

***Generation Interconnection
Feasibility Study Report***

For

***PJM Generation Interconnection Request
Queue Position AC2-159***

***Jackson – Woodland 115kV
40MW Capacity / 80MW Energy***

October / 2017

Introduction

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

Preface

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

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

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

General

The IC has proposed a solar generating facility located in Conway, NC (Northampton County). The installed facilities will have a total capability of 80 MW with 40 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is 5/01/2019. **This study does not imply an ITO commitment to this in-service date.**

Point of Interconnection

AC2-159 will interconnect with the ITO transmission system at one of the following points of interconnection:

Option 1 will connect via a new three breaker ring bus switching station that connects on the Jackson – Woodland 115kV line.

Option 2 will connect via a new three breaker ring bus switching station that connects on the Earleys – Northampton – Roanoke Valley NUG 230kV line.

Cost Summary

The AC2-159 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
Total Costs	\$7,850,000

In addition, the AC2-159 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	\$ 20,000,000
Previously Identified Upgrades	\$102,920,000
Total Costs	\$122,920,000

Cost allocations for these upgrades will be provided in the System Impact Study Report.

Option One

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 AC2-159 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. 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. These costs do not include CIAC Tax Gross-up.

Direct Connection Cost Estimate

Substation: Establish the new 115 kV AC2-159 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.

Non-Direct Connection Cost Estimate

Outage scheduling and coordination will impact the actual completion dates for the various identified network upgrades.

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 dollars 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.

System Reinforcement

Violation #	Upgrade Description	Upgrade Cost
# 4	Replace existing Earleys 230/115kV transformer with a larger unit. It is estimated to 14-16 months to engineer and construct.	\$5,500,000
# 5, 6	Wreck and rebuild the 10 mile Earleys - Aulander - Woodland 115kV line to an emergency rating of minimum 180 MVA and a load dump rating of minimum 208 MVA. It is estimated to take 30-36 months to permit, engineer and construct.	\$20,000,000
# 8 - 10	Replace wave trap at the Clubhouse and Sapony substations. This will increase emergency rating to 722 MVA. It is estimated to 12-16 months to engineer and construct.	\$150,000
# 11, 12, 19, 20	Wreck and rebuild the line #1001 Cox DP - Whitakers - Battleboro 115kV of 9.51 miles for a higher capacity since the overload exceeds the conductor rating. It is estimated to take 44-48 months to permit engineer and construct. VA CPCN is required.	\$19,020,000
# 13, 14, 26, 27	Rebuild the Hathaway - Hornertown 230kV line to increase its line rating to 706 MVA (normal), 706 MVA (emergency), and 812 MVA (load dump). Rebuild/Uprate approximately 28.9 miles of Line #2056. It is estimated to take 44-48 months to permit (NC PUC may be required), engineer and construct. Final engineering may require structure replacements.	\$24,000,000
# 15 – 17, 21 – 25	Wreck and rebuild the 18 mile Lakeview - AB2-100 Tap - Clubhouse 230kV to an emergency rating of 706 MVA and a load dump rating of 812 MVA. It is estimated to take 30-36 months to permit (combination of NC PUC and VA SCC may be required), engineer and construct.	\$46,000,000
# 18	Wreck and rebuild the line #2181 Nash – City of Rocky Mount Pod #4 230kV of 3.3 miles for a higher capacity since the overload exceeds the conductor rating. It is estimated to take 44-48 months to permit, engineer and construct. VA CPCN is required.	\$8,250,000
Total Network Upgrades		\$104,920,000

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

The Queue Project AC2-159 was evaluated as an 80.0 MW (Capacity 40.0 MW) injection tapping the Jackson – Woodland 115 kV line in the ITO area. Project AC2-159 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC2-159 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
2012TH4	CONTINGENCY '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
246T2034_A	CONTINGENCY '246T2034_A' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1 /* 246 AA1-138 TAP OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 246 - NUCOR OPEN BRANCH FROM BUS 314569 TO BUS 932450 CKT 1 /* 2034 AC2- 158 TAP END
3CAROLNA-6CAROLNA	CONTINGENCY '3CAROLNA-6CAROLNA' OPEN BRANCH FROM BUS 314559 TO BUS 314561 CKT 1 END
DVP_P1-2: LN 2181	CONTINGENCY 'DVP_P1-2: LN 2181' 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 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
DVP_P1-2:2056_A	CONTINGENCY 'DVP_P1-2:2056_A' OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1 /* 6HATHAWAY 230.00 - AC1-208 TAP 230.00 END
DVP_P1-2:2056_B	CONTINGENCY 'DVP_P1-2:2056_B' OPEN BRANCH FROM BUS 927140 TO BUS 314579 CKT 1 /* AC1-208 TAP 230.00 - 6HORNRTN 230.00 END

Contingency Name	Description
DVP_P7-1: LN 229-2058	CONTINGENCY 'DVP_P7-1: LN 229-2058' OPEN BRANCH FROM BUS 314564 TO BUS 314610 CKT 1 /* 6EDGECOM 230.00 - 6TOTDP4 230.00 OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 1 /* 3TARBORO 115.00 - 6TARBORO 230.00 OPEN BRANCH FROM BUS 314609 TO BUS 314610 CKT 1 /* 6TARBORO 230.00 - 6TOTDP4 230.00 OPEN BUS 314610 /* ISLAND: 6TOTDP4 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
LN 2012	CONTINGENCY 'LN 2012' OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /* 6NORTHAMPTON230.00 - 6EARLEYS 230.00 OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /* 6NORTHAMPTON230.00 - 6ROA VAL 230.00 OPEN BUS 314266 /* ISLAND END
LN 2058	CONTINGENCY 'LN 2058-2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA- RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
LN 2058-2181	CONTINGENCY 'LN 2058-2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA- RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
LN 2131A	CONTINGENCY '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

Contingency Name	Description
LN 238	CONTINGENCY 'LN 238-249' OPEN BRANCH FROM BUS 314282 TO BUS 314435 CKT 1 /* 6CARSON 230.00 - 6SAPONY 230.00 OPEN BRANCH FROM BUS 314435 TO BUS 314563 CKT 1 /* 6SAPONY 230.00 - 6CLUBHSE 230.00 OPEN BRANCH FROM BUS 314562 TO BUS 314563 CKT 1 /* 3CLUBHSE 115.00 - 6CLUBHSE 230.00 OPEN BUS 314435 /* ISLAND OPEN BRANCH FROM BUS 314282 TO BUS 314285 CKT 1 /* 6CARSON 230.00 - 6CHRL249 230.00 OPEN BRANCH FROM BUS 314285 TO BUS 314316 CKT 1 /* 6CHRL249 230.00 - 6LOCKS 230.00 OPEN BRANCH FROM BUS 314314 TO BUS 314316 CKT 1 /* 3LOCKS 115.00 - 6LOCKS 230.00 OPEN BUS 314285 /* ISLAND END
LN 238-249	CONTINGENCY 'LN 238-249' OPEN BRANCH FROM BUS 314282 TO BUS 314435 CKT 1 /* 6CARSON 230.00 - 6SAPONY 230.00 OPEN BRANCH FROM BUS 314435 TO BUS 314563 CKT 1 /* 6SAPONY 230.00 - 6CLUBHSE 230.00 OPEN BRANCH FROM BUS 314562 TO BUS 314563 CKT 1 /* 3CLUBHSE 115.00 - 6CLUBHSE 230.00 OPEN BUS 314435 /* ISLAND OPEN BRANCH FROM BUS 314282 TO BUS 314285 CKT 1 /* 6CARSON 230.00 - 6CHRL249 230.00 OPEN BRANCH FROM BUS 314285 TO BUS 314316 CKT 1 /* 6CHRL249 230.00 - 6LOCKS 230.00 OPEN BRANCH FROM BUS 314314 TO BUS 314316 CKT 1 /* 3LOCKS 115.00 - 6LOCKS 230.00 OPEN BUS 314285 /* ISLAND END
LN 246_A	CONTINGENCY 'LN 246_A' OPEN BRANCH FROM BUS 921571 TO BUS 314575 CKT 1 /* AA1-138 TAP - 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
LN 246_B	CONTINGENCY 'LN 246_B' OPEN BRANCH FROM BUS 314537 TO BUS 921571 CKT 1 /* 6SUFFOLK 230.00 - AA1-138 TAP END
LN 259	CONTINGENCY 'LN 259' OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 - 6CHSTF B 230.00 END
LN 54_A	CONTINGENCY 'LN 54_A' OPEN BRANCH FROM BUS 314559 TO BUS 921751 CKT 1 /* 3CAROLNA 115.00 - AA2-053 TAP END

Contingency Name	Description
LN 54-2012_C	CONTINGENCY 'LN 54-2012_C' OPEN BRANCH FROM BUS 932460 TO BUS 314626 CKT 1 /* AC2-159 TAP 115.00 - 3WOODLND 115.00 OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR 115.00 - 3WOODLND 115.00 OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS 115.00 - 3AULANDR 115.00 OPEN BUS 314625 /* ISLAND OPEN BUS 314626 /* ISLAND OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /* 6NORTHAMPTON230.00 - 6EARLEYS 230.00 OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /* 6NORTHAMPTON230.00 - 6ROA VAL 230.00 OPEN BUS 314266 /* ISLAND END
LN 56-2012_A	CONTINGENCY 'LN 56-2012_A' OPEN BRANCH FROM BUS 314259 TO BUS 314559 CKT Z1 /* 3CAR56_1 115.00 - 3CAROLNA 115.00 OPEN BRANCH FROM BUS 314259 TO BUS 921161 CKT 1 /* 3CAR56_1 115.00 - AA1-063A TAP 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 314259 /* ISLAND OPEN BUS 314587 /* ISLAND OPEN BUS 314604 /* ISLAND OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /* 6NORTHAMPTON230.00 - 6EARLEYS 230.00 OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /* 6NORTHAMPTON230.00 - 6ROA VAL 230.00 OPEN BUS 314266 /* ISLAND END
LN 563	CONTINGENCY 'LN 563' OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 END
LN 68	CONTINGENCY 'LN 68' OPEN BRANCH FROM BUS 314527 TO BUS 314536 CKT 1 /* 3HOLLAND 115.00 - 3SUFFOLK 115.00 OPEN BRANCH FROM BUS 314527 TO BUS 314539 CKT 1 /* 3HOLLAND 115.00 - 3UNCAMP 115.00 OPEN BUS 314527 /* ISLAND END

Summer Peak Analysis - 2020

System Reinforcement responsible by ITO

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
1	DCTL	LN 208-259	DVP - DVP	6CHARCTY-6LAKESD 230 kV line	314225	314227	1	DC	141.15	141.63	LD	459	4.82	4
2	DCTL	LN 208-259	DVP - DVP	6MESSER-6CHARCTY 230 kV line	314228	314225	1	DC	152.87	153.35	LD	459	4.82	5
3	DCTL	LN 208-259	DVP - DVP	6CHSTF B-6MESSER 230 kV line	314287	314228	1	DC	153.0	153.48	LD	459	4.82	6

Item 1 – 3 **PJM baseline project (b2745)** will eliminate the identified overloads. The scheduled in service date b2745 is 06/01/2020.

Generator Deliverability

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

None

Multiple Facility Contingency

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

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
4	LFFB	2012TH4	DVP - DVP	GEARLEYS 230/115 kV transformer	314568	314569	1	DC	86.24	99.96	LD	208	28.54	1
5	DCTL	LN 56-2012_A	DVP - DVP	3AULANDR-3EARLEYS 115 kV line	314625	314568	1	DC	73.34	103.27	LD	136	40.69	2

Contingency			Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
#	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
6	DCTL	LN 56-2012_A	DVP - DVP	3WOODLND-3AULANDR 115 kV line	314626	314625	1	DC	78.42	108.34	LD	136	40.69	3

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 Contribution	Ref
#	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
7	DCTL	LN 2058-2181	DVP - CPLE	3BTLEBRO-3ROCKYMT115T 115 kV line	314554	304223	1	DC	202.22	204.41	ER	164	7.97	7
8	LFFB	246T2034_A	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	125.04	128.45	LD	637	21.75	8
9	DCTL	LN 54-2012_C	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	123.39	127.21	LD	637	24.36	

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
10	DCTL	LN 56-2012_A	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	120.37	122.93	LD	637	16.34	
11	N-1	DVP_P1-2:2056_A	DVP - DVP	3COX DP-3WITAKRS 115 kV line	314577	314623	1	DC	109.3	112.15	ER	134	3.83	9
12	N-1	DVP_P1-2:2056_B	DVP - DVP	3COX DP-3WITAKRS 115 kV line	314577	314623	1	DC	106.91	109.76	ER	134	3.83	
13	DCTL	LN 54-2012_C	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	105.02	107.84	LD	541	15.29	10
14	DCTL	LN 238-249	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	101.68	103.87	LD	541	11.84	
15	LFFB	246T2034_A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	106.46	109.98	LD	459	16.16	11
16	DCTL	LN 54-2012_C	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	101.44	104.73	LD	459	15.09	
17	N-1	LN 2012	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	100.96	102.32	ER	375	5.08	
18	DCTL	DVP_P7-1: LN 229-2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	106.53	108.74	ER	470	10.37	12
19	N-1	DVP_P1-2:2056_A	DVP - DVP	3WITAKRS-3BTLEBRO 115 kV line	314623	314554	1	DC	107.76	110.6	ER	134	3.83	13
20	N-1	DVP_P1-2:2056_B	DVP - DVP	3WITAKRS-3BTLEBRO 115 kV line	314623	314554	1	DC	105.43	108.28	ER	134	3.83	
21	LFFB	246T2034_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	127.22	130.74	LD	459	16.16	14

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
22	DCTL	LN 54-2012_C	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	123.49	126.77	LD	459	15.09	
23	DCTL	LN 56-2012_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	122.97	125.31	LD	459	10.72	
24	N-1	LN 2012	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	119.46	120.81	ER	375	5.08	
25	N-1	DVP_P1-2:2056_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	115.12	116.88	ER	375	6.6	
26	DCTL	LN 54-2012_C	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	113.82	116.64	LD	541	15.29	15
27	DCTL	LN 238-249	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	110.86	113.05	LD	541	11.84	

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)

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
# 4	6EARLEYS 230/115 kV transformer	Replace existing transformer with a larger unit. It is estimated to 14-16 months to engineer and construct.	Pending	\$5,500,000
# 5	3AULANDR-3EARLEYS 115 kV line	Wreck and rebuild the line of 10 miles to an emergency rating of minimum 180 MVA and a load dump rating of minimum 208 MVA. It is estimated to take 30-36 months to permit, engineer and construct.	Pending	\$20,000,000
# 6	3WOODLND-3AULANDR 115 kV line			
Total New Network Upgrades				\$25,500,000

Contribution to Previously Identified System Reinforcements

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

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
# 7	3BTLEBRO-3ROCKYMT115T 115 kV line	CPL (Duke) owns the limiting element on the Battleboro - Rocky Mountain line. This violation will be further analyzed in the System Impact Study.		
# 8 - 10	6CLUBHSE-6SAPONY 230 kV line	Replace wave trap at the Clubhouse and Sapony substations. This will increase emergency rating to 722 MVA. It is estimated to 12-16 months to engineer and construct.	Pending	\$150,000
# 11, 12	3COX DP-3WITAKRS 115 kV line	Wreck and rebuild the line of 9.51 miles for a higher capacity since the overload exceeds the conductor rating. It is estimated to take 44-48 months to permit engineer and construct. VA CPCN is required.	Pending	\$19,020,000
# 19, 20	3WITAKRS-3BTLEBRO 115 kV line			

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
# 13, 14	6HORNRTN-AC1-208 TAP 230 kV line	Rebuild the line to increase its line rating to 706 MVA (normal), 706 MVA (emergency), and 812 MVA (load dump). Rebuild/Uprate approximately 28.9 miles of Line #2056. It is estimated to take 44-48 months to permit (NC PUC may be required), engineer and construct. Final engineering may require structure replacements.	Pending	\$24,000,000
# 26, 27	AC1-208 TAP-6HATHAWAY 230 kV line			
# 15 - 17	6LAKEVEW-AB2-100 TAP 230 kV line	Wreck and rebuild the line of 18 miles to an emergency rating of 706 MVA and a load dump rating of 812 MVA. It is estimated to take 30-36 months to permit (combination of NC PUC and VA SCC may be required), engineer and construct.	Pending	\$46,000,000
# 21 - 25	AB2-100 TAP-6CLUBHSE 230 kV line			
# 18	6NASH-6PA-RMOUNT#4 230 kV line	Wreck and rebuild the line #2181 Nash – City of Rocky Mount Pod #4 230kV of 3.3 miles for a higher capacity since the overload exceeds the conductor rating. It is estimated to take 44-48 months to permit, engineer and construct. VA CPCN is required.	Pending	\$8,250,000
Total New Network Upgrades				\$97,420,000

Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The IC can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
28	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6HATHAWAY-6ROCKYMT230T 230 kV line	313845	304222	1	DC	114.97	117.57	ER	386	10.03

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
29	N-1	LN 2058	DVP - DVP	6HATHAWAY-6NASH 230 kV line	313845	314591	1	DC	113.94	116.41	ER	449	11.12
30	N-1	LN 259	DVP - DVP	6CHARCTY-6LAKESD 230 kV line	314225	314227	1	DC	127.6	128.15	ER	375	4.56
31	N-1	LN 259	DVP - DVP	6MESSER-6CHARCTY 230 kV line	314228	314225	1	DC	141.95	142.49	ER	375	4.56
32	N-1	LN 259	DVP - DVP	6CHSTF B-6MESSER 230 kV line	314287	314228	1	DC	142.11	142.65	ER	375	4.56
33	N-1	LN 563	DVP - DVP	6CHSTF B-6BASIN 230 kV line	314287	314276	1	DC	170.31	170.89	ER	449	5.78
34	N-1	LN 246_B	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	110.4	113.24	ER	679	19.27
35	N-1	LN 68	DVP - DVP	6CAROLNA 230/115 kV transformer	314559	314561	1	DC	111.79	119.56	ER	240	18.64
36	N-1	3CAROLN A-6CAROLN A	DVP - DVP	6CLUBHSE 230/115 kV transformer	314562	314563	1	DC	123.78	126.2	ER	183	9.8
37	N-1	LN 246_B	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	126.07	129.29	ER	599	19.27
38	N-1	LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	120.9	124.3	ER	572	19.4
39	N-1	LN 2131A	DVP - DVP	6NUCO TP-AA1-138 TAP 230 kV line	314575	921571	1	DC	114.11	117.51	ER	572	19.4
40	N-1	DVP_P1-2:2056_A	DVP - DVP	3COX DP-3WITAKRS 115 kV line	314577	314623	1	DC	111.61	114.18	ER	134	7.66

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
41	N-1	LN 238	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	124.48	127.16	ER	442	11.84
42	N-1	LN 238	DVP - DVP	6LAKEVEW-6HORNRTN 230 kV line	314583	314579	1	DC	98.24	100.93	ER	442	11.91
43	N-1	LN 246_B	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	124.03	127.72	ER	375	13.84
44	N-1	LN 2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	104.44	106.8	ER	470	11.12
45	N-1	DVP_P1-2:2056_B	DVP - DVP	3WITAKRS-3BTLEBRO 115 kV line	314623	314554	1	DC	103.56	106.12	ER	134	7.65
46	N-1	LN 54_A	DVP - DVP	3AULANDR-3EARLEYS 115 kV line	314625	314568	1	DC	47.87	120	ER	111	80
47	N-1	LN 54_A	DVP - DVP	3WOODLND-3AULANDR 115 kV line	314626	314625	1	DC	54.09	126.22	ER	111	80
48	N-1	LN 2131A	DVP - DVP	AA1-138 TAP-6SUFFOLK 230 kV line	921571	314537	1	DC	122.39	125.79	ER	572	19.4
49	N-1	LN 246_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	146.42	150.11	ER	375	13.84
50	N-1	LN 238	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	135.74	138.42	ER	442	11.84

Light Load Analysis

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

ITO Analysis

ITO assessed the impact of the proposed Queue Project #AC2-159 interconnection of a 80 MW Energy (40 MW Capacity) injection into the ITO's Transmission System at a new interconnection switching station located between on the Jackson – Woodland 115kV line, for compliance with NERC Reliability Criteria on ITO's Transmission System. The system was assessed using the summer 2020 RTEP case provided to ITO by PJM. When performing a generation analysis, ITO's main analysis will be load flow study results under single contingency (both normal and stressed system conditions). ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of 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's 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.

As part of its generation impact analysis, the ITO routinely evaluates the impact that a proposed new generation resource will have under maximum generation conditions, stress system conditions and import/export system conditions (greater than 20 MW). The results of these studies are discussed in more detail below.

Category B Analysis (Single Contingency):

- System Normal – No deficiencies identified
- Critical System Condition (No Surry 230 kV or Possum Point 6 Unit) – No deficiencies identified.

Category C Analysis: (Multiple Facility Analysis)

1. Bus Fault - No deficiencies identified
2. Line Stuck Breaker - No deficiencies identified
3. Tower Line – No deficiencies identified

The import and export conditions into and out of the ITO System are evaluated with any new interconnection greater than 20 MW, any new facility that is interconnected with the ITO System should not significantly decrement FCITC between utilities. These studies will be performed during the System Impact Study.

Affected System Analysis & Mitigation

Duke, Progress & TVA Impacts:

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

Note:

- Violation # 7 on the Battleboro – Rocky Mount 115 kV line has been identified to be on the Duke owned portion of this line.
- Violation # 18 on the Nash – City of Rocky Mount 230kV line is expected to also be on the Duke owned portion of this line.

Option 2

Network Impacts

The Queue Project AC2-159 was evaluated as an 80.0 MW (Capacity 40.0 MW) injection tapping the Earleys – Northampton 230 kV line in the ITO area. Project AC2-159 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AC2-159 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
246T2034_A	CONTINGENCY '246T2034_A' /* EARLEYS OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1 /* 246 OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1 /* 246 AA1-138 TAP OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1 /* 246 - NUCOR OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1 /* 2034 OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1 /* TROWBRIDGE TX #1&2 END
562T563	CONTINGENCY '562T563' /*CARSON OPEN BRANCH FROM BUS 314902 TO BUS 314923 CKT 1 /*CARSON TO MIDLOTHIAN OPEN BRANCH FROM BUS 314914 TO BUS 314902 CKT 1 /*CARSON 500.00 - 8SEPTA 500.00 END
DVP_P1-2: LN 2181	CONTINGENCY 'DVP_P1-2: LN 2181' 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 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
DVP_P1-2:2056_A	CONTINGENCY 'DVP_P1-2:2056_A' OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1 /* 6HATHAWAY 230.00 - AC1-208 TAP 230.00 END

Contingency Name	Description
DVP_P7-1: LN 229-2058	CONTINGENCY 'DVP_P7-1: LN 229-2058' OPEN BRANCH FROM BUS 314564 TO BUS 314610 CKT 1 /* 6EDGECOM 230.00 - 6TOTDP4 230.00 OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 1 /* 3TARBORO 115.00 - 6TARBORO 230.00 OPEN BRANCH FROM BUS 314609 TO BUS 314610 CKT 1 /* 6TARBORO 230.00 - 6TOTDP4 230.00 OPEN BUS 314610 /* ISLAND: 6TOTDP4 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
H2T557	CONTINGENCY 'H2T557' /* ELMONT OPEN BRANCH FROM BUS 314908 TO BUS 314903 CKT 1 /*ELMONT TO CHICKAHOMINY (LINE 557) OPEN BRANCH FROM BUS 314903 TO BUS 314214 CKT 1 /*CHICKAHOMINY 500-230 (TX#1) OPEN BRANCH FROM BUS 314908 TO BUS 314218 CKT 2 /*ELMONT 500-230 (TX#2) END
LN 198-552	CONTINGENCY 'LN 198-552' OPEN BRANCH FROM BUS 314135 TO BUS 314367 CKT 1 /* 3CHANCE 115.00 - 3CHANC_1 115.00 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314775 CKT 1 /* 3CHANCE 115.00 - 3NI RVER 115.00 OPEN BRANCH FROM BUS 314775 TO BUS 314779 CKT 1 /* 3NI RVER 115.00 - 3TDTAVRN 115.00 OPEN BRANCH FROM BUS 314779 TO BUS 314755 CKT 1 /* 3TDTAVRN 115.00 - 3SPOTSYL 115.00 OPEN BUS 314367 /* ISLAND CHANC_1 CAP BANK OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE 115.00 - 8CHANCE 500.00 TRANSFORMER 2 OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER 500.00 - 8CHANCE 500.00 OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE 500.00 - 8LDYSMTH 500.00 END
LN 2012_A	CONTINGENCY 'LN 2012_A' OPEN BRANCH FROM BUS 932460 TO BUS 314569 CKT 1 /* AC2-159 TAP 230.00 - 6EARLEYS 230.00 END
LN 2020	CONTINGENCY 'LN 2020' OPEN BRANCH FROM BUS 313851 TO BUS 314638 CKT 1 /* 6ECITYDP2 230.00 - 6ELIZ CT 230.00 OPEN BRANCH FROM BUS 313851 TO BUS 314639 CKT 1 /* 6ECITYDP2 230.00 - 6TANGLEW 230.00 OPEN BRANCH FROM BUS 314639 TO BUS 314651 CKT 1 /* 6TANGLEW 230.00 - 6WINFALL 230.00 OPEN BUS 313851 /* ISLAND OPEN BUS 314639 /* ISLAND OPEN BUS 913391 /* ISLAND OPEN BUS 913392 /* ISLAND END

Contingency Name	Description
LN 2058	CONTINGENCY 'LN 2058-2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA- RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
LN 2058-2181	CONTINGENCY 'LN 2058-2181' OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00 OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA- RMOUNT#4230.00 - 6NASH 230.00 OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY 230.00 - 6NASH 230.00 OPEN BUS 314591 /* ISLAND: 6NASH 230.00 OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /* 6ROCKYMT230T230.00 - 6HATHAWAY 230.00 END
LN 208-259	CONTINGENCY 'LN 208-259' OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A 230.00 - 6IRON208 230.00 OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208 230.00 - 6SOUWEST 230.00 OPEN BUS 314309 /* ISLAND OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 - 6CHSTF B 230.00 END
LN 2131A	CONTINGENCY '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
LN 238	CONTINGENCY 'LN 238' OPEN BRANCH FROM BUS 314282 TO BUS 314435 CKT 1 /* 6CARSON 230.00 - 6SAPONY 230.00 OPEN BRANCH FROM BUS 314435 TO BUS 314563 CKT 1 /* 6SAPONY 230.00 - 6CLUBHSE 230.00 OPEN BRANCH FROM BUS 314562 TO BUS 314563 CKT 1 /* 3CLUBHSE 115.00 - 6CLUBHSE 230.00 OPEN BUS 314435 /* ISLAND END
LN 246_B	CONTINGENCY 'LN 246_B' OPEN BRANCH FROM BUS 314537 TO BUS 921571 CKT 1 /* 6SUFFOLK 230.00 - AA1-138 TAP END
LN 254_A	CONTINGENCY 'LN 254_A' OPEN BRANCH FROM BUS 314563 TO BUS 924510 CKT 1 /* 6CLUBHSE 230.00 - AB2-100 TAP 230.00 END

Contingency Name	Description
LN 259	CONTINGENCY 'LN 259' OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 - 6CHSTF B 230.00 END
LN 54-2012_C	CONTINGENCY 'LN 54-2012_C' OPEN BRANCH FROM BUS 921751 TO BUS 314581 CKT 1 /* AA2-053 TAP 115.00 - 3JACKSON 115.00 OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS 115.00 - 3AULANDR 115.00 OPEN BRANCH FROM BUS 314581 TO BUS 314626 CKT 1 /* 3JACKSON 115.00 - 3WOODLND 115.00 OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR 115.00 - 3WOODLND 115.00 OPEN BUS 314581 /* ISLAND OPEN BUS 314625 /* ISLAND OPEN BUS 314626 /* ISLAND OPEN BRANCH FROM BUS 932460 TO BUS 314569 CKT 1 /* AC2-159 TAP 230.00 - 6EARLEYS 230.00 END
LN 56-2012_C	CONTINGENCY 'LN 56-2012_C' OPEN BRANCH FROM BUS 314604 TO BUS 921161 CKT 1 /* 3SEABORD 115.00 - AA1-063A TAP 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 OPEN BUS 314604 /* ISLAND OPEN BRANCH FROM BUS 932460 TO BUS 314569 CKT 1 /* AC2-159 TAP 230.00 - 6EARLEYS 230.00 END
LN 563	CONTINGENCY 'LN 563' OPEN BRANCH FROM BUS 314902 TO BUS 314914 CKT 1 /* 8CARSON 500.00 - 8MDLTHAN 500.00 END
LN 81-2056_A	CONTINGENCY 'LN 81-2056_A' OPEN BRANCH FROM BUS 313858 TO BUS 314628 CKT 1 /* 3SO JUSTICE 115.00 - 3DARLINGT DP115.00 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 BUS 314628 /* ISLAND: 3DARLINGT DP115.00 OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1 /* 6HATHAWAY 230.00 - AC1-208 TAP 230.00 END

Contingency Name	Description
T672B	CONTINGENCY 'T672B' /*_ BASIN OPEN BRANCH FROM BUS 314276 TO BUS 314260 CKT 1 /*L284 BASIN VARINA OPEN BRANCH FROM BUS 314275 TO BUS 314276 CKT 1 /*L2055 BASIN BELLMEADE REMOVE MACHINE 1 FROM BUS 315053 /*BELMEADE GEN CT-1 REMOVE MACHINE 2 FROM BUS 315054 /*BELMEADE GEN CT-2 REMOVE MACHINE 3 FROM BUS 315055 /*BELMEADE GEN ST OPEN BRANCH FROM BUS 314274 TO BUS 314276 CKT 1 /*BASIN TX5 OPEN BRANCH FROM BUS 314274 TO BUS 314276 CKT 2 /*BASIN TX6 OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /*L259 BASIN CHESTERFIELD OPEN BRANCH FROM BUS 314276 TO BUS 314339 CKT 1 /*L2065 BASIN SPRUANCE NUG END

Summer Peak Analysis - 2020

Generator Deliverability

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

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
1	N-1	LN 2012_A	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	97.57	100.71	ER	442	13.84
2	N-1	LN 2012_A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	99.75	104.1	ER	375	16.29

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		
3	LFFB	562T563	DVP - DVP	6CHRL249-6LOCKS 230 kV line	314285	314316	1	DC	99.93	100.37	LD	684	6.7	16
4	LFFB	246T2034_A	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	97.84	100.73	LD	830	23.97	17
5	DCTL	LN 2058-2181	DVP - CPLE	6EVERETS-6GREENVILLE T 230 kV line	314574	304451	1	DC	98.85	101.56	ER	478	12.95	18
6	DCTL	LN 198-552	DVP - DVP	8SPOTSYL-8MORRSVL 500 kV line	314934	314916	1	DC	99.93	100.1	LD	3938	14.38	19
7	DCTL	LN 81-2056_A	DVP - DVP	AC2-159 TAP-6EARLEYS 230 kV line	932460	314569	1	DC	95.87	103.57	LD	658	50.67	20

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 Contribution	Ref
#	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
8	LFFB	H2T557	DVP - DVP	8ELMONT 500/230 kV transformer	314218	314908	1	DC	121.09	121.57	LD	1051	11.03	21
9	DCTL	LN 208-259	DVP - DVP	6CHARCTY-6LAKESD 230 kV line	314225	314227	1	DC	141.02	141.5	LD	459	4.94	22
10	LFFB	T672B	DVP - DVP	6CHARCTY-6LAKESD 230 kV line	314225	314227	1	DC	106.79	107.25	LD	459	4.68	
11	DCTL	LN 208-259	DVP - DVP	6MESSER-6CHARCTY 230 kV line	314228	314225	1	DC	152.74	153.22	LD	459	4.94	23
12	LFFB	T672B	DVP - DVP	6MESSER-6CHARCTY 230 kV line	314228	314225	1	DC	118.51	118.97	LD	459	4.68	
13	DCTL	LN 208-259	DVP - DVP	6CHSTF B-6MESSER 230 kV line	314287	314228	1	DC	152.87	153.35	LD	459	4.94	24
14	LFFB	T672B	DVP - DVP	6CHSTF B-6MESSER 230 kV line	314287	314228	1	DC	118.64	119.1	LD	459	4.68	

Contingency			Affected Area	Facility Description	Bus		Power Flow	Loading %		Rating		MW		Ref
#	Type	Name			From	To		Cir.	Initial	Final	Type	MVA	Contribution	
15	DCTL	LN 2058-2181	DVP - CPLE	3BTLEBRO-3ROCKYMT115T 115 kV line	314554	304223	1	DC	202.12	204.11	ER	164	7.23	25
16	LFFB	246T2034_A	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	128.28	132.05	LD	637	23.97	26
17	DCTL	LN 56-2012_C	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	123.06	128.14	LD	637	32.34	
18	DCTL	LN 54-2012_C	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	121.71	126.69	LD	637	31.7	
19	DCTL	LN 54-2012_C	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	103.8	109.05	LD	541	28.39	27
20	DCTL	LN 56-2012_C	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	103.62	108.91	LD	541	28.6	
21	LFFB	246T2034_A	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	110.99	116.14	LD	459	23.62	28
22	DCTL	LN 56-2012_C	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	102.46	109.74	LD	459	33.42	
23	DCTL	LN 54-2012_C	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	100.03	107.22	LD	459	33	
24	DCTL	DVP_P7-1: LN 229-2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	106.47	108.8	ER	470	10.95	29
25	LFFB	246T2034_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	131.78	136.93	LD	459	23.62	30
26	DCTL	LN 56-2012_C	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	124.65	131.93	LD	459	33.42	

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution	Ref
	Type	Name			From	To	Cir.		Initial	Final	Type	MVA		
27	DCTL	LN 54-2012_C	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	121.43	128.62	LD	459	33	
28	N-1	LN 2012_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	118.22	122.57	ER	375	16.29	
29	N-1	DVP_P1-2:2056_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	115.01	117.72	ER	375	10.17	
30	DCTL	LN 54-2012_C	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	112.6	117.85	LD	541	28.39	31
31	DCTL	LN 56-2012_C	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	112.46	117.75	LD	541	28.6	
32	N-1	LN 2012_A	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	104.96	108.09	ER	442	13.84	

Steady-State Voltage Requirements

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

To be determined during Impact Study

Stability and Reactive Power Requirement for Low Voltage Ride Through

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

To be determined during Impact Study

Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The IC can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
33	N-1	DVP_P1-2: LN 2181	DVP - CPLE	6HATHAWAY-6ROCKYMT230T 230 kV line	313845	304222	1	DC	115.05	117.95	ER	386	11.23
34	N-1	LN 2058	DVP - DVP	6HATHAWAY-6NASH 230 kV line	313845	314591	1	DC	114	116.77	ER	449	12.45
35	N-1	LN 259	DVP - DVP	6CHARCTY-6LAKESD 230 kV line	314225	314227	1	DC	128.98	129.54	ER	375	4.66
36	N-1	LN 259	DVP - DVP	6MESSER-6CHARCTY 230 kV line	314228	314225	1	DC	143.32	143.88	ER	375	4.66
37	N-1	LN 259	DVP - DVP	6CHSTF B-6MESSER 230 kV line	314287	314228	1	DC	143.48	144.04	ER	375	4.66
38	N-1	LN 563	DVP - DVP	6CHSTF B-6BASIN 230 kV line	314287	314276	1	DC	171.06	171.66	ER	449	5.92
39	N-1	LN 246_B	DVP - DVP	6SAPONY-6CARSON 230 kV line	314435	314282	1	DC	110.41	113.46	ER	679	20.7
40	N-1	LN 254_A	DVP - DVP	6CAROLNA 230/115 kV transformer	314561	314559	1	DC	106.52	111.61	ER	240	12.19
41	N-1	LN 246_B	DVP - DVP	6CLUBHSE-6SAPONY 230 kV line	314563	314435	1	DC	126.08	129.53	ER	599	20.7
42	N-1	LN 2131A	DVP - DVP	6EARLEYS-6NUCO TP 230 kV line	314569	314575	1	DC	120.31	124.55	ER	572	24.27
43	N-1	LN 2131A	DVP - DVP	6NUCO TP-AA1-138 TAP 230 kV line	314575	921571	1	DC	113.52	117.77	ER	572	24.27

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
44	N-1	LN 238	DVP - DVP	6HORNRTN-AC1-208 TAP 230 kV line	314579	927140	1	DC	123.82	127.61	ER	442	16.74
45	N-1	LN 238	DVP - DVP	6LAKEVEW-6HORNRTN 230 kV line	314583	314579	1	DC	97.43	101.24	ER	442	16.8
46	N-1	LN 246_B	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	124.01	129.49	ER	375	20.56
47	N-1	LN 2058	DVP - CPLE	6NASH-6PA-RMOUNT#4 230 kV line	314591	304226	1	DC	104.49	107.14	ER	470	12.45
48	N-1	LN 2020	DVP - DVP	6SUNBURY-6SUFFOLK 230 kV line	314648	314537	1	DC	102	102.7	ER	449	6.94
49	N-1	LN 2020	DVP - DVP	W1-029-6SUNBURY 230 kV line	901080	314648	1	DC	106.86	107.55	ER	449	6.94
50	N-1	LN 2131A	DVP - DVP	AA1-138 TAP-6SUFFOLK 230 kV line	921571	314537	1	DC	121.8	126.05	ER	572	24.27
51	N-1	LN 2012_A	DVP - DVP	AB2-100 TAP-6CLUBHSE 230 kV line	924510	314563	1	DC	144.92	153.6	ER	375	32.58
52	N-1	LN 238	DVP - DVP	AC1-208 TAP-6HATHAWAY 230 kV line	927140	313845	1	DC	135.05	138.84	ER	442	16.74
53	N-1	LN 238	DVP - DVP	AC2-159 TAP-6EARLEYS 230 kV line	932460	314569	1	DC	107.82	117.17	ER	559	52.3

Light Load Analysis

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

ITO Analysis

ITO assessed the impact of the proposed Queue Project #AC2-159 interconnection of a 80 MW Energy (40 MW Capacity) injection into the ITO's Transmission System at a new interconnection switching station located between on the Earleys – Northampton – Roanoke Valley NUG 230kV line, for compliance with NERC Reliability Criteria on ITO's Transmission System. The system was assessed using the summer 2020 RTEP case provided to ITO by PJM. When performing a generation analysis, ITO's main analysis will be load flow study results under single contingency (both normal and stressed system conditions). ITO Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of 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's 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.

As part of its generation impact analysis, the ITO routinely evaluates the impact that a proposed new generation resource will have under maximum generation conditions, stress system conditions and import/export system conditions (greater than 20 MW). The results of these studies are discussed in more detail below.

Category B Analysis (Single Contingency):

1. System Normal – No deficiencies identified
2. Critical System Condition (No Surry 230 kV or Possum Point 6 Unit) –

No Surry Unit 1

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA	
54	N-1	LN 246_B	DVP - DVP	6LAKEVEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	97.41	100.15	ER	375	10.27

No Possum Point Unit 6

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA	

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
55	N-1	DVP_P1-2:2056_A	DVP - DVP	6LAKEVIEW-AB2-100 TAP 230 kV line	314583	924510	1	DC	97.62	100.33	ER	375	10.17

Category C Analysis: (Multiple Facility Analysis)

1. Bus Fault - No deficiencies identified
2. Line Stuck Breaker - No deficiencies identified
3. Tower Line – No deficiencies identified

The import and export conditions into and out of the ITO System are evaluated with any new interconnection greater than 20 MW, any new facility that is interconnected with the ITO System should not significantly decrement FCITC between utilities. These studies will be performed during the System Impact Study.

Affected System Analysis & Mitigation

Duke, Progress & TVA Impacts:

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

Attachment 1.
System Configuration

Attachment 2.

Flowgate Appendices

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 gauge other generators impact. When a flowgate is identified in multiple analysis the appendix is presented for only the analysis with the greatest overload.

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 6EARLEYS 230/115 kV transformer (from bus 314568 to bus 314569 ckt 1) loads from 86.24% to 99.96% (**DC power flow**) of its load dump rating (208 MVA) for the line fault with failed breaker contingency outage of '2012TH4'. This project contributes approximately 28.54 MW to the thermal violation.

CONTINGENCY '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	1.05
315128	1ROARAP4	1.01
315115	1SHAMPT1	1.41
314539	3UNCAMP	1.48
314541	3WATKINS	0.53
931631	AC2-084 C	13.19
931632	AC2-084 E	6.5
932461	AC2-159 C OP	14.27
932462	AC2-159 E OP	14.27
932521	AC2-167 C	3.92
932522	AC2-167 E	6.4
900671	V4-068 C	0.16
900672	V4-068 E	0.53
907092	X1-038 E	3.69
917331	Z2-043 C	1.02
917332	Z2-043 E	2.68
917342	Z2-044 E	0.3
917591	Z2-099 C	0.18
917592	Z2-099 E	0.48
921162	AA1-063AC	7.68
921163	AA1-063AE	3.62
918561	AA1-072 C	0.15
918562	AA1-072 E	0.45
921752	AA2-053 C	12.11
921753	AA2-053 E	5.2
921762	AA2-057 C	5.66

921763	AA2-057 E	2.83
921862	AA2-068 C	2.34
921863	AA2-068 E	1.08
920021	AA2-086 C	0.09
920022	AA2-086 E	0.26
921982	AA2-088 C	6.88
921983	AA2-088 E	11.23
922442	AA2-165 C	0.77
922443	AA2-165 E	0.37
922472	AA2-169 C	1.14
922473	AA2-169 E	0.52
922512	AA2-174 C	0.55
922513	AA2-174 E	0.6
923572	AB1-173 C OP	1.24
923573	AB1-173 E OP	0.58
923582	AB1-173AC OP	1.24
923583	AB1-173AE OP	0.58
923801	AB2-015 C OP	6.07
923802	AB2-015 E OP	4.98
923911	AB2-031 C OP	1.23
923912	AB2-031 E OP	0.6
923991	AB2-040 C OP	4.03
923992	AB2-040 E OP	3.3
924381	AB2-087 C	1.93
924382	AB2-087 E	0.91
924501	AB2-099 C	1.77
924502	AB2-099 E	0.76
925141	AB2-171 C OP	4.08
925142	AB2-171 E OP	6.65
925171	AB2-174 C OP	3.41
925172	AB2-174 E OP	3.08
926201	AC1-098 C	9.26
926202	AC1-098 E	5.51
926211	AC1-099 C	3.1
926212	AC1-099 E	1.82
926771	AC1-163 C	6.36
926772	AC1-163 E	2.98
927051	AC1-193 C	2.99
927052	AC1-193 E	4.88

Appendix 2

(DVP - DVP) The 3AULANDR-3EARLEYS 115 kV line (from bus 314625 to bus 314568 ckt 1) loads from 73.34% to 103.27% (**DC power flow**) of its load dump rating (136 MVA) for the tower line contingency outage of 'LN 56-2012_A'. This project contributes approximately 40.69 MW to the thermal violation.

CONTINGENCY 'LN 56-2012_A'

```

OPEN BRANCH FROM BUS 314259 TO BUS 314559 CKT Z1          /* 3CAR56_1
115.00 - 3CAROLNA 115.00
OPEN BRANCH FROM BUS 314259 TO BUS 921161 CKT 1          /* 3CAR56_1
115.00 - AA1-063A TAP 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 314259                                           /* ISLAND
OPEN BUS 314587                                           /* ISLAND
OPEN BUS 314604                                           /* ISLAND
OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1          /*
6NORTHAMPTON230.00 - 6EARLEYS 230.00
OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1          /*
6NORTHAMPTON230.00 - 6ROA VAL 230.00
OPEN BUS 314266                                           /* ISLAND
END

```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315126	1ROARAP2	0.94
315128	1ROARAP4	0.91
315134	1ROAVALA	8.68
315135	1ROAVALB	2.32
932461	AC2-159 C OP	20.35
932462	AC2-159 E OP	20.35
921752	AA2-053 C	15.32
921753	AA2-053 E	6.58
922472	AA2-169 C	1.02
922473	AA2-169 E	0.47
922512	AA2-174 C	0.7
922513	AA2-174 E	0.76

923572	<i>AB1-173 C OP</i>	<i>1.1</i>
923573	<i>AB1-173 E OP</i>	<i>0.52</i>
923582	<i>AB1-173AC OP</i>	<i>1.1</i>
923583	<i>AB1-173AE OP</i>	<i>0.52</i>
923911	<i>AB2-031 C OP</i>	<i>1.1</i>
923912	<i>AB2-031 E OP</i>	<i>0.54</i>
923991	<i>AB2-040 C OP</i>	<i>3.6</i>
923992	<i>AB2-040 E OP</i>	<i>2.95</i>
924401	<i>AB2-089 C</i>	<i>0.76</i>
924402	<i>AB2-089 E</i>	<i>0.39</i>
924931	<i>AB2-147 C</i>	<i>0.83</i>
924932	<i>AB2-147 E</i>	<i>1.35</i>
924951	<i>AB2-150 C OP</i>	<i>0.83</i>
924952	<i>AB2-150 E OP</i>	<i>1.35</i>
925171	<i>AB2-174 C OP</i>	<i>3.03</i>
925172	<i>AB2-174 E OP</i>	<i>2.74</i>
925781	<i>AC1-054 C OP</i>	<i>2.85</i>
925782	<i>AC1-054 E OP</i>	<i>1.31</i>

Appendix 3

(DVP - DVP) The 3WOODLND-3AULANDR 115 kV line (from bus 314626 to bus 314625 ckt 1) loads from 78.42% to 108.34% (**DC power flow**) of its load dump rating (136 MVA) for the tower line contingency outage of 'LN 56-2012_A'. This project contributes approximately 40.69 MW to the thermal violation.

CONTINGENCY 'LN 56-2012_A'

OPEN BRANCH FROM BUS 314259 TO BUS 314559 CKT Z1 /* 3CAR56_1
115.00 - 3CAROLNA 115.00
OPEN BRANCH FROM BUS 314259 TO BUS 921161 CKT 1 /* 3CAR56_1
115.00 - AA1-063A TAP 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 314259 /* ISLAND
OPEN BUS 314587 /* ISLAND
OPEN BUS 314604 /* ISLAND
OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /*
6NORTHAMPTON230.00 - 6EARLEYS 230.00
OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /*
6NORTHAMPTON230.00 - 6ROA VAL 230.00
OPEN BUS 314266 /* ISLAND
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315126	1ROARAP2	0.94
315128	1ROARAP4	0.91
315134	1ROAVALA	8.68
315135	1ROAVALB	2.32
932461	AC2-159 C OP	20.35
932462	AC2-159 E OP	20.35
921752	AA2-053 C	15.32
921753	AA2-053 E	6.58
922472	AA2-169 C	1.02
922473	AA2-169 E	0.47
922512	AA2-174 C	0.7
922513	AA2-174 E	0.76
923572	AB1-173 C OP	1.1

923573	<i>AB1-173 E OP</i>	<i>0.52</i>
923582	<i>AB1-173AC OP</i>	<i>1.1</i>
923583	<i>AB1-173AE OP</i>	<i>0.52</i>
923911	<i>AB2-031 C OP</i>	<i>1.1</i>
923912	<i>AB2-031 E OP</i>	<i>0.54</i>
923991	<i>AB2-040 C OP</i>	<i>3.6</i>
923992	<i>AB2-040 E OP</i>	<i>2.95</i>
924401	<i>AB2-089 C</i>	<i>0.76</i>
924402	<i>AB2-089 E</i>	<i>0.39</i>
924931	<i>AB2-147 C</i>	<i>0.83</i>
924932	<i>AB2-147 E</i>	<i>1.35</i>
924951	<i>AB2-150 C OP</i>	<i>0.83</i>
924952	<i>AB2-150 E OP</i>	<i>1.35</i>
925171	<i>AB2-174 C OP</i>	<i>3.03</i>
925172	<i>AB2-174 E OP</i>	<i>2.74</i>
925781	<i>AC1-054 C OP</i>	<i>2.85</i>
925782	<i>AC1-054 E OP</i>	<i>1.31</i>

Appendix 4

(DVP - DVP) The 6CHARCTY-6LAKESD 230 kV line (from bus 314225 to bus 314227 ckt 1) loads from 141.15% to 141.63% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.82 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.04
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931041	AC2-012 C OP	2.94
931042	AC2-012 E OP	4.79
931581	AC2-078 C OP	3.15
931582	AC2-078 E OP	5.13
931591	AC2-079 C OP	3.12
931592	AC2-079 E OP	5.1
931631	AC2-084 C	2.99

931632	AC2-084 E	1.47
932061	AC2-130	0.81
932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932451	AC2-158 C OP	1.8
932452	AC2-158 E OP	1.8
932461	AC2-159 C OP	2.41
932462	AC2-159 E OP	2.41
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 5

(DVP - DVP) The 6MESSER-6CHARCTY 230 kV line (from bus 314228 to bus 314225 ckt 1) loads from 152.87% to 153.35% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.82 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.04
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931041	AC2-012 C OP	2.94
931042	AC2-012 E OP	4.79
931581	AC2-078 C OP	3.15
931582	AC2-078 E OP	5.13
931591	AC2-079 C OP	3.12
931592	AC2-079 E OP	5.1
931631	AC2-084 C	2.99

931632	AC2-084 E	1.47
932061	AC2-130	0.81
932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932451	AC2-158 C OP	1.8
932452	AC2-158 E OP	1.8
932461	AC2-159 C OP	2.41
932462	AC2-159 E OP	2.41
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 6

(DVP - DVP) The 6CHSTF B-6MESSER 230 kV line (from bus 314287 to bus 314228 ckt 1) loads from 153.0% to 153.48% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.82 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.04
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931041	AC2-012 C OP	2.94
931042	AC2-012 E OP	4.79
931581	AC2-078 C OP	3.15
931582	AC2-078 E OP	5.13
931591	AC2-079 C OP	3.12
931592	AC2-079 E OP	5.1
931631	AC2-084 C	2.99

931632	AC2-084 E	1.47
932061	AC2-130	0.81
932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932451	AC2-158 C OP	1.8
932452	AC2-158 E OP	1.8
932461	AC2-159 C OP	2.41
932462	AC2-159 E OP	2.41
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 7

(DVP - CPLE) The 3BTLEBRO-3ROCKYMT115T 115 kV line (from bus 314554 to bus 304223 ckt 1) loads from 202.22% to 204.41% (**DC power flow**) of its emergency rating (164 MVA) for the tower line contingency outage of 'LN 2058-2181'. This project contributes approximately 7.97 MW to the thermal violation.

CONTINGENCY 'LN 2058-2181'

OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00

OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-
RMOUNT#4230.00 - 6NASH 230.00

OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY
230.00 - 6NASH 230.00

OPEN BUS 314591 /* ISLAND: 6NASH 230.00

OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6HATHAWAY 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	13.46
315132	1EDGECEMB	13.46
315139	1GASTONA	2.09
315141	1GASTONB	2.09
315126	1ROARAP2	0.87
315128	1ROARAP4	0.84
315134	1ROAVALA	18.11
315135	1ROAVALB	4.83
315136	1ROSEMG1	1.69
315138	1ROSEMG2	0.79
315137	1ROSEMS1	1.05
314541	3WATKINS	0.26
931631	AC2-084 C	11.41
931632	AC2-084 E	5.62
932451	AC2-158 C OP	2.31
932452	AC2-158 E OP	2.31
932461	AC2-159 C OP	3.98
932462	AC2-159 E OP	3.98
932521	AC2-167 C	1.51
932522	AC2-167 E	2.46
900672	V4-068 E	0.15

917331	Z2-043 C	0.32
917332	Z2-043 E	0.83
917341	Z2-044 C	0.48
917342	Z2-044 E	1.25
917511	Z2-088 C OP1	0.61
917512	Z2-088 E OP1	6.1
917592	Z2-099 E	0.2
918411	AA1-050	0.51
LTF	AA1-055	9.27
921162	AA1-063AC	4.89
921163	AA1-063AE	2.3
918512	AA1-065 E OP	1.96
921182	AA1-067 C	0.74
921183	AA1-067 E	0.32
918561	AA1-072 C	0.05
918562	AA1-072 E	0.14
921562	AA1-135 C	4.04
921563	AA1-135 E	1.73
921752	AA2-053 C	5.43
921753	AA2-053 E	2.33
921762	AA2-057 C	12.89
921763	AA2-057 E	6.45
921862	AA2-068 C	3.3
921863	AA2-068 E	1.52
920022	AA2-086 E	0.11
921982	AA2-088 C	2.95
921983	AA2-088 E	4.81
922442	AA2-165 C	1.76
922443	AA2-165 E	0.85
922512	AA2-174 C	0.25
922513	AA2-174 E	0.27
922922	AB1-081 C OP	20.09
922923	AB1-081 E OP	8.61
923262	AB1-132 C OP	9.77
923263	AB1-132 E OP	4.19
923572	AB1-173 C OP	1.21
923573	AB1-173 E OP	0.57
923582	AB1-173AC OP	1.21
923583	AB1-173AE OP	0.57

923911	AB2-031 C OP	1.21
923912	AB2-031 E OP	0.59
923941	AB2-035 C	0.37
923942	AB2-035 E	0.16
923991	AB2-040 C OP	3.96
923992	AB2-040 E OP	3.24
924151	AB2-059 C OP	23.67
924152	AB2-059 E OP	12.19
924381	AB2-087 C	0.32
924382	AB2-087 E	0.15
924391	AB2-088 C	0.48
924392	AB2-088 E	0.23
924491	AB2-098 C	0.25
924492	AB2-098 E	0.11
924501	AB2-099 C	0.32
924502	AB2-099 E	0.14
924511	AB2-100 C	6.42
924512	AB2-100 E	3.16
924761	AB2-128 C	5.5
924762	AB2-128 E	2.17
924931	AB2-147 C	1.15
924932	AB2-147 E	1.87
924951	AB2-150 C OP	1.15
924952	AB2-150 E OP	1.87
925121	AB2-169 C OP	2.49
925122	AB2-169 E OP	2.23
925141	AB2-171 C OP	1.93
925142	AB2-171 E OP	3.15
925171	AB2-174 C OP	3.58
925172	AB2-174 E OP	3.24
925591	AC1-034 C OP	7.52
925592	AC1-034 E OP	5.68
926071	AC1-086 C	14.39
926072	AC1-086 E	6.55
926201	AC1-098 C	8.
926202	AC1-098 E	4.77
926211	AC1-099 C	2.68
926212	AC1-099 E	1.58
LTF	AC1-133	9.11

926771	AC1-163 C	1.14
926772	AC1-163 E	0.53
927021	AC1-189 C	5.16
927022	AC1-189 E	2.57
927051	AC1-193 C	1.42
927052	AC1-193 E	2.31
927111	AC1-206 C OP	5.12
927112	AC1-206 E OP	2.42
927141	AC1-208 C	10.07
927142	AC1-208 E	4.47

Appendix 8

(DVP - DVP) The 6CLUBHSE-6SAPONY 230 kV line (from bus 314563 to bus 314435 ckt 1) loads from 125.04% to 128.45% (**DC power flow**) of its load dump rating (637 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 21.75 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 932450 CKT 1

/* 2034 AC2-158

TAP

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	11.28
315132	1EDGECEMB	11.28
315139	1GASTONA	6.62
315141	1GASTONB	6.62
315126	1ROARAP2	2.39
315128	1ROARAP4	2.3
315134	1ROAVALA	57.56
315135	1ROAVALB	15.35
315136	1ROSEMG1	4.47
315138	1ROSEMG2	2.09
315137	1ROSEMS1	2.77
314704	3LAWRENC	0.7
314541	3WATKINS	0.52
931631	AC2-084 C	12.87
931632	AC2-084 E	6.34
932461	AC2-159 C OP	10.88
932462	AC2-159 E OP	10.88
932521	AC2-167 C	3.58
932522	AC2-167 E	5.84
900671	V4-068 C	0.11
900672	V4-068 E	0.36
917331	Z2-043 C	0.56
917332	Z2-043 E	1.48

917341	Z2-044 C	0.28
917342	Z2-044 E	0.74
917511	Z2-088 C OP1	0.92
917512	Z2-088 E OP1	9.15
917591	Z2-099 C	0.18
917592	Z2-099 E	0.48
918411	AA1-050	0.77
LTF	AA1-058	0.57
921162	AA1-063AC	12.84
921163	AA1-063AE	6.05
918511	AA1-065 C OP	2.23
918512	AA1-065 E OP	6.73
921182	AA1-067 C	1.89
921183	AA1-067 E	0.81
918561	AA1-072 C	0.08
918562	AA1-072 E	0.25
921562	AA1-135 C	12.17
921563	AA1-135 E	5.21
921752	AA2-053 C	14.91
921753	AA2-053 E	6.4
921762	AA2-057 C	9.77
921763	AA2-057 E	4.88
921862	AA2-068 C	3.26
921863	AA2-068 E	1.5
LTF	AA2-074	2.64
920021	AA2-086 C	0.09
920022	AA2-086 E	0.26
921982	AA2-088 C	6.85
921983	AA2-088 E	11.17
922442	AA2-165 C	1.33
922443	AA2-165 E	0.64
922472	AA2-169 C	2.95
922473	AA2-169 E	1.36
922512	AA2-174 C	0.68
922513	AA2-174 E	0.74
922922	AB1-081 C OP	10.8
922923	AB1-081 E OP	4.63
923262	AB1-132 C OP	30.95
923263	AB1-132 E OP	13.26

923572	AB1-173 C OP	5.12
923573	AB1-173 E OP	2.39
923582	AB1-173AC OP	5.12
923583	AB1-173AE OP	2.39
923911	AB2-031 C OP	5.08
923912	AB2-031 E OP	2.5
923941	AB2-035 C	0.4
923942	AB2-035 E	0.17
923991	AB2-040 C OP	16.68
923992	AB2-040 E OP	13.65
924021	AB2-043 C OP	2.78
924022	AB2-043 E OP	4.57
924151	AB2-059 C OP	12.73
924152	AB2-059 E OP	6.56
924301	AB2-077 C OP	1.75
924302	AB2-077 E OP	1.16
924311	AB2-078 C OP	1.75
924312	AB2-078 E OP	1.16
924321	AB2-079 C OP	1.75
924322	AB2-079 E OP	1.16
924381	AB2-087 C	0.85
924382	AB2-087 E	0.4
924391	AB2-088 C	0.51
924392	AB2-088 E	0.25
924401	AB2-089 C	2.42
924402	AB2-089 E	1.25
924411	AB2-090 C	3.51
924412	AB2-090 E	1.8
924491	AB2-098 C	0.63
924492	AB2-098 E	0.27
924501	AB2-099 C	0.84
924502	AB2-099 E	0.36
924511	AB2-100 C	31.38
924512	AB2-100 E	15.45
924761	AB2-128 C	26.88
924762	AB2-128 E	10.58
924931	AB2-147 C	6.65
924932	AB2-147 E	10.85
924951	AB2-150 C OP	6.65

924952	AB2-150 E OP	10.85
925141	AB2-171 C OP	4.01
925142	AB2-171 E OP	6.54
925171	AB2-174 C OP	16.92
925172	AB2-174 E OP	15.31
925221	AB2-176 C	1.44
925222	AB2-176 E	0.62
925591	AC1-034 C OP	8.1
925592	AC1-034 E OP	6.11
925781	AC1-054 C OP	8.72
925782	AC1-054 E OP	4.02
926071	AC1-086 C	45.57
926072	AC1-086 E	20.74
926201	AC1-098 C	9.03
926202	AC1-098 E	5.38
926211	AC1-099 C	3.02
926212	AC1-099 E	1.78
926771	AC1-163 C	3.02
926772	AC1-163 E	1.41
927021	AC1-189 C	9.72
927022	AC1-189 E	4.84
927051	AC1-193 C	2.94
927052	AC1-193 E	4.8
927111	AC1-206 C OP	38.58
927112	AC1-206 E OP	18.24
927141	AC1-208 C	14.98
927142	AC1-208 E	6.65
927211	AC1-215 C	9.18
927212	AC1-215 E	4.16

Appendix 9

(DVP - DVP) The 3COX DP-3WITAKRS 115 kV line (from bus 314577 to bus 314623 ckt 1) loads from 109.3% to 112.15% (**DC power flow**) of its emergency rating (134 MVA) for the single line contingency outage of 'DVP_P1-2:2056_A'. This project contributes approximately 3.83 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2:2056_A'

OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1 /* 6HATHAWAY
230.00 - AC1-208 TAP 230.00
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	1.05
315141	1GASTONB	1.05
315126	1ROARAP2	0.9
315128	1ROARAP4	0.86
315134	1ROAVALA	9.33
315135	1ROAVALB	2.49
315136	1ROSEMG1	0.75
315138	1ROSEMG2	0.35
315137	1ROSEMS1	0.47
315115	1SHAMPT1	0.61
931631	AC2-084 C	20.25
932461	AC2-159 C OP	3.83
932521	AC2-167 C	1.41
900671	V4-068 C	0.04
917331	Z2-043 C	0.44
917591	Z2-099 C	0.07
921162	AA1-063AC	4.9
918561	AA1-072 C	0.07
921752	AA2-053 C	5.44
921762	AA2-057 C	25.38
921862	AA2-068 C	6.12
920021	AA2-086 C	0.04
921982	AA2-088 C	2.75
922442	AA2-165 C	3.46
922472	AA2-169 C	0.91
922512	AA2-174 C	0.25
923262	AB1-132 C OP	4.89

923572	<i>AB1-173 C OP</i>	<i>1.09</i>
923582	<i>AB1-173AC OP</i>	<i>1.09</i>
923801	<i>AB2-015 C OP</i>	<i>2.74</i>
923911	<i>AB2-031 C OP</i>	<i>1.08</i>
923991	<i>AB2-040 C OP</i>	<i>3.55</i>
924381	<i>AB2-087 C</i>	<i>0.28</i>
924501	<i>AB2-099 C</i>	<i>0.28</i>
924511	<i>AB2-100 C</i>	<i>3.38</i>
924761	<i>AB2-128 C</i>	<i>2.9</i>
924931	<i>AB2-147 C</i>	<i>0.86</i>
924951	<i>AB2-150 C OP</i>	<i>0.86</i>
925141	<i>AB2-171 C OP</i>	<i>1.74</i>
925171	<i>AB2-174 C OP</i>	<i>3.04</i>
925781	<i>AC1-054 C OP</i>	<i>2.48</i>
926071	<i>AC1-086 C</i>	<i>7.2</i>
926201	<i>AC1-098 C</i>	<i>14.2</i>
926211	<i>AC1-099 C</i>	<i>4.76</i>
926771	<i>AC1-163 C</i>	<i>1.02</i>
927051	<i>AC1-193 C</i>	<i>1.28</i>
927141	<i>AC1-208 C</i>	<i>3.22</i>

Appendix 10

(DVP - DVP) The 6HORNRTN-AC1-208 TAP 230 kV line (from bus 314579 to bus 927140 ckt 1) loads from 105.02% to 107.84% (**DC power flow**) of its load dump rating (541 MVA) for the tower line contingency outage of 'LN 54-2012_C'. This project contributes approximately 15.29 MW to the thermal violation.

CONTINGENCY 'LN 54-2012_C'

OPEN BRANCH FROM BUS 932460 TO BUS 314626 CKT 1 /* AC2-159 TAP
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS
115.00 - 3AULANDR 115.00
OPEN BUS 314625 /* ISLAND
OPEN BUS 314626 /* ISLAND
OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /*
6NORTHAMPTON230.00 - 6EARLEYS 230.00
OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /*
6NORTHAMPTON230.00 - 6ROA VAL 230.00
OPEN BUS 314266 /* ISLAND
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	6.51
315141	1GASTONB	6.51
315126	1ROARAP2	1.55
315128	1ROARAP4	1.49
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	5.37
315138	1ROSEMG2	2.51
315137	1ROSEMS1	3.33
314704	3LAWRENC	0.3
932461	AC2-159 C OP	7.64
932462	AC2-159 E OP	7.64
932521	AC2-167 C	1.51
932522	AC2-167 E	2.46
917592	Z2-099 E	0.22
921162	AA1-063AC	7.64

921163	AA1-063AE	3.6
921752	AA2-053 C	10.01
921753	AA2-053 E	4.3
920022	AA2-086 E	0.12
921982	AA2-088 C	3.18
921983	AA2-088 E	5.18
922472	AA2-169 C	1.63
922473	AA2-169 E	0.75
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
923262	AB1-132 C OP	30.45
923263	AB1-132 E OP	13.05
923572	AB1-173 C OP	2.56
923573	AB1-173 E OP	1.19
923582	AB1-173AC OP	2.56
923583	AB1-173AE OP	1.19
923851	AB2-025 C	1.71
923852	AB2-025 E	0.77
923911	AB2-031 C OP	2.54
923912	AB2-031 E OP	1.25
923991	AB2-040 C OP	8.34
923992	AB2-040 E OP	6.82
924401	AB2-089 C	1.19
924402	AB2-089 E	0.61
924511	AB2-100 C	19.32
924512	AB2-100 E	9.52
924761	AB2-128 C	16.55
924762	AB2-128 E	6.52
924931	AB2-147 C	2.81
924932	AB2-147 E	4.59
924951	AB2-150 C OP	2.81
924952	AB2-150 E OP	4.59
925171	AB2-174 C OP	7.94
925172	AB2-174 E OP	7.19
925781	AC1-054 C OP	4.51
925782	AC1-054 E OP	2.08
926071	AC1-086 C	44.85
926072	AC1-086 E	20.41
927111	AC1-206 C OP	14.55

927112	AC1-206 E OP	6.88
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Appendix 11

(DVP - DVP) The 6LAKEVIEW-AB2-100 TAP 230 kV line (from bus 314583 to bus 924510 ckt 1) loads from 106.46% to 109.98% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 16.16 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 932450 CKT 1

/* 2034 AC2-158

TAP

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	10.91
315132	1EDGECEMB	10.91
315139	1GASTONA	6.89
315141	1GASTONB	6.89
315126	1ROARAP2	1.47
315128	1ROARAP4	1.42
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	4.63
315138	1ROSEMG2	2.17
315137	1ROSEMS1	2.87
314541	3WATKINS	0.36
931631	AC2-084 C	10.35
931632	AC2-084 E	5.1
932461	AC2-159 C OP	8.08
932462	AC2-159 E OP	8.08
932521	AC2-167 C	2.53
932522	AC2-167 E	4.14
900671	V4-068 C	0.08
900672	V4-068 E	0.28
917331	Z2-043 C	0.48
917332	Z2-043 E	1.26
917341	Z2-044 C	0.25

917342	Z2-044 E	0.65
917511	Z2-088 C OP1	0.88
917512	Z2-088 E OP1	8.76
917591	Z2-099 C	0.12
917592	Z2-099 E	0.33
918411	AA1-050	0.74
LTF	AA1-058	0.52
921162	AA1-063AC	8.19
921163	AA1-063AE	3.86
918511	AA1-065 C OP	2.12
918512	AA1-065 E OP	6.39
921182	AA1-067 C	1.8
921183	AA1-067 E	0.77
918561	AA1-072 C	0.07
918562	AA1-072 E	0.21
921562	AA1-135 C	11.57
921563	AA1-135 E	4.96
921752	AA2-053 C	9.99
921753	AA2-053 E	4.29
921762	AA2-057 C	8.06
921763	AA2-057 E	4.03
921862	AA2-068 C	2.55
921863	AA2-068 E	1.17
LTF	AA2-074	2.29
920021	AA2-086 C	0.07
920022	AA2-086 E	0.18
921982	AA2-088 C	4.75
921983	AA2-088 E	7.75
922442	AA2-165 C	1.1
922443	AA2-165 E	0.53
922472	AA2-169 C	1.5
922473	AA2-169 E	0.69
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
922922	AB1-081 C OP	10.03
922923	AB1-081 E OP	4.3
923262	AB1-132 C OP	32.21
923263	AB1-132 E OP	13.81
923941	AB2-035 C	0.38

923942	AB2-035 E	0.16
924151	AB2-059 C OP	11.83
924152	AB2-059 E OP	6.09
924381	AB2-087 C	0.75
924382	AB2-087 E	0.35
924391	AB2-088 C	0.49
924392	AB2-088 E	0.24
924491	AB2-098 C	0.6
924492	AB2-098 E	0.26
924501	AB2-099 C	0.72
924502	AB2-099 E	0.31
925121	AB2-169 C OP	3.97
925122	AB2-169 E OP	3.56
925141	AB2-171 C OP	2.78
925142	AB2-171 E OP	4.53
925591	AC1-034 C OP	7.79
925592	AC1-034 E OP	5.88
925781	AC1-054 C OP	4.09
925782	AC1-054 E OP	1.88
926071	AC1-086 C	47.44
926072	AC1-086 E	21.59
926201	AC1-098 C	7.26
926202	AC1-098 E	4.32
926211	AC1-099 C	2.43
926212	AC1-099 E	1.43
926771	AC1-163 C	2.59
926772	AC1-163 E	1.21
927021	AC1-189 C	9.29
927022	AC1-189 E	4.63
927051	AC1-193 C	2.04
927052	AC1-193 E	3.32
927141	AC1-208 C	15.14
927142	AC1-208 E	6.72

Appendix 12

(DVP - CPLE) The 6NASH-6PA-RMOUNT#4 230 kV line (from bus 314591 to bus 304226 ckt 1) loads from 106.53% to 108.74% (**DC power flow**) of its emergency rating (470 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 229-2058'. This project contributes approximately 10.37 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 229-2058'

OPEN BRANCH FROM BUS 314564 TO BUS 314610 CKT 1 /* 6EDGECOM
230.00 - 6TOTDP4 230.00

OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 1 /* 3TARBORO
115.00 - 6TARBORO 230.00

OPEN BRANCH FROM BUS 314609 TO BUS 314610 CKT 1 /* 6TARBORO
230.00 - 6TOTDP4 230.00

OPEN BUS 314610 /* ISLAND: 6TOTDP4 230.00

OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6HATHAWAY 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	32.93
315132	1EDGECEMB	32.93
315139	1GASTONA	4.08
315141	1GASTONB	4.08
315126	1ROARAP2	1.28
315128	1ROARAP4	1.23
315134	1ROAVALA	33.48
315135	1ROAVALB	8.93
315136	1ROSEMG1	3.49
315138	1ROSEMG2	1.63
315137	1ROSEMS1	2.16
314704	3LAWRENC	0.21
314541	3WATKINS	0.35
931631	AC2-084 C	10.53
931632	AC2-084 E	5.19
932461	AC2-159 C OP	5.19
932462	AC2-159 E OP	5.19
932521	AC2-167 C	2.02
932522	AC2-167 E	3.3
900671	V4-068 C	0.06

900672	V4-068 E	0.19
917331	Z2-043 C	0.32
917332	Z2-043 E	0.83
917341	Z2-044 C	0.38
917342	Z2-044 E	1.
917591	Z2-099 C	0.1
917592	Z2-099 E	0.28
921162	AA1-063AC	7.02
921163	AA1-063AE	3.31
918512	AA1-065 E OP	2.16
918561	AA1-072 C	0.05
918562	AA1-072 E	0.14
921752	AA2-053 C	7.6
921753	AA2-053 E	3.27
921762	AA2-057 C	10.92
921763	AA2-057 E	5.46
921862	AA2-068 C	2.99
921863	AA2-068 E	1.38
920021	AA2-086 C	0.05
920022	AA2-086 E	0.15
921982	AA2-088 C	3.99
921983	AA2-088 E	6.51
922442	AA2-165 C	1.49
922443	AA2-165 E	0.72
922472	AA2-169 C	1.3
922473	AA2-169 E	0.6
922512	AA2-174 C	0.35
922513	AA2-174 E	0.38
922922	AB1-081 C OP	20.13
922923	AB1-081 E OP	8.63
923262	AB1-132 C OP	19.06
923263	AB1-132 E OP	8.17
923572	AB1-173 C OP	1.94
923573	AB1-173 E OP	0.9
923582	AB1-173AC OP	1.94
923583	AB1-173AE OP	0.9
923801	AB2-015 C OP	4.18
923802	AB2-015 E OP	3.43
923851	AB2-025 C	1.18

923852	AB2-025 E	0.53
923911	AB2-031 C OP	1.92
923912	AB2-031 E OP	0.95
923991	AB2-040 C OP	6.31
923992	AB2-040 E OP	5.16
924151	AB2-059 C OP	23.73
924152	AB2-059 E OP	12.22
924381	AB2-087 C	0.35
924382	AB2-087 E	0.17
924501	AB2-099 C	0.36
924502	AB2-099 E	0.16
924511	AB2-100 C	12.32
924512	AB2-100 E	6.07
924761	AB2-128 C	10.55
924762	AB2-128 E	4.15
924931	AB2-147 C	1.97
924932	AB2-147 E	3.22
924951	AB2-150 C OP	1.97
924952	AB2-150 E OP	3.22
925141	AB2-171 C OP	2.6
925142	AB2-171 E OP	4.25
925171	AB2-174 C OP	5.85
925172	AB2-174 E OP	5.29
925781	AC1-054 C OP	3.51
925782	AC1-054 E OP	1.62
926071	AC1-086 C	28.08
926072	AC1-086 E	12.78
926201	AC1-098 C	7.39
926202	AC1-098 E	4.4
926211	AC1-099 C	2.48
926212	AC1-099 E	1.45
926771	AC1-163 C	1.31
926772	AC1-163 E	0.61
927051	AC1-193 C	1.91
927052	AC1-193 E	3.12
927111	AC1-206 C OP	9.55
927112	AC1-206 E OP	4.52
927141	AC1-208 C	23.22
927142	AC1-208 E	10.31

Appendix 13

(DVP - DVP) The 3WITAKRS-3BTLEBRO 115 kV line (from bus 314623 to bus 314554 ckt 1) loads from 107.76% to 110.6% (**DC power flow**) of its emergency rating (134 MVA) for the single line contingency outage of 'DVP_P1-2:2056_A'. This project contributes approximately 3.83 MW to the thermal violation.

CONTINGENCY 'DVP_P1-2:2056_A'

OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1

/* 6HATHAWAY

230.00 - AC1-208 TAP 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	1.04
315141	1GASTONB	1.04
315126	1ROARAP2	0.9
315128	1ROARAP4	0.86
315134	1ROAVALA	9.33
315135	1ROAVALB	2.49
315136	1ROSEMG1	0.75
315138	1ROSEMG2	0.35
315137	1ROSEMS1	0.47
315115	1SHAMPT1	0.61
931631	AC2-084 C	20.25
932461	AC2-159 C OP	3.83
932521	AC2-167 C	1.41
900671	V4-068 C	0.04
917331	Z2-043 C	0.44
917341	Z2-044 C	0.98
917591	Z2-099 C	0.07
921162	AA1-063AC	4.89
918561	AA1-072 C	0.07
921752	AA2-053 C	5.44
921762	AA2-057 C	25.38
921862	AA2-068 C	6.12
920021	AA2-086 C	0.04
921982	AA2-088 C	2.75
922442	AA2-165 C	3.46
922472	AA2-169 C	0.91

922512	AA2-174 C	0.25
923262	AB1-132 C OP	4.88
923572	AB1-173 C OP	1.09
923582	AB1-173AC OP	1.09
923801	AB2-015 C OP	2.73
923911	AB2-031 C OP	1.08
923991	AB2-040 C OP	3.55
924381	AB2-087 C	0.28
924501	AB2-099 C	0.28
924511	AB2-100 C	3.38
924761	AB2-128 C	2.9
924931	AB2-147 C	0.86
924951	AB2-150 C OP	0.86
925141	AB2-171 C OP	1.74
925171	AB2-174 C OP	3.04
925781	AC1-054 C OP	2.48
926071	AC1-086 C	7.19
926201	AC1-098 C	14.2
926211	AC1-099 C	4.76
926771	AC1-163 C	1.02
927051	AC1-193 C	1.28
927141	AC1-208 C	3.22

Appendix 14

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 127.22% to 130.74% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 16.16 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 932450 CKT 1

/* 2034 AC2-158

TAP

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	10.91
315132	1EDGECEMB	10.91
315139	1GASTONA	6.89
315141	1GASTONB	6.89
315126	1ROARAP2	1.47
315128	1ROARAP4	1.42
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	4.63
315138	1ROSEMG2	2.17
315137	1ROSEMS1	2.87
931631	AC2-084 C	10.35
931632	AC2-084 E	5.1
932461	AC2-159 C OP	8.08
932462	AC2-159 E OP	8.08
932521	AC2-167 C	2.53
932522	AC2-167 E	4.14
900671	V4-068 C	0.08
900672	V4-068 E	0.28
917331	Z2-043 C	0.48
917332	Z2-043 E	1.26
917341	Z2-044 C	0.25
917342	Z2-044 E	0.65

917511	Z2-088 C OP1	0.88
917512	Z2-088 E OP1	8.76
917591	Z2-099 C	0.12
917592	Z2-099 E	0.33
918411	AA1-050	0.74
LTF	AA1-058	0.52
921162	AA1-063AC	8.19
921163	AA1-063AE	3.86
918511	AA1-065 C OP	2.12
918512	AA1-065 E OP	6.39
921182	AA1-067 C	1.8
921183	AA1-067 E	0.77
918561	AA1-072 C	0.07
918562	AA1-072 E	0.21
921562	AA1-135 C	11.57
921563	AA1-135 E	4.96
921752	AA2-053 C	9.99
921753	AA2-053 E	4.29
921762	AA2-057 C	8.06
921763	AA2-057 E	4.03
921862	AA2-068 C	2.55
921863	AA2-068 E	1.17
LTF	AA2-074	2.29
920021	AA2-086 C	0.07
920022	AA2-086 E	0.18
921982	AA2-088 C	4.75
921983	AA2-088 E	7.75
922442	AA2-165 C	1.1
922443	AA2-165 E	0.53
922472	AA2-169 C	1.5
922473	AA2-169 E	0.69
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
922922	AB1-081 C OP	10.03
922923	AB1-081 E OP	4.3
923262	AB1-132 C OP	32.21
923263	AB1-132 E OP	13.81
923941	AB2-035 C	0.38
923942	AB2-035 E	0.16

924151	AB2-059 C OP	11.83
924152	AB2-059 E OP	6.09
924381	AB2-087 C	0.75
924382	AB2-087 E	0.35
924391	AB2-088 C	0.49
924392	AB2-088 E	0.24
924491	AB2-098 C	0.6
924492	AB2-098 E	0.26
924501	AB2-099 C	0.72
924502	AB2-099 E	0.31
924511	AB2-100 C	35.61
924512	AB2-100 E	17.54
924761	AB2-128 C	30.5
924762	AB2-128 E	12.01
925121	AB2-169 C OP	3.97
925122	AB2-169 E OP	3.56
925141	AB2-171 C OP	2.78
925142	AB2-171 E OP	4.53
925591	AC1-034 C OP	7.79
925592	AC1-034 E OP	5.88
925781	AC1-054 C OP	4.09
925782	AC1-054 E OP	1.88
926071	AC1-086 C	47.44
926072	AC1-086 E	21.59
926201	AC1-098 C	7.26
926202	AC1-098 E	4.32
926211	AC1-099 C	2.43
926212	AC1-099 E	1.43
926771	AC1-163 C	2.59
926772	AC1-163 E	1.21
927021	AC1-189 C	9.29
927022	AC1-189 E	4.63
927051	AC1-193 C	2.04
927052	AC1-193 E	3.32
927141	AC1-208 C	15.14
927142	AC1-208 E	6.72

Appendix 15

(DVP - DVP) The AC1-208 TAP-6HATHAWAY 230 kV line (from bus 927140 to bus 313845 ckt 1) loads from 113.82% to 116.64% (**DC power flow**) of its load dump rating (541 MVA) for the tower line contingency outage of 'LN 54-2012_C'. This project contributes approximately 15.29 MW to the thermal violation.

CONTINGENCY 'LN 54-2012_C'

OPEN BRANCH FROM BUS 932460 TO BUS 314626 CKT 1 /* AC2-159 TAP
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS
115.00 - 3AULANDR 115.00
OPEN BUS 314625 /* ISLAND
OPEN BUS 314626 /* ISLAND
OPEN BRANCH FROM BUS 314266 TO BUS 314569 CKT 1 /*
6NORTHAMPTON230.00 - 6EARLEYS 230.00
OPEN BRANCH FROM BUS 314266 TO BUS 314599 CKT 1 /*
6NORTHAMPTON230.00 - 6ROA VAL 230.00
OPEN BUS 314266 /* ISLAND
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	6.51
315141	1GASTONB	6.51
315126	1ROARAP2	1.55
315128	1ROARAP4	1.49
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	5.37
315138	1ROSEMG2	2.51
315137	1ROSEMS1	3.33
314704	3LAWRENC	0.3
932461	AC2-159 C OP	7.64
932462	AC2-159 E OP	7.64
932521	AC2-167 C	1.51
932522	AC2-167 E	2.46
917592	Z2-099 E	0.22
921162	AA1-063AC	7.64

921163	AA1-063AE	3.6
921752	AA2-053 C	10.01
921753	AA2-053 E	4.3
920022	AA2-086 E	0.12
921982	AA2-088 C	3.18
921983	AA2-088 E	5.18
922472	AA2-169 C	1.63
922473	AA2-169 E	0.75
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
923262	AB1-132 C OP	30.45
923263	AB1-132 E OP	13.05
923572	AB1-173 C OP	2.56
923573	AB1-173 E OP	1.19
923582	AB1-173AC OP	2.56
923583	AB1-173AE OP	1.19
923851	AB2-025 C	1.71
923852	AB2-025 E	0.77
923911	AB2-031 C OP	2.54
923912	AB2-031 E OP	1.25
923991	AB2-040 C OP	8.34
923992	AB2-040 E OP	6.82
924401	AB2-089 C	1.19
924402	AB2-089 E	0.61
924511	AB2-100 C	19.32
924512	AB2-100 E	9.52
924761	AB2-128 C	16.55
924762	AB2-128 E	6.52
924931	AB2-147 C	2.81
924932	AB2-147 E	4.59
924951	AB2-150 C OP	2.81
924952	AB2-150 E OP	4.59
925171	AB2-174 C OP	7.94
925172	AB2-174 E OP	7.19
925781	AC1-054 C OP	4.51
925782	AC1-054 E OP	2.08
926071	AC1-086 C	44.85
926072	AC1-086 E	20.41
927111	AC1-206 C OP	14.55

<i>927112</i>	<i>AC1-206 E OP</i>	<i>6.88</i>
<i>927141</i>	<i>AC1-208 C</i>	<i>33.17</i>
<i>927142</i>	<i>AC1-208 E</i>	<i>14.73</i>

Appendix 16

(DVP - DVP) The 6CHRL249-6LOCKS 230 kV line (from bus 314285 to bus 314316 ckt 1) loads from 99.93% to 100.37% (**DC power flow**) of its load dump rating (684 MVA) for the line fault with failed breaker contingency outage of '562T563'. This project contributes approximately 6.7 MW to the thermal violation.

CONTINGENCY '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>
315131	1EDGECEMA	4.62
315132	1EDGECEMB	4.62
315139	1GASTONA	2.
315141	1GASTONB	2.
315134	1ROAVALA	17.18
315135	1ROAVALB	4.58
315136	1ROSEMG1	1.38
315138	1ROSEMG2	0.65
315137	1ROSEMS1	0.86
315073	1STONECA	-2.75
314784	1WEYRHSB	0.73
314704	3LAWRENC	0.23
314541	3WATKINS	0.23
931631	AC2-084 C	4.33
931632	AC2-084 E	2.13
931701	AC2-093 C	39.47
931702	AC2-093 E	22.58
931761	AC2-100 C	2.18
931762	AC2-100 E	1.06
931823	AC2-107	0.01
931821	AC2-107 C OP	3.86
931822	AC2-107 E OP	1.81
932451	AC2-158 C OP	2.2
932452	AC2-158 E OP	2.2
932461	AC2-159 C OP	3.35

932462	AC2-159 E OP	3.35
932521	AC2-167 C	1.3
932522	AC2-167 E	2.12
292791	U1-032 E	-1.43
900672	V4-068 E	0.12
916301	Z1-086 C	26.71
916302	Z1-086 E	5.11
917332	Z2-043 E	0.45
917342	Z2-044 E	0.29
LTF	Z2-067	8.58
917512	Z2-088 E OP1	3.58
917592	Z2-099 E	0.18
LTF	AA1-058	0.38
921162	AA1-063AC	4.33
921163	AA1-063AE	2.04
918512	AA1-065 E OP	1.76
921182	AA1-067 C	0.72
921183	AA1-067 E	0.31
918562	AA1-072 E	0.07
921562	AA1-135 C	3.78
921563	AA1-135 E	1.62
921752	AA2-053 C	4.72
921753	AA2-053 E	2.03
921762	AA2-057 C	3.59
921763	AA2-057 E	1.8
921862	AA2-068 C	1.14
921863	AA2-068 E	0.52
LTF	AA2-074	2.56
920022	AA2-086 E	0.1
921982	AA2-088 C	2.56
921983	AA2-088 E	4.18
922442	AA2-165 C	0.49
922443	AA2-165 E	0.24
922472	AA2-169 C	1.15
922473	AA2-169 E	0.53
922512	AA2-174 C	0.22
922513	AA2-174 E	0.23
922922	AB1-081 C OP	4.43
922923	AB1-081 E OP	1.9

923262	AB1-132 C OP	9.35
923263	AB1-132 E OP	4.01
923572	AB1-173 C OP	1.58
923573	AB1-173 E OP	0.74
923582	AB1-173AC OP	1.58
923583	AB1-173AE OP	0.74
923851	AB2-025 C	2.84
923852	AB2-025 E	1.27
923911	AB2-031 C OP	1.57
923912	AB2-031 E OP	0.77
923941	AB2-035 C	0.16
923942	AB2-035 E	0.07
923991	AB2-040 C OP	5.14
923992	AB2-040 E OP	4.21
924021	AB2-043 C OP	1.39
924022	AB2-043 E OP	2.28
924151	AB2-059 C OP	5.22
924152	AB2-059 E OP	2.69
924161	AB2-060 C OP	3.43
924162	AB2-060 E OP	1.62
924301	AB2-077 C OP	0.88
924302	AB2-077 E OP	0.59
924311	AB2-078 C OP	0.88
924312	AB2-078 E OP	0.59
924321	AB2-079 C OP	0.88
924322	AB2-079 E OP	0.59
924381	AB2-087 C	0.24
924382	AB2-087 E	0.11
924391	AB2-088 C	0.2
924392	AB2-088 E	0.1
924401	AB2-089 C	1.05
924402	AB2-089 E	0.54
924411	AB2-090 C	1.75
924412	AB2-090 E	0.9
924491	AB2-098 C	0.24
924492	AB2-098 E	0.1
924501	AB2-099 C	0.25
924502	AB2-099 E	0.11
924511	AB2-100 C	9.13

924512	AB2-100 E	4.5
924761	AB2-128 C	7.82
924762	AB2-128 E	3.08
924931	AB2-147 C	2.01
924932	AB2-147 E	3.27
924951	AB2-150 C OP	2.01
924952	AB2-150 E OP	3.27
925121	AB2-169 C OP	2.37
925122	AB2-169 E OP	2.12
925141	AB2-171 C OP	1.69
925142	AB2-171 E OP	2.76
925171	AB2-174 C OP	5.16
925172	AB2-174 E OP	4.67
925221	AB2-176 C	0.72
925222	AB2-176 E	0.31
925591	AC1-034 C OP	3.24
925592	AC1-034 E OP	2.44
925611	AC1-036 C	0.36
925612	AC1-036 E	0.59
925781	AC1-054 C OP	3.62
925782	AC1-054 E OP	1.67
926071	AC1-086 C	13.77
926072	AC1-086 E	6.27
926201	AC1-098 C	3.04
926202	AC1-098 E	1.81
926211	AC1-099 C	1.02
926212	AC1-099 E	0.6
926271	AC1-105 C OP	2.33
926272	AC1-105 E OP	1.16
926771	AC1-163 C	0.89
926772	AC1-163 E	0.42
927021	AC1-189 C	3.75
927022	AC1-189 E	1.87
927051	AC1-193 C	1.24
927052	AC1-193 E	2.03
927111	AC1-206 C OP	10.95
927112	AC1-206 E OP	5.18
927141	AC1-208 C	5.18
927142	AC1-208 E	2.3

927211	AC1-215 C	4.76
927212	AC1-215 E	2.16
927251	AC1-221 C	1.23
927252	AC1-221 E	0.66
927261	AC1-222 C	1.9
927262	AC1-222 E	0.92

Appendix 17

(DVP - DVP) The 6SAPONY-6CARSON 230 kV line (from bus 314435 to bus 314282 ckt 1) loads from 97.84% to 100.73% (**DC power flow**) of its load dump rating (830 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 23.97 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1

/* TROWBRIDGE

TX #1&2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	11.38
315132	1EDGECEMB	11.38
315139	1GASTONA	6.65
315141	1GASTONB	6.65
315126	1ROARAP2	2.41
315128	1ROARAP4	2.31
315134	1ROAVALA	57.8
315135	1ROAVALB	15.41
315136	1ROSEMG1	4.49
315138	1ROSEMG2	2.1
315137	1ROSEMS1	2.78
314704	3LAWRENC	0.7
314541	3WATKINS	0.52
931631	AC2-084 C	12.95
931632	AC2-084 E	6.38
932451	AC2-158 C OP	7.16
932452	AC2-158 E OP	7.16
932461	AC2-159 C OP	11.98
932462	AC2-159 E OP	11.98
932521	AC2-167 C	3.6
932522	AC2-167 E	5.87

900671	V4-068 C	0.11
900672	V4-068 E	0.36
917331	Z2-043 C	0.57
917332	Z2-043 E	1.49
917341	Z2-044 C	0.28
917342	Z2-044 E	0.75
917511	Z2-088 C OP1	0.93
917512	Z2-088 E OP1	9.3
917591	Z2-099 C	0.18
917592	Z2-099 E	0.48
918411	AA1-050	0.78
LTF	AA1-058	0.57
921162	AA1-063AC	12.89
921163	AA1-063AE	6.08
918511	AA1-065 C OP	2.25
918512	AA1-065 E OP	6.79
921182	AA1-067 C	1.92
921183	AA1-067 E	0.82
918561	AA1-072 C	0.09
918562	AA1-072 E	0.25
921562	AA1-135 C	12.33
921563	AA1-135 E	5.29
921752	AA2-053 C	14.98
921753	AA2-053 E	6.43
921762	AA2-057 C	9.84
921763	AA2-057 E	4.92
921862	AA2-068 C	3.28
921863	AA2-068 E	1.51
LTF	AA2-074	2.67
920021	AA2-086 C	0.09
920022	AA2-086 E	0.26
921982	AA2-088 C	6.87
921983	AA2-088 E	11.21
922442	AA2-165 C	1.34
922443	AA2-165 E	0.65
922472	AA2-169 C	2.97
922473	AA2-169 E	1.36
922512	AA2-174 C	0.69
922513	AA2-174 E	0.74

922922	AB1-081 C OP	10.89
922923	AB1-081 E OP	4.67
923262	AB1-132 C OP	31.06
923263	AB1-132 E OP	13.31
923572	AB1-173 C OP	5.13
923573	AB1-173 E OP	2.39
923582	AB1-173AC OP	5.13
923583	AB1-173AE OP	2.39
923851	AB2-025 C	10.36
923852	AB2-025 E	4.65
923911	AB2-031 C OP	5.09
923912	AB2-031 E OP	2.51
923941	AB2-035 C	0.4
923942	AB2-035 E	0.17
923991	AB2-040 C OP	16.73
923992	AB2-040 E OP	13.69
924021	AB2-043 C OP	2.79
924022	AB2-043 E OP	4.58
924151	AB2-059 C OP	12.83
924152	AB2-059 E OP	6.61
924301	AB2-077 C OP	1.75
924302	AB2-077 E OP	1.17
924311	AB2-078 C OP	1.75
924312	AB2-078 E OP	1.17
924321	AB2-079 C OP	1.75
924322	AB2-079 E OP	1.17
924381	AB2-087 C	0.86
924382	AB2-087 E	0.4
924391	AB2-088 C	0.52
924392	AB2-088 E	0.25
924401	AB2-089 C	2.43
924402	AB2-089 E	1.25
924411	AB2-090 C	3.52
924412	AB2-090 E	1.8
924491	AB2-098 C	0.64
924492	AB2-098 E	0.27
924501	AB2-099 C	0.84
924502	AB2-099 E	0.36
924511	AB2-100 C	31.44

924512	AB2-100 E	15.49
924761	AB2-128 C	26.94
924762	AB2-128 E	10.61
924931	AB2-147 C	6.66
924932	AB2-147 E	10.87
924951	AB2-150 C OP	6.66
924952	AB2-150 E OP	10.87
925141	AB2-171 C OP	4.02
925142	AB2-171 E OP	6.56
925171	AB2-174 C OP	16.96
925172	AB2-174 E OP	15.34
925221	AB2-176 C	1.45
925222	AB2-176 E	0.62
925591	AC1-034 C OP	8.19
925592	AC1-034 E OP	6.18
925781	AC1-054 C OP	8.75
925782	AC1-054 E OP	4.03
926071	AC1-086 C	45.74
926072	AC1-086 E	20.82
926201	AC1-098 C	9.09
926202	AC1-098 E	5.41
926211	AC1-099 C	3.05
926212	AC1-099 E	1.79
926771	AC1-163 C	3.04
926772	AC1-163 E	1.42
927021	AC1-189 C	9.89
927022	AC1-189 E	4.93
927051	AC1-193 C	2.95
927052	AC1-193 E	4.81
927111	AC1-206 C OP	38.63
927112	AC1-206 E OP	18.26
927141	AC1-208 C	15.07
927142	AC1-208 E	6.69
927211	AC1-215 C	9.21
927212	AC1-215 E	4.17

Appendix 18

(DVP - CPLE) The 6EVERETS-6GREENVILE T 230 kV line (from bus 314574 to bus 304451 ckt 1) loads from 98.85% to 101.56% (**DC power flow**) of its emergency rating (478 MVA) for the tower line contingency outage of 'LN 2058-2181'. This project contributes approximately 12.95 MW to the thermal violation.

CONTINGENCY 'LN 2058-2181'

OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00

OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-
RMOUNT#4230.00 - 6NASH 230.00

OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY
230.00 - 6NASH 230.00

OPEN BUS 314591 /* ISLAND: 6NASH 230.00

OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6HATHAWAY 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315292	1DOMTR78	1.8
315131	1EDGECEMA	9.38
315132	1EDGECEMB	9.38
315134	1ROAVALA	21.95
315135	1ROAVALB	5.85
314784	1WEYRHSB	2.76
314539	3UNCAMP	1.2
314541	3WATKINS	0.37
931631	AC2-084 C	6.26
931632	AC2-084 E	3.09
932451	AC2-158 C OP	8.9
932452	AC2-158 E OP	8.9
932461	AC2-159 C OP	6.48
932462	AC2-159 E OP	6.48
932521	AC2-167 C	2.02
932522	AC2-167 E	3.29
932711	AC2-194 C	0.59
932712	AC2-194 E	0.95
900672	V4-068 E	0.21
901082	W1-029 E	22.99
907092	X1-038 E	2.99

913392	Y1-086 E	1.04
916042	Z1-036 E	30.03
917122	Z2-027 E	0.5
917331	Z2-043 C	0.33
917332	Z2-043 E	0.87
917342	Z2-044 E	0.33
917511	Z2-088 C OP1	1.47
917512	Z2-088 E OP1	14.69
917592	Z2-099 E	0.27
918411	AA1-050	1.24
921162	AA1-063AC	5.22
921163	AA1-063AE	2.46
918511	AA1-065 C OP	1.63
918512	AA1-065 E OP	4.91
921182	AA1-067 C	3.8
921183	AA1-067 E	1.63
918561	AA1-072 C	0.05
918562	AA1-072 E	0.15
921562	AA1-135 C	15.33
921563	AA1-135 E	6.57
921572	AA1-138 C	5.83
921573	AA1-138 E	2.5
921752	AA2-053 C	6.11
921753	AA2-053 E	2.62
921762	AA2-057 C	4.37
921763	AA2-057 E	2.19
921772	AA2-059 C	0.87
921773	AA2-059 E	0.41
921862	AA2-068 C	1.45
921863	AA2-068 E	0.67
920022	AA2-086 E	0.14
921982	AA2-088 C	3.87
921983	AA2-088 E	6.32
922442	AA2-165 C	0.6
922443	AA2-165 E	0.29
922512	AA2-174 C	0.28
922513	AA2-174 E	0.3
922532	AA2-178 C	8.57
922533	AA2-178 E	3.67

922602	AB1-013 C	2.59
922603	AB1-013 E	17.3
922922	AB1-081 C OP	5.72
922923	AB1-081 E OP	2.45
923262	AB1-132 C OP	10.48
923263	AB1-132 E OP	4.49
923572	AB1-173 C OP	1.22
923573	AB1-173 E OP	0.57
923582	AB1-173AC OP	1.22
923583	AB1-173AE OP	0.57
923801	AB2-015 C OP	4.44
923802	AB2-015 E OP	3.64
923831	AB2-022 C	1.01
923832	AB2-022 E	0.54
923911	AB2-031 C OP	1.21
923912	AB2-031 E OP	0.6
923941	AB2-035 C	0.48
923942	AB2-035 E	0.21
923991	AB2-040 C OP	3.97
923992	AB2-040 E OP	3.25
924151	AB2-059 C OP	6.74
924152	AB2-059 E OP	3.47
924381	AB2-087 C	0.56
924382	AB2-087 E	0.26
924391	AB2-088 C	0.62
924392	AB2-088 E	0.3
924491	AB2-098 C	1.27
924492	AB2-098 E	0.54
924501	AB2-099 C	0.54
924502	AB2-099 E	0.23
924511	AB2-100 C	7.
924512	AB2-100 E	3.45
924761	AB2-128 C	5.99
924762	AB2-128 E	2.36
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925121	AB2-169 C OP	9.9

925122	AB2-169 E OP	8.88
925141	AB2-171 C OP	2.67
925142	AB2-171 E OP	4.35
925171	AB2-174 C OP	3.65
925172	AB2-174 E OP	3.3
925281	AB2-186 C	0.36
925282	AB2-186 E	0.15
925291	AB2-188 C OP	2.11
925292	AB2-188 E OP	0.95
925591	AC1-034 C OP	9.87
925592	AC1-034 E OP	7.44
926071	AC1-086 C	15.44
926072	AC1-086 E	7.03
926201	AC1-098 C	4.39
926202	AC1-098 E	2.62
926211	AC1-099 C	1.47
926212	AC1-099 E	0.86
LTF	AC1-133	21.95
926771	AC1-163 C	1.93
926772	AC1-163 E	0.9
927021	AC1-189 C	17.56
927022	AC1-189 E	8.75
927051	AC1-193 C	1.96
927052	AC1-193 E	3.19
927111	AC1-206 C OP	5.7
927112	AC1-206 E OP	2.7
927141	AC1-208 C	8.04
927142	AC1-208 E	3.57

Appendix 19

(DVP - DVP) The 8SPOTSYL-8MORRSVL 500 kV line (from bus 314934 to bus 314916 ckt 1) loads from 99.93% to 100.1% (**DC power flow**) of its load dump rating (3938 MVA) for the tower line contingency outage of 'LN 198-552'. This project contributes approximately 14.38 MW to the thermal violation.

CONTINGENCY 'LN 198-552'

OPEN BRANCH FROM BUS 314135 TO BUS 314367 CKT 1 /* 3CHANCE
115.00 - 3CHANC_1 115.00 CAP BANK
OPEN BRANCH FROM BUS 314135 TO BUS 314775 CKT 1 /* 3CHANCE
115.00 - 3NI RVER 115.00
OPEN BRANCH FROM BUS 314775 TO BUS 314779 CKT 1 /* 3NI RVER
115.00 - 3TDTAVRN 115.00
OPEN BRANCH FROM BUS 314779 TO BUS 314755 CKT 1 /* 3TDTAVRN
115.00 - 3SPOTSYL 115.00
OPEN BUS 314367 /* ISLAND CHANC_1 CAP BANK
OPEN BRANCH FROM BUS 314135 TO BUS 314905 CKT 2 /* 3CHANCE
115.00 - 8CHANCE 500.00 TRANSFORMER 2
OPEN BRANCH FROM BUS 314900 TO BUS 314905 CKT 1 /* 8BRISTER
500.00 - 8CHANCE 500.00
OPEN BRANCH FROM BUS 314905 TO BUS 314911 CKT 1 /* 8CHANCE
500.00 - 8LDYSMTH 500.00
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315053	1BELMED1	3.21
315054	1BELMED2	3.21
315055	1BELMED3	2.67
315065	1CHESTF6	22.78
315074	1HOPCGN1	9.45
315075	1HOPCGN2	9.33
315225	1N ANNA1	60.03
315226	1N ANNA2	59.1
315134	1ROAVALA	29.38
315135	1ROAVALB	7.84
315083	1SPRUNCA	12.2
315084	1SPRUNCB	12.2
315085	1SPRUNCC	9.04
315086	1SPRUNCD	9.04

315073	1STONECA	7.84
315233	1SURRY 2	28.9
314784	1WEYRHSB	2.26
315090	1YORKTN1	32.27
315091	1YORKTN2	33.49
314539	3UNCAMP	2.69
314541	3WATKINS	0.76
314229	6MT R221	0.81
314189	6PAPERMILL	7.26
314251	6S PUMP	1.08
931041	AC2-012 C OP	11.62
931042	AC2-012 E OP	18.96
931501	AC2-070 C	1.85
931502	AC2-070 E	0.76
931531	AC2-073 C	2.59
931532	AC2-073 E	1.31
931581	AC2-078 C OP	4.62
931582	AC2-078 E OP	7.54
931591	AC2-079 C OP	7.67
931592	AC2-079 E OP	12.52
931631	AC2-084 C	9.12
931632	AC2-084 E	4.49
931701	AC2-093 C	80.48
931702	AC2-093 E	46.03
931711	AC2-094 C	16.22
931712	AC2-094 E	9.38
931831	AC2-110 C	1.47
931832	AC2-110 E	2.41
932011	AC2-125	2.58
932021	AC2-126	2.6
932031	AC2-127	1.42
932041	AC2-128	1.37
932051	AC2-129	1.28
932061	AC2-130	2.68
932071	AC2-131 1	1.82
932081	AC2-131 2	0.83
932111	AC2-132 1	0.95
932121	AC2-132 2	0.49
932261	AC2-137 C	2.3

932262	AC2-137 E	1.49
932291	AC2-141 C OP	34.33
932292	AC2-141 E OP	14.65
932451	AC2-158 C OP	5.65
932452	AC2-158 E OP	5.65
932461	AC2-159 C OP	7.19
932462	AC2-159 E OP	7.19
932471	AC2-161 C	2.7
932472	AC2-161 E	1.39
932481	AC2-162 C	2.65
932482	AC2-162 E	1.37
932501	AC2-165 C	11.91
932502	AC2-165 E	6.06
932521	AC2-167 C	3.51
932522	AC2-167 E	5.72
932711	AC2-194 C	1.23
932712	AC2-194 E	1.98
932731	AC2-196 C	2.04
932732	AC2-196 E	1.36
292791	U1-032 E	4.08
292883	U1-093 E	3.47
292885	U1-094 E	3.47
292887	U1-095 E	3.47
900672	V4-068 E	0.32
901082	W1-029 E	51.82
907092	X1-038 E	6.72
913392	Y1-086 E	2.47
916042	Z1-036 E	50.84
916192	Z1-068 E	2.15
916302	Z1-086 E	10.31
917122	Z2-027 E	1.2
917332	Z2-043 E	1.06
LTF	Z2-067	18.74
917592	Z2-099 E	0.48
921092	AA1-049 C	2.75
921093	AA1-049 E	1.3
LTF	AA1-058	0.83
921162	AA1-063AC	9.11
921163	AA1-063AE	4.29

918512	AA1-065 E OP	4.79
918562	AA1-072 E	0.18
921292	AA1-083	3.88
921532	AA1-132 C	8.5
921533	AA1-132 E	3.64
921562	AA1-135 C	9.73
921563	AA1-135 E	4.17
921572	AA1-138 C	10.93
921573	AA1-138 E	4.68
921582	AA1-139 C	17.05
921583	AA1-139 E	7.31
921622	AA1-145	65.98
921752	AA2-053 C	9.24
921753	AA2-053 E	3.97
921772	AA2-059 C	1.31
921773	AA2-059 E	0.62
921862	AA2-068 C	2.3
921863	AA2-068 E	1.06
LTF	AA2-074	5.58
920022	AA2-086 E	0.26
921982	AA2-088 C	7.04
921983	AA2-088 E	11.48
922512	AA2-174 C	0.42
922513	AA2-174 E	0.46
922522	AA2-177 C	11.42
922523	AA2-177 E	4.9
922532	AA2-178 C	10.58
922533	AA2-178 E	4.53
922602	AB1-013 C	3.19
922603	AB1-013 E	21.36
922682	AB1-027 C	2.81
922683	AB1-027 E	1.21
923262	AB1-132 C OP	14.92
923263	AB1-132 E OP	6.39
923272	AB1-135 C OP	2.81
923273	AB1-135 E OP	1.21
923572	AB1-173 C OP	2.41
923573	AB1-173 E OP	1.12
923582	AB1-173AC OP	2.41

923583	AB1-173AE OP	1.12
923801	AB2-015 C OP	9.52
923802	AB2-015 E OP	7.81
923831	AB2-022 C	2.6
923832	AB2-022 E	1.4
923841	AB2-024 C	2.71
923842	AB2-024 E	1.22
923851	AB2-025 C	2.74
923852	AB2-025 E	1.23
923861	AB2-026 C	2.66
923862	AB2-026 E	1.2
923911	AB2-031 C OP	2.39
923912	AB2-031 E OP	1.18
923981	AB2-039 C OP	9.52
923982	AB2-039 E OP	7.7
923991	AB2-040 C OP	7.86
923992	AB2-040 E OP	6.43
924061	AB2-050	3.88
924071	AB2-051 C OP	156.87
924072	AB2-051 E OP	21.54
924182	AB2-062 E	5.51
924241	AB2-068 OP	214.26
924381	AB2-087 C	0.61
924382	AB2-087 E	0.29
924501	AB2-099 C	0.63
924502	AB2-099 E	0.27
924511	AB2-100 C	12.26
924512	AB2-100 E	6.04
924761	AB2-128 C	10.5
924762	AB2-128 E	4.14
924811	AB2-134 C OP	14.65
924812	AB2-134 E OP	19.58
924931	AB2-147 C	2.74
924932	AB2-147 E	4.48
924941	AB2-149 C OP	3.84
924942	AB2-149 E OP	6.26
924951	AB2-150 C OP	2.74
924952	AB2-150 E OP	4.48
925021	AB2-158 C	10.33

925022	AB2-158 E	4.61
925051	AB2-160 C OP	6.22
925052	AB2-160 E OP	10.14
925061	AB2-161 C OP	3.85
925062	AB2-161 E OP	6.28
925121	AB2-169 C OP	6.92
925122	AB2-169 E OP	6.21
925141	AB2-171 C OP	5.37
925142	AB2-171 E OP	8.77
925171	AB2-174 C OP	7.54
925172	AB2-174 E OP	6.82
925281	AB2-186 C	0.69
925282	AB2-186 E	0.29
925291	AB2-188 C OP	2.61
925292	AB2-188 E OP	1.17
925331	AB2-190 C	26.11
925332	AB2-190 E	6.53
925521	AC1-027 C	2.29
925522	AC1-027 E	1.31
925691	AC1-045 C	1.97
925692	AC1-045 E	1.07
925701	AC1-046 C	1.98
925702	AC1-046 E	1.08
925711	AC1-047 C	2.63
925712	AC1-047 E	1.45
925811	AC1-060	0.08
925821	AC1-061	0.04
925841	AC1-063	0.43
925861	AC1-065 C	3.69
925862	AC1-065 E	6.01
926001	AC1-076 C	6.88
926002	AC1-076 E	11.19
926071	AC1-086 C	21.97
926072	AC1-086 E	10.
926201	AC1-098 C	6.4
926202	AC1-098 E	3.81
926211	AC1-099 C	2.15
926212	AC1-099 E	1.26
926291	AC1-107 OP	323.41

926411	AC1-112 C	2.19
926412	AC1-112 E	1.23
926441	AC1-115 C	1.04
926442	AC1-115 E	1.68
926551	AC1-134	9.7
926591	AC1-142 C	10.1
926592	AC1-142 E	7.62
926661	AC1-147 C	2.58
926662	AC1-147 E	1.52
926731	AC1-158 C	184.91
926732	AC1-158 E	81.15
926741	AC1-159 C	155.66
926751	AC1-161 C OP	34.87
926752	AC1-161 E OP	14.89
926771	AC1-163 C	2.28
926772	AC1-163 E	1.07
926781	AC1-164 C OP	44.63
926782	AC1-164 E OP	20.05
927041	AC1-191 C	10.72
927042	AC1-191 E	5.34
927051	AC1-193 C	3.94
927052	AC1-193 E	6.43
927111	AC1-206 C OP	12.79
927112	AC1-206 E OP	6.05
927221	AC1-216 C OP	11.18
927222	AC1-216 E OP	8.79

Appendix 20

(DVP - DVP) The AC2-159 TAP-GEARLEYS 230 kV line (from bus 932460 to bus 314569 ckt 1) loads from 95.87% to 103.57% (**DC power flow**) of its load dump rating (658 MVA) for the tower line contingency outage of 'LN 81-2056_A'. This project contributes approximately 50.67 MW to the thermal violation.

CONTINGENCY 'LN 81-2056_A'

OPEN BRANCH FROM BUS 313858 TO BUS 314628 CKT 1 /* 3SO JUSTICE
115.00 - 3DARLINGT DP115.00

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 BUS 314628 /* ISLAND: 3DARLINGT DP115.00

OPEN BRANCH FROM BUS 313845 TO BUS 927140 CKT 1 /* 6HATHAWAY
230.00 - AC1-208 TAP 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	6.45
315141	1GASTONB	6.45
315126	1ROARAP2	1.63
315128	1ROARAP4	1.57
315134	1ROAVALA	69.27
315135	1ROAVALB	18.47
315136	1ROSEMG1	4.64
315138	1ROSEMG2	2.17
315137	1ROSEMS1	2.88
314704	3LAWRENC	0.3
932461	AC2-159 C OP	25.33
932462	AC2-159 E OP	25.33
921162	AA1-063AC	7.37
921163	AA1-063AE	3.48
921752	AA2-053 C	6.62
921753	AA2-053 E	2.84

922472	AA2-169 C	1.79
922473	AA2-169 E	0.82
922512	AA2-174 C	0.3
922513	AA2-174 E	0.33
923262	AB1-132 C OP	30.16
923263	AB1-132 E OP	12.93
923572	AB1-173 C OP	2.62
923573	AB1-173 E OP	1.22
923582	AB1-173AC OP	2.62
923583	AB1-173AE OP	1.22
923851	AB2-025 C	1.59
923852	AB2-025 E	0.72
923911	AB2-031 C OP	2.6
923912	AB2-031 E OP	1.28
923991	AB2-040 C OP	8.54
923992	AB2-040 E OP	6.99
924401	AB2-089 C	1.35
924402	AB2-089 E	0.7
924511	AB2-100 C	19.03
924512	AB2-100 E	9.37
924761	AB2-128 C	16.3
924762	AB2-128 E	6.42
924931	AB2-147 C	2.82
924932	AB2-147 E	4.6
924951	AB2-150 C OP	2.82
924952	AB2-150 E OP	4.6
925171	AB2-174 C OP	8.07
925172	AB2-174 E OP	7.3
925781	AC1-054 C OP	5.05
925782	AC1-054 E OP	2.32
926071	AC1-086 C	44.41
926072	AC1-086 E	20.21
927111	AC1-206 C OP	14.19
927112	AC1-206 E OP	6.71
927141	AC1-208 C	19.89
927142	AC1-208 E	8.83

Appendix 21

(DVP - DVP) The 8ELMONT 500/230 kV transformer (from bus 314218 to bus 314908 ckt 1) loads from 121.09% to 121.57% (**DC power flow**) of its load dump rating (1051 MVA) for the line fault with failed breaker contingency outage of 'H2T557'. This project contributes approximately 11.03 MW to the thermal violation.

```

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

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315067	1DARBY 1	4.15
315068	1DARBY 2	4.16
315069	1DARBY 3	4.21
315070	1DARBY 4	4.21
315043	1FRIVERA	5.59
315044	1FRIVERB	4.33
315045	1FRIVERC	5.59
315046	1FRIVERD	4.33
315047	1FRIVERE	4.33
315048	1FRIVERF	5.59
315074	1HOPCGN1	11.03
315075	1HOPCGN2	10.89
315134	1ROAVALA	22.58
315135	1ROAVALB	6.02
315083	1SPRUNCA	14.8
315084	1SPRUNCB	14.8
315085	1SPRUNCC	10.97
315086	1SPRUNCD	10.97
315073	1STONECA	9.15
314784	1WEYRHSB	1.72
315090	1YORKTN1	30.62
315091	1YORKTN2	31.78
314539	3UNCAMP	2.15

314541	3WATKINS	0.6
314229	6MT R221	1.42
314236	6NRTHEST	0.31
314189	6PAPERMILL	8.8
314251	6S PUMP	1.6
931041	AC2-012 C OP	9.29
931042	AC2-012 E OP	15.16
931501	AC2-070 C	2.92
931502	AC2-070 E	1.21
931531	AC2-073 C	3.09
931532	AC2-073 E	1.56
931581	AC2-078 C OP	4.26
931582	AC2-078 E OP	6.95
931591	AC2-079 C OP	6.71
931592	AC2-079 E OP	10.94
931831	AC2-110 C	1.74
931832	AC2-110 E	2.84
932061	AC2-130	3.46
932071	AC2-131 1	2.34
932081	AC2-131 2	1.07
932111	AC2-132 1	1.23
932121	AC2-132 2	0.63
932261	AC2-137 C	3.16
932262	AC2-137 E	2.05
932271	AC2-138 C	0.87
932272	AC2-138 E	1.09
932291	AC2-141 C OP	31.89
932292	AC2-141 E OP	13.61
932461	AC2-159 C OP	5.51
932462	AC2-159 E OP	5.51
932471	AC2-161 C	2.43
932472	AC2-161 E	1.25
932481	AC2-162 C	4.19
932482	AC2-162 E	2.16
932521	AC2-167 C	2.73
932522	AC2-167 E	4.46
932711	AC2-194 C	0.97
932712	AC2-194 E	1.57
932731	AC2-196 C	1.63

932732	AC2-196 E	1.09
292791	U1-032 E	4.77
297087	V2-040	0.23
900672	V4-068 E	0.25
901082	W1-029 E	41.26
907092	X1-038 E	5.37
913392	Y1-086 E	1.97
916042	Z1-036 E	40.07
916192	Z1-068 E	1.73
917122	Z2-027 E	0.95
917592	Z2-099 E	0.37
921092	AA1-049 C	2.2
921093	AA1-049 E	1.03
921162	AA1-063AC	6.95
921163	AA1-063AE	3.28
918512	AA1-065 E OP	3.66
921292	AA1-083	6.01
921532	AA1-132 C	6.78
921533	AA1-132 E	2.91
921572	AA1-138 C	8.67
921573	AA1-138 E	3.72
921582	AA1-139 C	13.62
921583	AA1-139 E	5.84
921622	AA1-145	102.14
921772	AA2-059 C	1.03
921773	AA2-059 E	0.48
920022	AA2-086 E	0.2
921982	AA2-088 C	5.5
921983	AA2-088 E	8.97
922522	AA2-177 C	12.13
922523	AA2-177 E	5.2
922532	AA2-178 C	8.22
922533	AA2-178 E	3.52
922602	AB1-013 C	2.48
922603	AB1-013 E	16.61
922672	AB1-026 C	2.22
922673	AB1-026 E	0.95
922682	AB1-027 C	4.45
922683	AB1-027 E	1.91

923262	AB1-132 C OP	11.49
923263	AB1-132 E OP	4.92
923272	AB1-135 C OP	3.7
923273	AB1-135 E OP	1.59
923572	AB1-173 C OP	1.85
923573	AB1-173 E OP	0.86
923582	AB1-173AC OP	1.85
923583	AB1-173AE OP	0.86
923801	AB2-015 C OP	7.58
923802	AB2-015 E OP	6.22
923831	AB2-022 C	2.07
923832	AB2-022 E	1.12
923841	AB2-024 C	3.3
923842	AB2-024 E	1.48
923851	AB2-025 C	2.36
923852	AB2-025 E	1.06
923861	AB2-026 C	1.95
923862	AB2-026 E	0.88
923911	AB2-031 C OP	1.84
923912	AB2-031 E OP	0.91
923981	AB2-039 C OP	8.78
923982	AB2-039 E OP	7.1
923991	AB2-040 C OP	6.04
923992	AB2-040 E OP	4.94
924061	AB2-050	6.01
924071	AB2-051 C OP	126.98
924072	AB2-051 E OP	17.43
924241	AB2-068 OP	175.78
924381	AB2-087 C	0.47
924382	AB2-087 E	0.22
924501	AB2-099 C	0.48
924502	AB2-099 E	0.21
924511	AB2-100 C	9.75
924512	AB2-100 E	4.8
924761	AB2-128 C	8.36
924762	AB2-128 E	3.29
924811	AB2-134 C OP	15.56
924812	AB2-134 E OP	20.8
924931	AB2-147 C	2.14

924932	AB2-147 E	3.48
924941	AB2-149 C OP	3.35
924942	AB2-149 E OP	5.47
924951	AB2-150 C OP	2.14
924952	AB2-150 E OP	3.48
925051	AB2-160 C OP	7.01
925052	AB2-160 E OP	11.43
925061	AB2-161 C OP	3.55
925062	AB2-161 E OP	5.79
925141	AB2-171 C OP	4.25
925142	AB2-171 E OP	6.94
925171	AB2-174 C OP	5.83
925172	AB2-174 E OP	5.27
925281	AB2-186 C	0.54
925282	AB2-186 E	0.23
925291	AB2-188 C OP	2.03
925292	AB2-188 E OP	0.91
925331	AB2-190 C	27.73
925332	AB2-190 E	6.93
925521	AC1-027 C	1.85
925522	AC1-027 E	1.06
925691	AC1-045 C	1.65
925692	AC1-045 E	0.9
925701	AC1-046 C	1.58
925702	AC1-046 E	0.87
925711	AC1-047 C	2.1
925712	AC1-047 E	1.16
925811	AC1-060	0.1
925821	AC1-061	0.05
925841	AC1-063	0.5
925861	AC1-065 C	4.35
925862	AC1-065 E	7.09
926071	AC1-086 C	16.92
926072	AC1-086 E	7.7
926291	AC1-107 OP	265.33
926411	AC1-112 C	3.46
926412	AC1-112 E	1.94
926441	AC1-115 C	1.03
926442	AC1-115 E	1.67

926471	AC1-118 C	2.1
926472	AC1-118 E	1.08
926551	AC1-134	15.02
926591	AC1-142 C	11.38
926592	AC1-142 E	8.58
926661	AC1-147 C	2.1
926662	AC1-147 E	1.23
926741	AC1-159 C	126.
926751	AC1-161 C OP	26.8
926752	AC1-161 E OP	11.44
926771	AC1-163 C	1.74
926772	AC1-163 E	0.82
926781	AC1-164 C OP	36.62
926782	AC1-164 E OP	16.45
927041	AC1-191 C	19.88
927042	AC1-191 E	9.9
927051	AC1-193 C	3.12
927052	AC1-193 E	5.09
927111	AC1-206 C OP	10.48
927112	AC1-206 E OP	4.95
927221	AC1-216 C OP	11.87
927222	AC1-216 E OP	9.34

Appendix 22

(DVP - DVP) The 6CHARCTY-6LAKESD 230 kV line (from bus 314225 to bus 314227 ckt 1) loads from 141.02% to 141.5% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.94 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.06
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931581	AC2-078 C OP	2.39
931582	AC2-078 E OP	3.89
931591	AC2-079 C OP	3.17
931592	AC2-079 E OP	5.17
931631	AC2-084 C	2.99
931632	AC2-084 E	1.47
932061	AC2-130	0.81

932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932291	AC2-141 C OP	12.62
932292	AC2-141 E OP	5.38
932451	AC2-158 C OP	1.71
932452	AC2-158 E OP	1.71
932461	AC2-159 C OP	2.47
932462	AC2-159 E OP	2.47
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 23

(DVP - DVP) The 6MESSER-6CHARCTY 230 kV line (from bus 314228 to bus 314225 ckt 1) loads from 152.74% to 153.22% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.94 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.06
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931581	AC2-078 C OP	2.39
931582	AC2-078 E OP	3.89
931591	AC2-079 C OP	3.17
931592	AC2-079 E OP	5.17
931631	AC2-084 C	2.99
931632	AC2-084 E	1.47
932061	AC2-130	0.81

932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932291	AC2-141 C OP	12.62
932292	AC2-141 E OP	5.38
932451	AC2-158 C OP	1.71
932452	AC2-158 E OP	1.71
932461	AC2-159 C OP	2.47
932462	AC2-159 E OP	2.47
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 24

(DVP - DVP) The 6CHSTF B-6MESSER 230 kV line (from bus 314287 to bus 314228 ckt 1) loads from 152.87% to 153.35% (**DC power flow**) of its load dump rating (459 MVA) for the tower line contingency outage of 'LN 208-259'. This project contributes approximately 4.94 MW to the thermal violation.

CONTINGENCY 'LN 208-259'

OPEN BRANCH FROM BUS 314286 TO BUS 314309 CKT 1 /* 6CHSTF A
230.00 - 6IRON208 230.00

OPEN BRANCH FROM BUS 314309 TO BUS 314338 CKT 1 /* 6IRON208
230.00 - 6SOUWEST 230.00

OPEN BUS 314309 /* ISLAND

OPEN BRANCH FROM BUS 314276 TO BUS 314287 CKT 1 /* 6BASIN 230.00 -
6CHSTF B 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315065	1CHESTF6	31.06
315074	1HOPCGN1	6.83
315075	1HOPCGN2	6.75
315077	1HOPHCF1	1.8
315078	1HOPHCF2	1.8
315079	1HOPHCF3	1.8
315080	1HOPHCF4	2.73
315076	1HOPPOLC	1.54
315134	1ROAVALA	11.31
315135	1ROAVALB	3.02
315073	1STONECA	5.67
314784	1WEYRHSB	0.66
314539	3UNCAMP	0.86
314541	3WATKINS	0.25
314229	6MT R221	-0.33
931581	AC2-078 C OP	2.39
931582	AC2-078 E OP	3.89
931591	AC2-079 C OP	3.17
931592	AC2-079 E OP	5.17
931631	AC2-084 C	2.99
931632	AC2-084 E	1.47
932061	AC2-130	0.81

932071	AC2-131 1	0.55
932081	AC2-131 2	0.25
932111	AC2-132 1	0.29
932121	AC2-132 2	0.15
932291	AC2-141 C OP	12.62
932292	AC2-141 E OP	5.38
932451	AC2-158 C OP	1.71
932452	AC2-158 E OP	1.71
932461	AC2-159 C OP	2.47
932462	AC2-159 E OP	2.47
932471	AC2-161 C	0.92
932472	AC2-161 E	0.47
932521	AC2-167 C	1.16
932522	AC2-167 E	1.9
932711	AC2-194 C	0.32
932712	AC2-194 E	0.52
292791	U1-032 E	2.95
900672	V4-068 E	0.11
901082	W1-029 E	13.49
907092	X1-038 E	2.15
913392	Y1-086 E	0.63
914231	Y2-077	0.72
916042	Z1-036 E	13.59
916192	Z1-068 E	0.53
917122	Z2-027 E	0.31
917332	Z2-043 E	0.34
917342	Z2-044 E	0.18
917592	Z2-099 E	0.16
921092	AA1-049 C	0.68
921093	AA1-049 E	0.32
921162	AA1-063AC	3.19
921163	AA1-063AE	1.51
918512	AA1-065 E OP	1.48
918562	AA1-072 E	0.06
921532	AA1-132 C	2.1
921533	AA1-132 E	0.9
921562	AA1-135 C	2.95
921563	AA1-135 E	1.26
921572	AA1-138 C	3.

921573	AA1-138 E	1.29
921752	AA2-053 C	3.26
921753	AA2-053 E	1.4
921762	AA2-057 C	2.35
921763	AA2-057 E	1.17
921772	AA2-059 C	0.36
921773	AA2-059 E	0.17
921862	AA2-068 C	0.76
921863	AA2-068 E	0.35
920022	AA2-086 E	0.09
921982	AA2-088 C	2.33
921983	AA2-088 E	3.81
922442	AA2-165 C	0.32
922443	AA2-165 E	0.15
922472	AA2-169 C	0.71
922473	AA2-169 E	0.33
922512	AA2-174 C	0.15
922513	AA2-174 E	0.16
922522	AA2-177 C	6.39
922523	AA2-177 E	2.74
922532	AA2-178 C	2.96
922533	AA2-178 E	1.27
922602	AB1-013 C	0.89
922603	AB1-013 E	5.98
923262	AB1-132 C OP	5.97
923263	AB1-132 E OP	2.56
923572	AB1-173 C OP	0.99
923573	AB1-173 E OP	0.46
923582	AB1-173AC OP	0.99
923583	AB1-173AE OP	0.46
923801	AB2-015 C OP	3.07
923802	AB2-015 E OP	2.51
923831	AB2-022 C	0.66
923832	AB2-022 E	0.35
923851	AB2-025 C	1.62
923852	AB2-025 E	0.73
923911	AB2-031 C OP	0.98
923912	AB2-031 E OP	0.48
923981	AB2-039 C OP	4.92

923982	AB2-039 E OP	3.98
923991	AB2-040 C OP	3.21
923992	AB2-040 E OP	2.63
924071	AB2-051 C OP	39.06
924072	AB2-051 E OP	5.36
924381	AB2-087 C	0.19
924382	AB2-087 E	0.09
924501	AB2-099 C	0.2
924502	AB2-099 E	0.09
924511	AB2-100 C	5.58
924512	AB2-100 E	2.75
924761	AB2-128 C	4.78
924762	AB2-128 E	1.88
924811	AB2-134 C OP	8.19
924812	AB2-134 E OP	10.95
924931	AB2-147 C	1.2
924932	AB2-147 E	1.96
924941	AB2-149 C OP	1.59
924942	AB2-149 E OP	2.59
924951	AB2-150 C OP	1.2
924952	AB2-150 E OP	1.96
925051	AB2-160 C OP	4.18
925052	AB2-160 E OP	6.83
925061	AB2-161 C OP	1.99
925062	AB2-161 E OP	3.24
925121	AB2-169 C OP	2.02
925122	AB2-169 E OP	1.81
925141	AB2-171 C OP	1.75
925142	AB2-171 E OP	2.85
925171	AB2-174 C OP	3.17
925172	AB2-174 E OP	2.87
925281	AB2-186 C	0.18
925282	AB2-186 E	0.08
925291	AB2-188 C OP	0.73
925292	AB2-188 E OP	0.33
925331	AB2-190 C	14.6
925332	AB2-190 E	3.65
925521	AC1-027 C	0.57
925522	AC1-027 E	0.32

925691	AC1-045 C	0.54
925692	AC1-045 E	0.29
925821	AC1-061	0.03
926071	AC1-086 C	8.79
926072	AC1-086 E	4.
926201	AC1-098 C	2.1
926202	AC1-098 E	1.25
926211	AC1-099 C	0.7
926212	AC1-099 E	0.41
926661	AC1-147 C	0.65
926662	AC1-147 E	0.38
926741	AC1-159 C	38.76
926771	AC1-163 C	0.73
926772	AC1-163 E	0.34
927051	AC1-193 C	1.28
927052	AC1-193 E	2.09
927111	AC1-206 C OP	6.48
927112	AC1-206 E OP	3.06
927141	AC1-208 C	3.26
927142	AC1-208 E	1.45
927221	AC1-216 C OP	6.25
927222	AC1-216 E OP	4.92

Appendix 25

(DVP - CPLE) The 3BTLEBRO-3ROCKYMT115T 115 kV line (from bus 314554 to bus 304223 ckt 1) loads from 202.12% to 204.11% (**DC power flow**) of its emergency rating (164 MVA) for the tower line contingency outage of 'LN 2058-2181'. This project contributes approximately 7.23 MW to the thermal violation.

CONTINGENCY 'LN 2058-2181'

OPEN BUS 304226 /* ISLAND: 6PA-RMOUNT#4115.00

OPEN BRANCH FROM BUS 304226 TO BUS 314591 CKT 1 /* 6PA-
RMOUNT#4230.00 - 6NASH 230.00

OPEN BRANCH FROM BUS 313845 TO BUS 314591 CKT 1 /* 6HATHAWAY
230.00 - 6NASH 230.00

OPEN BUS 314591 /* ISLAND: 6NASH 230.00

OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6HATHAWAY 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	13.46
315132	1EDGECEMB	13.46
315139	1GASTONA	2.09
315141	1GASTONB	2.09
315126	1ROARAP2	0.87
315128	1ROARAP4	0.84
315134	1ROAVALA	18.11
315135	1ROAVALB	4.83
315136	1ROSEMG1	1.69
315138	1ROSEMG2	0.79
315137	1ROSEMS1	1.05
314541	3WATKINS	0.26
931631	AC2-084 C	11.41
931632	AC2-084 E	5.62
932451	AC2-158 C OP	2.35
932452	AC2-158 E OP	2.35
932461	AC2-159 C OP	3.62
932462	AC2-159 E OP	3.62
932521	AC2-167 C	1.51
932522	AC2-167 E	2.46
900672	V4-068 E	0.15

917331	Z2-043 C	0.32
917332	Z2-043 E	0.83
917341	Z2-044 C	0.48
917342	Z2-044 E	1.25
917511	Z2-088 C OP1	0.61
917512	Z2-088 E OP1	6.1
917592	Z2-099 E	0.2
918411	AA1-050	0.52
LTF	AA1-055	9.27
921162	AA1-063AC	4.89
921163	AA1-063AE	2.3
918512	AA1-065 E OP	1.96
921182	AA1-067 C	0.74
921183	AA1-067 E	0.32
918561	AA1-072 C	0.05
918562	AA1-072 E	0.14
921562	AA1-135 C	4.04
921563	AA1-135 E	1.73
921752	AA2-053 C	5.43
921753	AA2-053 E	2.33
921762	AA2-057 C	12.89
921763	AA2-057 E	6.45
921862	AA2-068 C	3.3
921863	AA2-068 E	1.52
920022	AA2-086 E	0.11
921982	AA2-088 C	2.95
921983	AA2-088 E	4.81
922442	AA2-165 C	1.76
922443	AA2-165 E	0.85
922512	AA2-174 C	0.25
922513	AA2-174 E	0.27
922922	AB1-081 C OP	20.09
922923	AB1-081 E OP	8.61
923262	AB1-132 C OP	9.77
923263	AB1-132 E OP	4.19
923572	AB1-173 C OP	1.21
923573	AB1-173 E OP	0.57
923582	AB1-173AC OP	1.21
923583	AB1-173AE OP	0.57

923911	AB2-031 C OP	1.21
923912	AB2-031 E OP	0.59
923941	AB2-035 C	0.37
923942	AB2-035 E	0.16
923991	AB2-040 C OP	3.96
923992	AB2-040 E OP	3.24
924151	AB2-059 C OP	23.67
924152	AB2-059 E OP	12.19
924381	AB2-087 C	0.32
924382	AB2-087 E	0.15
924391	AB2-088 C	0.48
924392	AB2-088 E	0.23
924491	AB2-098 C	0.25
924492	AB2-098 E	0.11
924501	AB2-099 C	0.32
924502	AB2-099 E	0.14
924511	AB2-100 C	6.42
924512	AB2-100 E	3.16
924761	AB2-128 C	5.5
924762	AB2-128 E	2.17
924931	AB2-147 C	1.15
924932	AB2-147 E	1.87
924951	AB2-150 C OP	1.15
924952	AB2-150 E OP	1.87
925121	AB2-169 C OP	2.49
925122	AB2-169 E OP	2.23
925141	AB2-171 C OP	1.93
925142	AB2-171 E OP	3.15
925171	AB2-174 C OP	3.58
925172	AB2-174 E OP	3.24
925591	AC1-034 C OP	7.52
925592	AC1-034 E OP	5.68
926071	AC1-086 C	14.39
926072	AC1-086 E	6.55
926201	AC1-098 C	8.
926202	AC1-098 E	4.77
926211	AC1-099 C	2.68
926212	AC1-099 E	1.58
LTF	AC1-133	9.11

926771	AC1-163 C	1.14
926772	AC1-163 E	0.53
927021	AC1-189 C	5.16
927022	AC1-189 E	2.57
927051	AC1-193 C	1.42
927052	AC1-193 E	2.31
927111	AC1-206 C OP	5.12
927112	AC1-206 E OP	2.42
927141	AC1-208 C	10.07
927142	AC1-208 E	4.47

Appendix 26

(DVP - DVP) The 6CLUBHSE-6SAPONY 230 kV line (from bus 314563 to bus 314435 ckt 1) loads from 128.28% to 132.05% (**DC power flow**) of its load dump rating (637 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 23.97 MW to the thermal violation.

```

CONTINGENCY '246T2034_A'                                /* EARLEYS
  OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1      /* 246
  OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1      /* 246 AA1-138
TAP
  OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1      /* 246 - NUCOR
  OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1      /* 2034
  OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1      /* 2034
  OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1      /* TROWBRIDGE
TX #1&2
END
  
```

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	11.38
315132	1EDGECEMB	11.38
315139	1GASTONA	6.65
315141	1GASTONB	6.65
315126	1ROARAP2	2.41
315128	1ROARAP4	2.31
315134	1ROAVALA	57.8
315135	1ROAVALB	15.41
315136	1ROSEMG1	4.49
315138	1ROSEMG2	2.1
315137	1ROSEMS1	2.78
314704	3LAWRENC	0.7
314541	3WATKINS	0.52
931631	AC2-084 C	12.95
931632	AC2-084 E	6.38
932451	AC2-158 C OP	7.16
932452	AC2-158 E OP	7.16
932461	AC2-159 C OP	11.98
932462	AC2-159 E OP	11.98
932521	AC2-167 C	3.6
932522	AC2-167 E	5.87

900671	V4-068 C	0.11
900672	V4-068 E	0.36
917331	Z2-043 C	0.57
917332	Z2-043 E	1.49
917341	Z2-044 C	0.28
917342	Z2-044 E	0.75
917511	Z2-088 C OP1	0.93
917512	Z2-088 E OP1	9.3
917591	Z2-099 C	0.18
917592	Z2-099 E	0.48
918411	AA1-050	0.78
LTF	AA1-058	0.57
921162	AA1-063AC	12.89
921163	AA1-063AE	6.08
918511	AA1-065 C OP	2.25
918512	AA1-065 E OP	6.79
921182	AA1-067 C	1.92
921183	AA1-067 E	0.82
918561	AA1-072 C	0.09
918562	AA1-072 E	0.25
921562	AA1-135 C	12.33
921563	AA1-135 E	5.29
921752	AA2-053 C	14.98
921753	AA2-053 E	6.43
921762	AA2-057 C	9.84
921763	AA2-057 E	4.92
921862	AA2-068 C	3.28
921863	AA2-068 E	1.51
LTF	AA2-074	2.67
920021	AA2-086 C	0.09
920022	AA2-086 E	0.26
921982	AA2-088 C	6.87
921983	AA2-088 E	11.21
922442	AA2-165 C	1.34
922443	AA2-165 E	0.65
922472	AA2-169 C	2.97
922473	AA2-169 E	1.36
922512	AA2-174 C	0.69
922513	AA2-174 E	0.74

922922	AB1-081 C OP	10.89
922923	AB1-081 E OP	4.67
923262	AB1-132 C OP	31.06
923263	AB1-132 E OP	13.31
923572	AB1-173 C OP	5.13
923573	AB1-173 E OP	2.39
923582	AB1-173AC OP	5.13
923583	AB1-173AE OP	2.39
923911	AB2-031 C OP	5.09
923912	AB2-031 E OP	2.51
923941	AB2-035 C	0.4
923942	AB2-035 E	0.17
923991	AB2-040 C OP	16.73
923992	AB2-040 E OP	13.69
924021	AB2-043 C OP	2.79
924022	AB2-043 E OP	4.58
924151	AB2-059 C OP	12.83
924152	AB2-059 E OP	6.61
924301	AB2-077 C OP	1.75
924302	AB2-077 E OP	1.17
924311	AB2-078 C OP	1.75
924312	AB2-078 E OP	1.17
924321	AB2-079 C OP	1.75
924322	AB2-079 E OP	1.17
924381	AB2-087 C	0.86
924382	AB2-087 E	0.4
924391	AB2-088 C	0.52
924392	AB2-088 E	0.25
924401	AB2-089 C	2.43
924402	AB2-089 E	1.25
924411	AB2-090 C	3.52
924412	AB2-090 E	1.8
924491	AB2-098 C	0.64
924492	AB2-098 E	0.27
924501	AB2-099 C	0.84
924502	AB2-099 E	0.36
924511	AB2-100 C	31.44
924512	AB2-100 E	15.49
924761	AB2-128 C	26.94

924762	AB2-128 E	10.61
924931	AB2-147 C	6.66
924932	AB2-147 E	10.87
924951	AB2-150 C OP	6.66
924952	AB2-150 E OP	10.87
925141	AB2-171 C OP	4.02
925142	AB2-171 E OP	6.56
925171	AB2-174 C OP	16.96
925172	AB2-174 E OP	15.34
925221	AB2-176 C	1.45
925222	AB2-176 E	0.62
925591	AC1-034 C OP	8.19
925592	AC1-034 E OP	6.18
925781	AC1-054 C OP	8.75
925782	AC1-054 E OP	4.03
926071	AC1-086 C	45.74
926072	AC1-086 E	20.82
926201	AC1-098 C	9.09
926202	AC1-098 E	5.41
926211	AC1-099 C	3.05
926212	AC1-099 E	1.79
926771	AC1-163 C	3.04
926772	AC1-163 E	1.42
927021	AC1-189 C	9.89
927022	AC1-189 E	4.93
927051	AC1-193 C	2.95
927052	AC1-193 E	4.81
927111	AC1-206 C OP	38.63
927112	AC1-206 E OP	18.26
927141	AC1-208 C	15.07
927142	AC1-208 E	6.69
927211	AC1-215 C	9.21
927212	AC1-215 E	4.17

Appendix 27

(DVP - DVP) The 6HORNRTN-AC1-208 TAP 230 kV line (from bus 314579 to bus 927140 ckt 1) loads from 103.8% to 109.05% (**DC power flow**) of its load dump rating (541 MVA) for the tower line contingency outage of 'LN 54-2012_C'. This project contributes approximately 28.39 MW to the thermal violation.

CONTINGENCY 'LN 54-2012_C'

OPEN BRANCH FROM BUS 921751 TO BUS 314581 CKT 1 /* AA2-053 TAP
115.00 - 3JACKSON 115.00
OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS
115.00 - 3AULANDR 115.00
OPEN BRANCH FROM BUS 314581 TO BUS 314626 CKT 1 /* 3JACKSON
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR
115.00 - 3WOODLND 115.00
OPEN BUS 314581 /* ISLAND
OPEN BUS 314625 /* ISLAND
OPEN BUS 314626 /* ISLAND
OPEN BRANCH FROM BUS 932460 TO BUS 314569 CKT 1 /* AC2-159 TAP
230.00 - 6EARLEYS 230.00
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	6.52
315141	1GASTONB	6.52
315126	1ROARAP2	1.55
315128	1ROARAP4	1.49
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	5.37
315138	1ROSEMG2	2.52
315137	1ROSEMS1	3.33
314704	3LAWRENC	0.3
932461	AC2-159 C OP	14.2
932462	AC2-159 E OP	14.2
932521	AC2-167 C	1.51
932522	AC2-167 E	2.46
917592	Z2-099 E	0.22
921162	AA1-063AC	7.64

921163	AA1-063AE	3.6
921752	AA2-053 C	10.01
921753	AA2-053 E	4.3
920022	AA2-086 E	0.12
921982	AA2-088 C	3.18
921983	AA2-088 E	5.18
922472	AA2-169 C	1.63
922473	AA2-169 E	0.75
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
923262	AB1-132 C OP	30.45
923263	AB1-132 E OP	13.05
923572	AB1-173 C OP	2.56
923573	AB1-173 E OP	1.19
923582	AB1-173AC OP	2.56
923583	AB1-173AE OP	1.19
923851	AB2-025 C	1.71
923852	AB2-025 E	0.77
923911	AB2-031 C OP	2.54
923912	AB2-031 E OP	1.25
923991	AB2-040 C OP	8.34
923992	AB2-040 E OP	6.82
924401	AB2-089 C	1.19
924402	AB2-089 E	0.61
924511	AB2-100 C	19.32
924512	AB2-100 E	9.52
924761	AB2-128 C	16.55
924762	AB2-128 E	6.52
924931	AB2-147 C	2.81
924932	AB2-147 E	4.59
924951	AB2-150 C OP	2.81
924952	AB2-150 E OP	4.59
925171	AB2-174 C OP	7.94
925172	AB2-174 E OP	7.19
925781	AC1-054 C OP	4.51
925782	AC1-054 E OP	2.08
926071	AC1-086 C	44.85
926072	AC1-086 E	20.41
927111	AC1-206 C OP	14.55

927112	AC1-206 E OP	6.88
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Appendix 28

(DVP - DVP) The 6LAKEVEW-AB2-100 TAP 230 kV line (from bus 314583 to bus 924510 ckt 1) loads from 110.99% to 116.14% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 23.62 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1

/* TROWBRIDGE

TX #1&2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	11.
315132	1EDGECEMB	11.
315139	1GASTONA	6.92
315141	1GASTONB	6.92
315126	1ROARAP2	1.48
315128	1ROARAP4	1.43
315134	1ROAVALA	58.79
315135	1ROAVALB	15.68
315136	1ROSEMG1	4.65
315138	1ROSEMG2	2.18
315137	1ROSEMS1	2.88
314784	1WEYRHSB	1.18
314541	3WATKINS	0.36
931631	AC2-084 C	10.43
931632	AC2-084 E	5.14
932451	AC2-158 C OP	6.8
932452	AC2-158 E OP	6.8
932461	AC2-159 C OP	11.81
932462	AC2-159 E OP	11.81
932521	AC2-167 C	2.55
932522	AC2-167 E	4.16

900671	V4-068 C	0.08
900672	V4-068 E	0.28
917331	Z2-043 C	0.49
917332	Z2-043 E	1.27
917341	Z2-044 C	0.25
917342	Z2-044 E	0.65
917511	Z2-088 C OP1	0.89
917512	Z2-088 E OP1	8.9
917591	Z2-099 C	0.12
917592	Z2-099 E	0.34
918411	AA1-050	0.75
LTF	AA1-058	0.53
921162	AA1-063AC	8.24
921163	AA1-063AE	3.88
918511	AA1-065 C OP	2.14
918512	AA1-065 E OP	6.45
921182	AA1-067 C	1.83
921183	AA1-067 E	0.78
918561	AA1-072 C	0.07
918562	AA1-072 E	0.21
921562	AA1-135 C	11.73
921563	AA1-135 E	5.03
921752	AA2-053 C	10.06
921753	AA2-053 E	4.32
921762	AA2-057 C	8.12
921763	AA2-057 E	4.06
921862	AA2-068 C	2.57
921863	AA2-068 E	1.18
LTF	AA2-074	2.31
920021	AA2-086 C	0.07
920022	AA2-086 E	0.18
921982	AA2-088 C	4.78
921983	AA2-088 E	7.79
922442	AA2-165 C	1.11
922443	AA2-165 E	0.54
922472	AA2-169 C	1.51
922473	AA2-169 E	0.7
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5

922922	<i>AB1-081 C OP</i>	10.12
922923	<i>AB1-081 E OP</i>	4.34
923262	<i>AB1-132 C OP</i>	32.32
923263	<i>AB1-132 E OP</i>	13.85
923941	<i>AB2-035 C</i>	0.39
923942	<i>AB2-035 E</i>	0.17
924151	<i>AB2-059 C OP</i>	11.92
924152	<i>AB2-059 E OP</i>	6.14
924381	<i>AB2-087 C</i>	0.76
924382	<i>AB2-087 E</i>	0.36
924391	<i>AB2-088 C</i>	0.5
924392	<i>AB2-088 E</i>	0.24
924491	<i>AB2-098 C</i>	0.61
924492	<i>AB2-098 E</i>	0.26
924501	<i>AB2-099 C</i>	0.73
924502	<i>AB2-099 E</i>	0.31
925121	<i>AB2-169 C OP</i>	4.44
925122	<i>AB2-169 E OP</i>	3.98
925141	<i>AB2-171 C OP</i>	2.79
925142	<i>AB2-171 E OP</i>	4.55
925591	<i>AC1-034 C OP</i>	7.88
925592	<i>AC1-034 E OP</i>	5.95
925781	<i>AC1-054 C OP</i>	4.12
925782	<i>AC1-054 E OP</i>	1.9
926071	<i>AC1-086 C</i>	47.59
926072	<i>AC1-086 E</i>	21.66
926201	<i>AC1-098 C</i>	7.31
926202	<i>AC1-098 E</i>	4.36
926211	<i>AC1-099 C</i>	2.45
926212	<i>AC1-099 E</i>	1.44
926771	<i>AC1-163 C</i>	2.61
926772	<i>AC1-163 E</i>	1.22
927021	<i>AC1-189 C</i>	9.45
927022	<i>AC1-189 E</i>	4.71
927051	<i>AC1-193 C</i>	2.04
927052	<i>AC1-193 E</i>	3.34
927141	<i>AC1-208 C</i>	15.22
927142	<i>AC1-208 E</i>	6.76

Appendix 29

(DVP - CPLE) The 6NASH-6PA-RMOUNT#4 230 kV line (from bus 314591 to bus 304226 ckt 1) loads from 106.47% to 108.8% (**DC power flow**) of its emergency rating (470 MVA) for the tower line contingency outage of 'DVP_P7-1: LN 229-2058'. This project contributes approximately 10.95 MW to the thermal violation.

CONTINGENCY 'DVP_P7-1: LN 229-2058'

OPEN BRANCH FROM BUS 314564 TO BUS 314610 CKT 1 /* 6EDGECOM
230.00 - 6TOTDP4 230.00

OPEN BRANCH FROM BUS 314608 TO BUS 314609 CKT 1 /* 3TARBORO
115.00 - 6TARBORO 230.00

OPEN BRANCH FROM BUS 314609 TO BUS 314610 CKT 1 /* 6TARBORO
230.00 - 6TOTDP4 230.00

OPEN BUS 314610 /* ISLAND: 6TOTDP4 230.00

OPEN BRANCH FROM BUS 304222 TO BUS 313845 CKT 1 /*
6ROCKYMT230T230.00 - 6HATHAWAY 230.00

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	32.93
315132	1EDGECEMB	32.93
315139	1GASTONA	4.08
315141	1GASTONB	4.08
315126	1ROARAP2	1.28
315128	1ROARAP4	1.23
315134	1ROAVALA	33.48
315135	1ROAVALB	8.93
315136	1ROSEMG1	3.49
315138	1ROSEMG2	1.64
315137	1ROSEMS1	2.17
314704	3LAWRENC	0.21
314541	3WATKINS	0.35
931631	AC2-084 C	10.53
931632	AC2-084 E	5.19
932461	AC2-159 C OP	5.48
932462	AC2-159 E OP	5.48
932521	AC2-167 C	2.02
932522	AC2-167 E	3.3
900671	V4-068 C	0.06

900672	V4-068 E	0.19
917331	Z2-043 C	0.32
917332	Z2-043 E	0.83
917341	Z2-044 C	0.38
917342	Z2-044 E	1.
917591	Z2-099 C	0.1
917592	Z2-099 E	0.28
921162	AA1-063AC	7.02
921163	AA1-063AE	3.31
918512	AA1-065 E OP	2.16
918561	AA1-072 C	0.05
918562	AA1-072 E	0.14
921752	AA2-053 C	7.6
921753	AA2-053 E	3.27
921762	AA2-057 C	10.92
921763	AA2-057 E	5.46
921862	AA2-068 C	2.99
921863	AA2-068 E	1.38
920021	AA2-086 C	0.05
920022	AA2-086 E	0.15
921982	AA2-088 C	3.99
921983	AA2-088 E	6.51
922442	AA2-165 C	1.49
922443	AA2-165 E	0.72
922472	AA2-169 C	1.3
922473	AA2-169 E	0.6
922512	AA2-174 C	0.35
922513	AA2-174 E	0.38
922922	AB1-081 C OP	20.13
922923	AB1-081 E OP	8.63
923262	AB1-132 C OP	19.06
923263	AB1-132 E OP	8.17
923572	AB1-173 C OP	1.94
923573	AB1-173 E OP	0.9
923582	AB1-173AC OP	1.94
923583	AB1-173AE OP	0.9
923801	AB2-015 C OP	4.18
923802	AB2-015 E OP	3.43
923851	AB2-025 C	1.18

923852	AB2-025 E	0.53
923911	AB2-031 C OP	1.92
923912	AB2-031 E OP	0.95
923991	AB2-040 C OP	6.31
923992	AB2-040 E OP	5.16
924151	AB2-059 C OP	23.73
924152	AB2-059 E OP	12.22
924381	AB2-087 C	0.35
924382	AB2-087 E	0.17
924501	AB2-099 C	0.36
924502	AB2-099 E	0.16
924511	AB2-100 C	12.32
924512	AB2-100 E	6.07
924761	AB2-128 C	10.55
924762	AB2-128 E	4.15
924931	AB2-147 C	1.97
924932	AB2-147 E	3.22
924951	AB2-150 C OP	1.97
924952	AB2-150 E OP	3.22
925141	AB2-171 C OP	2.6
925142	AB2-171 E OP	4.25
925171	AB2-174 C OP	5.85
925172	AB2-174 E OP	5.29
925781	AC1-054 C OP	3.51
925782	AC1-054 E OP	1.62
926071	AC1-086 C	28.08
926072	AC1-086 E	12.78
926201	AC1-098 C	7.39
926202	AC1-098 E	4.4
926211	AC1-099 C	2.48
926212	AC1-099 E	1.45
926771	AC1-163 C	1.31
926772	AC1-163 E	0.61
927051	AC1-193 C	1.91
927052	AC1-193 E	3.12
927111	AC1-206 C OP	9.55
927112	AC1-206 E OP	4.52
927141	AC1-208 C	23.22
927142	AC1-208 E	10.31

Appendix 30

(DVP - DVP) The AB2-100 TAP-6CLUBHSE 230 kV line (from bus 924510 to bus 314563 ckt 1) loads from 131.78% to 136.93% (**DC power flow**) of its load dump rating (459 MVA) for the line fault with failed breaker contingency outage of '246T2034_A'. This project contributes approximately 23.62 MW to the thermal violation.

CONTINGENCY '246T2034_A'

/* EARLEYS

OPEN BRANCH FROM BUS 314569 TO BUS 314575 CKT 1

/* 246

OPEN BRANCH FROM BUS 314575 TO BUS 921571 CKT 1

/* 246 AA1-138

TAP

OPEN BRANCH FROM BUS 314575 TO BUS 314590 CKT 1

/* 246 - NUCOR

OPEN BRANCH FROM BUS 314569 TO BUS 314620 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314620 TO BUS 314616 CKT 1

/* 2034

OPEN BRANCH FROM BUS 314616 TO BUS 314613 CKT 1

/* TROWBRIDGE

TX #1&2

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315131	1EDGECEMA	11.
315132	1EDGECEMB	11.
315139	1GASTONA	6.92
315141	1GASTONB	6.92
315126	1ROARAP2	1.48
315128	1ROARAP4	1.43
315134	1ROAVALA	58.79
315135	1ROAVALB	15.68
315136	1ROSEMG1	4.65
315138	1ROSEMG2	2.18
315137	1ROSEMS1	2.88
314784	1WEYRHSB	1.18
931631	AC2-084 C	10.43
931632	AC2-084 E	5.14
932451	AC2-158 C OP	6.8
932452	AC2-158 E OP	6.8
932461	AC2-159 C OP	11.81
932462	AC2-159 E OP	11.81
932521	AC2-167 C	2.55
932522	AC2-167 E	4.16
900671	V4-068 C	0.08

900672	V4-068 E	0.28
917331	Z2-043 C	0.49
917332	Z2-043 E	1.27
917341	Z2-044 C	0.25
917342	Z2-044 E	0.65
917511	Z2-088 C OP1	0.89
917512	Z2-088 E OP1	8.9
917591	Z2-099 C	0.12
917592	Z2-099 E	0.34
918411	AA1-050	0.75
LTF	AA1-058	0.53
921162	AA1-063AC	8.24
921163	AA1-063AE	3.88
918511	AA1-065 C OP	2.14
918512	AA1-065 E OP	6.45
921182	AA1-067 C	1.83
921183	AA1-067 E	0.78
918561	AA1-072 C	0.07
918562	AA1-072 E	0.21
921562	AA1-135 C	11.73
921563	AA1-135 E	5.03
921752	AA2-053 C	10.06
921753	AA2-053 E	4.32
921762	AA2-057 C	8.12
921763	AA2-057 E	4.06
921862	AA2-068 C	2.57
921863	AA2-068 E	1.18
LTF	AA2-074	2.31
920021	AA2-086 C	0.07
920022	AA2-086 E	0.18
921982	AA2-088 C	4.78
921983	AA2-088 E	7.79
922442	AA2-165 C	1.11
922443	AA2-165 E	0.54
922472	AA2-169 C	1.51
922473	AA2-169 E	0.7
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
922922	AB1-081 C OP	10.12

922923	<i>AB1-081 E OP</i>	4.34
923262	<i>AB1-132 C OP</i>	32.32
923263	<i>AB1-132 E OP</i>	13.85
923941	<i>AB2-035 C</i>	0.39
923942	<i>AB2-035 E</i>	0.17
924151	<i>AB2-059 C OP</i>	11.92
924152	<i>AB2-059 E OP</i>	6.14
924381	<i>AB2-087 C</i>	0.76
924382	<i>AB2-087 E</i>	0.36
924391	<i>AB2-088 C</i>	0.5
924392	<i>AB2-088 E</i>	0.24
924491	<i>AB2-098 C</i>	0.61
924492	<i>AB2-098 E</i>	0.26
924501	<i>AB2-099 C</i>	0.73
924502	<i>AB2-099 E</i>	0.31
924511	<i>AB2-100 C</i>	35.67
924512	<i>AB2-100 E</i>	17.57
924761	<i>AB2-128 C</i>	30.56
924762	<i>AB2-128 E</i>	12.03
925121	<i>AB2-169 C OP</i>	4.44
925122	<i>AB2-169 E OP</i>	3.98
925141	<i>AB2-171 C OP</i>	2.79
925142	<i>AB2-171 E OP</i>	4.55
925591	<i>AC1-034 C OP</i>	7.88
925592	<i>AC1-034 E OP</i>	5.95
925781	<i>AC1-054 C OP</i>	4.12
925782	<i>AC1-054 E OP</i>	1.9
926071	<i>AC1-086 C</i>	47.59
926072	<i>AC1-086 E</i>	21.66
926201	<i>AC1-098 C</i>	7.31
926202	<i>AC1-098 E</i>	4.36
926211	<i>AC1-099 C</i>	2.45
926212	<i>AC1-099 E</i>	1.44
926771	<i>AC1-163 C</i>	2.61
926772	<i>AC1-163 E</i>	1.22
927021	<i>AC1-189 C</i>	9.45
927022	<i>AC1-189 E</i>	4.71
927051	<i>AC1-193 C</i>	2.04
927052	<i>AC1-193 E</i>	3.34

<i>927141</i>	<i>AC1-208 C</i>	<i>15.22</i>
<i>927142</i>	<i>AC1-208 E</i>	<i>6.76</i>

Appendix 31

(DVP - DVP) The AC1-208 TAP-6HATHAWAY 230 kV line (from bus 927140 to bus 313845 ckt 1) loads from 112.6% to 117.85% (**DC power flow**) of its load dump rating (541 MVA) for the tower line contingency outage of 'LN 54-2012_C'. This project contributes approximately 28.39 MW to the thermal violation.

CONTINGENCY 'LN 54-2012_C'

OPEN BRANCH FROM BUS 921751 TO BUS 314581 CKT 1 /* AA2-053 TAP
115.00 - 3JACKSON 115.00
OPEN BRANCH FROM BUS 314568 TO BUS 314625 CKT 1 /* 3EARLEYS
115.00 - 3AULANDR 115.00
OPEN BRANCH FROM BUS 314581 TO BUS 314626 CKT 1 /* 3JACKSON
115.00 - 3WOODLND 115.00
OPEN BRANCH FROM BUS 314625 TO BUS 314626 CKT 1 /* 3AULANDR
115.00 - 3WOODLND 115.00
OPEN BUS 314581 /* ISLAND
OPEN BUS 314625 /* ISLAND
OPEN BUS 314626 /* ISLAND
OPEN BRANCH FROM BUS 932460 TO BUS 314569 CKT 1 /* AC2-159 TAP
230.00 - 6EARLEYS 230.00
END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
315139	1GASTONA	6.52
315141	1GASTONB	6.52
315126	1ROARAP2	1.55
315128	1ROARAP4	1.49
315134	1ROAVALA	58.56
315135	1ROAVALB	15.62
315136	1ROSEMG1	5.37
315138	1ROSEMG2	2.52
315137	1ROSEMS1	3.33
314704	3LAWRENC	0.3
932461	AC2-159 C OP	14.2
932462	AC2-159 E OP	14.2
917592	Z2-099 E	0.22
921162	AA1-063AC	7.64
921163	AA1-063AE	3.6
921752	AA2-053 C	10.01

921753	AA2-053 E	4.3
920022	AA2-086 E	0.12
921982	AA2-088 C	3.18
921983	AA2-088 E	5.18
922472	AA2-169 C	1.63
922473	AA2-169 E	0.75
922512	AA2-174 C	0.46
922513	AA2-174 E	0.5
923262	AB1-132 C OP	30.45
923263	AB1-132 E OP	13.05
923572	AB1-173 C OP	2.56
923573	AB1-173 E OP	1.19
923582	AB1-173AC OP	2.56
923583	AB1-173AE OP	1.19
923851	AB2-025 C	1.71
923852	AB2-025 E	0.77
923911	AB2-031 C OP	2.54
923912	AB2-031 E OP	1.25
923991	AB2-040 C OP	8.34
923992	AB2-040 E OP	6.82
924401	AB2-089 C	1.19
924402	AB2-089 E	0.61
924511	AB2-100 C	19.32
924512	AB2-100 E	9.52
924761	AB2-128 C	16.55
924762	AB2-128 E	6.52
924931	AB2-147 C	2.81
924932	AB2-147 E	4.59
924951	AB2-150 C OP	2.81
924952	AB2-150 E OP	4.59
925171	AB2-174 C OP	7.94
925172	AB2-174 E OP	7.19
925781	AC1-054 C OP	4.51
925782	AC1-054 E OP	2.08
926071	AC1-086 C	44.85
926072	AC1-086 E	20.41
927111	AC1-206 C OP	14.55
927112	AC1-206 E OP	6.88
927141	AC1-208 C	33.17

927142	AC1-208 E	14.73
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