072 C | 0.1   |
| 918562 | AA1-072 E | 0.24  |
| 919701 | AA2-057 C | 5.54  |
| 919702 | AA2-057 E | 14.1  |
| 919821 | AA2-068 C | 1.72  |
| 919822 | AA2-068 E | 4.04  |
| 920591 | AA2-165 C | 0.76  |
| 920592 | AA2-165 E | 1.86  |
| 926201 | AC1-098 C | 20.01 |
| 926202 | AC1-098 E | 11.92 |
| 926211 | AC1-099 C | 6.7   |
| 926212 | AC1-099 E | 3.94  |
| 927141 | AC1-208 C | 40.1  |
| 927142 | AC1-208 E | 17.8  |

## Appendix 9

(DVP - DVP) The 3POPLR C-3EVERETS 115 kV line (from bus 314596 to bus 314573 ckt 1) loads from 69.43% to 70.74% (**DC power flow**) of its load dump rating (239 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 246T2034'. This project contributes approximately 5.91 MW to the thermal violation.

```
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
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 5.23                     |
| 315292            | 1DOMTR78        | 3.53                     |
| 315293            | 1DOMTR9         | 2.88                     |
| 314566            | 3CRESWEL        | 2.89                     |
| 314620            | 6CASHIE         | 1.28                     |
| 314594            | 6PLYMOTH        | 1.24                     |
| 314648            | 6SUNBURY        | 0.36                     |
| 314651            | 6WINFALL        | 1.11                     |
| 933451            | AC2-158 C       | 8.3                      |
| 933452            | AC2-158 E       | 8.3                      |
| 933711            | AC2-194 C       | 0.69                     |
| 933712            | AC2-194 E       | 1.11                     |
| 933991            | AD1-023 C       | 19.83                    |
| 933992            | AD1-023 E       | 10.8                     |
| 934043            | AD1-029 BAT     | 5.91                     |
| 934521            | AD1-076 C O1    | 81.86                    |
| 934522            | AD1-076 E O1    | 41.68                    |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>AMIL</i>       | <i>0.16</i>      |
| <i>LTF</i> | <i>BAYOU</i>      | <i>0.86</i>      |
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>1.36</i>      |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>2.74</i>      |
| <i>LTF</i> | <i>BLUEG</i>      | <i>0.83</i>      |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>0.51</i>      |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.16</i>      |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>0.49</i>      |
| <i>LTF</i> | <i>CBM-N</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>1.4</i>       |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.47</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.16</i>      |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.93</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>3.03</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>3.37</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.3</i>       |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.26</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.47</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.2</i>       |
| <i>LTF</i> | <i>G-007A</i>     | <i>0.4</i>       |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.29</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>2.05</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>1.49</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.71</i>      |
| <i>LTF</i> | <i>NYISO</i>      | <i>0.08</i>      |
| <i>LTF</i> | <i>O-066A</i>     | <i>0.18</i>      |

|               |                   |              |
|---------------|-------------------|--------------|
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>1.54</i>  |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>1.01</i>  |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>0.14</i>  |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>0.14</i>  |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.35</i>  |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.3</i>   |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.16</i>  |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.63</i>  |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.9</i>   |
| <i>LTF</i>    | <i>VFT</i>        | <i>1.06</i>  |
| <i>901082</i> | <i>W1-029E</i>    | <i>24.87</i> |
| <i>LTF</i>    | <i>X1-078</i>     | <i>0.31</i>  |
| <i>913392</i> | <i>Y1-086 E</i>   | <i>1.13</i>  |
| <i>916041</i> | <i>Z1-036 C</i>   | <i>1.07</i>  |
| <i>916042</i> | <i>Z1-036 E</i>   | <i>36.63</i> |
| <i>917122</i> | <i>Z2-027 E</i>   | <i>0.55</i>  |
| <i>919731</i> | <i>AA2-059 C</i>  | <i>0.2</i>   |
| <i>919732</i> | <i>AA2-059 E</i>  | <i>0.49</i>  |
| <i>920691</i> | <i>AA2-178 C</i>  | <i>11.57</i> |
| <i>920692</i> | <i>AA2-178 E</i>  | <i>4.96</i>  |
| <i>930051</i> | <i>AB1-013 C</i>  | <i>3.49</i>  |
| <i>930052</i> | <i>AB1-013 E</i>  | <i>23.37</i> |
| <i>923831</i> | <i>AB2-022 C</i>  | <i>1.04</i>  |
| <i>923832</i> | <i>AB2-022 E</i>  | <i>0.56</i>  |
| <i>925121</i> | <i>AB2-169 C</i>  | <i>5.52</i>  |
| <i>925122</i> | <i>AB2-169 E</i>  | <i>4.95</i>  |

|               |                     |             |
|---------------|---------------------|-------------|
| <i>925281</i> | <i>AB2-186 C</i>    | <i>0.45</i> |
| <i>925282</i> | <i>AB2-186 E</i>    | <i>0.19</i> |
| <i>925291</i> | <i>AB2-188 C O1</i> | <i>2.85</i> |
| <i>925292</i> | <i>AB2-188 E O1</i> | <i>1.28</i> |

## **Appendix 10**

(DVP - DVP) The 3ROAN DP-3HORNRTN 115 kV line (from bus 314598 to bus 314578 ckt 1) loads from 85.37% to 114.34% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 12342'. This project contributes approximately 58.53 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 12342'

OPEN BUS 314554

OPEN BUS 314834

END

/\*BATTLEBORO

/\*BATTLEBORO 115KV BUS

/\*BATTLEBORO 115KV CAP

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314582            | 3KELFORD        | 1.21                     |
| 314603            | 3SCOT NK        | 8.46                     |
| 932631            | AC2-084 C       | 28.52                    |
| 932632            | AC2-084 E       | 14.05                    |
| 934041            | AD1-029 C       | 35.27                    |
| 934042            | AD1-029 E       | 23.25                    |
| LTF               | AMIL            | 0.01                     |
| LTF               | BAYOU           | 0.04                     |
| LTF               | BIG_CAJUN1      | 0.06                     |
| LTF               | BIG_CAJUN2      | 0.12                     |
| LTF               | BLUEG           | 0.06                     |
| LTF               | CALDERWOOD      | 0.02                     |
| LTF               | CANNELTON       | 0.01                     |
| LTF               | CARR            | < 0.01                   |
| LTF               | CATAWBA         | 0.02                     |
| LTF               | CELEVELAND      | 0.05                     |
| LTF               | CHEOAH          | 0.02                     |
| LTF               | CHILHOWEE       | < 0.01                   |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>CHOCTAW</i>    | <i>0.04</i>      |
| <i>LTF</i>    | <i>CLIFTY</i>     | <i>0.24</i>      |
| <i>LTF</i>    | <i>COTTONWOOD</i> | <i>0.15</i>      |
| <i>LTF</i>    | <i>DEARBORN</i>   | <i>0.03</i>      |
| <i>LTF</i>    | <i>EDWARDS</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>ELMERSMITH</i> | <i>0.03</i>      |
| <i>LTF</i>    | <i>FARMERCITY</i> | <i>0.01</i>      |
| <i>LTF</i>    | <i>G-007</i>      | <i>0.01</i>      |
| <i>LTF</i>    | <i>GIBSON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>HAMLET</i>     | <i>0.04</i>      |
| <i>LTF</i>    | <i>MORGAN</i>     | <i>0.07</i>      |
| <i>LTF</i>    | <i>NEWTON</i>     | <i>0.05</i>      |
| <i>LTF</i>    | <i>O-066</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>0.09</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>    | <i>0.03</i>      |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.01</i>      |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.03</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.03</i>      |
| <i>917331</i> | <i>Z2-043 C</i>   | <i>0.66</i>      |
| <i>917332</i> | <i>Z2-043 E</i>   | <i>1.45</i>      |

|        |           |       |
|--------|-----------|-------|
| 917341 | Z2-044 C  | 1.06  |
| 917342 | Z2-044 E  | 2.31  |
| 918561 | AA1-072 C | 0.1   |
| 918562 | AA1-072 E | 0.24  |
| 919701 | AA2-057 C | 5.54  |
| 919702 | AA2-057 E | 14.1  |
| 919821 | AA2-068 C | 1.72  |
| 919822 | AA2-068 E | 4.04  |
| 920591 | AA2-165 C | 0.76  |
| 920592 | AA2-165 E | 1.86  |
| 926201 | AC1-098 C | 20.01 |
| 926202 | AC1-098 E | 11.92 |
| 926211 | AC1-099 C | 6.7   |
| 926212 | AC1-099 E | 3.94  |
| 927141 | AC1-208 C | 40.1  |
| 927142 | AC1-208 E | 17.8  |

## Appendix 11

(DVP - DVP) The 3DARLINGT DP-3ROAN DP 115 kV line (from bus 314628 to bus 314598 ckt 1) loads from 88.44% to 117.41% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 8042'. This project contributes approximately 58.53 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 8042'

OPEN BUS 314554  
OPEN BUS 314556  
OPEN BUS 314567  
OPEN BUS 314205  
OPEN BUS 314834  
END

/\* BATTLEBORO  
/\*BATTLEBORO 115KV BUS  
/\*LINE 80  
/\*LINE 80  
/\*LINE 80  
/\*BATTLEBORO 115KV CAP

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314582            | 3KELFORD        | 1.21                     |
| 314603            | 3SCOT NK        | 8.46                     |
| 932631            | AC2-084 C       | 28.52                    |
| 932632            | AC2-084 E       | 14.05                    |
| 934041            | AD1-029 C       | 35.27                    |
| 934042            | AD1-029 E       | 23.25                    |
| LTF               | AMIL            | 0.01                     |
| LTF               | BAYOU           | 0.04                     |
| LTF               | BIG_CAJUN1      | 0.06                     |
| LTF               | BIG_CAJUN2      | 0.12                     |
| LTF               | BLUEG           | 0.06                     |
| LTF               | CALDERWOOD      | 0.02                     |
| LTF               | CANNELTON       | 0.01                     |
| LTF               | CARR            | < 0.01                   |
| LTF               | CATAWBA         | 0.02                     |
| LTF               | CELEVELAND      | 0.05                     |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.02</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.04</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>0.24</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>0.15</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.03</i>      |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.02</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.03</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.01</i>      |
| <i>LTF</i> | <i>G-007</i>      | <i>0.01</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.02</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>0.04</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.07</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.05</i>      |
| <i>LTF</i> | <i>O-066</i>      | <i>0.04</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>0.09</i>      |
| <i>LTF</i> | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ROSETON</i>    | <i>0.03</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>0.04</i>      |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TATANKA</i>    | <i>0.02</i>      |
| <i>LTF</i> | <i>TILTON</i>     | <i>0.02</i>      |
| <i>LTF</i> | <i>TRIMBLE</i>    | <i>0.01</i>      |
| <i>LTF</i> | <i>TVA</i>        | <i>0.03</i>      |
| <i>LTF</i> | <i>UNIONPOWER</i> | <i>0.03</i>      |

|        |           |       |
|--------|-----------|-------|
| 917331 | Z2-043 C  | 0.66  |
| 917332 | Z2-043 E  | 1.45  |
| 917341 | Z2-044 C  | 1.06  |
| 917342 | Z2-044 E  | 2.31  |
| 918561 | AA1-072 C | 0.1   |
| 918562 | AA1-072 E | 0.24  |
| 919701 | AA2-057 C | 5.54  |
| 919702 | AA2-057 E | 14.1  |
| 919821 | AA2-068 C | 1.72  |
| 919822 | AA2-068 E | 4.04  |
| 920591 | AA2-165 C | 0.76  |
| 920592 | AA2-165 E | 1.86  |
| 926201 | AC1-098 C | 20.01 |
| 926202 | AC1-098 E | 11.92 |
| 926211 | AC1-099 C | 6.7   |
| 926212 | AC1-099 E | 3.94  |
| 927141 | AC1-208 C | 40.1  |
| 927142 | AC1-208 E | 17.8  |

## Appendix 12

(DVP - DVP) The 6S HERTFORD-6WINFALL 230 kV line (from bus 314662 to bus 314651 ckt 1) loads from 81.27% to 82.99% (**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 15.43 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
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 5.68                     |
| 315292            | 1DOMTR78        | 3.84                     |
| 315293            | 1DOMTR9         | 3.13                     |
| 315132            | 1EDGECEMB       | 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 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    | CPL          | 2.68   |
| LTF    | G-007        | 0.47   |
| LTF    | IPL          | 1.21   |

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

|        |           |       |
|--------|-----------|-------|
| 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 13

(DVP - DVP) The Z1-036 TAP-6S HERTFORD 230 kV line (from bus 916040 to bus 314662 ckt 1) loads from 85.36% to 87.08% (**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 15.43 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 5.68                     |
| 315292            | 1DOMTR78        | 3.84                     |
| 315293            | 1DOMTR9         | 3.13                     |
| 315131            | 1EDGECEMA       | 6.42                     |
| 315132            | 1EDGECEMB       | 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    |

|            |                   |        |
|------------|-------------------|--------|
| <i>LTF</i> | <i>CPL</i>        | 2.68   |
| <i>LTF</i> | <i>G-007</i>      | 0.47   |
| <i>LTF</i> | <i>IPL</i>        | 1.21   |
| <i>LTF</i> | <i>LGEE</i>       | 0.41   |
| <i>LTF</i> | <i>MEC</i>        | 4.27   |
| <i>LTF</i> | <i>MECS</i>       | 1.94   |
| <i>LTF</i> | <i>O-066</i>      | 1.55   |
| <i>LTF</i> | <i>RENSSELAER</i> | 0.05   |
| <i>LTF</i> | <i>ROSETON</i>    | 0.38   |
| 900671     | V4-068 C          | 0.07   |
| 900672     | V4-068 E          | 0.21   |
| <i>LTF</i> | <i>WEC</i>        | 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 14

(DVP - DVP) The AC1-208 TAP-3SO JUSTICE 115 kV line (from bus 927140 to bus 313858 ckt 1) loads from 94.0% to 102.22% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 5602'. This project contributes approximately 16.6 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 5602' /\* CAROLINA 115 KV  
 OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1 /\* 3PECAN 115.00 -  
 3SEABORD 115.00  
 OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1 /\* 3BOYKINS  
 115.00 - 3MARGTSV 115.00  
 OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1 /\* 3MARGTSV  
 115.00 - 3SEABORD 115.00  
 OPEN BUS 314587 /\* ISLAND: 3MARGTSV 115.00  
 OPEN BUS 314604 /\* ISLAND: 3SEABORD 115.00  
 OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1 /\* 3CAROLNA  
 115.00 - 3EATON F 115.00  
 OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1 /\* 3CAROLNA  
 115.00 - AA2-053 TAP 115.00  
 OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1 /\* 3CAROLNA  
 115.00 - 3PLHITP 115.00  
 OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 /\* 3CAROLNA  
 115.00 - 6CAROLNA 230.00  
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315159            | 1KERR 2         | 1.26                     |
| 315164            | 1KERR 7         | 1.24                     |
| 315126            | 1ROARAP2        | 5.61                     |
| 315128            | 1ROARAP4        | 5.4                      |
| 314578            | 3HORNRTN        | 12.21                    |
| 934043            | AD1-029 BAT     | 16.6                     |
| 934231            | AD1-050 C       | 5.62                     |
| 934232            | AD1-050 E       | 3.07                     |
| LTF               | AMIL            | 0.01                     |
| LTF               | BAYOU           | 0.07                     |

|            |                   |             |
|------------|-------------------|-------------|
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>0.11</i> |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>0.21</i> |
| <i>LTF</i> | <i>BLUEG</i>      | <i>0.06</i> |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>0.04</i> |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.01</i> |
| <i>LTF</i> | <i>CARR</i>       | <i>0.02</i> |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>0.04</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>0.1</i>  |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.03</i> |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.01</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.07</i> |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>0.23</i> |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>0.27</i> |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.03</i> |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.02</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.04</i> |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.02</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>0.07</i> |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.02</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>0.22</i> |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.11</i> |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.06</i> |
| <i>LTF</i> | <i>O-066</i>      | <i>0.25</i> |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>0.12</i> |
| <i>LTF</i> | <i>RENSSELAER</i> | <i>0.02</i> |
| <i>LTF</i> | <i>ROSETON</i>    | <i>0.12</i> |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>ROWAN</i>        | <i>0.05</i>  |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.01</i>  |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.01</i>  |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.03</i>  |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.02</i>  |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.01</i>  |
| <i>LTF</i>    | <i>TVA</i>          | <i>0.05</i>  |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>0.07</i>  |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>5.75</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>13.8</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>4.15</i>  |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>1.91</i>  |
| <i>924401</i> | <i>AB2-089 C</i>    | <i>2.55</i>  |
| <i>924402</i> | <i>AB2-089 E</i>    | <i>1.31</i>  |
| <i>925781</i> | <i>AC1-054 C</i>    | <i>5.37</i>  |
| <i>925782</i> | <i>AC1-054 E</i>    | <i>2.47</i>  |
| <i>927141</i> | <i>AC1-208 C</i>    | <i>41.85</i> |
| <i>927142</i> | <i>AC1-208 E</i>    | <i>18.58</i> |

## Appendix 15

(DVP - DVP) The AC1-208 TAP-3DARLINGT DP 115 kV line (from bus 927140 to bus 314628 ckt 1) loads from 91.16% to 120.13% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 12342'. This project contributes approximately 58.53 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 12342'

OPEN BUS 314554

OPEN BUS 314834

END

/\*BATTLEBORO

/\*BATTLEBORO 115KV BUS

/\*BATTLEBORO 115KV CAP

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314582            | 3KELFORD        | 1.21                     |
| 314603            | 3SCOT NK        | 8.46                     |
| 932631            | AC2-084 C       | 28.52                    |
| 932632            | AC2-084 E       | 14.05                    |
| 934041            | AD1-029 C       | 35.27                    |
| 934042            | AD1-029 E       | 23.25                    |
| LTF               | AMIL            | 0.01                     |
| LTF               | BAYOU           | 0.04                     |
| LTF               | BIG_CAJUN1      | 0.06                     |
| LTF               | BIG_CAJUN2      | 0.12                     |
| LTF               | BLUEG           | 0.06                     |
| LTF               | CALDERWOOD      | 0.02                     |
| LTF               | CANNELTON       | 0.01                     |
| LTF               | CARR            | < 0.01                   |
| LTF               | CATAWBA         | 0.02                     |
| LTF               | CELEVELAND      | 0.05                     |
| LTF               | CHEOAH          | 0.02                     |
| LTF               | CHILHOWEE       | < 0.01                   |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>CHOCTAW</i>    | <i>0.04</i>      |
| <i>LTF</i>    | <i>CLIFTY</i>     | <i>0.24</i>      |
| <i>LTF</i>    | <i>COTTONWOOD</i> | <i>0.15</i>      |
| <i>LTF</i>    | <i>DEARBORN</i>   | <i>0.03</i>      |
| <i>LTF</i>    | <i>EDWARDS</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>ELMERSMITH</i> | <i>0.03</i>      |
| <i>LTF</i>    | <i>FARMERCITY</i> | <i>0.01</i>      |
| <i>LTF</i>    | <i>G-007</i>      | <i>0.01</i>      |
| <i>LTF</i>    | <i>GIBSON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>HAMLET</i>     | <i>0.04</i>      |
| <i>LTF</i>    | <i>MORGAN</i>     | <i>0.07</i>      |
| <i>LTF</i>    | <i>NEWTON</i>     | <i>0.05</i>      |
| <i>LTF</i>    | <i>O-066</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>0.09</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>    | <i>0.03</i>      |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>0.04</i>      |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.02</i>      |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.02</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.01</i>      |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.03</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.03</i>      |
| <i>917331</i> | <i>Z2-043 C</i>   | <i>0.66</i>      |
| <i>917332</i> | <i>Z2-043 E</i>   | <i>1.45</i>      |

|        |           |       |
|--------|-----------|-------|
| 917341 | Z2-044 C  | 1.06  |
| 917342 | Z2-044 E  | 2.31  |
| 918561 | AA1-072 C | 0.1   |
| 918562 | AA1-072 E | 0.24  |
| 919701 | AA2-057 C | 5.54  |
| 919702 | AA2-057 E | 14.1  |
| 919821 | AA2-068 C | 1.72  |
| 919822 | AA2-068 E | 4.04  |
| 920591 | AA2-165 C | 0.76  |
| 920592 | AA2-165 E | 1.86  |
| 926201 | AC1-098 C | 20.01 |
| 926202 | AC1-098 E | 11.92 |
| 926211 | AC1-099 C | 6.7   |
| 926212 | AC1-099 E | 3.94  |
| 927141 | AC1-208 C | 40.1  |
| 927142 | AC1-208 E | 17.8  |

## **Appendix 16**

(DVP - DVP) The 3CHESTNUT-3WITAKRS 115 kV line (from bus 313719 to bus 314623 ckt 1) loads from 150.96% to 180.86% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 5602'. This project contributes approximately 52.02 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 5602'                                /* CAROLINA 115 KV
  OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1          /* 3PECAN 115.00 -
3SEABORD 115.00
  OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1          /* 3BOYKINS
115.00 - 3MARGTSV 115.00
  OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1          /* 3MARGTSV
115.00 - 3SEABORD 115.00
  OPEN BUS 314587                                           /* ISLAND: 3MARGTSV 115.00
  OPEN BUS 314604                                           /* ISLAND: 3SEABORD 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1          /* 3CAROLNA
115.00 - 3EATON F 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1          /* 3CAROLNA
115.00 - AA2-053 TAP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1          /* 3CAROLNA
115.00 - 3PLHITP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1          /* 3CAROLNA
115.00 - 6CAROLNA 230.00
END
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 3.85                     |
| 315128            | 1ROARAP4        | 3.7                      |
| 314578            | 3HORNRTN        | 8.39                     |
| 314582            | 3KELFORD        | 1.13                     |
| 314603            | 3SCOT NK        | 7.6                      |
| 932631            | AC2-084 C       | 25.35                    |
| 932632            | AC2-084 E       | 12.48                    |
| 934041            | AD1-029 C       | 31.35                    |
| 934042            | AD1-029 E       | 20.67                    |
| 934231            | AD1-050 C       | 3.78                     |

|            |                   |             |
|------------|-------------------|-------------|
| 934232     | AD1-050 E         | 2.06        |
| <i>LTF</i> | <i>AMIL</i>       | <i>0.07</i> |
| <i>LTF</i> | <i>BAYOU</i>      | <i>0.38</i> |
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>0.59</i> |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>1.19</i> |
| <i>LTF</i> | <i>BLUEG</i>      | <i>0.39</i> |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>0.22</i> |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.07</i> |
| <i>LTF</i> | <i>CARR</i>       | <i>0.02</i> |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>0.21</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>0.59</i> |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.2</i>  |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.07</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.4</i>  |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>1.44</i> |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>1.48</i> |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.15</i> |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.12</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.22</i> |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.09</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>0.02</i> |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.14</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>0.89</i> |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.65</i> |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.33</i> |
| <i>LTF</i> | <i>O-066</i>      | <i>0.06</i> |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>PRAIRIE</i>      | <i>0.7</i>   |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.02</i>  |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.12</i>  |
| <i>LTF</i>    | <i>ROWAN</i>        | <i>0.42</i>  |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.06</i>  |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.06</i>  |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.16</i>  |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.14</i>  |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.07</i>  |
| <i>LTF</i>    | <i>TVA</i>          | <i>0.27</i>  |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>0.38</i>  |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.62</i>  |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>1.35</i>  |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>3.94</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>9.47</i>  |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.09</i>  |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.23</i>  |
| <i>919701</i> | <i>AA2-057 C</i>    | <i>5.99</i>  |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>15.26</i> |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>1.52</i>  |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>3.57</i>  |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.82</i>  |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>2.01</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>2.82</i>  |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>1.3</i>   |
| <i>924401</i> | <i>AB2-089 C</i>    | <i>1.71</i>  |

|               |                  |              |
|---------------|------------------|--------------|
| <i>924402</i> | <i>AB2-089 E</i> | <i>0.88</i>  |
| <i>926201</i> | <i>AC1-098 C</i> | <i>17.78</i> |
| <i>926202</i> | <i>AC1-098 E</i> | <i>10.59</i> |
| <i>926211</i> | <i>AC1-099 C</i> | <i>5.96</i>  |
| <i>926212</i> | <i>AC1-099 E</i> | <i>3.5</i>   |
| <i>927141</i> | <i>AC1-208 C</i> | <i>28.79</i> |
| <i>927142</i> | <i>AC1-208 E</i> | <i>12.78</i> |

## Appendix 17

(DVP - CPLE) The 6MORNSTR-6ROCKYMT230T 230 kV line (from bus 313845 to bus 304222 ckt 1) loads from 131.23% to 136.38% (**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 19.24 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

```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315131            | 1EDGECEMA       | 24.8                     |
| 315132            | 1EDGECEMB       | 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            | 3BETHEL C       | 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 |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>AMIL</i>       | <i>0.38</i>      |
| <i>LTF</i> | <i>BAYOU</i>      | <i>1.98</i>      |
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>3.12</i>      |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>6.28</i>      |
| <i>LTF</i> | <i>BLUEG</i>      | <i>1.99</i>      |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>1.17</i>      |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.38</i>      |
| <i>LTF</i> | <i>CARR</i>       | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>1.14</i>      |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>3.25</i>      |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>1.09</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.38</i>      |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>2.13</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>7.32</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>7.76</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.72</i>      |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.61</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>1.11</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.48</i>      |
| <i>LTF</i> | <i>G-007A</i>     | <i>0.76</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.69</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>4.52</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>3.43</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>1.68</i>      |
| <i>LTF</i> | <i>O-066A</i>     | <i>0.35</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>3.62</i>      |

|               |                     |             |
|---------------|---------------------|-------------|
| <i>LTF</i>    | <i>ROWAN</i>        | <i>2.4</i>  |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.32</i> |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.32</i> |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.82</i> |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.73</i> |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.38</i> |
| <i>LTF</i>    | <i>TVA</i>          | <i>1.45</i> |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>2.08</i> |
| <i>900671</i> | <i>V4-068 C</i>     | <i>0.07</i> |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.18</i> |
| <i>LTF</i>    | <i>VFT</i>          | <i>2.03</i> |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.59</i> |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.38</i> |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.84</i> |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>0.34</i> |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.75</i> |
| <i>917511</i> | <i>Z2-088 C OP1</i> | <i>1.68</i> |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>6.74</i> |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.25</i> |
| <i>918411</i> | <i>AA1-050</i>      | <i>1.41</i> |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>1.14</i> |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>2.74</i> |
| <i>918511</i> | <i>AA1-065 C OP</i> | <i>1.16</i> |
| <i>918512</i> | <i>AA1-065 E OP</i> | <i>2.92</i> |
| <i>918531</i> | <i>AA1-067 C</i>    | <i>0.25</i> |
| <i>918532</i> | <i>AA1-067 E</i>    | <i>0.54</i> |

|        |           |       |
|--------|-----------|-------|
| 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 18

(DVP - DVP) The 3SO JUSTICE-3COX DP 115 kV line (from bus 313858 to bus 314577 ckt 1) loads from 105.95% to 129.75% (**DC power flow**) of its load dump rating (202 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 5602'. This project contributes approximately 52.05 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 5602'                                /* CAROLINA 115 KV
  OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1          /* 3PECAN 115.00 -
3SEABORD 115.00
  OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1          /* 3BOYKINS
115.00 - 3MARGTSV 115.00
  OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1          /* 3MARGTSV
115.00 - 3SEABORD 115.00
  OPEN BUS 314587                                           /* ISLAND: 3MARGTSV 115.00
  OPEN BUS 314604                                           /* ISLAND: 3SEABORD 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1          /* 3CAROLNA
115.00 - 3EATON F 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1          /* 3CAROLNA
115.00 - AA2-053 TAP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1          /* 3CAROLNA
115.00 - 3PLHITP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1          /* 3CAROLNA
115.00 - 6CAROLNA 230.00
END
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 3.85                     |
| 315128            | 1ROARAP4        | 3.71                     |
| 314578            | 3HORNRTN        | 8.39                     |
| 314582            | 3KELFORD        | 1.13                     |
| 314603            | 3SCOT NK        | 7.6                      |
| 932631            | AC2-084 C       | 25.36                    |
| 932632            | AC2-084 E       | 12.49                    |
| 934041            | AD1-029 C       | 31.37                    |
| 934042            | AD1-029 E       | 20.68                    |
| 934231            | AD1-050 C       | 3.78                     |

|        |            |        |
|--------|------------|--------|
| 934232 | AD1-050 E  | 2.07   |
| LTF    | AMIL       | 0.07   |
| LTF    | BAYOU      | 0.35   |
| LTF    | BIG_CAJUN1 | 0.55   |
| LTF    | BIG_CAJUN2 | 1.11   |
| LTF    | BLUEG      | 0.34   |
| LTF    | CALDERWOOD | 0.2    |
| LTF    | CANNELTON  | 0.07   |
| LTF    | CARR       | 0.01   |
| LTF    | CATAWBA    | 0.2    |
| LTF    | CELEVELAND | 0.57   |
| LTF    | CHEOAH     | 0.19   |
| LTF    | CHILHOWEE  | 0.07   |
| LTF    | CHOCTAW    | 0.38   |
| LTF    | CLIFTY     | 1.26   |
| LTF    | COTTONWOOD | 1.37   |
| LTF    | DEARBORN   | 0.13   |
| LTF    | EDWARDS    | 0.11   |
| LTF    | ELMERSMITH | 0.19   |
| LTF    | FARMERCITY | 0.08   |
| LTF    | G-007A     | 0.02   |
| LTF    | GIBSON     | 0.12   |
| LTF    | HAMLET     | 0.86   |
| LTF    | MORGAN     | 0.61   |
| LTF    | NEWTON     | 0.29   |
| LTF    | O-066A     | < 0.01 |

|               |                     |                  |
|---------------|---------------------|------------------|
| <i>LTF</i>    | <i>PRAIRIE</i>      | <i>0.64</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.07</i>      |
| <i>LTF</i>    | <i>ROWAN</i>        | <i>0.4</i>       |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.06</i>      |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.06</i>      |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.14</i>      |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.13</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.07</i>      |
| <i>LTF</i>    | <i>TVA</i>          | <i>0.25</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>0.36</i>      |
| <i>LTF</i>    | <i>VFT</i>          | <i>0.05</i>      |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.02</i>      |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.62</i>      |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>1.35</i>      |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>3.95</i>      |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>9.48</i>      |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.09</i>      |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.23</i>      |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>1.52</i>      |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>3.57</i>      |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>2.83</i>      |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>1.3</i>       |
| <i>924401</i> | <i>AB2-089 C</i>    | <i>1.72</i>      |
| <i>924402</i> | <i>AB2-089 E</i>    | <i>0.88</i>      |
| <i>926201</i> | <i>AC1-098 C</i>    | <i>17.79</i>     |

|        |           |       |
|--------|-----------|-------|
| 926202 | AC1-098 E | 10.6  |
| 926211 | AC1-099 C | 5.96  |
| 926212 | AC1-099 E | 3.5   |
| 927141 | AC1-208 C | 28.81 |
| 927142 | AC1-208 E | 12.79 |

## Appendix 19

(DVP - DVP) The 6CARSON-6CHRL249 230 kV line (from bus 314282 to bus 314285 ckt 1) loads from 106.56% to 107.11% (**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 9.16 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315105            | 1BRUNSWICKS1    | 11.25                    |
| 315131            | 1EDGECEMA       | 4.76                     |
| 315132            | 1EDGECEMB       | 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    | 40.57 |
| 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  |
| 934041 | AD1-029 C    | 5.52  |
| 934042 | AD1-029 E    | 3.64  |
| 934201 | AD1-047 C    | 5.74  |
| 934202 | AD1-047 E    | 3.82  |
| 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 O1 | 5.88  |
| 934332 | AD1-057 E O1 | 3.14  |
| 934341 | AD1-058 C    | 2.35  |
| 934342 | AD1-058 E    | 0.6   |
| 934611 | AD1-087 C O1 | 3.97  |

|        |              |       |
|--------|--------------|-------|
| 934612 | AD1-087 E O1 | 1.85  |
| 934621 | AD1-088 C O1 | 5.56  |
| 934622 | AD1-088 E O1 | 2.61  |
| 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 O1 | 3.68  |
| 935172 | AD1-152 E O1 | 2.45  |
| 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       | 13.62 |
| LTF    | CBM-W2       | 33.97 |
| LTF    | CIN          | 3.08  |
| LTF    | CPL          | 3.87  |
| LTF    | G-007        | 1.04  |
| LTF    | IPL          | 1.96  |
| LTF    | LGEE         | 0.66  |
| LTF    | MEC          | 6.96  |
| LTF    | MECS         | 3.01  |
| LTF    | O-066        | 3.47  |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.14</i>  |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>1.04</i>  |
| <i>292791</i> | <i>U1-032 E</i>     | <i>-1.34</i> |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.13</i>  |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.84</i>  |
| <i>916301</i> | <i>Z1-086 C</i>     | <i>33.</i>   |
| <i>916302</i> | <i>Z1-086 E</i>     | <i>5.26</i>  |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.46</i>  |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.3</i>   |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>1.84</i>  |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.18</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>2.09</i>  |
| <i>918512</i> | <i>AA1-065 E OP</i> | <i>1.82</i>  |
| <i>918532</i> | <i>AA1-067 E</i>    | <i>0.32</i>  |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.08</i>  |
| <i>919692</i> | <i>AA2-053 E</i>    | <i>2.08</i>  |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>1.84</i>  |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>0.54</i>  |
| <i>LTF</i>    | <i>AA2-074</i>      | <i>2.63</i>  |
| <i>920022</i> | <i>AA2-086 E</i>    | <i>0.1</i>   |
| <i>920042</i> | <i>AA2-088 E</i>    | <i>4.33</i>  |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>0.24</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>1.18</i>  |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>0.54</i>  |
| <i>920672</i> | <i>AA2-174 E</i>    | <i>0.24</i>  |
| <i>930401</i> | <i>AB1-081 C</i>    | <i>4.55</i>  |

|        |              |      |
|--------|--------------|------|
| 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 | 5.21  |
| 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 6CHRL249-6LOCKS 230 kV line (from bus 314285 to bus 314316 ckt 1) loads from 103.75% to 104.3% (**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 9.16 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
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315105            | 1BRUNSWICKS1    | 11.25                    |
| 315131            | 1EDGECEMA       | 4.76                     |
| 315132            | 1EDGECEMB       | 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    | 40.57 |
| 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  |
| 934041 | AD1-029 C    | 5.52  |
| 934042 | AD1-029 E    | 3.64  |
| 934201 | AD1-047 C    | 5.74  |
| 934202 | AD1-047 E    | 3.82  |
| 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 O1 | 5.88  |
| 934332 | AD1-057 E O1 | 3.14  |
| 934341 | AD1-058 C    | 2.35  |
| 934342 | AD1-058 E    | 0.6   |
| 934611 | AD1-087 C O1 | 3.97  |

|        |              |       |
|--------|--------------|-------|
| 934612 | AD1-087 E O1 | 1.85  |
| 934621 | AD1-088 C O1 | 5.56  |
| 934622 | AD1-088 E O1 | 2.61  |
| 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 O1 | 3.68  |
| 935172 | AD1-152 E O1 | 2.45  |
| 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       | 13.62 |
| LTF    | CBM-W2       | 33.97 |
| LTF    | CIN          | 3.08  |
| LTF    | CPL          | 3.87  |
| LTF    | G-007        | 1.04  |
| LTF    | IPL          | 1.96  |
| LTF    | LGEE         | 0.66  |
| LTF    | MEC          | 6.96  |
| LTF    | MECS         | 3.01  |
| LTF    | O-066        | 3.47  |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.14</i>  |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>1.04</i>  |
| <i>292791</i> | <i>U1-032 E</i>     | <i>-1.34</i> |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.13</i>  |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.84</i>  |
| <i>916301</i> | <i>Z1-086 C</i>     | <i>33.</i>   |
| <i>916302</i> | <i>Z1-086 E</i>     | <i>5.26</i>  |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.46</i>  |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.3</i>   |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>1.84</i>  |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.18</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>2.09</i>  |
| <i>918512</i> | <i>AA1-065 E OP</i> | <i>1.82</i>  |
| <i>918532</i> | <i>AA1-067 E</i>    | <i>0.32</i>  |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.08</i>  |
| <i>919692</i> | <i>AA2-053 E</i>    | <i>2.08</i>  |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>1.84</i>  |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>0.54</i>  |
| <i>LTF</i>    | <i>AA2-074</i>      | <i>2.63</i>  |
| <i>920022</i> | <i>AA2-086 E</i>    | <i>0.1</i>   |
| <i>920042</i> | <i>AA2-088 E</i>    | <i>4.33</i>  |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>0.24</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>1.18</i>  |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>0.54</i>  |
| <i>920672</i> | <i>AA2-174 E</i>    | <i>0.24</i>  |
| <i>930401</i> | <i>AB1-081 C</i>    | <i>4.55</i>  |

|        |              |      |
|--------|--------------|------|
| 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 | 5.21  |
| 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 21

(DVP - CPLE) The 3BTLEBRO-3ROCKYMT115T 115 kV line (from bus 314554 to bus 304223 ckt 1) loads from 413.46% to 438.46% (**DC power flow**) of its emergency rating (93 MVA) for the tower line contingency outage of 'DVP\_P7-1: LN 2058-2181'. This project contributes approximately 23.25 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315131            | 1EDGECEMA       | 13.41                    |
| 315132            | 1EDGECEMB       | 13.41                    |
| 315139            | 1GASTONA        | 2.49                     |
| 315141            | 1GASTONB        | 2.49                     |
| 315126            | 1ROARAP2        | 1.04                     |
| 315128            | 1ROARAP4        | 1.                       |
| 315136            | 1ROSEMG1        | 2.02                     |
| 315138            | 1ROSEMG2        | 0.95                     |
| 315137            | 1ROSEMS1        | 1.25                     |
| 314557            | 3BETHEL C       | 0.88                     |
| 314554            | 3BTLEBRO        | 1.95                     |
| 314572            | 3EMPORIA        | 0.2                      |
| 314578            | 3HORNRTN        | 2.51                     |
| 314582            | 3KELFORD        | 0.68                     |

|        |              |        |
|--------|--------------|--------|
| 314603 | 3SCOT NK     | 3.67   |
| 314617 | 3TUNIS       | 0.44   |
| 314574 | 6EVERETS     | 1.04   |
| 932631 | AC2-084 C    | 11.33  |
| 932632 | AC2-084 E    | 5.58   |
| 933451 | AC2-158 C    | 2.27   |
| 933452 | AC2-158 E    | 2.27   |
| 933461 | AC2-159 C    | 3.97   |
| 933462 | AC2-159 E    | 3.97   |
| 934041 | AD1-029 C    | 14.01  |
| 934042 | AD1-029 E    | 9.24   |
| 934201 | AD1-047 C    | 4.29   |
| 934202 | AD1-047 E    | 2.86   |
| 934331 | AD1-057 C O1 | 11.1   |
| 934332 | AD1-057 E O1 | 5.92   |
| LTF    | AMIL         | 0.26   |
| LTF    | BAYOU        | 1.35   |
| LTF    | BIG_CAJUN1   | 2.13   |
| LTF    | BIG_CAJUN2   | 4.29   |
| LTF    | BLUEG        | 1.35   |
| LTF    | CALDERWOOD   | 0.8    |
| LTF    | CANNELTON    | 0.26   |
| LTF    | CARR         | < 0.01 |
| LTF    | CATAWBA      | 0.78   |
| LTF    | CELEVELAND   | 2.22   |
| LTF    | CHEOAH       | 0.74   |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>CHILHOWEE</i>  | <i>0.26</i>      |
| <i>LTF</i>    | <i>CHOCTAW</i>    | <i>1.45</i>      |
| <i>LTF</i>    | <i>CLIFTY</i>     | <i>4.95</i>      |
| <i>LTF</i>    | <i>COTTONWOOD</i> | <i>5.29</i>      |
| <i>LTF</i>    | <i>DEARBORN</i>   | <i>0.49</i>      |
| <i>LTF</i>    | <i>EDWARDS</i>    | <i>0.42</i>      |
| <i>LTF</i>    | <i>ELMERSMITH</i> | <i>0.75</i>      |
| <i>LTF</i>    | <i>FARMERCITY</i> | <i>0.33</i>      |
| <i>LTF</i>    | <i>G-007A</i>     | <i>0.49</i>      |
| <i>LTF</i>    | <i>GIBSON</i>     | <i>0.47</i>      |
| <i>LTF</i>    | <i>HAMLET</i>     | <i>3.13</i>      |
| <i>LTF</i>    | <i>MORGAN</i>     | <i>2.34</i>      |
| <i>LTF</i>    | <i>NEWTON</i>     | <i>1.14</i>      |
| <i>LTF</i>    | <i>O-066A</i>     | <i>0.23</i>      |
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>2.46</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>    | <i>0.01</i>      |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>1.63</i>      |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>0.22</i>      |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>0.22</i>      |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.55</i>      |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.49</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.26</i>      |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.99</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>1.42</i>      |
| <i>900672</i> | <i>V4-068 E</i>   | <i>0.15</i>      |

|               |                     |             |
|---------------|---------------------|-------------|
| <i>LTF</i>    | <i>VFT</i>          | <i>1.32</i> |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.38</i> |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.38</i> |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.82</i> |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>0.57</i> |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>1.25</i> |
| <i>917511</i> | <i>Z2-088 C OP1</i> | <i>0.92</i> |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>3.69</i> |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.2</i>  |
| <i>918411</i> | <i>AA1-050</i>      | <i>0.77</i> |
| <i>LTF</i>    | <i>AA1-055</i>      | <i>9.69</i> |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>2.28</i> |
| <i>918512</i> | <i>AA1-065 E OP</i> | <i>1.93</i> |
| <i>918532</i> | <i>AA1-067 E</i>    | <i>0.31</i> |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.06</i> |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.14</i> |
| <i>919691</i> | <i>AA2-053 C</i>    | <i>1.06</i> |
| <i>919692</i> | <i>AA2-053 E</i>    | <i>2.32</i> |
| <i>919701</i> | <i>AA2-057 C</i>    | <i>2.6</i>  |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>6.64</i> |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>0.64</i> |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>1.51</i> |
| <i>920022</i> | <i>AA2-086 E</i>    | <i>0.11</i> |
| <i>920042</i> | <i>AA2-088 E</i>    | <i>4.77</i> |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.36</i> |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>0.87</i> |

|        |              |       |
|--------|--------------|-------|
| 920671 | AA2-174 C    | 0.05  |
| 920672 | AA2-174 E    | 0.27  |
| 930401 | AB1-081 C    | 20.03 |
| 930402 | AB1-081 E    | 8.59  |
| 930861 | AB1-132 C    | 9.71  |
| 930862 | AB1-132 E    | 4.16  |
| 931231 | AB1-173 C    | 1.21  |
| 931232 | AB1-173 E    | 0.56  |
| 931241 | AB1-173AC    | 1.21  |
| 931242 | AB1-173AE    | 0.56  |
| 923911 | AB2-031 C O1 | 1.2   |
| 923912 | AB2-031 E O1 | 0.59  |
| 923941 | AB2-035 C    | 0.37  |
| 923942 | AB2-035 E    | 0.16  |
| 923991 | AB2-040 C O1 | 3.93  |
| 923992 | AB2-040 E O1 | 3.22  |
| 924151 | AB2-059 C O1 | 23.61 |
| 924152 | AB2-059 E O1 | 12.16 |
| 924381 | AB2-087 C    | 0.31  |
| 924382 | AB2-087 E    | 0.15  |
| 924391 | AB2-088 C    | 0.47  |
| 924392 | AB2-088 E    | 0.23  |
| 924491 | AB2-098 C    | 0.24  |
| 924492 | AB2-098 E    | 0.1   |
| 924501 | AB2-099 C    | 0.31  |
| 924502 | AB2-099 E    | 0.13  |

|        |              |       |
|--------|--------------|-------|
| 924511 | AB2-100 C    | 5.31  |
| 924512 | AB2-100 E    | 2.61  |
| 925171 | AB2-174 C O1 | 3.6   |
| 925172 | AB2-174 E O1 | 3.26  |
| 925591 | AC1-034 C    | 7.49  |
| 925592 | AC1-034 E    | 5.65  |
| 926071 | AC1-086 C    | 14.29 |
| 926072 | AC1-086 E    | 6.5   |
| 926201 | AC1-098 C    | 7.95  |
| 926202 | AC1-098 E    | 4.73  |
| 926211 | AC1-099 C    | 2.66  |
| 926212 | AC1-099 E    | 1.56  |
| LTF    | AC1-133      | 9.36  |
| 926771 | AC1-163 C    | 1.04  |
| 926772 | AC1-163 E    | 0.48  |
| 927021 | AC1-189 C    | 6.74  |
| 927022 | AC1-189 E    | 3.36  |
| 927111 | AC1-206 C    | 4.31  |
| 927112 | AC1-206 E    | 2.04  |
| 927141 | AC1-208 C    | 11.27 |
| 927142 | AC1-208 E    | 5.    |

## Appendix 22

(DVP - DVP) The 6CLUBHSE-6SAPONY 230 kV line (from bus 314563 to bus 314435 ckt 1) loads from 116.21% to 120.03% (**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 24.24 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

```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315131            | 1EDGECEMA       | 10.81                    |
| 315132            | 1EDGECEMB       | 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    | CPL          | 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 | <i>AB2-174 E O1</i> | <i>14.62</i> |
| 925221 | <i>AB2-176 C</i>    | <i>1.39</i>  |
| 925222 | <i>AB2-176 E</i>    | <i>0.59</i>  |
| 925291 | <i>AB2-188 C O1</i> | <i>1.67</i>  |
| 925292 | <i>AB2-188 E O1</i> | <i>0.75</i>  |
| 925591 | <i>AC1-034 C</i>    | <i>7.73</i>  |
| 925592 | <i>AC1-034 E</i>    | <i>5.83</i>  |
| 925781 | <i>AC1-054 C</i>    | <i>8.28</i>  |
| 925782 | <i>AC1-054 E</i>    | <i>3.81</i>  |
| 926071 | <i>AC1-086 C</i>    | <i>43.47</i> |
| 926072 | <i>AC1-086 E</i>    | <i>19.78</i> |
| 926201 | <i>AC1-098 C</i>    | <i>8.29</i>  |
| 926202 | <i>AC1-098 E</i>    | <i>4.94</i>  |
| 926211 | <i>AC1-099 C</i>    | <i>2.78</i>  |
| 926212 | <i>AC1-099 E</i>    | <i>1.63</i>  |
| 926771 | <i>AC1-163 C</i>    | <i>2.41</i>  |
| 926772 | <i>AC1-163 E</i>    | <i>1.13</i>  |
| 927021 | <i>AC1-189 C</i>    | <i>9.39</i>  |
| 927022 | <i>AC1-189 E</i>    | <i>4.68</i>  |
| 927111 | <i>AC1-206 C</i>    | <i>32.26</i> |
| 927112 | <i>AC1-206 E</i>    | <i>15.25</i> |
| 927141 | <i>AC1-208 C</i>    | <i>13.11</i> |
| 927142 | <i>AC1-208 E</i>    | <i>5.82</i>  |

## Appendix 23

(DVP - DVP) The 6CLUBHSE 230/115 kV transformer (from bus 314563 to bus 314562 ckt 1) loads from 106.92% to 109.32% (**DC power flow**) of its load dump rating (209 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 239T2141'. This project contributes approximately 9.45 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 239T2141' /\* LAKEVIEW  
 OPEN BRANCH FROM BUS 314583 TO BUS 314579 CKT 1 /\* 239  
 OPEN BRANCH FROM BUS 314579 TO BUS 314605 CKT 1 /\* 2057  
 OPEN BRANCH FROM BUS 314583 TO BUS 314561 CKT 1 /\* 2141  
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315139            | 1GASTONA        | 4.6                      |
| 315141            | 1GASTONB        | 4.6                      |
| 314541            | 3WATKINS        | -0.27                    |
| 934043            | AD1-029 BAT     | 9.45                     |
| 934233            | AD1-050 BAT     | 5.52                     |
| LTF               | AMIL            | 0.13                     |
| LTF               | BAYOU           | 0.69                     |
| LTF               | BIG_CAJUN1      | 1.09                     |
| LTF               | BIG_CAJUN2      | 2.18                     |
| LTF               | BLUEG           | 0.69                     |
| LTF               | CALDERWOOD      | 0.41                     |
| LTF               | CANNELTON       | 0.13                     |
| LTF               | CATAWBA         | 0.39                     |
| LTF               | CBM-N           | 0.02                     |
| LTF               | CELEVELAND      | 1.12                     |
| LTF               | CHEOAH          | 0.38                     |
| LTF               | CHILHOWEE       | 0.13                     |

|               |                   |             |
|---------------|-------------------|-------------|
| <i>LTF</i>    | <i>CHOCTAW</i>    | <i>0.74</i> |
| <i>LTF</i>    | <i>CLIFTY</i>     | <i>2.53</i> |
| <i>LTF</i>    | <i>COTTONWOOD</i> | <i>2.7</i>  |
| <i>LTF</i>    | <i>DEARBORN</i>   | <i>0.23</i> |
| <i>LTF</i>    | <i>EDWARDS</i>    | <i>0.21</i> |
| <i>LTF</i>    | <i>ELMERSMITH</i> | <i>0.39</i> |
| <i>LTF</i>    | <i>FARMERCITY</i> | <i>0.17</i> |
| <i>LTF</i>    | <i>G-007A</i>     | <i>0.55</i> |
| <i>LTF</i>    | <i>GIBSON</i>     | <i>0.24</i> |
| <i>LTF</i>    | <i>HAMLET</i>     | <i>1.52</i> |
| <i>LTF</i>    | <i>MORGAN</i>     | <i>1.2</i>  |
| <i>LTF</i>    | <i>NEWTON</i>     | <i>0.58</i> |
| <i>LTF</i>    | <i>NYISO</i>      | <i>0.28</i> |
| <i>LTF</i>    | <i>O-066A</i>     | <i>0.26</i> |
| <i>LTF</i>    | <i>PRAIRIE</i>    | <i>1.25</i> |
| <i>LTF</i>    | <i>ROWAN</i>      | <i>0.83</i> |
| <i>LTF</i>    | <i>SANTEETLA</i>  | <i>0.11</i> |
| <i>LTF</i>    | <i>SMITHLAND</i>  | <i>0.11</i> |
| <i>LTF</i>    | <i>TATANKA</i>    | <i>0.28</i> |
| <i>LTF</i>    | <i>TILTON</i>     | <i>0.25</i> |
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>0.13</i> |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.51</i> |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.72</i> |
| <i>LTF</i>    | <i>VFT</i>        | <i>1.48</i> |
| <i>LTF</i>    | <i>X1-078</i>     | <i>0.42</i> |
| <i>930861</i> | <i>AB1-132 C</i>  | <i>17.9</i> |

|        |           |       |
|--------|-----------|-------|
| 930862 | AB1-132 E | 7.67  |
| 923851 | AB2-025 C | 0.33  |
| 923852 | AB2-025 E | 0.75  |
| 924511 | AB2-100 C | 14.28 |
| 924512 | AB2-100 E | 7.03  |
| 926071 | AC1-086 C | 26.37 |
| 926072 | AC1-086 E | 12.   |
| 927111 | AC1-206 C | 12.3  |
| 927112 | AC1-206 E | 5.82  |

## **Appendix 24**

(DVP - DVP) The 6EARLEYS 230/115 kV transformer (from bus 314568 to bus 314569 ckt 1) loads from 112.99% to 125.95% (**DC power flow**) of its load dump rating (208 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 2012TH4'. This project contributes approximately 26.93 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 2012TH4' /\* EARLEYS  
 OPEN BRANCH FROM BUS 314569 TO BUS 314266 CKT 1 /\* 2012  
 OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /\* 2012  
 OPEN BRANCH FROM BUS 314569 TO BUS 314568 CKT 2 /\* TX. #4  
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 1.31                     |
| 315128            | 1ROARAP4        | 1.26                     |
| 315115            | 1S HAMPT1       | 1.43                     |
| 314578            | 3HORNRTN        | 2.79                     |
| 314582            | 3KELFORD        | 2.21                     |
| 314603            | 3SCOT NK        | 6.37                     |
| 314617            | 3TUNIS          | 2.13                     |
| 314539            | 3UNCAMP         | 1.47                     |
| 314541            | 3WATKINS        | 0.53                     |
| 932631            | AC2-084 C       | 13.12                    |
| 932632            | AC2-084 E       | 6.46                     |
| 933461            | AC2-159 C       | 13.79                    |
| 933462            | AC2-159 E       | 13.79                    |
| 934041            | AD1-029 C       | 16.23                    |
| 934042            | AD1-029 E       | 10.7                     |
| 934201            | AD1-047 C       | 4.57                     |
| 934202            | AD1-047 E       | 3.05                     |

|               |                     |             |
|---------------|---------------------|-------------|
| <i>LTF</i>    | <i>CARR</i>         | <i>0.02</i> |
| <i>LTF</i>    | <i>CBM-S1</i>       | <i>0.3</i>  |
| <i>LTF</i>    | <i>CBM-S2</i>       | <i>0.51</i> |
| <i>LTF</i>    | <i>CBM-W1</i>       | <i>0.63</i> |
| <i>LTF</i>    | <i>CBM-W2</i>       | <i>1.59</i> |
| <i>LTF</i>    | <i>CIN</i>          | <i>0.15</i> |
| <i>LTF</i>    | <i>CPL</i>          | <i>0.12</i> |
| <i>LTF</i>    | <i>G-007</i>        | <i>0.09</i> |
| <i>LTF</i>    | <i>IPL</i>          | <i>0.09</i> |
| <i>LTF</i>    | <i>LGEE</i>         | <i>0.03</i> |
| <i>LTF</i>    | <i>MEC</i>          | <i>0.33</i> |
| <i>LTF</i>    | <i>MECS</i>         | <i>0.13</i> |
| <i>LTF</i>    | <i>O-066</i>        | <i>0.3</i>  |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.11</i> |
| <i>900671</i> | <i>V4-068 C</i>     | <i>0.19</i> |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.53</i> |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.04</i> |
| <i>907092</i> | <i>X1-038 E</i>     | <i>3.69</i> |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>1.21</i> |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>2.65</i> |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.31</i> |
| <i>917591</i> | <i>Z2-099 C</i>     | <i>0.22</i> |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.48</i> |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>1.55</i> |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>3.71</i> |

|        |              |       |
|--------|--------------|-------|
| 918561 | AA1-072 C    | 0.18  |
| 918562 | AA1-072 E    | 0.44  |
| 919691 | AA2-053 C    | 2.35  |
| 919692 | AA2-053 E    | 5.15  |
| 919701 | AA2-057 C    | 1.05  |
| 919702 | AA2-057 E    | 2.66  |
| 919821 | AA2-068 C    | 0.46  |
| 919822 | AA2-068 E    | 1.08  |
| 920021 | AA2-086 C    | 0.11  |
| 920022 | AA2-086 E    | 0.26  |
| 920041 | AA2-088 C    | 1.35  |
| 920042 | AA2-088 E    | 11.24 |
| 920591 | AA2-165 C    | 0.14  |
| 920592 | AA2-165 E    | 0.35  |
| 920631 | AA2-169 C    | 1.18  |
| 920632 | AA2-169 E    | 0.54  |
| 920671 | AA2-174 C    | 0.11  |
| 920672 | AA2-174 E    | 0.6   |
| 931231 | AB1-173 C    | 1.29  |
| 931232 | AB1-173 E    | 0.6   |
| 931241 | AB1-173AC    | 1.29  |
| 931242 | AB1-173AE    | 0.6   |
| 923801 | AB2-015 C O1 | 6.06  |
| 923802 | AB2-015 E O1 | 4.97  |
| 923911 | AB2-031 C O1 | 1.28  |
| 923912 | AB2-031 E O1 | 0.63  |

|        |                     |             |
|--------|---------------------|-------------|
| 923991 | <i>AB2-040 C O1</i> | <i>4.19</i> |
| 923992 | <i>AB2-040 E O1</i> | <i>3.43</i> |
| 924381 | <i>AB2-087 C</i>    | <i>1.9</i>  |
| 924382 | <i>AB2-087 E</i>    | <i>0.9</i>  |
| 924501 | <i>AB2-099 C</i>    | <i>1.74</i> |
| 924502 | <i>AB2-099 E</i>    | <i>0.75</i> |
| 925171 | <i>AB2-174 C O1</i> | <i>3.65</i> |
| 925172 | <i>AB2-174 E O1</i> | <i>3.3</i>  |
| 926201 | <i>AC1-098 C</i>    | <i>9.21</i> |
| 926202 | <i>AC1-098 E</i>    | <i>5.48</i> |
| 926211 | <i>AC1-099 C</i>    | <i>3.09</i> |
| 926212 | <i>AC1-099 E</i>    | <i>1.81</i> |
| 926771 | <i>AC1-163 C</i>    | <i>5.74</i> |
| 926772 | <i>AC1-163 E</i>    | <i>2.69</i> |
| 927141 | <i>AC1-208 C</i>    | <i>8.93</i> |
| 927142 | <i>AC1-208 E</i>    | <i>3.96</i> |

## Appendix 25

(DVP - DVP) The 6EARLEYS 230/115 kV transformer (from bus 314568 to bus 314569 ckt 2) loads from 102.91% to 114.72% (**DC power flow**) of its load dump rating (228 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 201262'. This project contributes approximately 26.93 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 201262' /\* EARLEYS  
 OPEN BRANCH FROM BUS 314569 TO BUS 314266 CKT 1 /\* 2012  
 OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /\* 2012  
 OPEN BRANCH FROM BUS 314569 TO BUS 314568 CKT 1 /\* TX. #3  
 END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 1.31                     |
| 315128            | 1ROARAP4        | 1.26                     |
| 315115            | 1S HAMPT1       | 1.43                     |
| 314578            | 3HORNRTN        | 2.79                     |
| 314582            | 3KELFORD        | 2.21                     |
| 314603            | 3SCOT NK        | 6.37                     |
| 314617            | 3TUNIS          | 2.13                     |
| 314539            | 3UNCAMP         | 1.47                     |
| 314541            | 3WATKINS        | 0.53                     |
| 932631            | AC2-084 C       | 13.12                    |
| 932632            | AC2-084 E       | 6.46                     |
| 933461            | AC2-159 C       | 13.79                    |
| 933462            | AC2-159 E       | 13.79                    |
| 934041            | AD1-029 C       | 16.23                    |
| 934042            | AD1-029 E       | 10.7                     |
| 934201            | AD1-047 C       | 4.57                     |
| 934202            | AD1-047 E       | 3.05                     |

|               |                     |             |
|---------------|---------------------|-------------|
| <i>LTF</i>    | <i>CARR</i>         | <i>0.02</i> |
| <i>LTF</i>    | <i>CBM-S1</i>       | <i>0.3</i>  |
| <i>LTF</i>    | <i>CBM-S2</i>       | <i>0.51</i> |
| <i>LTF</i>    | <i>CBM-W1</i>       | <i>0.63</i> |
| <i>LTF</i>    | <i>CBM-W2</i>       | <i>1.59</i> |
| <i>LTF</i>    | <i>CIN</i>          | <i>0.15</i> |
| <i>LTF</i>    | <i>CPL</i>          | <i>0.12</i> |
| <i>LTF</i>    | <i>G-007</i>        | <i>0.09</i> |
| <i>LTF</i>    | <i>IPL</i>          | <i>0.09</i> |
| <i>LTF</i>    | <i>LGEE</i>         | <i>0.03</i> |
| <i>LTF</i>    | <i>MEC</i>          | <i>0.33</i> |
| <i>LTF</i>    | <i>MECS</i>         | <i>0.13</i> |
| <i>LTF</i>    | <i>O-066</i>        | <i>0.3</i>  |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.11</i> |
| <i>900671</i> | <i>V4-068 C</i>     | <i>0.19</i> |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.53</i> |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.04</i> |
| <i>907092</i> | <i>X1-038 E</i>     | <i>3.69</i> |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>1.21</i> |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>2.65</i> |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.31</i> |
| <i>917591</i> | <i>Z2-099 C</i>     | <i>0.22</i> |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.48</i> |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>1.55</i> |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>3.71</i> |

|        |              |       |
|--------|--------------|-------|
| 918561 | AA1-072 C    | 0.18  |
| 918562 | AA1-072 E    | 0.44  |
| 919691 | AA2-053 C    | 2.35  |
| 919692 | AA2-053 E    | 5.15  |
| 919701 | AA2-057 C    | 1.05  |
| 919702 | AA2-057 E    | 2.66  |
| 919821 | AA2-068 C    | 0.46  |
| 919822 | AA2-068 E    | 1.08  |
| 920021 | AA2-086 C    | 0.11  |
| 920022 | AA2-086 E    | 0.26  |
| 920041 | AA2-088 C    | 1.35  |
| 920042 | AA2-088 E    | 11.24 |
| 920591 | AA2-165 C    | 0.14  |
| 920592 | AA2-165 E    | 0.35  |
| 920631 | AA2-169 C    | 1.18  |
| 920632 | AA2-169 E    | 0.54  |
| 920671 | AA2-174 C    | 0.11  |
| 920672 | AA2-174 E    | 0.6   |
| 931231 | AB1-173 C    | 1.29  |
| 931232 | AB1-173 E    | 0.6   |
| 931241 | AB1-173AC    | 1.29  |
| 931242 | AB1-173AE    | 0.6   |
| 923801 | AB2-015 C O1 | 6.06  |
| 923802 | AB2-015 E O1 | 4.97  |
| 923911 | AB2-031 C O1 | 1.28  |
| 923912 | AB2-031 E O1 | 0.63  |

|        |                     |             |
|--------|---------------------|-------------|
| 923991 | <i>AB2-040 C O1</i> | <i>4.19</i> |
| 923992 | <i>AB2-040 E O1</i> | <i>3.43</i> |
| 924381 | <i>AB2-087 C</i>    | <i>1.9</i>  |
| 924382 | <i>AB2-087 E</i>    | <i>0.9</i>  |
| 924501 | <i>AB2-099 C</i>    | <i>1.74</i> |
| 924502 | <i>AB2-099 E</i>    | <i>0.75</i> |
| 925171 | <i>AB2-174 C O1</i> | <i>3.65</i> |
| 925172 | <i>AB2-174 E O1</i> | <i>3.3</i>  |
| 926201 | <i>AC1-098 C</i>    | <i>9.21</i> |
| 926202 | <i>AC1-098 E</i>    | <i>5.48</i> |
| 926211 | <i>AC1-099 C</i>    | <i>3.09</i> |
| 926212 | <i>AC1-099 E</i>    | <i>1.81</i> |
| 926771 | <i>AC1-163 C</i>    | <i>5.74</i> |
| 926772 | <i>AC1-163 E</i>    | <i>2.69</i> |
| 927141 | <i>AC1-208 C</i>    | <i>8.93</i> |
| 927142 | <i>AC1-208 E</i>    | <i>3.96</i> |

## **Appendix 26**

(DVP - CPLE) The 6EVERETS-6GREENVILLE T 230 kV line (from bus 314574 to bus 304451 ckt 1) loads from 117.05% to 118.24% (**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 12.65 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 3.12                     |
| 315292            | 1DOMTR78        | 2.11                     |
| 315293            | 1DOMTR9         | 1.72                     |
| 315131            | 1EDGECEMA       | 9.28                     |
| 315132            | 1EDGECEMB       | 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            |
| <i>LTF</i> | <i>AMIL</i>       | <i>0.48</i>      |
| <i>LTF</i> | <i>BAYOU</i>      | <i>2.64</i>      |
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>4.17</i>      |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>8.39</i>      |
| <i>LTF</i> | <i>BLUEG</i>      | <i>2.5</i>       |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>1.54</i>      |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.48</i>      |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>1.51</i>      |
| <i>LTF</i> | <i>CBM-N</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>4.27</i>      |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>1.44</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.5</i>       |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>2.84</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>9.05</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>10.33</i>     |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.9</i>       |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.78</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>1.42</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.62</i>      |
| <i>LTF</i> | <i>G-007A</i>     | <i>1.03</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.88</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>6.47</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>4.57</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>2.15</i>      |
| <i>LTF</i> | <i>NYISO</i>      | <i>0.09</i>      |

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

|        |              |       |
|--------|--------------|-------|
| 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 27

(DVP - DVP) The 3COX DP-3CHESTNUT 115 kV line (from bus 314577 to bus 313719 ckt 1) loads from 116.85% to 144.48% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 5602'. This project contributes approximately 52.05 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 5602'                                /* CAROLINA 115 KV
  OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1          /* 3PECAN 115.00 -
3SEABORD 115.00
  OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1          /* 3BOYKINS
115.00 - 3MARGTSV 115.00
  OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1          /* 3MARGTSV
115.00 - 3SEABORD 115.00
  OPEN BUS 314587                                           /* ISLAND: 3MARGTSV 115.00
  OPEN BUS 314604                                           /* ISLAND: 3SEABORD 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1          /* 3CAROLNA
115.00 - 3EATON F 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1          /* 3CAROLNA
115.00 - AA2-053 TAP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1          /* 3CAROLNA
115.00 - 3PLHITP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1          /* 3CAROLNA
115.00 - 6CAROLNA 230.00
END
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 3.85                     |
| 315128            | 1ROARAP4        | 3.71                     |
| 314578            | 3HORNRTN        | 8.39                     |
| 314582            | 3KELFORD        | 1.13                     |
| 314603            | 3SCOT NK        | 7.6                      |
| 932631            | AC2-084 C       | 25.36                    |
| 932632            | AC2-084 E       | 12.49                    |
| 934041            | AD1-029 C       | 31.37                    |
| 934042            | AD1-029 E       | 20.68                    |
| 934231            | AD1-050 C       | 3.78                     |

|        |            |        |
|--------|------------|--------|
| 934232 | AD1-050 E  | 2.07   |
| LTF    | AMIL       | 0.07   |
| LTF    | BAYOU      | 0.35   |
| LTF    | BIG_CAJUN1 | 0.55   |
| LTF    | BIG_CAJUN2 | 1.11   |
| LTF    | BLUEG      | 0.34   |
| LTF    | CALDERWOOD | 0.2    |
| LTF    | CANNELTON  | 0.07   |
| LTF    | CARR       | 0.01   |
| LTF    | CATAWBA    | 0.2    |
| LTF    | CELEVELAND | 0.57   |
| LTF    | CHEOAH     | 0.19   |
| LTF    | CHILHOWEE  | 0.07   |
| LTF    | CHOCTAW    | 0.38   |
| LTF    | CLIFTY     | 1.26   |
| LTF    | COTTONWOOD | 1.37   |
| LTF    | DEARBORN   | 0.13   |
| LTF    | EDWARDS    | 0.11   |
| LTF    | ELMERSMITH | 0.19   |
| LTF    | FARMERCITY | 0.08   |
| LTF    | G-007A     | 0.02   |
| LTF    | GIBSON     | 0.12   |
| LTF    | HAMLET     | 0.86   |
| LTF    | MORGAN     | 0.61   |
| LTF    | NEWTON     | 0.29   |
| LTF    | O-066A     | < 0.01 |

|               |                     |                  |
|---------------|---------------------|------------------|
| <i>LTF</i>    | <i>PRAIRIE</i>      | <i>0.64</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.07</i>      |
| <i>LTF</i>    | <i>ROWAN</i>        | <i>0.4</i>       |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.06</i>      |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.06</i>      |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.14</i>      |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.13</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.07</i>      |
| <i>LTF</i>    | <i>TVA</i>          | <i>0.25</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>0.36</i>      |
| <i>LTF</i>    | <i>VFT</i>          | <i>0.05</i>      |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.02</i>      |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.62</i>      |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>1.35</i>      |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>3.95</i>      |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>9.48</i>      |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.09</i>      |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.23</i>      |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>1.52</i>      |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>3.57</i>      |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>2.83</i>      |
| <i>920632</i> | <i>AA2-169 E</i>    | <i>1.3</i>       |
| <i>924401</i> | <i>AB2-089 C</i>    | <i>1.72</i>      |
| <i>924402</i> | <i>AB2-089 E</i>    | <i>0.88</i>      |
| <i>926201</i> | <i>AC1-098 C</i>    | <i>17.79</i>     |

|        |                  |              |
|--------|------------------|--------------|
| 926202 | <i>AC1-098 E</i> | <i>10.6</i>  |
| 926211 | <i>AC1-099 C</i> | <i>5.96</i>  |
| 926212 | <i>AC1-099 E</i> | <i>3.5</i>   |
| 927141 | <i>AC1-208 C</i> | <i>28.81</i> |
| 927142 | <i>AC1-208 E</i> | <i>12.79</i> |

## Appendix 28

(DVP - DVP) The 3KELFORD-3EARLEYS 115 kV line (from bus 314582 to bus 314568 ckt 1) loads from 160.85% to 223.7% (**DC power flow**) of its load dump rating (175 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 8142'. This project contributes approximately 109.98 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 8142'

OPEN BUS 314554  
OPEN BUS 314556  
OPEN BUS 314567  
OPEN BUS 314205  
OPEN BUS 314834  
OPEN BUS 314623  
OPEN BUS 314577  
OPEN BUS 314628  
OPEN BUS 314598  
OPEN BUS 314578  
END

/\* BATTLEBORO  
/\*BATTLEBORO 115KV BUS  
/\*LINE 80  
/\*LINE 80  
/\*LINE 80  
/\*BATTLEBORO 115KV CAP  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314582            | 3KELFORD        | 5.                       |
| 314603            | 3SCOT NK        | 20.                      |
| 932631            | AC2-084 C       | 53.59                    |
| 932632            | AC2-084 E       | 26.4                     |
| 934041            | AD1-029 C       | 66.29                    |
| 934042            | AD1-029 E       | 43.69                    |
| LTF               | AMIL            | < 0.01                   |
| LTF               | BAYOU           | 0.02                     |
| LTF               | BIG_CAJUN1      | 0.02                     |
| LTF               | BIG_CAJUN2      | 0.05                     |
| LTF               | BLUEG           | 0.03                     |
| LTF               | CALDERWOOD      | < 0.01                   |
| LTF               | CANNELTON       | < 0.01                   |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CARR</i>       | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>0.02</i>      |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.02</i>      |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>0.11</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>0.06</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.01</i>      |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.01</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>0.02</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>0.02</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.03</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.02</i>      |
| <i>LTF</i> | <i>O-066</i>      | <i>0.05</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>0.04</i>      |
| <i>LTF</i> | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ROSETON</i>    | <i>0.03</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>0.01</i>      |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TATANKA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TILTON</i>     | <i>&lt; 0.01</i> |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>TRIMBLE</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>TVA</i>        | <i>0.01</i>      |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.01</i>      |
| <i>917331</i> | <i>Z2-043 C</i>   | <i>2.75</i>      |
| <i>917332</i> | <i>Z2-043 E</i>   | <i>6.</i>        |
| <i>918561</i> | <i>AA1-072 C</i>  | <i>0.41</i>      |
| <i>918562</i> | <i>AA1-072 E</i>  | <i>1.</i>        |
| <i>919821</i> | <i>AA2-068 C</i>  | <i>2.69</i>      |
| <i>919822</i> | <i>AA2-068 E</i>  | <i>6.3</i>       |
| <i>926201</i> | <i>AC1-098 C</i>  | <i>37.59</i>     |
| <i>926202</i> | <i>AC1-098 E</i>  | <i>22.4</i>      |
| <i>926211</i> | <i>AC1-099 C</i>  | <i>12.6</i>      |
| <i>926212</i> | <i>AC1-099 E</i>  | <i>7.4</i>       |
| <i>927141</i> | <i>AC1-208 C</i>  | <i>55.39</i>     |
| <i>927142</i> | <i>AC1-208 E</i>  | <i>24.6</i>      |

## **Appendix 29**

(DVP - DVP) The 6LAKEVEW-6CAROLNA 230 kV line (from bus 314583 to bus 314561 ckt 1) loads from 123.1% to 126.91% (**DC power flow**) of its emergency rating (375 MVA) for the single line contingency outage of 'DVP\_P1-2: LN 2056-A'. This project contributes approximately 14.31 MW to the thermal violation.

CONTINGENCY 'DVP\_P1-2: LN 2056-A'

OPEN BRANCH FROM BUS 313845 TO BUS 934330 CKT 1

/\* 6HATHAWAY

230.00 - AD1-057 TAP 230.00

END

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315139            | 1GASTONA        | 12.26                    |
| 315141            | 1GASTONB        | 12.26                    |
| 315136            | 1ROSEMG1        | 8.8                      |
| 315138            | 1ROSEMG2        | 4.12                     |
| 315137            | 1ROSEMS1        | 5.46                     |
| 314704            | 3LAWRENC        | 0.21                     |
| 934043            | AD1-029 BAT     | 14.31                    |
| 934233            | AD1-050 BAT     | 3.5                      |
| 934331            | AD1-057 C O1    | 34.8                     |
| 935211            | AD1-156 C       | 0.6                      |
| LTF               | AMIL            | 0.18                     |
| LTF               | BAYOU           | 0.93                     |
| LTF               | BIG_CAJUN1      | 1.47                     |
| LTF               | BIG_CAJUN2      | 2.95                     |
| LTF               | BLUEG           | 0.92                     |
| LTF               | CALDERWOOD      | 0.55                     |
| LTF               | CANNELTON       | 0.18                     |
| LTF               | CATAWBA         | 0.53                     |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CBM-N</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>1.5</i>       |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.51</i>      |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.18</i>      |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>1.</i>        |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>3.38</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>3.64</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.33</i>      |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.28</i>      |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.52</i>      |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.22</i>      |
| <i>LTF</i> | <i>G-007A</i>     | <i>0.39</i>      |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.32</i>      |
| <i>LTF</i> | <i>HAMLET</i>     | <i>2.16</i>      |
| <i>LTF</i> | <i>MORGAN</i>     | <i>1.61</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.78</i>      |
| <i>LTF</i> | <i>NYISO</i>      | <i>0.03</i>      |
| <i>LTF</i> | <i>O-066A</i>     | <i>0.18</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>1.69</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>1.08</i>      |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>0.15</i>      |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>0.15</i>      |
| <i>LTF</i> | <i>TATANKA</i>    | <i>0.38</i>      |
| <i>LTF</i> | <i>TILTON</i>     | <i>0.34</i>      |
| <i>LTF</i> | <i>TRIMBLE</i>    | <i>0.18</i>      |
| <i>LTF</i> | <i>TVA</i>        | <i>0.68</i>      |

|               |                   |              |
|---------------|-------------------|--------------|
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>0.97</i>  |
| <i>LTF</i>    | <i>VFT</i>        | <i>1.03</i>  |
| <i>LTF</i>    | <i>X1-078</i>     | <i>0.3</i>   |
| <i>930861</i> | <i>AB1-132 C</i>  | <i>47.69</i> |
| <i>923851</i> | <i>AB2-025 C</i>  | <i>0.44</i>  |
| <i>924511</i> | <i>AB2-100 C</i>  | <i>21.43</i> |
| <i>926071</i> | <i>AC1-086 C</i>  | <i>70.23</i> |
| <i>927111</i> | <i>AC1-206 C</i>  | <i>16.67</i> |

## Appendix 30

(DVP - DVP) The 3SAMS HD-3KELFORD 115 kV line (from bus 314602 to bus 314582 ckt 1) loads from 151.82% to 215.03% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 8142'. This project contributes approximately 109.99 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 8142'

OPEN BUS 314554  
OPEN BUS 314556  
OPEN BUS 314567  
OPEN BUS 314205  
OPEN BUS 314834  
OPEN BUS 314623  
OPEN BUS 314577  
OPEN BUS 314628  
OPEN BUS 314598  
OPEN BUS 314578  
END

/\* BATTLEBORO  
/\*BATTLEBORO 115KV BUS  
/\*LINE 80  
/\*LINE 80  
/\*LINE 80  
/\*BATTLEBORO 115KV CAP  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314603            | 3SCOT NK        | 20.                      |
| 932631            | AC2-084 C       | 53.6                     |
| 932632            | AC2-084 E       | 26.4                     |
| 934041            | AD1-029 C       | 66.3                     |
| 934042            | AD1-029 E       | 43.7                     |
| LTF               | AMIL            | < 0.01                   |
| LTF               | BAYOU           | < 0.01                   |
| LTF               | BIG_CAJUN1      | 0.01                     |
| LTF               | BIG_CAJUN2      | 0.02                     |
| LTF               | BLUEG           | 0.01                     |
| LTF               | CALDERWOOD      | < 0.01                   |
| LTF               | CANNELTON       | < 0.01                   |
| LTF               | CARR            | < 0.01                   |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CATAWBA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>0.05</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>0.03</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>GIBSON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.01</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>O-066</i>      | <i>0.02</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>0.02</i>      |
| <i>LTF</i> | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ROSETON</i>    | <i>0.01</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TATANKA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TILTON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TRIMBLE</i>    | <i>&lt; 0.01</i> |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>TVA</i>        | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>&lt; 0.01</i> |
| <i>919821</i> | <i>AA2-068 C</i>  | <i>2.69</i>      |
| <i>919822</i> | <i>AA2-068 E</i>  | <i>6.3</i>       |
| <i>926201</i> | <i>AC1-098 C</i>  | <i>37.6</i>      |
| <i>926202</i> | <i>AC1-098 E</i>  | <i>22.4</i>      |
| <i>926211</i> | <i>AC1-099 C</i>  | <i>12.6</i>      |
| <i>926212</i> | <i>AC1-099 E</i>  | <i>7.4</i>       |
| <i>927141</i> | <i>AC1-208 C</i>  | <i>55.4</i>      |
| <i>927142</i> | <i>AC1-208 E</i>  | <i>24.6</i>      |

## Appendix 31

(DVP - DVP) The 3SCOT NK-3SAMS HD 115 kV line (from bus 314603 to bus 314602 ckt 1) loads from 152.97% to 216.18% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 8142'. This project contributes approximately 109.99 MW to the thermal violation.

CONTINGENCY 'DVP\_P4-2: 8142'

OPEN BUS 314554  
OPEN BUS 314556  
OPEN BUS 314567  
OPEN BUS 314205  
OPEN BUS 314834  
OPEN BUS 314623  
OPEN BUS 314577  
OPEN BUS 314628  
OPEN BUS 314598  
OPEN BUS 314578  
END

/\* BATTLEBORO  
/\*BATTLEBORO 115KV BUS  
/\*LINE 80  
/\*LINE 80  
/\*LINE 80  
/\*BATTLEBORO 115KV CAP  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81  
/\*LINE 81

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 314603            | 3SCOT NK        | 20.                      |
| 932631            | AC2-084 C       | 53.6                     |
| 932632            | AC2-084 E       | 26.4                     |
| 934041            | AD1-029 C       | 66.3                     |
| 934042            | AD1-029 E       | 43.7                     |
| LTF               | AMIL            | < 0.01                   |
| LTF               | BAYOU           | < 0.01                   |
| LTF               | BIG_CAJUN1      | 0.01                     |
| LTF               | BIG_CAJUN2      | 0.02                     |
| LTF               | BLUEG           | 0.01                     |
| LTF               | CALDERWOOD      | < 0.01                   |
| LTF               | CANNELTON       | < 0.01                   |
| LTF               | CARR            | < 0.01                   |

|            |                   |                  |
|------------|-------------------|------------------|
| <i>LTF</i> | <i>CATAWBA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>0.05</i>      |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>0.03</i>      |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>GIBSON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.01</i>      |
| <i>LTF</i> | <i>NEWTON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>O-066</i>      | <i>0.02</i>      |
| <i>LTF</i> | <i>PRAIRIE</i>    | <i>0.02</i>      |
| <i>LTF</i> | <i>RENSSELAER</i> | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>ROSETON</i>    | <i>0.01</i>      |
| <i>LTF</i> | <i>ROWAN</i>      | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SANTEETLA</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>SMITHLAND</i>  | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TATANKA</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TILTON</i>     | <i>&lt; 0.01</i> |
| <i>LTF</i> | <i>TRIMBLE</i>    | <i>&lt; 0.01</i> |

|               |                   |                  |
|---------------|-------------------|------------------|
| <i>LTF</i>    | <i>TVA</i>        | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>UNIONPOWER</i> | <i>&lt; 0.01</i> |
| <i>919821</i> | <i>AA2-068 C</i>  | <i>2.69</i>      |
| <i>919822</i> | <i>AA2-068 E</i>  | <i>6.3</i>       |
| <i>926201</i> | <i>AC1-098 C</i>  | <i>37.6</i>      |
| <i>926202</i> | <i>AC1-098 E</i>  | <i>22.4</i>      |
| <i>926211</i> | <i>AC1-099 C</i>  | <i>12.6</i>      |
| <i>926212</i> | <i>AC1-099 E</i>  | <i>7.4</i>       |
| <i>927141</i> | <i>AC1-208 C</i>  | <i>55.4</i>      |
| <i>927142</i> | <i>AC1-208 E</i>  | <i>24.6</i>      |

## Appendix 32

(DVP - DVP) The 3WITAKRS-3BTLEBRO 115 kV line (from bus 314623 to bus 314554 ckt 1) loads from 153.3% to 183.19% (**DC power flow**) of its load dump rating (174 MVA) for the line fault with failed breaker contingency outage of 'DVP\_P4-2: 5602'. This project contributes approximately 52.01 MW to the thermal violation.

```
CONTINGENCY 'DVP_P4-2: 5602'                                /* CAROLINA 115 KV
  OPEN BRANCH FROM BUS 313723 TO BUS 314604 CKT 1          /* 3PECAN 115.00 -
3SEABORD 115.00
  OPEN BRANCH FROM BUS 314558 TO BUS 314587 CKT 1          /* 3BOYKINS
115.00 - 3MARGTSV 115.00
  OPEN BRANCH FROM BUS 314587 TO BUS 314604 CKT 1          /* 3MARGTSV
115.00 - 3SEABORD 115.00
  OPEN BUS 314587                                           /* ISLAND: 3MARGTSV 115.00
  OPEN BUS 314604                                           /* ISLAND: 3SEABORD 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314571 CKT 1          /* 3CAROLNA
115.00 - 3EATON F 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 919690 CKT 1          /* 3CAROLNA
115.00 - AA2-053 TAP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314600 CKT 1          /* 3CAROLNA
115.00 - 3PLHITP 115.00
  OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1          /* 3CAROLNA
115.00 - 6CAROLNA 230.00
END
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315126            | 1ROARAP2        | 3.85                     |
| 315128            | 1ROARAP4        | 3.7                      |
| 314578            | 3HORNRTN        | 8.39                     |
| 314582            | 3KELFORD        | 1.12                     |
| 314603            | 3SCOT NK        | 7.59                     |
| 932631            | AC2-084 C       | 25.34                    |
| 932632            | AC2-084 E       | 12.48                    |
| 934041            | AD1-029 C       | 31.35                    |
| 934042            | AD1-029 E       | 20.66                    |
| 934231            | AD1-050 C       | 3.78                     |

|            |                   |             |
|------------|-------------------|-------------|
| 934232     | AD1-050 E         | 2.06        |
| <i>LTF</i> | <i>AMIL</i>       | <i>0.07</i> |
| <i>LTF</i> | <i>BAYOU</i>      | <i>0.38</i> |
| <i>LTF</i> | <i>BIG_CAJUN1</i> | <i>0.6</i>  |
| <i>LTF</i> | <i>BIG_CAJUN2</i> | <i>1.21</i> |
| <i>LTF</i> | <i>BLUEG</i>      | <i>0.4</i>  |
| <i>LTF</i> | <i>CALDERWOOD</i> | <i>0.22</i> |
| <i>LTF</i> | <i>CANNELTON</i>  | <i>0.07</i> |
| <i>LTF</i> | <i>CARR</i>       | <i>0.02</i> |
| <i>LTF</i> | <i>CATAWBA</i>    | <i>0.21</i> |
| <i>LTF</i> | <i>CELEVELAND</i> | <i>0.6</i>  |
| <i>LTF</i> | <i>CHEOAH</i>     | <i>0.21</i> |
| <i>LTF</i> | <i>CHILHOWEE</i>  | <i>0.07</i> |
| <i>LTF</i> | <i>CHOCTAW</i>    | <i>0.41</i> |
| <i>LTF</i> | <i>CLIFTY</i>     | <i>1.48</i> |
| <i>LTF</i> | <i>COTTONWOOD</i> | <i>1.5</i>  |
| <i>LTF</i> | <i>DEARBORN</i>   | <i>0.16</i> |
| <i>LTF</i> | <i>EDWARDS</i>    | <i>0.12</i> |
| <i>LTF</i> | <i>ELMERSMITH</i> | <i>0.22</i> |
| <i>LTF</i> | <i>FARMERCITY</i> | <i>0.09</i> |
| <i>LTF</i> | <i>G-007</i>      | <i>0.02</i> |
| <i>LTF</i> | <i>GIBSON</i>     | <i>0.14</i> |
| <i>LTF</i> | <i>HAMLET</i>     | <i>0.89</i> |
| <i>LTF</i> | <i>MORGAN</i>     | <i>0.66</i> |
| <i>LTF</i> | <i>NEWTON</i>     | <i>0.33</i> |
| <i>LTF</i> | <i>O-066</i>      | <i>0.08</i> |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>PRAIRIE</i>      | <i>0.71</i>  |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.02</i>  |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.13</i>  |
| <i>LTF</i>    | <i>ROWAN</i>        | <i>0.42</i>  |
| <i>LTF</i>    | <i>SANTEETLA</i>    | <i>0.06</i>  |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>0.06</i>  |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.16</i>  |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.15</i>  |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.08</i>  |
| <i>LTF</i>    | <i>TVA</i>          | <i>0.28</i>  |
| <i>LTF</i>    | <i>UNIONPOWER</i>   | <i>0.39</i>  |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.62</i>  |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>1.35</i>  |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>1.29</i>  |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>2.82</i>  |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>3.94</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>9.47</i>  |
| <i>918561</i> | <i>AA1-072 C</i>    | <i>0.09</i>  |
| <i>918562</i> | <i>AA1-072 E</i>    | <i>0.23</i>  |
| <i>919701</i> | <i>AA2-057 C</i>    | <i>5.99</i>  |
| <i>919702</i> | <i>AA2-057 E</i>    | <i>15.26</i> |
| <i>919821</i> | <i>AA2-068 C</i>    | <i>1.52</i>  |
| <i>919822</i> | <i>AA2-068 E</i>    | <i>3.57</i>  |
| <i>920591</i> | <i>AA2-165 C</i>    | <i>0.82</i>  |
| <i>920592</i> | <i>AA2-165 E</i>    | <i>2.01</i>  |
| <i>920631</i> | <i>AA2-169 C</i>    | <i>2.82</i>  |

|        |           |       |
|--------|-----------|-------|
| 920632 | AA2-169 E | 1.3   |
| 924401 | AB2-089 C | 1.71  |
| 924402 | AB2-089 E | 0.88  |
| 926201 | AC1-098 C | 17.78 |
| 926202 | AC1-098 E | 10.59 |
| 926211 | AC1-099 C | 5.96  |
| 926212 | AC1-099 E | 3.5   |
| 927141 | AC1-208 C | 28.79 |
| 927142 | AC1-208 E | 12.78 |

## **Appendix 33**

(DVP - DVP) The 6ELIZ CT-6SHAWBRO 230 kV line (from bus 314638 to bus 314647 ckt 1) loads from 112.81% to 114.72% (**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 13.4 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

```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 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   |

|               |                     |               |
|---------------|---------------------|---------------|
| <i>LTF</i>    | <i>CPLE</i>         | <i>2.31</i>   |
| <i>LTF</i>    | <i>G-007</i>        | <i>0.43</i>   |
| <i>LTF</i>    | <i>IPL</i>          | <i>1.01</i>   |
| <i>LTF</i>    | <i>LGEE</i>         | <i>0.34</i>   |
| <i>LTF</i>    | <i>MEC</i>          | <i>3.58</i>   |
| <i>LTF</i>    | <i>MECS</i>         | <i>1.59</i>   |
| <i>LTF</i>    | <i>O-066</i>        | <i>1.43</i>   |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.05</i>   |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.38</i>   |
| <i>900671</i> | <i>V4-068 C</i>     | <i>0.07</i>   |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.18</i>   |
| <i>901081</i> | <i>W1-029C</i>      | <i>5.03</i>   |
| <i>901082</i> | <i>W1-029E</i>      | <i>171.41</i> |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.44</i>   |
| <i>913391</i> | <i>Y1-086 C</i>     | <i>1.08</i>   |
| <i>913392</i> | <i>Y1-086 E</i>     | <i>8.99</i>   |
| <i>916041</i> | <i>Z1-036 C</i>     | <i>4.62</i>   |
| <i>916042</i> | <i>Z1-036 E</i>     | <i>157.7</i>  |
| <i>917121</i> | <i>Z2-027 C</i>     | <i>1.99</i>   |
| <i>917122</i> | <i>Z2-027 E</i>     | <i>4.35</i>   |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.43</i>   |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.94</i>   |
| <i>917511</i> | <i>Z2-088 C OP1</i> | <i>0.77</i>   |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>3.1</i>    |
| <i>918411</i> | <i>AA1-050</i>      | <i>0.65</i>   |
| <i>918511</i> | <i>AA1-065 C OP</i> | <i>2.22</i>   |

|        |              |       |
|--------|--------------|-------|
| 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  |

|               |                  |             |
|---------------|------------------|-------------|
| <i>927021</i> | <i>AC1-189 C</i> | <i>7.54</i> |
| <i>927022</i> | <i>AC1-189 E</i> | <i>3.75</i> |
| <i>927141</i> | <i>AC1-208 C</i> | <i>5.8</i>  |
| <i>927142</i> | <i>AC1-208 E</i> | <i>2.58</i> |

## **Appendix 34**

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 118.33% to 122.52% (**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 19.15 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
  
```

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 315294            | 1DOMTR10        | 2.12                     |
| 315131            | 1EDGECEMA       | 10.48                    |
| 315132            | 1EDGECEMB       | 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            | 3BETHEL C       | 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  |

|               |                     |              |
|---------------|---------------------|--------------|
| <i>LTF</i>    | <i>CBM-S1</i>       | <i>4.51</i>  |
| <i>LTF</i>    | <i>CBM-S2</i>       | <i>9.28</i>  |
| <i>LTF</i>    | <i>CBM-W1</i>       | <i>9.82</i>  |
| <i>LTF</i>    | <i>CBM-W2</i>       | <i>24.32</i> |
| <i>LTF</i>    | <i>CIN</i>          | <i>2.2</i>   |
| <i>LTF</i>    | <i>CPL</i>          | <i>3.18</i>  |
| <i>LTF</i>    | <i>G-007</i>        | <i>0.61</i>  |
| <i>LTF</i>    | <i>IPL</i>          | <i>1.4</i>   |
| <i>LTF</i>    | <i>LGEE</i>         | <i>0.47</i>  |
| <i>LTF</i>    | <i>MEC</i>          | <i>4.99</i>  |
| <i>LTF</i>    | <i>MECS</i>         | <i>2.2</i>   |
| <i>LTF</i>    | <i>O-066</i>        | <i>2.02</i>  |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.08</i>  |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.55</i>  |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.24</i>  |
| <i>LTF</i>    | <i>WEC</i>          | <i>0.61</i>  |
| <i>917331</i> | <i>Z2-043 C</i>     | <i>0.5</i>   |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>1.1</i>   |
| <i>917341</i> | <i>Z2-044 C</i>     | <i>0.28</i>  |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.61</i>  |
| <i>917511</i> | <i>Z2-088 C OP1</i> | <i>1.02</i>  |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>4.12</i>  |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.3</i>   |
| <i>918411</i> | <i>AA1-050</i>      | <i>0.86</i>  |
| <i>918491</i> | <i>AA1-063AC OP</i> | <i>1.46</i>  |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>3.51</i>  |

|        |              |       |
|--------|--------------|-------|
| 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 35**

(AEP - AEP) The 05EDAN 1-05DANVL2 138 kV line (from bus 242631 to bus 242620 ckt 1) loads from 107.73% to 108.49% (**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 7.02 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

| <i>Bus Number</i> | <i>Bus Name</i> | <i>Full Contribution</i> |
|-------------------|-----------------|--------------------------|
| 244012            | 05PINNACLE      | -2.08                    |
| 315131            | 1EDGECEMA       | 4.25                     |
| 315132            | 1EDGECEMB       | 4.25                     |
| 314557            | 3BETHEL C       | 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 |

|               |                     |                  |
|---------------|---------------------|------------------|
| <i>LTF</i>    | <i>CPL</i>          | <i>5.57</i>      |
| <i>LTF</i>    | <i>DEARBORN</i>     | <i>0.98</i>      |
| <i>LTF</i>    | <i>EDWARDS</i>      | <i>0.45</i>      |
| <i>LTF</i>    | <i>ELMERSMITH</i>   | <i>0.71</i>      |
| <i>LTF</i>    | <i>FARMERCITY</i>   | <i>0.12</i>      |
| <i>LTF</i>    | <i>G-007A</i>       | <i>0.79</i>      |
| <i>LTF</i>    | <i>GIBSON</i>       | <i>0.59</i>      |
| <i>LTF</i>    | <i>NEWTON</i>       | <i>0.97</i>      |
| <i>LTF</i>    | <i>O-066A</i>       | <i>0.36</i>      |
| <i>LTF</i>    | <i>PRAIRIE</i>      | <i>0.86</i>      |
| <i>LTF</i>    | <i>RENSSELAER</i>   | <i>0.05</i>      |
| <i>LTF</i>    | <i>ROSETON</i>      | <i>0.35</i>      |
| <i>LTF</i>    | <i>SMITHLAND</i>    | <i>&lt; 0.01</i> |
| <i>LTF</i>    | <i>TATANKA</i>      | <i>0.34</i>      |
| <i>LTF</i>    | <i>TILTON</i>       | <i>0.61</i>      |
| <i>LTF</i>    | <i>TRIMBLE</i>      | <i>0.41</i>      |
| <i>900672</i> | <i>V4-068 E</i>     | <i>0.1</i>       |
| <i>LTF</i>    | <i>VFT</i>          | <i>2.09</i>      |
| <i>LTF</i>    | <i>X1-078</i>       | <i>0.61</i>      |
| <i>917332</i> | <i>Z2-043 E</i>     | <i>0.36</i>      |
| <i>917342</i> | <i>Z2-044 E</i>     | <i>0.25</i>      |
| <i>917512</i> | <i>Z2-088 E OP1</i> | <i>1.66</i>      |
| <i>917592</i> | <i>Z2-099 E</i>     | <i>0.14</i>      |
| <i>918492</i> | <i>AA1-063AE OP</i> | <i>1.37</i>      |
| <i>918512</i> | <i>AA1-065 E OP</i> | <i>1.46</i>      |
| <i>918532</i> | <i>AA1-067 E</i>    | <i>0.29</i>      |

|        |              |      |
|--------|--------------|------|
| 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 |