Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position Z2-089

Sewaren 230 kV

September 2014

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer 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 project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The Interconnection Customer (IC), has proposed a natural gas generating facility located in Sewaren, New Jersey. The installed facilities will have a total capability of 568 MW with 509 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is May 31, 2018. **This study does not imply a PSE&G commitment to this in-service date.**

Point of Interconnection

Option 1 - Z2-089 will interconnect with the PSE&G transmission system to a new breaker position at Sewaren 230 kV substation.

Option 2 – Z2-089 will interconnect the CT to the Sewaren 138 kV bus and the ST to the Sewaren 26 kV bus.

Cost Summary

The Z2-089 project will be responsible for the following costs:

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

In addition, the Z2-089 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 641,000,000
Previously Identified Upgrades	$ 36,400,000
Total Costs	**$ 677,400,000**

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

Attachment Facilities

The attachment facilities necessary to connect Z2-089 to the new breaker position at the Sewaren 230 kV substation will cost $1,000,000 and take 48 months to complete.

Revenue Metering and SCADA Requirements

PJM Requirements

The Interconnection Customer 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.

Public Service Electric and Gas Requirements

The Interconnection Customer will be required to comply with all PSE&G Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Information and Requirements for Electric Service" document located at the following links:

http://www.pseg.com/business/builders/new_service/before/
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

Option 1

Network Impacts

The Queue Project Z2-089 was studied as a 568.0 MW (Capacity 509.0 MW) injection at the Sewaren 230 kV substation in the PSEG area. Project Z2-089 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project Z2-089 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
BF_ALDE_2-8_LT	CONTINGENCY 'BF_ALDE_2-8_LT' DISCONNECT BUS 218307 /* ALDENE BUS SECTION 2 DISCONNECT BUS 218430 /* STANELTY TERRACE BUS SECTION 1 DISCONNECT BUS 219038 /* ALDENE BUS SECTION 8 DISCONNECT BUS 219053 /* WESTFIELD SECTION 2 CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1 /* WESTFIELD END

Contingency Name	Description
G2207+H2286_LT	CONTINGENCY 'G2207+H2286_LT' /*FANWOOD-METUCHEN & LINDEN-DEANS DISCONNECT BUS 218354 /* MINUE STREET G DISCONNECT BUS 218355 /* NEW DOVER REMOVE H DISCONNECT BUS 218357 /* REMOVE PIERSON H DISCONNECT BUS 218320 /* REMOVE FANWOOD SECTION 1 CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1 /* NEW DOVER CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1 /* FANWOOD CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1 /* MINUE STREET INCREASE BUS 218410 LOAD BY 4 MW /* TAKE ON LOAD AT WARI NICO INCREASE BUS 218411 LOAD BY 4 MW /* TAKE ON LOAD AT WARI NICO INCREASE BUS 218412 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG INCREASE BUS 218413 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG INCREASE BUS 218414 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG DECREASE BUS 218396 LOAD BY 16 MW /* PUSH OUT MVA MIN UEST DECREASE BUS 218397 LOAD BY 16 MW /* PUSH OUT MVA MIN UEST END
G2207+R2218	CONTINGENCY 'G2207+R2218' /* LINDEN - DEAN & LINDEN - SEWARREN DISCONNECT BUS 218354 /* MINUE STREET G DISCONNECT BUS 218353 /* MINUE R DISCONNECT BUS 218396 /* MINUE STREET LOAD LOSS DISCONNECT BUS 218397 /* MINUE STREET LOAD LOSS END

Contingency Name	Description
H2286+W2249_LT	CONTINGENCY 'H2286+W2249_LT' /* DEANS - WESTFIELD & METUCHEN - FANWOOD DISCONNECT BUS 218355 /* NEW DOVER REMOVE H DISCONNECT BUS 218357 /* REMOVE PIERSON H DISCONNECT BUS 218320 /* REMOVE FANWOOD SECTION 1 DISCONNECT BUS 218305 /* REMOVE WESTFIELD BUS 1 DISCONNECT BUS 218356 /* RMEOVE NEW DOVER BUS W SIDE DISCONNECT BUS 218398 /* NEW DOVER LOAD LOSS DISCONNECT BUS 218399 /* NEW DOVER LOAD LOSS CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1 /* WESTFIELD CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1 /* FANWOOD END
L_G-2285/* ALDENE TO SPRINGFIELD ROAD	CONTINGENCY 'L_G-2285/* ALDENE TO SPRINGFIELD ROAD' DISCONNECT BUS 218345 /* ALDENE BUS SECTION 6 DISCONNECT BUS 216911 /* SPRINGFIELD RD BUS SECTION2 END
L_H-2286	CONTINGENCY 'L_H-2286' /* FANWOOD TO METUCHEN DISCONNECT BUS 218355 /* NEW DOVER REMOVE H DISCONNECT BUS 218357 /* REMOVE PIERSON H DISCONNECT BUS 218320 /* REMOVE FANWOOD SECTION 1 END

Contingency Name	Description
L_N-2292_LT	CONTINGENCY 'L_N-2292_LT' /* WEST ORANGE TO SPRINGFIELD RD DISCONNECT BUS 219051 /* SPRINGFIEDL ROAD SECTION 2 CLOSE LINE FROM BUS 216926 TO BUS 216927 CKT 1 /* SPRINGFIELD ROAD INCREASE BUS 216930 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216931 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216932 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216933 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 218380 LOAD BY 8 MW /* TAKE ON LOAD AT FAN WOOD INCREASE BUS 218381 LOAD BY 8 MW /* TAKE ON LOAD AT FAN WOOD DECREASE BUS 216926 LOAD BY 20 MW /* PUSH OUT MVA SPRI NGRD DECREASE BUS 216927 LOAD BY 20 MW /* PUSH OUT MVA SPRI NGRD END
L_R-2218	CONTINGENCY 'L_R-2218' /* LINDEN TO SEWARREN DISCONNECT BUS 218353 /* MINUE R END

Generator Deliverability

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
1	Non	Non	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	93.99	104.26	NR	936	96.19	1
2	N-1	L_H-2286	PSEG - PSEG	LINDEN-TOSCO_3 230 kV line	218300	219046	1	DC	95.34	107.34	ER	1081	129.76	4
3	Non	Non	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	99.78	112.92	NR	732	96.19	7
4	N-1	L_R-2218	PSEG - PSEG	NEWDOVR_H-FANWOOD_1 230 kV line	218355	218320	1	DC	91.58	114.56	ER	870	199.94	11
5	N-1	L_R-2218	PSEG - PSEG	PRSNAVS_H-NEWDOVR_H 230 kV line	218357	218355	1	DC	96.05	119.03	ER	870	199.94	12
6	Non	Non	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	99.9	129.69	NR	688	204.96	20

Multiple Facility Contingency

(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
7	DCTL	G2207+R2218	PSEG - PSEG	FANWOOD_2-ROSELAND 230 kV line	219052	216950	1	DC	82.19	104.51	ER	887	209.97	2
8	DCTL	G2207+H2286_LT	PSEG - PSEG	PRSNAVS_S-DEANS 230 kV line	218358	218306	1	DC	84.15	107.07	ER	887	215.6	3
9	DCTL	H2286+W2249_LT	PSEG - PSEG	LINDEN-TOSCO_3 230 kV line	218300	219046	1	DC	95.96	108.2	ER	1081	140.16	5
10	LFFB	BF_ALDE_2-8_LT	PSEG - PSEG	ALDENE_6-SPRINGRD_2 230 kV line	218345	216911	1	DC	99.58	111.62	ER	699	89.12	6

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
11	DCTL	G2207+H2 286_LT	PSEG - PSEG	METUCHEN-PRSNAVS_S 230 kV line	218469	218358	1	DC	96.45	119.37	ER	887	215.6	13

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

#	Area	Bus No.	Bus	Breaker	Rating Type	Duty Percent Without Z2-089	Duty Percent With Z2-089	Duty Percent Difference
39	PSE&G	4996	LINDEN 230 KV	11H	S	99.78	101.46	1.68
40	PSE&G	4996	LINDEN 230 KV	12H	S	99.78	101.46	1.68
41	PSE&G	4996	LINDEN 230 KV	21H	S	99.78	101.46	1.68
42	PSE&G	4996	LINDEN 230 KV	22H	S	99.78	101.46	1.68
43	PSE&G	4996	LINDEN 230 KV	31H	S	99.78	101.46	1.68
44	PSE&G	4996	LINDEN 230 KV	32H	S	99.78	101.46	1.68
45	PSE&G	4996	LINDEN 230 KV	41H	S	99.78	101.46	1.68
46	PSE&G	4996	LINDEN 230 KV	42H	S	99.78	101.46	1.68
47	PSE&G	4996	LINDEN 230 KV	43H	S	99.78	101.46	1.68
48	PSE&G		SEWAREN 26 KV	Multiple				

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

#	Area	Bus No.	Bus	Breaker	Rating Type	Duty Percent Without Z2-089	Duty Percent With Z2-089	Duty Percent Difference
49	PSE&G	5022	SEWAREN 230 KV	1HB	S	111.10	124.22	13.11

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

	Contingency		Affected		Bus			Power	Loading %		Rating		MW	
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution	Ref
12	Non	Non	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	102.92	113.19	NR	936	96.19	8
13	N-1	L_H-2286	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	101.36	113.33	ER	1081	129.38	9
14	DCTL	G2207+H2286_LT	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	100.12	114.18	ER	1081	161.1	10
15	N-1	L_H-2286	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	109.45	121.42	ER	1081	129.38	14
16	N-1	L_H-2286	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	107.12	121.61	ER	887	128.44	15
17	DCTL	G2207+H2286_LT	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	109.21	123.26	ER	1081	161.1	16
18	N-1	L_R-2218	PSEG - PSEG	METUCHEN-PRSNAVS_H 230 kV line	218469	218357	1	DC	102.32	125.3	ER	870	199.94	17
19	DCTL	G2207+R2218	PSEG - PSEG	NEWDOVR_H-FANWOOD_1 230 kV line	218355	218320	1	DC	101.77	126.05	ER	870	224.04	18
20	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	115.24	129.67	NR	667	96.19	19
21	DCTL	G2207+R2218	PSEG - PSEG	PRSNAVS_H-NEWDOVR_H 230 kV line	218357	218355	1	DC	106.23	130.51	ER	870	224.04	21
22	N-1	L_H-2286	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	120.41	136.06	ER	821	128.44	22
23	DCTL	G2207+R2218	PSEG - PSEG	METUCHEN-PRSNAVS_H 230 kV line	218469	218357	1	DC	112.41	136.69	ER	870	224.04	23
24	N-1	L_H-2286	PSEG - PSEG	MINUEST_R-LINDEN 230 kV line	218353	218300	1	DC	108.79	138.57	ER	887	264.1	24
25	DCTL	H2286+W2249_LT	PSEG - PSEG	MINUEST_R-LINDEN 230 kV line	218353	218300	1	DC	114.72	145.73	ER	887	291.78	25
26	N-1	L_H-2286	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	119.62	151.4	ER	831	264.1	26

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
27	DCTL	G2207+H2 286_LT	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	142.03	158.99	ER	887	159.59	27
28	DCTL	H2286+W2 249_LT	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	125.95	159.06	ER	831	291.78	28
29	DCTL	G2207+H2 286_LT	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	159.1	177.43	ER	821	159.59	29

Steady-State Voltage Requirements

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

To be determined.

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.

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
#1, 13, 14	TOSCO_2-Z1-109 TAP 230 kV line	Re-conductor the Tosco – VFT (S-2271) 230 kV overhead cable. Estimated Cost: $7.6M; Estimated Time: 52 months	Pending	**$ 7,600,000**
#2, 9	LINDEN-TOSCO_3 230 kV line	Re-conductor the Linden -Tosco (B-2254) 230 kV overhead cable. Estimated Cost: $17.7M; Estimated Time: 52 months	Pending	**$ 17,700,000**
#3, 16, 27	WARINICO_2-ALDENE_5 230 kV line	Re-conductor the Aldene - Warinanco (N-2240) 230 kV overhead cable. Estimated Cost: $65.7M; Estimated Time: 52 months Re-conductor the Aldene – Stanley Terrace (O-2320) 230 kV overhead cable. Estimated Cost: $35.5M; Estimated Time: 52 months	Pending	**$ 101,200,000**

Violation #	Overloaded Facility	Upgrade Description	Network Upgrade Number	Upgrade Cost
#4, 5, 18, 19, 21, 23	NEWDOVR_H-FANWOOD_1 230 kV line	Re-conductor the Metuchen – Pierson – New Dover – Fanwood (H-2286) 230 kV overhead cable. Estimated Cost: $80.3M; Estimated Time: 52 months	Pending	**$ 80,300,000**
#6, 24, 25, 26, 28	SEWAREN-MINUEST_R 230 kV line	Re-conductor the Sewaren – Minue - Linden (R-2218) 230 kV overhead cable. Estimated Cost: $55.2M; Estimated Time: 52 months	Pending	**$ 55,200,000**
#7	FANWOOD_2-ROSELAND 230 kV line	Re-conductor the Roseland – Fanwood (I-2287) 230 kV overhead cable. Estimated Cost: $80.8M; Estimated Time: 52 months	Pending	**$ 80,800,000**
#8, 11	PRSNAVS_S-DEANS 230 kV line	Re-conductor the Metuchen – Pierson - Deans (S-2219) 230 kV overhead cable. Estimated Cost: $83.7M; Estimated Time: 52 months	Pending	**$ 83,700,000**
#10	ALDENE_6-SPRINGRD_2 230 kV line	Re-conductor the Aldene – Springfield Rd 230 kV overhead cable. Estimated Cost: $214.5M; Estimated Time: 52 months	Pending	**$ 214,500,000**
#39-47	Linden Breakers	PSE&G looked into the 90 kA breaker requirement that the Z2-089 queue study presents. While ABB can manufacture a 90 kA breaker, the appropriate disconnect switches do not exist at this time. Therefore a possible transmission level solution for Z2-089 short circuit would be to upgrade the Linden 230 kV bus and possibly other stations to 345 kV. This would require extensive study. Costs will be provided in the System Impact Study if this continues to appear as a violation.	Pending	**$ TBD**
#48	Sewaren 26 kV breakers	12 breakers are above 40 kA and will need to be replaced with 50 kA breakers. Costs will be provided in the System Impact Study if this continues to appear as a violation.	Pending	**$ TBD**
			Total New Network Upgrades	**$ 641,000,000**

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
#12, 15, 17	Z1-109 TAP-VFT 2 230 kV line	Re-conductor the Tosco – VFT (S-2271) 230 kV overhead cable. Estimated Cost: $7.6M; Estimated Time: 52 months Re-conductor the Aldene – Stanley Terrace (O-2320) 230 kV overhead cable. Estimated Cost: $35.5M; Estimated Time: 52 months	Pending	**$ Included above**
#20, 22, 29	VFT 1-WARINICO_1 230 kV line	Re-conductor Warinanco – VFT (U-2273) 230 kV overhead cable. Estimated Cost: $36.4M; Estimated Time: 52 months Re-conductor the Aldene – Stanley Terrace (O-2320) 230 kV overhead cable. Estimated Cost: $35.5M; Estimated Time: 52 months	Pending	**$ 36,400,000**
#49	Sewaren 230 kV breakers	This breaker will be upgraded to 63 kA as a result of a baseline project.	b2276	**$ 0**
			Total New Network Upgrades	**$ 36,400,000**

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

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

	Contingency		Affected		Bus			Power	Loading %		Rating		MW
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution
30	Non	Non	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	93.31	104.12	NR	936	107.33
31	Non	Non	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	102.24	113.05	NR	936	107.33

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
32	N-1	L_G-2285/* ALDENE TO SPRINGFIELD ROAD	PSEG - PSEG	MCARTER-WORANGE 230 kV line	217170	216914	1	DC	104.4	116.31	ER	550	69.51
33	N-1	L_N-2292_LT	PSEG - PSEG	ALDENE_2-STANTER_1 230 kV line	218307	218430	1	DC	106.88	119.45	ER	558	74.44
34	N-1	L_N-2292_LT	PSEG - PSEG	STANTER_2-MCARTER 230 kV line	217101	217170	1	DC	108.43	121.18	ER	550	74.44
35	Non	Non	PSEG - PSEG	MINUEST_R-LINDEN 230 kV line	218353	218300	1	DC	92.38	121.84	NR	732	228.72
36	Non	Non	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	102.5	133.85	NR	688	228.72
37	Non	Non	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	134.63	148.46	NR	732	107.33
38	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	153.49	168.67	NR	667	107.33

Option 2

Network Impacts

The Queue Project Z2-089 was studied as a 568.0 MW (Capacity 509.0 MW) injection at the Sewaren 230 and 26 kV substations in the PSEG area. Project Z2-089 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project Z2-089 was studied with a commercial probability of 53%. Potential network impacts were as follows:

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Contingency Name	Description
BF_MET_3-P_LT	CONTINGENCY 'BF_MET_3-P_LT' TRIP LINE FROM BUS 218469 TO BUS 218335 CKT 1 /*REMOVE P LINE DISCONNECT BRANCH FROM BUS 218315 TO BUS 218469 CKT 1 /* METUCHENT 220-1 138/230KV TRANFORMER TRIP LINE FROM BUS 218315 TO BUS 218352 CKT 1 /*REMOVE R LINE DISCONNECT BUS 218367/* WOOD BRIDGE REMOVE P DISCONNECT BUS 218335 /* WOODBRIDGE P CLOSE LINE FROM BUS 218390 TO BUS 218391 CKT 1 /* LAFYATTE CLOSE LINE FROM BUS 218412 TO BUS 218413 CKT 1 /* WOODRBIDGE 138KV INCREASE BUS 218398 LOAD BY 4 MW /* TAKE ON LOAD AT NEW DOVR INCREASE BUS 218399 LOAD BY 4 MW /* TAKE ON LOAD AT NEW DOVR INCREASE BUS 218401 LOAD BY 2 MW /* TAKE ON LOAD AT PRS NAVS INCREASE BUS 218402 LOAD BY 2 MW /* TAKE ON LOAD AT PRS NAVS INCREASE BUS 218428 LOAD BY 2 MW /* TAKE ON LOAD AT PRS NAVS INCREASE BUS 218429 LOAD BY 2 MW /* TAKE ON LOAD AT PRS NAVS INCREASE BUS 218392 LOAD BY 4 MW /* TAKE ON LOAD AT MD WRD INCREASE BUS 218393 LOAD BY 4 MW /* TAKE ON LOAD AT MD WRD DECREASE BUS 218390 LOAD BY 12 MW /* PUSH OUT MVA LAF AYET DECREASE BUS 218391 LOAD BY 12 MW /* PUSH OUT MVA LAF AYET END

Contingency Name	Description
G2207+H2286_LT	CONTINGENCY 'G2207+H2286_LT' /*FANWOOD-METUCHEN & LINDEN-DEANS DISCONNECT BUS 218354 /* MINUE STREET G DISCONNECT BUS 218355 /* NEW DOVER REMOVE H DISCONNECT BUS 218357 /* REMOVE PIERSON H DISCONNECT BUS 218320 /* REMOVE FANWOOD SECTION 1 CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1 /* PIERSON AVE CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1 /* NEW DOVER CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1 /* FANWOOD CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1 /* MINUE STREET INCREASE BUS 218410 LOAD BY 4 MW /* TAKE ON LOAD AT WARI NICO INCREASE BUS 218411 LOAD BY 4 MW /* TAKE ON LOAD AT WARI NICO INCREASE BUS 218412 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG INCREASE BUS 218413 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG INCREASE BUS 218414 LOAD BY 8 MW /* TAKE ON LOAD AT WDB RDG DECREASE BUS 218396 LOAD BY 16 MW /* PUSH OUT MVA MIN UEST DECREASE BUS 218397 LOAD BY 16 MW /* PUSH OUT MVA MIN UEST END
G2207+R2218	CONTINGENCY 'G2207+R2218' /* LINDEN - DEAN & LINDEN - SEWARREN DISCONNECT BUS 218354 /* MINUE STREET G DISCONNECT BUS 218353 /* MINUE R DISCONNECT BUS 218396 /* MINUE STREET LOAD LOSS DISCONNECT BUS 218397 /* MINUE STREET LOAD LOSS END
L_G-2285/* ALDENE TO SPRINGFIELD ROAD	CONTINGENCY 'L_G-2285/* ALDENE TO SPRINGFIELD ROAD' DISCONNECT BUS 218345 /* ALDENE BUS SECTION 6 DISCONNECT BUS 216911 /* SPRINGFIELD RD BUS SECTION2 END

Contingency Name	Description
L_H-2286	CONTINGENCY 'L_H-2286' /* FANWOOD TO METUCHEN DISCONNECT BUS 218355 /* NEW DOVER REMOVE H DISCONNECT BUS 218357 /* REMOVE PIERSON H DISCONNECT BUS 218320 /* REMOVE FANWOOD SECTION 1 END
L_N-2292_LT	CONTINGENCY 'L_N-2292_LT' /* WEST ORANGE TO SPRINGFIELD RD DISCONNECT BUS 219051 /* SPRINGFIEDL ROAD SECTION 2 CLOSE LINE FROM BUS 216926 TO BUS 216927 CKT 1 /* SPRINGFIELD ROAD INCREASE BUS 216930 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216931 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216932 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 216933 LOAD BY 6 MW /* TAKE ON LOAD AT DOR MPL INCREASE BUS 218380 LOAD BY 8 MW /* TAKE ON LOAD AT FAN WOOD INCREASE BUS 218381 LOAD BY 8 MW /* TAKE ON LOAD AT FAN WOOD DECREASE BUS 216926 LOAD BY 20 MW /* PUSH OUT MVA SPRI NGRD DECREASE BUS 216927 LOAD BY 20 MW /* PUSH OUT MVA SPRI NGRD END
L_R-2218	CONTINGENCY 'L_R-2218' /* LINDEN TO SEWARREN DISCONNECT BUS 218353 /* MINUE R END

Generator Deliverability

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

	Contingency		Affected		Bus			Power	Loading %		Rating		MW	
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution	Ref
1	Non	Non	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	93.97	107.11	NR	732	96.19	5
2	N-1	L_H-2286	PSEG - PSEG	LINDEN-TOSCO_3 230 kV line	218300	219046	1	DC	95.34	107.34	ER	1081	129.76	6
3	N-1	L_R-2218	PSEG - PSEG	NEWDOVR_H-FANWOOD_1 230 kV line	218355	218320	1	DC	91.58	114.56	ER	870	199.94	8
4	N-1	L_R-2218	PSEG - PSEG	PRSNAVS_H-NEWDOVR_H 230 kV line	218357	218355	1	DC	96.05	119.03	ER	870	199.94	10
5	Non	Non	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	99.91	129.7	NR	688	204.96	16

Multiple Facility Contingency

(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

	Contingency		Affected		Bus			Power	Loading %		Rating		MW	
#	Type	Name	Area	Facility Description	From	To	Cir.	Flow	Initial	Final	Type	MVA	Contribution	Ref
6	DCTL	G2207+R2218	PSEG - PSEG	FANWOOD_2-ROSELAND 230 kV line	219052	216950	1	DC	82.19	104.51	ER	887	209.97	1
7	DCTL	G2207+H2286_LT	PSEG - PSEG	PRSNAVS_S-DEANS 230 kV line	218358	218306	1	DC	81.72	104.64	ER	887	215.6	2
8	LFFB	BF_MET_3-P_LT	PSEG - PSEG	DEANS-BRUNSWCK 230 kV line	218306	218304	1	DC	95.31	105.37	ER	740	78.9	3
9	LFFB	BF_ALDE_2-8_LT	PSEG - PSEG	ALDENE_6-SPRINGRD_2 230 kV line	218345	216911	1	DC	93.75	105.79	ER	699	89.12	4
10	DCTL	G2207+H2286_LT	PSEG - PSEG	METUCHEN-PRSNAVS_S 230 kV line	218469	218358	1	DC	94.01	116.93	ER	887	215.6	9

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

#	Area	Bus No.	Bus	Breaker	Rating Type	Duty Percent Without Z2-089	Duty Percent With Z2-089	Duty Percent Difference
39	PSE&G	4996	LINDEN 230 KV	11H	S	99.78	101.03	1.25
40	PSE&G	4996	LINDEN 230 KV	12H	S	99.78	101.03	1.25
41	PSE&G	4996	LINDEN 230 KV	21H	S	99.78	101.03	1.25
42	PSE&G	4996	LINDEN 230 KV	22H	S	99.78	101.03	1.25
43	PSE&G	4996	LINDEN 230 KV	31H	S	99.78	101.03	1.25
44	PSE&G	4996	LINDEN 230 KV	32H	S	99.78	101.03	1.25
45	PSE&G	4996	LINDEN 230 KV	41H	S	99.78	101.03	1.25
46	PSE&G	4996	LINDEN 230 KV	42H	S	99.78	101.03	1.25
47	PSE&G	4996	LINDEN 230 KV	43H	S	99.78	101.03	1.25
48	PSE&G		SEWAREN 26 KV	Multiple				

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

#	Area	Bus No.	Bus	Breaker	Rating Type	Duty Percent Without Z2-089	Duty Percent With Z2-089	Duty Percent Difference
49	PSE&G	5022	SEWAREN 230 KV	1HB	S	111.10	121.06	9.96

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
11	N-1	L_H-2286	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	101.36	113.33	ER	1081	129.38	7
12	N-1	L_H-2286	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	109.45	121.42	ER	1081	129.38	11
13	N-1	L_H-2286	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	107.12	121.61	ER	887	128.44	12
14	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	108.87	123.29	NR	667	96.19	13
15	N-1	L_R-2218	PSEG - PSEG	METUCHEN-PRSNAVS_H 230 kV line	218469	218357	1	DC	102.32	125.3	ER	870	199.94	14
16	DCTL	G2207+R2218	PSEG - PSEG	NEWDOVR_H-FANWOOD_1 230 kV line	218355	218320	1	DC	101.77	126.05	ER	870	224.04	15
17	DCTL	G2207+R2218	PSEG - PSEG	PRSNAVS_H-NEWDOVR_H 230 kV line	218357	218355	1	DC	106.23	130.51	ER	870	224.04	17
18	N-1	L_H-2286	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	120.41	136.06	ER	821	128.44	18
19	DCTL	G2207+R2218	PSEG - PSEG	METUCHEN-PRSNAVS_H 230 kV line	218469	218357	1	DC	112.41	136.69	ER	870	224.04	19
20	N-1	L_H-2286	PSEG - PSEG	MINUEST_R-LINDEN 230 kV line	218353	218300	1	DC	108.79	138.57	ER	887	264.1	20
21	DCTL	G2207+H2286_LT	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	133.03	150	ER	887	159.59	21
22	N-1	L_H-2286	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	119.62	151.4	ER	831	264.1	22
23	DCTL	G2207+H2286_LT	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	149.38	167.71	ER	821	159.59	23

Steady-State Voltage Requirements

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

To be determined.

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.

New System Reinforcements

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

To be determined.

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)

To be determined.

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

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

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution
24	Non	Non	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	97.31	108.12	NR	936	107.33
25	Non	Non	PSEG - PSEG	MINUEST_R-LINDEN 230 kV line	218353	218300	1	DC	78.93	108.4	NR	732	228.72
26	N-1	L_G-2285/* ALDENE TO SPRINGFIELD ROAD	PSEG - PSEG	MCARTER-WORANGE 230 kV line	217170	216914	1	DC	98.52	110.42	ER	550	69.51
27	N-1	L_N-2292_LT	PSEG - PSEG	ALDENE_2-STANTER_1 230 kV line	218307	218430	1	DC	100.72	113.29	ER	558	74.44
28	N-1	L_N-2292_LT	PSEG - PSEG	STANTER_2-MCARTER 230 kV line	217101	217170	1	DC	102.19	114.94	ER	550	74.44
29	Non	Non	PSEG - PSEG	SEWAREN-MINUEST_R 230 kV line	218311	218353	1	DC	88.21	119.56	NR	688	228.72
30	Non	Non	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	128.34	142.17	NR	732	107.33
31	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	146.59	161.77	NR	667	107.33

Attachment 1

System Configuration – Option 1

Attachment 2

Flowgate Appendices – Option 1

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

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

Appendix 1

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 93.99% to 104.26% (**DC power flow**) of its normal rating (936 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
901801	W1-101 C	< 0.01
902251	W2-023	118.11
905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01

912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917521	Z2-089 C	96.19

Appendix 2

(PSEG - PSEG) The FANWOOD_2-ROSELAND 230 kV line (from bus 219052 to bus 216950 ckt 1) loads from 82.19% to 104.51% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 209.97 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN -
SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.71
206638	28PEAPACK	-0.27
219029	EDISON_112	15.17
219028	EDISON_134	14.96
219030	EDISON_212	14.97
219031	EDISON_234	15.65
219032	EDISON_312	16.06
219033	EDISON_334	15.22
94130	O66_NONFIRM	40.63
219060	SEWAREN_1LD5	38.45
219064	SEWAREN_2LD2	43.62
219068	SEWAREN_3LD2	39.55
219071	SEWAREN_4LD1	45.84
218364	SEWAREN_G6	41.
292185	V1-030 E2	0.9
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.12
292189	V1-030 EA	0.4
292078	V1-034	0.35
297021	V2-009 E1	0.25
297023	V2-009 E2	0.5
297025	V2-009 E3	0.29
297027	V2-009 E4	0.33
293378	V3-024 E	0.5
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.45
902002	W1-121 E	0.3

902251	W2-023	231.04
902651	W2-052 C	< 0.01
902652	W2-052 E	0.18
905641	W4-080 C	0.17
905642	W4-080 E	4.59
909452	X2-088 E	0.24
909461	X2-089 C	0.02
909462	X2-089 E	0.66
910612	X3-029 E	-0.6
910762	X3-052 E	-0.35
915831	Y3-049 1	0.47
915841	Y3-049 2	0.47
915851	Y3-049 3	0.47
915861	Y3-049 4	0.47
915871	Y3-049 5	0.47
915881	Y3-049 6	0.47
916402	Z1-096 E	0.35
916581	Z1-116 C	268.65
916582	Z1-116 E	22.23
917521	Z2-089 C	188.16
917522	Z2-089 E	21.81

Appendix 3

(PSEG - PSEG) The PRSNAVS_S-DEANS 230 kV line (from bus 218358 to bus 218306 ckt 1) loads from 84.15% to 107.07% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 215.6 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
217006	BERGEN_26A	2.6
219029	EDISON_112	13.71
219028	EDISON_134	13.51
219030	EDISON_212	13.5
219031	EDISON_234	14.12
219032	EDISON_312	14.5
219033	EDISON_334	13.74
217913	ESSEX_1012	9.08
217914	ESSEX_1034	9.08
217273	ESSEX_1112	10.79
217274	ESSEX_1134	9.84

217275	ESSEX_1212	9.11
217276	ESSEX_1234	9.1
217086	KRNY_G9	1.62
219060	SEWAREN_1LD5	39.48
219064	SEWAREN_2LD2	44.79
219068	SEWAREN_3LD2	40.61
219071	SEWAREN_4LD1	47.07
218364	SEWAREN_G6	42.09
293093	U2-077	127.09
292095	V1-030 E1	0.32
292185	V1-030 E2	0.82
292107	V1-030 E7	0.09
292111	V1-030 E9	0.12
292191	V1-030 EC	0.57
292092	V1-030 ED	0.45
297021	V2-009 E1	0.19
297023	V2-009 E2	0.38
297069	V2-025 E	0.52
293378	V3-024 E	0.39
293444	V3-065 E	0.05
293440	V3-066 E	0.03
293434	V3-067 E	0.08
293429	V3-068 E	0.04
292680	V3-069 C	0.02
292681	V3-069 E	0.49
94150	VFT ENJECT	63.54
900801	W1-001	3.03
901802	W1-101 E	0.15
902251	W2-023	237.23
902651	W2-052 C	< 0.01
902652	W2-052 E	0.2
905492	W4-059 E	0.05
905641	W4-080 C	0.2
905642	W4-080 E	5.26
907402	X1-072 E	0.1
909442	X2-087 E	0.11
909452	X2-088 E	0.18
909461	X2-089 C	0.02
909462	X2-089 E	0.74
910762	X3-052 E	0.36
913101	Y1-026	33.25
915201	Y3-044 1	0.15
915211	Y3-044 2	0.15
915221	Y3-044 3	0.15
915231	Y3-044 4	0.15

915761	Y3-045 1	0.2
915771	Y3-045 2	0.2
915781	Y3-045 3	0.2
915791	Y3-045 4	0.2
915251	Y3-046 1	0.67
915261	Y3-046 2	0.67
915801	Y3-047 C1	0.24
915811	Y3-047 C2	0.29
915821	Y3-047 C3	0.29
915831	Y3-049 1	0.43
915841	Y3-049 2	0.43
915851	Y3-049 3	0.42
915861	Y3-049 4	0.42
915871	Y3-049 5	0.42
915881	Y3-049 6	0.42
915341	Y3-050 C1	0.48
915351	Y3-050 C2	0.48
915361	Y3-050 C3	0.48
915371	Y3-050 C4	0.48
915381	Y3-050 C5	0.3
915391	Y3-050 C6	0.3
915891	Y3-052 C1	0.2
915901	Y3-052 C2	0.2
915911	Y3-052 C3	0.2
915921	Y3-052 C4	0.2
915931	Y3-052 C5	0.31
915941	Y3-052 C6	0.31
915421	Y3-053 C1	0.12
915511	Y3-053 C10	0.3
915431	Y3-053 C2	0.12
915441	Y3-053 C3	0.12
915451	Y3-053 C4	0.12
915461	Y3-053 C5	0.12
915471	Y3-053 C6	0.12
915481	Y3-053 C7	0.12
915491	Y3-053 C8	0.12
915501	Y3-053 C9	0.3
915721	Y3-107	5.57
916141	Z1-058	6.27
916151	Z1-059 C	4.02
916152	Z1-059 E	1.12
916531	Z1-109	42.71
916581	Z1-116 C	307.62
916582	Z1-116 E	25.46
917011	Z2-002 C	12.49

917012	Z2-002 E	3.35
917521	Z2-089 C	193.2
917522	Z2-089 E	22.39

Appendix 4

(PSEG - PSEG) The LINDEN-TOSCO_3 230 kV line (from bus 218300 to bus 219046 ckt 1) loads from 95.34% to 107.34% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.76 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
217918	BERGEN_14	1.04
217118	BERGEN_1ST	1.88
217065	ECRR_1	0.35
217323	ECRR_2	0.35
219029	EDISON_112	9.17
219028	EDISON_134	9.04
219030	EDISON_212	9.05
219031	EDISON_234	9.47
219032	EDISON_312	9.71
219033	EDISON_334	9.2
217913	ESSEX_1012	7.12
217914	ESSEX_1034	7.12
217273	ESSEX_1112	8.46
217274	ESSEX_1134	7.72
217112	HUDSN_G2	6.41
218435	LINDEN_1GT	2.48
218426	LINDEN_2ST	6.6
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.77
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.38
218418	LINDEN_G5	1.92
218419	LINDEN_G6	1.92
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
219060	SEWAREN_1LD5	26.51

219064	SEWAREN_2LD2	30.08
219068	SEWAREN_3LD2	27.28
219071	SEWAREN_4LD1	31.61
218364	SEWAREN_G6	28.27
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	159.33
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.35
916151	Z1-059 C	6.48
916581	Z1-116 C	163.02
917011	Z2-002 C	20.17
917521	Z2-089 C	129.76

Appendix 5

(PSEG - PSEG) The LINDEN-TOSCO_3 230 kV line (from bus 218300 to bus 219046 ckt 1) loads from 95.96% to 108.2% (**DC power flow**) of its emergency rating (1081 MVA) for the tower line contingency outage of 'H2286+W2249_LT'. This project contributes approximately 140.16 MW to the thermal violation.

```
CONTINGENCY 'H2286+W2249_LT'                          /* DEANS - WESTFIELD &
METUCHEN - FANWOOD
  DISCONNECT BUS 218355                               /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                               /* REMOVE PIERSON H
  DISCONNECT BUS 218320                               /* REMOVE FANWOOD SECTION
1
  DISCONNECT BUS 218305                               /* REMOVE WESTFIELD BUS 1
  DISCONNECT BUS 218356                               /* RMEOVE NEW DOVER BUS W
SIDE
  DISCONNECT BUS 218398                               /* NEW DOVER LOAD LOSS
  DISCONNECT BUS 218399                               /* NEW DOVER LOAD LOSS
  CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1      /* WESTFIELD
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1      /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1      /* PIERSON AVE
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1      /* FANWOOD
  END
```

Bus Number	Bus Name	Full Contribution
206638	28PEAPACK	-0.1
219029	EDISON_112	9.69
219028	EDISON_134	9.55
219030	EDISON_212	9.56
219031	EDISON_234	10.
219032	EDISON_312	10.26
219033	EDISON_334	9.72
218426	LINDEN_2ST	6.06
218423	LINDEN_G21	3.01
218424	LINDEN_G22	3.1
218418	LINDEN_G5	1.76
218419	LINDEN_G6	1.76
219060	SEWAREN_1LD5	25.66
219064	SEWAREN_2LD2	29.12
219068	SEWAREN_3LD2	26.4
219071	SEWAREN_4LD1	30.6
218364	SEWAREN_G6	27.37
292094	V1-030 C1	0.02
292095	V1-030 E1	0.47
292185	V1-030 E2	0.58
292189	V1-030 EA	0.36

292092	V1-030 ED	0.41
297069	V2-025 E	0.48
293434	V3-067 E	0.07
293429	V3-068 E	0.04
292681	V3-069 E	0.29
901802	W1-101 E	0.13
902251	W2-023	154.23
902652	W2-052 E	0.11
905642	W4-080 E	2.76
907402	X1-072 E	0.08
909442	X2-087 E	0.11
909462	X2-089 E	0.38
915761	Y3-045 1	0.15
915771	Y3-045 2	0.15
915781	Y3-045 3	0.15
915791	Y3-045 4	0.15
915251	Y3-046 1	0.99
915261	Y3-046 2	0.99
915831	Y3-049 1	0.3
915841	Y3-049 2	0.3
915851	Y3-049 3	0.3
915861	Y3-049 4	0.3
915871	Y3-049 5	0.3
915881	Y3-049 6	0.3
915891	Y3-052 C1	0.15
915901	Y3-052 C2	0.15
915911	Y3-052 C3	0.15
915921	Y3-052 C4	0.15
916141	Z1-058	6.2
916151	Z1-059 C	5.95
916152	Z1-059 E	1.65
916581	Z1-116 C	161.52
916582	Z1-116 E	13.37
917011	Z2-002 C	18.52
917012	Z2-002 E	4.96
917521	Z2-089 C	125.6
917522	Z2-089 E	14.56

Appendix 6

(PSEG - PSEG) The ALDENE_6-SPRINGRD_2 230 kV line (from bus 218345 to bus 216911 ckt 1) loads from 99.58% to 111.62% (**DC power flow**) of its emergency rating (699 MVA) for the line fault with failed breaker contingency outage of 'BF_ALDE_2-8_LT'. This project contributes approximately 89.12 MW to the thermal violation.

```
CONTINGENCY 'BF_ALDE_2-8_LT'
  DISCONNECT BUS 218307                                  /* ALDENE BUS SECTION 2
  DISCONNECT BUS 218430                                  /* STANELTY TERRACE BUS
SECTION 1
  DISCONNECT BUS 219038                                  /* ALDENE BUS SECTION 8
  DISCONNECT BUS 219053                                  /* WESTFIELD SECTION 2
  CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1                 /* WESTFIELD
  END
```

Bus Number	Bus Name	Full Contribution
218376	ALDENE_AB	16.25
219029	EDISON_112	5.5
219028	EDISON_134	5.42
219030	EDISON_212	5.43
219031	EDISON_234	5.67
219032	EDISON_312	5.82
219033	EDISON_334	5.52
218426	LINDEN_2ST	5.05
218423	LINDEN_G21	2.5
218424	LINDEN_G22	2.58
218418	LINDEN_G5	1.47
218419	LINDEN_G6	1.47
290745	S-061	0.4
219060	SEWAREN_1LD5	16.32
219064	SEWAREN_2LD2	18.52
219068	SEWAREN_3LD2	16.79
219071	SEWAREN_4LD1	19.46
218364	SEWAREN_G6	17.4
218344	TOSCO_G6	2.35
293093	U2-077	214.03
292094	V1-030 C1	0.01
292095	V1-030 E1	0.39
292185	V1-030 E2	0.33
292092	V1-030 ED	0.36
297027	V2-009 E4	0.12
297069	V2-025 E	0.42
293434	V3-067 E	0.07
293429	V3-068 E	0.04
292681	V3-069 E	0.17

94150	VFT ENJECT	107.01
900801	W1-001	5.1
901802	W1-101 E	0.12
902251	W2-023	98.07
902652	W2-052 E	0.06
905642	W4-080 E	1.53
907402	X1-072 E	0.07
909442	X2-087 E	0.09
909462	X2-089 E	0.2
913101	Y1-026	51.41
915761	Y3-045 1	0.14
915771	Y3-045 2	0.14
915781	Y3-045 3	0.14
915791	Y3-045 4	0.14
915251	Y3-046 1	0.83
915261	Y3-046 2	0.83
915831	Y3-049 1	0.17
915841	Y3-049 2	0.17
915851	Y3-049 3	0.17
915861	Y3-049 4	0.17
915871	Y3-049 5	0.17
915881	Y3-049 6	0.17
915891	Y3-052 C1	0.14
915901	Y3-052 C2	0.14
915911	Y3-052 C3	0.14
915921	Y3-052 C4	0.14
916141	Z1-058	5.41
916151	Z1-059 C	4.95
916152	Z1-059 E	1.38
916531	Z1-109	68.41
916581	Z1-116 C	89.25
916582	Z1-116 E	7.39
917011	Z2-002 C	15.41
917012	Z2-002 E	4.13
917521	Z2-089 C	79.87
917522	Z2-089 E	9.26

Appendix 7

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 99.78% to 112.92% (**DC power flow**) of its normal rating (732 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
94150	VFT ENJECT	130.74
900801	W1-001	6.23
901801	W1-101 C	< 0.01
902251	W2-023	118.11

905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01
912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916531	Z1-109	83.59
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917521	Z2-089 C	96.19

Appendix 8

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 102.92% to 113.19% (**DC power flow**) of its normal rating (936 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
901801	W1-101 C	< 0.01
902251	W2-023	118.11
905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01

912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916531	Z1-109	83.59
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917521	Z2-089 C	96.19

Appendix 9

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 101.36% to 113.33% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.38 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.12
219028	EDISON_134	9.
219030	EDISON_212	9.
219031	EDISON_234	9.42
219032	EDISON_312	9.66
219033	EDISON_334	9.15
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.4
217274	ESSEX_1134	7.66
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.59
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.37
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.43
219064	SEWAREN_2LD2	29.99
219068	SEWAREN_3LD2	27.2
219071	SEWAREN_4LD1	31.52

218364	SEWAREN_G6	28.19
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	158.86
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.87
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.32
916151	Z1-059 C	6.47
916581	Z1-116 C	162.48
917011	Z2-002 C	20.12
917521	Z2-089 C	129.38

Appendix 10

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 100.12% to 114.18% (**DC power flow**) of its emergency rating (1081 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 161.1 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.53
219028	EDISON_134	9.4
219030	EDISON_212	9.4
219031	EDISON_234	9.83
219032	EDISON_312	10.09
219033	EDISON_334	9.56
217913	ESSEX_1012	9.37
217914	ESSEX_1034	9.37
217273	ESSEX_1112	11.13
217274	ESSEX_1134	10.15
218426	LINDEN_2ST	7.62

218423	LINDEN_G21	3.78
218424	LINDEN_G22	3.9
218418	LINDEN_G5	2.21
218419	LINDEN_G6	2.21
290745	S-061	0.57
219060	SEWAREN_1LD5	29.5
219064	SEWAREN_2LD2	33.47
219068	SEWAREN_3LD2	30.35
219071	SEWAREN_4LD1	35.17
218364	SEWAREN_G6	31.45
218344	TOSCO_G6	3.4
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.57
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
901802	W1-101 E	0.2
902251	W2-023	177.27
902652	W2-052 E	0.12
905642	W4-080 E	3.05
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	74.25
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.25
915261	Y3-046 2	1.25
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.3
915841	Y3-049 2	0.3
915851	Y3-049 3	0.3
915861	Y3-049 4	0.3
915871	Y3-049 5	0.3
915881	Y3-049 6	0.3
915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24

915921	Y3-052 C4	0.24
916141	Z1-058	8.9
916151	Z1-059 C	7.48
916152	Z1-059 E	2.08
916581	Z1-116 C	178.3
916582	Z1-116 E	14.76
917011	Z2-002 C	23.27
917012	Z2-002 E	6.23
917521	Z2-089 C	144.37
917522	Z2-089 E	16.73

Appendix 11

(PSEG - PSEG) The NEWDOVR_H-FANWOOD_1 230 kV line (from bus 218355 to bus 218320 ckt 1) loads from 91.58% to 114.56% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

CONTINGENCY 'L_R-2218' /* LINDEN TO SEWARREN
DISCONNECT BUS 218353 /* MINUE R
END

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
909461	X2-089 C	0.02
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.18
917521	Z2-089 C	199.94

Appendix 12

(PSEG - PSEG) The PRSNAVS_H-NEWDOVR_H 230 kV line (from bus 218357 to bus 218355 ckt 1) loads from 96.05% to 119.03% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

```
CONTINGENCY 'L_R-2218'                    /* LINDEN TO SEWARREN
  DISCONNECT BUS 218353                   /* MINUE R
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
909461	X2-089 C	0.02
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.18
917521	Z2-089 C	199.94

Appendix 13

(PSEG - PSEG) The METUCHEN-PRSNAVS_S 230 kV line (from bus 218469 to bus 218358 ckt 1) loads from 96.45% to 119.37% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 215.6 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
217006	BERGEN_26A	2.6
219029	EDISON_112	13.71
219028	EDISON_134	13.51
219030	EDISON_212	13.5
219031	EDISON_234	14.12
219032	EDISON_312	14.5
219033	EDISON_334	13.74
217913	ESSEX_1012	9.08
217914	ESSEX_1034	9.08
217273	ESSEX_1112	10.79
217274	ESSEX_1134	9.84

217275	ESSEX_1212	9.11
217276	ESSEX_1234	9.1
217086	KRNY_G9	1.62
219060	SEWAREN_1LD5	39.48
219064	SEWAREN_2LD2	44.79
219068	SEWAREN_3LD2	40.61
219071	SEWAREN_4LD1	47.07
218364	SEWAREN_G6	42.09
293093	U2-077	127.1
292095	V1-030 E1	0.32
292185	V1-030 E2	0.82
292107	V1-030 E7	0.09
292111	V1-030 E9	0.12
292191	V1-030 EC	0.57
292092	V1-030 ED	0.45
297021	V2-009 E1	0.19
297023	V2-009 E2	0.38
297069	V2-025 E	0.52
293378	V3-024 E	0.39
293444	V3-065 E	0.05
293440	V3-066 E	0.03
293434	V3-067 E	0.08
293429	V3-068 E	0.04
292680	V3-069 C	0.02
292681	V3-069 E	0.49
94150	VFT ENJECT	63.55
900801	W1-001	3.03
901802	W1-101 E	0.15
902251	W2-023	237.23
902651	W2-052 C	< 0.01
902652	W2-052 E	0.2
905492	W4-059 E	0.05
905641	W4-080 C	0.2
905642	W4-080 E	5.26
907402	X1-072 E	0.1
909442	X2-087 E	0.11
909452	X2-088 E	0.18
910762	X3-052 E	0.36
913101	Y1-026	33.25
915201	Y3-044 1	0.15
915211	Y3-044 2	0.15
915221	Y3-044 3	0.15
915231	Y3-044 4	0.15
915761	Y3-045 1	0.2
915771	Y3-045 2	0.2

915781	Y3-045 3	0.2
915791	Y3-045 4	0.2
915251	Y3-046 1	0.67
915261	Y3-046 2	0.67
915801	Y3-047 C1	0.24
915811	Y3-047 C2	0.29
915821	Y3-047 C3	0.29
915831	Y3-049 1	0.43
915841	Y3-049 2	0.43
915851	Y3-049 3	0.42
915861	Y3-049 4	0.42
915871	Y3-049 5	0.42
915881	Y3-049 6	0.42
915341	Y3-050 C1	0.48
915351	Y3-050 C2	0.48
915361	Y3-050 C3	0.48
915371	Y3-050 C4	0.48
915381	Y3-050 C5	0.3
915391	Y3-050 C6	0.3
915891	Y3-052 C1	0.2
915901	Y3-052 C2	0.2
915911	Y3-052 C3	0.2
915921	Y3-052 C4	0.2
915931	Y3-052 C5	0.31
915941	Y3-052 C6	0.31
915421	Y3-053 C1	0.12
915511	Y3-053 C10	0.3
915431	Y3-053 C2	0.12
915441	Y3-053 C3	0.12
915451	Y3-053 C4	0.12
915461	Y3-053 C5	0.12
915471	Y3-053 C6	0.12
915481	Y3-053 C7	0.12
915491	Y3-053 C8	0.12
915501	Y3-053 C9	0.3
915721	Y3-107	5.57
916141	Z1-058	6.27
916151	Z1-059 C	4.02
916152	Z1-059 E	1.12
916531	Z1-109	42.71
916581	Z1-116 C	307.62
916582	Z1-116 E	25.46
917011	Z2-002 C	12.49
917012	Z2-002 E	3.35
917521	Z2-089 C	193.2

917522	Z2-089 E	22.39

Appendix 14

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 109.45% to 121.42% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.38 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.12
219028	EDISON_134	9.
219030	EDISON_212	9.
219031	EDISON_234	9.42
219032	EDISON_312	9.66
219033	EDISON_334	9.15
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.4
217274	ESSEX_1134	7.66
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.59
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.37
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.43
219064	SEWAREN_2LD2	29.99
219068	SEWAREN_3LD2	27.2
219071	SEWAREN_4LD1	31.52

218364	SEWAREN_G6	28.19
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	158.86
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.87
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.32
916151	Z1-059 C	6.47
916531	Z1-109	87.42
916581	Z1-116 C	162.48
917011	Z2-002 C	20.12
917521	Z2-089 C	129.38

Appendix 15

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 107.12% to 121.61% (**DC power flow**) of its emergency rating (887 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 128.44 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.04
219028	EDISON_134	8.91
219030	EDISON_212	8.92
219031	EDISON_234	9.32
219032	EDISON_312	9.57
219033	EDISON_334	9.07
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.41
217274	ESSEX_1134	7.67
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.58
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.9
218423	LINDEN_G21	3.26
218424	LINDEN_G22	3.36
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.24
219064	SEWAREN_2LD2	29.78
219068	SEWAREN_3LD2	27.
219071	SEWAREN_4LD1	31.29

218364	SEWAREN_G6	27.98
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
94150	VFT ENJECT	136.1
900801	W1-001	6.48
901801	W1-101 C	< 0.01
902251	W2-023	157.71
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.1
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.78
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.31
916151	Z1-059 C	6.46
916531	Z1-109	87.31
916581	Z1-116 C	160.9
917011	Z2-002 C	20.09
917521	Z2-089 C	128.44

Appendix 16

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 109.21% to 123.26% (**DC power flow**) of its emergency rating (1081 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 161.1 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.53
219028	EDISON_134	9.4
219030	EDISON_212	9.4
219031	EDISON_234	9.83
219032	EDISON_312	10.09
219033	EDISON_334	9.56
217913	ESSEX_1012	9.37
217914	ESSEX_1034	9.37
217273	ESSEX_1112	11.13
217274	ESSEX_1134	10.15
218426	LINDEN_2ST	7.62

218423	LINDEN_G21	3.78
218424	LINDEN_G22	3.9
218418	LINDEN_G5	2.21
218419	LINDEN_G6	2.21
290745	S-061	0.57
219060	SEWAREN_1LD5	29.5
219064	SEWAREN_2LD2	33.47
219068	SEWAREN_3LD2	30.35
219071	SEWAREN_4LD1	35.17
218364	SEWAREN_G6	31.45
218344	TOSCO_G6	3.4
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.57
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
901802	W1-101 E	0.2
902251	W2-023	177.27
902652	W2-052 E	0.12
905642	W4-080 E	3.05
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	74.25
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.25
915261	Y3-046 2	1.25
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.3
915841	Y3-049 2	0.3
915851	Y3-049 3	0.3
915861	Y3-049 4	0.3
915871	Y3-049 5	0.3
915881	Y3-049 6	0.3
915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24

915921	Y3-052 C4	0.24
916141	Z1-058	8.9
916151	Z1-059 C	7.48
916152	Z1-059 E	2.08
916531	Z1-109	98.19
916581	Z1-116 C	178.3
916582	Z1-116 E	14.76
917011	Z2-002 C	23.27
917012	Z2-002 E	6.23
917521	Z2-089 C	144.37
917522	Z2-089 E	16.73

Appendix 17

(PSEG - PSEG) The METUCHEN-PRSNAVS_H 230 kV line (from bus 218469 to bus 218357 ckt 1) loads from 102.32% to 125.3% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

```
CONTINGENCY 'L_R-2218'                    /* LINDEN TO SEWARREN
  DISCONNECT BUS 218353                   /* MINUE R
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.19
917521	Z2-089 C	199.94

Appendix 18

(PSEG - PSEG) The NEWDOVR_H-FANWOOD_1 230 kV line (from bus 218355 to bus 218320 ckt 1) loads from 101.77% to 126.05% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.2
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.52
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
909461	X2-089 C	0.02
909462	X2-089 E	0.71
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917521	Z2-089 C	200.76
917522	Z2-089 E	23.27

Appendix 19

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 115.24% to 129.67% (**DC power flow**) of its normal rating (667 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
94150	VFT ENJECT	130.74
900801	W1-001	6.23
901801	W1-101 C	< 0.01
902251	W2-023	118.11

905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01
912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916531	Z1-109	83.59
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917521	Z2-089 C	96.19

Appendix 20

(PSEG - PSEG) The SEWAREN-MINUEST_R 230 kV line (from bus 218311 to bus 218353 ckt 1) loads from 99.9% to 129.69% (**DC power flow**) of its normal rating (688 MVA) for non-contingency condition. This project contributes approximately 204.96 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	12.17
219028	EDISON_134	12.
219030	EDISON_212	12.
219031	EDISON_234	12.55
219032	EDISON_312	12.88
219033	EDISON_334	12.21
219060	SEWAREN_1LD5	41.88
219064	SEWAREN_2LD2	47.52
219068	SEWAREN_3LD2	43.09
219071	SEWAREN_4LD1	49.93
218364	SEWAREN_G6	44.66
292096	V1-030 C2	0.03
292078	V1-034	0.36
292680	V3-069 C	0.02
902251	W2-023	251.68
902651	W2-052 C	< 0.01
905641	W4-080 C	0.15
909461	X2-089 C	0.01
915831	Y3-049 1	0.38
915841	Y3-049 2	0.38
915851	Y3-049 3	0.38
915861	Y3-049 4	0.38
915871	Y3-049 5	0.38
915881	Y3-049 6	0.38
916581	Z1-116 C	227.52
917521	Z2-089 C	204.96

Appendix 21

(PSEG - PSEG) The PRSNAVS_H-NEWDOVR_H 230 kV line (from bus 218357 to bus 218355 ckt 1) loads from 106.23% to 130.51% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.2
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.52
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
909461	X2-089 C	0.02
909462	X2-089 E	0.71
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917521	Z2-089 C	200.76
917522	Z2-089 E	23.27

Appendix 22

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 120.41% to 136.06% (**DC power flow**) of its emergency rating (821 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 128.44 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.04
219028	EDISON_134	8.91
219030	EDISON_212	8.92
219031	EDISON_234	9.32
219032	EDISON_312	9.57
219033	EDISON_334	9.07
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.41
217274	ESSEX_1134	7.67
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.58
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.9
218423	LINDEN_G21	3.26
218424	LINDEN_G22	3.36
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.24
219064	SEWAREN_2LD2	29.78
219068	SEWAREN_3LD2	27.
219071	SEWAREN_4LD1	31.29

218364	SEWAREN_G6	27.98
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
94150	VFT ENJECT	136.1
900801	W1-001	6.48
901801	W1-101 C	< 0.01
902251	W2-023	157.71
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.1
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.78
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.31
916151	Z1-059 C	6.46
916531	Z1-109	87.31
916581	Z1-116 C	160.9
917011	Z2-002 C	20.09
917521	Z2-089 C	128.44

Appendix 23

(PSEG - PSEG) The METUCHEN-PRSNAVS_H 230 kV line (from bus 218469 to bus 218357 ckt 1) loads from 112.41% to 136.69% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.21
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.53
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917521	Z2-089 C	200.77
917522	Z2-089 E	23.27

Appendix 24

(PSEG - PSEG) The MINUEST_R-LINDEN 230 kV line (from bus 218353 to bus 218300 ckt 1) loads from 108.79% to 138.57% (**DC power flow**) of its emergency rating (887 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 264.1 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	17.8
219028	EDISON_134	17.56
219030	EDISON_212	17.57
219031	EDISON_234	18.37
219032	EDISON_312	18.85
219033	EDISON_334	17.86
219060	SEWAREN_1LD5	53.96
219064	SEWAREN_2LD2	61.23
219068	SEWAREN_3LD2	55.52
219071	SEWAREN_4LD1	64.34
218364	SEWAREN_G6	57.54
292096	V1-030 C2	0.04
292078	V1-034	0.42
292680	V3-069 C	0.03
902251	W2-023	324.29
902651	W2-052 C	< 0.01
905641	W4-080 C	0.21
915831	Y3-049 1	0.55
915841	Y3-049 2	0.55
915851	Y3-049 3	0.55
915861	Y3-049 4	0.55
915871	Y3-049 5	0.55
915881	Y3-049 6	0.55
916581	Z1-116 C	327.39
917521	Z2-089 C	264.1

Appendix 25

(PSEG - PSEG) The MINUEST_R-LINDEN 230 kV line (from bus 218353 to bus 218300 ckt 1) loads from 114.72% to 145.73% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'H2286+W2249_LT'. This project contributes approximately 291.78 MW to the thermal violation.

```
CONTINGENCY 'H2286+W2249_LT'                    /* DEANS - WESTFIELD &
METUCHEN - FANWOOD
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  DISCONNECT BUS 218305                         /* REMOVE WESTFIELD BUS 1
  DISCONNECT BUS 218356                         /* RMEOVE NEW DOVER BUS W
SIDE
  DISCONNECT BUS 218398                         /* NEW DOVER LOAD LOSS
  DISCONNECT BUS 218399                         /* NEW DOVER LOAD LOSS
  CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1        /* WESTFIELD
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.66
206638	28PEAPACK	-0.26
219029	EDISON_112	18.13
219028	EDISON_134	17.88
219030	EDISON_212	17.89
219031	EDISON_234	18.7
219032	EDISON_312	19.19
219033	EDISON_334	18.19
94130	O66_NONFIRM	56.64
219060	SEWAREN_1LD5	53.42
219064	SEWAREN_2LD2	60.62
219068	SEWAREN_3LD2	54.96
219071	SEWAREN_4LD1	63.7
218364	SEWAREN_G6	56.97
292185	V1-030 E2	1.08
292101	V1-030 E4	0.08
292103	V1-030 E5	0.18
292107	V1-030 E7	0.14
292189	V1-030 EA	0.42
292078	V1-034	0.48
297021	V2-009 E1	0.29
297023	V2-009 E2	0.59
297025	V2-009 E3	0.33
297027	V2-009 E4	0.39
293378	V3-024 E	0.59
292666	V3-058 E	0.17
292668	V3-059 E	0.17

292681	V3-069 E	0.59
902002	W1-121 E	0.34
902251	W2-023	321.06
902652	W2-052 E	0.21
905642	W4-080 E	5.58
909452	X2-088 E	0.28
909462	X2-089 E	0.78
910562	X3-007 E	0.11
910762	X3-052 E	-0.47
915831	Y3-049 1	0.56
915841	Y3-049 2	0.56
915851	Y3-049 3	0.56
915861	Y3-049 4	0.56
915871	Y3-049 5	0.56
915881	Y3-049 6	0.56
916402	Z1-096 E	0.39
916581	Z1-116 C	326.43
916582	Z1-116 E	27.02
917521	Z2-089 C	261.47
917522	Z2-089 E	30.31

Appendix 26

(PSEG - PSEG) The SEWAREN-MINUEST_R 230 kV line (from bus 218311 to bus 218353 ckt 1) loads from 119.62% to 151.4% (**DC power flow**) of its emergency rating (831 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 264.1 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	17.8
219028	EDISON_134	17.56
219030	EDISON_212	17.57
219031	EDISON_234	18.37
219032	EDISON_312	18.85
219033	EDISON_334	17.86
219060	SEWAREN_1LD5	53.96
219064	SEWAREN_2LD2	61.23
219068	SEWAREN_3LD2	55.52
219071	SEWAREN_4LD1	64.34
218364	SEWAREN_G6	57.54
292096	V1-030 C2	0.04
292078	V1-034	0.42
292680	V3-069 C	0.03
902251	W2-023	324.29
902651	W2-052 C	< 0.01
905641	W4-080 C	0.21
915831	Y3-049 1	0.55
915841	Y3-049 2	0.55
915851	Y3-049 3	0.55
915861	Y3-049 4	0.55
915871	Y3-049 5	0.55
915881	Y3-049 6	0.55
916581	Z1-116 C	327.39
917521	Z2-089 C	264.1

Appendix 27

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 142.03% to 158.99% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 159.59 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.43
219028	EDISON_134	9.3
219030	EDISON_212	9.3
219031	EDISON_234	9.73
219032	EDISON_312	9.98
219033	EDISON_334	9.46
217913	ESSEX_1012	9.31
217914	ESSEX_1034	9.31
217273	ESSEX_1112	11.06
217274	ESSEX_1134	10.09
218426	LINDEN_2ST	7.58
218423	LINDEN_G21	3.76
218424	LINDEN_G22	3.87
218418	LINDEN_G5	2.2
218419	LINDEN_G6	2.2
290745	S-061	0.57
219060	SEWAREN_1LD5	29.22

219064	SEWAREN_2LD2	33.15
219068	SEWAREN_3LD2	30.06
219071	SEWAREN_4LD1	34.84
218364	SEWAREN_G6	31.16
218344	TOSCO_G6	3.38
293093	U2-077	303.38
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.56
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
94150	VFT ENJECT	151.69
900801	W1-001	7.22
901802	W1-101 E	0.2
902251	W2-023	175.61
902652	W2-052 E	0.12
905642	W4-080 E	3.01
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	73.93
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.24
915261	Y3-046 2	1.24
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.29
915841	Y3-049 2	0.29
915851	Y3-049 3	0.29
915861	Y3-049 4	0.29
915871	Y3-049 5	0.29
915881	Y3-049 6	0.29
915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24
915921	Y3-052 C4	0.24
916141	Z1-058	8.85
916151	Z1-059 C	7.44

916152	Z1-059 E	2.07
916531	Z1-109	97.78
916581	Z1-116 C	176.28
916582	Z1-116 E	14.59
917011	Z2-002 C	23.14
917012	Z2-002 E	6.2
917521	Z2-089 C	143.01
917522	Z2-089 E	16.58

Appendix 28

(PSEG - PSEG) The SEWAREN-MINUEST_R 230 kV line (from bus 218311 to bus 218353 ckt 1) loads from 125.95% to 159.06% (**DC power flow**) of its emergency rating (831 MVA) for the tower line contingency outage of 'H2286+W2249_LT'. This project contributes approximately 291.78 MW to the thermal violation.

```
CONTINGENCY 'H2286+W2249_LT'                    /* DEANS - WESTFIELD &
METUCHEN - FANWOOD
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  DISCONNECT BUS 218305                         /* REMOVE WESTFIELD BUS 1
  DISCONNECT BUS 218356                         /* RMEOVE NEW DOVER BUS W
SIDE
  DISCONNECT BUS 218398                         /* NEW DOVER LOAD LOSS
  DISCONNECT BUS 218399                         /* NEW DOVER LOAD LOSS
  CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1        /* WESTFIELD
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.66
206638	28PEAPACK	-0.26
219029	EDISON_112	18.13
219028	EDISON_134	17.88
219030	EDISON_212	17.89
219031	EDISON_234	18.7
219032	EDISON_312	19.19
219033	EDISON_334	18.19
94130	O66_NONFIRM	56.64
219060	SEWAREN_1LD5	53.42
219064	SEWAREN_2LD2	60.62
219068	SEWAREN_3LD2	54.96
219071	SEWAREN_4LD1	63.7
218364	SEWAREN_G6	56.97
292185	V1-030 E2	1.08
292101	V1-030 E4	0.08
292103	V1-030 E5	0.18
292107	V1-030 E7	0.14
292189	V1-030 EA	0.42
292078	V1-034	0.48
297021	V2-009 E1	0.29

297023	V2-009 E2	0.59
297025	V2-009 E3	0.33
297027	V2-009 E4	0.39
293378	V3-024 E	0.59
292666	V3-058 E	0.17
292668	V3-059 E	0.17
292681	V3-069 E	0.59
902002	W1-121 E	0.34
902251	W2-023	321.06
902652	W2-052 E	0.21
905642	W4-080 E	5.58
909452	X2-088 E	0.28
909462	X2-089 E	0.78
910562	X3-007 E	0.11
910762	X3-052 E	-0.47
915831	Y3-049 1	0.56
915841	Y3-049 2	0.56
915851	Y3-049 3	0.56
915861	Y3-049 4	0.56
915871	Y3-049 5	0.56
915881	Y3-049 6	0.56
916402	Z1-096 E	0.39
916581	Z1-116 C	326.43
916582	Z1-116 E	27.02
917521	Z2-089 C	261.47
917522	Z2-089 E	30.31

Appendix 29

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 159.1% to 177.43% (**DC power flow**) of its emergency rating (821 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 159.59 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1          /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1          /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1          /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1          /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1          /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.43
219028	EDISON_134	9.3
219030	EDISON_212	9.3
219031	EDISON_234	9.73
219032	EDISON_312	9.98
219033	EDISON_334	9.46
217913	ESSEX_1012	9.31
217914	ESSEX_1034	9.31
217273	ESSEX_1112	11.06
217274	ESSEX_1134	10.09
218426	LINDEN_2ST	7.58

218423	LINDEN_G21	3.76
218424	LINDEN_G22	3.87
218418	LINDEN_G5	2.2
218419	LINDEN_G6	2.2
290745	S-061	0.57
219060	SEWAREN_1LD5	29.22
219064	SEWAREN_2LD2	33.15
219068	SEWAREN_3LD2	30.06
219071	SEWAREN_4LD1	34.84
218364	SEWAREN_G6	31.16
218344	TOSCO_G6	3.38
293093	U2-077	303.38
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.56
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
94150	VFT ENJECT	151.69
900801	W1-001	7.22
901802	W1-101 E	0.2
902251	W2-023	175.61
902652	W2-052 E	0.12
905642	W4-080 E	3.01
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	73.93
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.24
915261	Y3-046 2	1.24
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.29
915841	Y3-049 2	0.29
915851	Y3-049 3	0.29
915861	Y3-049 4	0.29
915871	Y3-049 5	0.29
915881	Y3-049 6	0.29

915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24
915921	Y3-052 C4	0.24
916141	Z1-058	8.85
916151	Z1-059 C	7.44
916152	Z1-059 E	2.07
916531	Z1-109	97.78
916581	Z1-116 C	176.28
916582	Z1-116 E	14.59
917011	Z2-002 C	23.14
917012	Z2-002 E	6.2
917521	Z2-089 C	143.01
917522	Z2-089 E	16.58

Attachment 3

Flowgate Appendices – Option 2

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

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

Appendix 1

(PSEG - PSEG) The FANWOOD_2-ROSELAND 230 kV line (from bus 219052 to bus 216950 ckt 1) loads from 82.19% to 104.51% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 209.97 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN -
SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.71
206638	28PEAPACK	-0.27
219029	EDISON_112	15.17
219028	EDISON_134	14.96
219030	EDISON_212	14.97
219031	EDISON_234	15.65
219032	EDISON_312	16.06
219033	EDISON_334	15.22
94130	O66_NONFIRM	40.63
219060	SEWAREN_1LD5	38.45
219064	SEWAREN_2LD2	43.62
219068	SEWAREN_3LD2	39.55
219071	SEWAREN_4LD1	45.84
218364	SEWAREN_G6	41.
292185	V1-030 E2	0.9
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.12
292189	V1-030 EA	0.4
292078	V1-034	0.35
297021	V2-009 E1	0.25
297023	V2-009 E2	0.5
297025	V2-009 E3	0.29
297027	V2-009 E4	0.33
293378	V3-024 E	0.5
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.45
902002	W1-121 E	0.3

902251	W2-023	231.04
902651	W2-052 C	< 0.01
902652	W2-052 E	0.18
905641	W4-080 C	0.17
905642	W4-080 E	4.59
909452	X2-088 E	0.24
909461	X2-089 C	0.02
909462	X2-089 E	0.66
910612	X3-029 E	-0.6
910762	X3-052 E	-0.35
915831	Y3-049 1	0.47
915841	Y3-049 2	0.47
915851	Y3-049 3	0.47
915861	Y3-049 4	0.47
915871	Y3-049 5	0.47
915881	Y3-049 6	0.47
916402	Z1-096 E	0.35
916581	Z1-116 C	268.65
916582	Z1-116 E	22.23
917511	Z2-089 C1	110.53
917513	Z2-089 C2	77.63
917512	Z2-089 E	21.81

Appendix 2

(PSEG - PSEG) The PRSNAVS_S-DEANS 230 kV line (from bus 218358 to bus 218306 ckt 1) loads from 81.72% to 104.64% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 215.6 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
217006	BERGEN_26A	2.6
219029	EDISON_112	13.71
219028	EDISON_134	13.51
219030	EDISON_212	13.5
219031	EDISON_234	14.12
219032	EDISON_312	14.5
219033	EDISON_334	13.74
217913	ESSEX_1012	9.08
217914	ESSEX_1034	9.08
217273	ESSEX_1112	10.79
217274	ESSEX_1134	9.84

217275	ESSEX_1212	9.11
217276	ESSEX_1234	9.1
217086	KRNY_G9	1.62
219060	SEWAREN_1LD5	39.48
219064	SEWAREN_2LD2	44.79
219068	SEWAREN_3LD2	40.61
219071	SEWAREN_4LD1	47.07
218364	SEWAREN_G6	42.09
293093	U2-077	127.09
292095	V1-030 E1	0.32
292185	V1-030 E2	0.82
292107	V1-030 E7	0.09
292111	V1-030 E9	0.12
292191	V1-030 EC	0.57
292092	V1-030 ED	0.45
297021	V2-009 E1	0.19
297023	V2-009 E2	0.38
297069	V2-025 E	0.52
293378	V3-024 E	0.39
293444	V3-065 E	0.05
293440	V3-066 E	0.03
293434	V3-067 E	0.08
293429	V3-068 E	0.04
292680	V3-069 C	0.02
292681	V3-069 E	0.49
94150	VFT ENJECT	63.54
900801	W1-001	3.03
901802	W1-101 E	0.15
902251	W2-023	237.23
902651	W2-052 C	< 0.01
902652	W2-052 E	0.2
905492	W4-059 E	0.05
905641	W4-080 C	0.2
905642	W4-080 E	5.26
907402	X1-072 E	0.1
909442	X2-087 E	0.11
909452	X2-088 E	0.18
909461	X2-089 C	0.02
909462	X2-089 E	0.74
910762	X3-052 E	0.36
913101	Y1-026	33.25
915201	Y3-044 1	0.15
915211	Y3-044 2	0.15
915221	Y3-044 3	0.15
915231	Y3-044 4	0.15

915761	Y3-045 1	0.2
915771	Y3-045 2	0.2
915781	Y3-045 3	0.2
915791	Y3-045 4	0.2
915251	Y3-046 1	0.67
915261	Y3-046 2	0.67
915801	Y3-047 C1	0.24
915811	Y3-047 C2	0.29
915821	Y3-047 C3	0.29
915831	Y3-049 1	0.43
915841	Y3-049 2	0.43
915851	Y3-049 3	0.42
915861	Y3-049 4	0.42
915871	Y3-049 5	0.42
915881	Y3-049 6	0.42
915341	Y3-050 C1	0.48
915351	Y3-050 C2	0.48
915361	Y3-050 C3	0.48
915371	Y3-050 C4	0.48
915381	Y3-050 C5	0.3
915391	Y3-050 C6	0.3
915891	Y3-052 C1	0.2
915901	Y3-052 C2	0.2
915911	Y3-052 C3	0.2
915921	Y3-052 C4	0.2
915931	Y3-052 C5	0.31
915941	Y3-052 C6	0.31
915421	Y3-053 C1	0.12
915511	Y3-053 C10	0.3
915431	Y3-053 C2	0.12
915441	Y3-053 C3	0.12
915451	Y3-053 C4	0.12
915461	Y3-053 C5	0.12
915471	Y3-053 C6	0.12
915481	Y3-053 C7	0.12
915491	Y3-053 C8	0.12
915501	Y3-053 C9	0.3
915721	Y3-107	5.57
916141	Z1-058	6.27
916151	Z1-059 C	4.02
916152	Z1-059 E	1.12
916531	Z1-109	42.71
916581	Z1-116 C	307.62
916582	Z1-116 E	25.46
917011	Z2-002 C	12.49

917012	Z2-002 E	3.35
917511	Z2-089 C1	113.49
917513	Z2-089 C2	79.71
917512	Z2-089 E	22.39

Appendix 3

(PSEG - PSEG) The DEANS-BRUNSWCK 230 kV line (from bus 218306 to bus 218304 ckt 1) loads from 95.31% to 105.37% (**DC power flow**) of its emergency rating (740 MVA) for the line fault with failed breaker contingency outage of 'BF_MET_3-P_LT'. This project contributes approximately 78.9 MW to the thermal violation.

```
CONTINGENCY 'BF_MET_3-P_LT'
  TRIP LINE FROM BUS 218469 TO BUS 218335 CKT 1                /*REMOVE P LINE
  DISCONNECT BRANCH FROM BUS 218315 TO BUS 218469 CKT 1        /*
METUCHENT 220-1 138/230KV TRANFORMER
  TRIP LINE FROM BUS 218315 TO BUS 218352 CKT 1                /*REMOVE R LINE
  DISCONNECT BUS 218367/* WOOD BRIDGE REMOVE P
  DISCONNECT BUS 218335                                  /* WOODBRIDGE P
  CLOSE LINE FROM BUS 218390 TO BUS 218391 CKT 1               /* LAFYATTE
  CLOSE LINE FROM BUS 218412 TO BUS 218413 CKT 1               /* WOODRBIDGE
138KV
  INCREASE BUS 218398 LOAD BY 4 MW                     /* TAKE ON LOAD AT
NEW DOVR
  INCREASE BUS 218399 LOAD BY 4 MW                     /* TAKE ON LOAD AT
NEW DOVR
  INCREASE BUS 218401 LOAD BY 2 MW                     /* TAKE ON LOAD AT PRS
NAVS
  INCREASE BUS 218402 LOAD BY 2 MW                     /* TAKE ON LOAD AT PRS
NAVS
  INCREASE BUS 218428 LOAD BY 2 MW                     /* TAKE ON LOAD AT PRS
NAVS
  INCREASE BUS 218429 LOAD BY 2 MW                     /* TAKE ON LOAD AT PRS
NAVS
  INCREASE BUS 218392 LOAD BY 4 MW                     /* TAKE ON LOAD AT MD
WRD
  INCREASE BUS 218393 LOAD BY 4 MW                     /* TAKE ON LOAD AT MD
WRD
  DECREASE BUS 218390 LOAD BY 12 MW                     /* PUSH OUT MVA LAF
AYET
  DECREASE BUS 218391 LOAD BY 12 MW                     /* PUSH OUT MVA LAF
AYET
  END
```

Bus Number	Bus Name	Full Contribution
219060	SEWAREN_1LD5	14.45
219064	SEWAREN_2LD2	16.39
219068	SEWAREN_3LD2	14.86
219071	SEWAREN_4LD1	17.22
218364	SEWAREN_G6	15.41
293093	U2-077	74.93
292095	V1-030 E1	0.18

292680	V3-069 C	< 0.01
292681	V3-069 E	0.17
94150	VFT ENJECT	37.47
900801	W1-001	1.78
902251	W2-023	86.82
902651	W2-052 C	< 0.01
902652	W2-052 E	0.07
905641	W4-080 C	0.07
905642	W4-080 E	1.8
909461	X2-089 C	< 0.01
909462	X2-089 E	0.25
913101	Y1-026	19.24
915251	Y3-046 1	0.37
915261	Y3-046 2	0.37
916151	Z1-059 C	2.22
916152	Z1-059 E	0.62
916531	Z1-109	24.9
916581	Z1-116 C	105.2
916582	Z1-116 E	8.71
917011	Z2-002 C	6.92
917012	Z2-002 E	1.85
917511	Z2-089 C1	41.53
917513	Z2-089 C2	29.17
917512	Z2-089 E	8.2

Appendix 4

(PSEG - PSEG) The ALDENE_6-SPRINGRD_2 230 kV line (from bus 218345 to bus 216911 ckt 1) loads from 93.75% to 105.79% (**DC power flow**) of its emergency rating (699 MVA) for the line fault with failed breaker contingency outage of 'BF_ALDE_2-8_LT'. This project contributes approximately 89.12 MW to the thermal violation.

CONTINGENCY 'BF_ALDE_2-8_LT'
DISCONNECT BUS 218307 /* ALDENE BUS SECTION 2
DISCONNECT BUS 218430 /* STANELTY TERRACE BUS SECTION 1
DISCONNECT BUS 219038 /* ALDENE BUS SECTION 8
DISCONNECT BUS 219053 /* WESTFIELD SECTION 2
CLOSE LINE FROM BUS 218415 TO BUS 218416 CKT 1 /* WESTFIELD
END

Bus Number	Bus Name	Full Contribution
218376	ALDENE_AB	16.25
219029	EDISON_112	5.5
219028	EDISON_134	5.42
219030	EDISON_212	5.43
219031	EDISON_234	5.67
219032	EDISON_312	5.82
219033	EDISON_334	5.52
218426	LINDEN_2ST	5.05
218423	LINDEN_G21	2.5
218424	LINDEN_G22	2.58
218418	LINDEN_G5	1.47
218419	LINDEN_G6	1.47
290745	S-061	0.4
219060	SEWAREN_1LD5	16.32
219064	SEWAREN_2LD2	18.52
219068	SEWAREN_3LD2	16.79
219071	SEWAREN_4LD1	19.46
218364	SEWAREN_G6	17.4
218344	TOSCO_G6	2.35
293093	U2-077	214.03
292094	V1-030 C1	0.01
292095	V1-030 E1	0.39
292185	V1-030 E2	0.33
292092	V1-030 ED	0.36
297027	V2-009 E4	0.12
297069	V2-025 E	0.42
293434	V3-067 E	0.07
293429	V3-068 E	0.04
292681	V3-069 E	0.17

94150	VFT ENJECT	107.01
900801	W1-001	5.1
901802	W1-101 E	0.12
902251	W2-023	98.07
902652	W2-052 E	0.06
905642	W4-080 E	1.53
907402	X1-072 E	0.07
909442	X2-087 E	0.09
909462	X2-089 E	0.2
913101	Y1-026	51.41
915761	Y3-045 1	0.14
915771	Y3-045 2	0.14
915781	Y3-045 3	0.14
915791	Y3-045 4	0.14
915251	Y3-046 1	0.83
915261	Y3-046 2	0.83
915831	Y3-049 1	0.17
915841	Y3-049 2	0.17
915851	Y3-049 3	0.17
915861	Y3-049 4	0.17
915871	Y3-049 5	0.17
915881	Y3-049 6	0.17
915891	Y3-052 C1	0.14
915901	Y3-052 C2	0.14
915911	Y3-052 C3	0.14
915921	Y3-052 C4	0.14
916141	Z1-058	5.41
916151	Z1-059 C	4.95
916152	Z1-059 E	1.38
916531	Z1-109	68.41
916581	Z1-116 C	89.25
916582	Z1-116 E	7.39
917011	Z2-002 C	15.41
917012	Z2-002 E	4.13
917511	Z2-089 C1	46.92
917513	Z2-089 C2	32.95
917512	Z2-089 E	9.26

Appendix 5

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 93.97% to 107.11% (**DC power flow**) of its normal rating (732 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
94150	VFT ENJECT	130.74
900801	W1-001	6.23
901801	W1-101 C	< 0.01
902251	W2-023	118.11

905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01
912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916531	Z1-109	83.59
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917511	Z2-089 C1	56.5
917513	Z2-089 C2	39.68

Appendix 6

(PSEG - PSEG) The LINDEN-TOSCO_3 230 kV line (from bus 218300 to bus 219046 ckt 1) loads from 95.34% to 107.34% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.76 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
217918	BERGEN_14	1.04
217118	BERGEN_1ST	1.88
217065	ECRR_1	0.35
217323	ECRR_2	0.35
219029	EDISON_112	9.17
219028	EDISON_134	9.04
219030	EDISON_212	9.05
219031	EDISON_234	9.47
219032	EDISON_312	9.71
219033	EDISON_334	9.2
217913	ESSEX_1012	7.12
217914	ESSEX_1034	7.12
217273	ESSEX_1112	8.46
217274	ESSEX_1134	7.72
217112	HUDSN_G2	6.41
218435	LINDEN_1GT	2.48
218426	LINDEN_2ST	6.6
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.77
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.38
218418	LINDEN_G5	1.92
218419	LINDEN_G6	1.92
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
219060	SEWAREN_1LD5	26.51

219064	SEWAREN_2LD2	30.08
219068	SEWAREN_3LD2	27.28
219071	SEWAREN_4LD1	31.61
218364	SEWAREN_G6	28.27
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	159.33
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.35
916151	Z1-059 C	6.48
916581	Z1-116 C	163.02
917011	Z2-002 C	20.17
917511	Z2-089 C1	76.22
917513	Z2-089 C2	53.54

Appendix 7

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 101.36% to 113.33% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.38 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.12
219028	EDISON_134	9.
219030	EDISON_212	9.
219031	EDISON_234	9.42
219032	EDISON_312	9.66
219033	EDISON_334	9.15
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.4
217274	ESSEX_1134	7.66
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.59
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.37
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.43
219064	SEWAREN_2LD2	29.99
219068	SEWAREN_3LD2	27.2
219071	SEWAREN_4LD1	31.52

218364	SEWAREN_G6	28.19
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	158.86
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.87
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.32
916151	Z1-059 C	6.47
916581	Z1-116 C	162.48
917011	Z2-002 C	20.12
917511	Z2-089 C1	76.
917513	Z2-089 C2	53.38

Appendix 8

(PSEG - PSEG) The NEWDOVR_H-FANWOOD_1 230 kV line (from bus 218355 to bus 218320 ckt 1) loads from 91.58% to 114.56% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

CONTINGENCY 'L_R-2218' /* LINDEN TO SEWARREN
DISCONNECT BUS 218353 /* MINUE R
END

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
909461	X2-089 C	0.02
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.18
917511	Z2-089 C1	117.45
917513	Z2-089 C2	82.49

Appendix 9

(PSEG - PSEG) The METUCHEN-PRSNAVS_S 230 kV line (from bus 218469 to bus 218358 ckt 1) loads from 94.01% to 116.93% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 215.6 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
217006	BERGEN_26A	2.6
219029	EDISON_112	13.71
219028	EDISON_134	13.51
219030	EDISON_212	13.5
219031	EDISON_234	14.12
219032	EDISON_312	14.5
219033	EDISON_334	13.74
217913	ESSEX_1012	9.08
217914	ESSEX_1034	9.08
217273	ESSEX_1112	10.79
217274	ESSEX_1134	9.84

217275	ESSEX_1212	9.11
217276	ESSEX_1234	9.1
217086	KRNY_G9	1.62
219060	SEWAREN_1LD5	39.48
219064	SEWAREN_2LD2	44.79
219068	SEWAREN_3LD2	40.61
219071	SEWAREN_4LD1	47.07
218364	SEWAREN_G6	42.09
293093	U2-077	127.1
292095	V1-030 E1	0.32
292185	V1-030 E2	0.82
292107	V1-030 E7	0.09
292111	V1-030 E9	0.12
292191	V1-030 EC	0.57
292092	V1-030 ED	0.45
297021	V2-009 E1	0.19
297023	V2-009 E2	0.38
297069	V2-025 E	0.52
293378	V3-024 E	0.39
293444	V3-065 E	0.05
293440	V3-066 E	0.03
293434	V3-067 E	0.08
293429	V3-068 E	0.04
292680	V3-069 C	0.02
292681	V3-069 E	0.49
94150	VFT ENJECT	63.55
900801	W1-001	3.03
901802	W1-101 E	0.15
902251	W2-023	237.23
902651	W2-052 C	< 0.01
902652	W2-052 E	0.2
905492	W4-059 E	0.05
905641	W4-080 C	0.2
905642	W4-080 E	5.26
907402	X1-072 E	0.1
909442	X2-087 E	0.11
909452	X2-088 E	0.18
910762	X3-052 E	0.36
913101	Y1-026	33.25
915201	Y3-044 1	0.15
915211	Y3-044 2	0.15
915221	Y3-044 3	0.15
915231	Y3-044 4	0.15
915761	Y3-045 1	0.2
915771	Y3-045 2	0.2

915781	Y3-045 3	0.2
915791	Y3-045 4	0.2
915251	Y3-046 1	0.67
915261	Y3-046 2	0.67
915801	Y3-047 C1	0.24
915811	Y3-047 C2	0.29
915821	Y3-047 C3	0.29
915831	Y3-049 1	0.43
915841	Y3-049 2	0.43
915851	Y3-049 3	0.42
915861	Y3-049 4	0.42
915871	Y3-049 5	0.42
915881	Y3-049 6	0.42
915341	Y3-050 C1	0.48
915351	Y3-050 C2	0.48
915361	Y3-050 C3	0.48
915371	Y3-050 C4	0.48
915381	Y3-050 C5	0.3
915391	Y3-050 C6	0.3
915891	Y3-052 C1	0.2
915901	Y3-052 C2	0.2
915911	Y3-052 C3	0.2
915921	Y3-052 C4	0.2
915931	Y3-052 C5	0.31
915941	Y3-052 C6	0.31
915421	Y3-053 C1	0.12
915511	Y3-053 C10	0.3
915431	Y3-053 C2	0.12
915441	Y3-053 C3	0.12
915451	Y3-053 C4	0.12
915461	Y3-053 C5	0.12
915471	Y3-053 C6	0.12
915481	Y3-053 C7	0.12
915491	Y3-053 C8	0.12
915501	Y3-053 C9	0.3
915721	Y3-107	5.57
916141	Z1-058	6.27
916151	Z1-059 C	4.02
916152	Z1-059 E	1.12
916531	Z1-109	42.71
916581	Z1-116 C	307.62
916582	Z1-116 E	25.46
917011	Z2-002 C	12.49
917012	Z2-002 E	3.35
917511	Z2-089 C1	113.49

917513	Z2-089 C2	79.71
917512	Z2-089 E	22.39

Appendix 10

(PSEG - PSEG) The PRSNAVS_H-NEWDOVR_H 230 kV line (from bus 218357 to bus 218355 ckt 1) loads from 96.05% to 119.03% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

```
CONTINGENCY 'L_R-2218'                    /* LINDEN TO SEWARREN
  DISCONNECT BUS 218353                   /* MINUE R
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
909461	X2-089 C	0.02
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.18
917511	Z2-089 C1	117.45
917513	Z2-089 C2	82.49

Appendix 11

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 109.45% to 121.42% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 129.38 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.12
219028	EDISON_134	9.
219030	EDISON_212	9.
219031	EDISON_234	9.42
219032	EDISON_312	9.66
219033	EDISON_334	9.15
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.4
217274	ESSEX_1134	7.66
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.59
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.91
218423	LINDEN_G21	3.27
218424	LINDEN_G22	3.37
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.43
219064	SEWAREN_2LD2	29.99
219068	SEWAREN_3LD2	27.2
219071	SEWAREN_4LD1	31.52

218364	SEWAREN_G6	28.19
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
901801	W1-101 C	< 0.01
902251	W2-023	158.86
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.11
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.87
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.32
916151	Z1-059 C	6.47
916531	Z1-109	87.42
916581	Z1-116 C	162.48
917011	Z2-002 C	20.12
917511	Z2-089 C1	76.
917513	Z2-089 C2	53.38

Appendix 12

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 107.12% to 121.61% (**DC power flow**) of its emergency rating (887 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 128.44 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.04
219028	EDISON_134	8.91
219030	EDISON_212	8.92
219031	EDISON_234	9.32
219032	EDISON_312	9.57
219033	EDISON_334	9.07
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.41
217274	ESSEX_1134	7.67
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.58
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.9
218423	LINDEN_G21	3.26
218424	LINDEN_G22	3.36
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.24
219064	SEWAREN_2LD2	29.78
219068	SEWAREN_3LD2	27.
219071	SEWAREN_4LD1	31.29

218364	SEWAREN_G6	27.98
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
94150	VFT ENJECT	136.1
900801	W1-001	6.48
901801	W1-101 C	< 0.01
902251	W2-023	157.71
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.1
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.78
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.31
916151	Z1-059 C	6.46
916531	Z1-109	87.31
916581	Z1-116 C	160.9
917011	Z2-002 C	20.09
917511	Z2-089 C1	75.45
917513	Z2-089 C2	52.99

Appendix 13

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 108.87% to 123.29% (**DC power flow**) of its normal rating (667 MVA) for non-contingency condition. This project contributes approximately 96.19 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.39
217183	BAYONNE_CTG2	0.39
217184	BAYONNE_CTG3	0.39
217185	BAYONNE_STG4	0.6
217913	ESSEX_1012	7.26
217914	ESSEX_1034	7.26
217273	ESSEX_1112	8.64
217274	ESSEX_1134	7.88
217112	HUDSN_G2	6.25
218435	LINDEN_1GT	2.39
218426	LINDEN_2ST	6.17
218318	LINDEN_AB	0.48
218436	LINDEN_G11	3.64
218425	LINDEN_G12	1.85
218423	LINDEN_G21	3.06
218424	LINDEN_G22	3.16
218418	LINDEN_G5	1.79
218419	LINDEN_G6	1.79
219036	LINDEN_G7	1.03
219035	LINDEN_G8	0.98
290745	S-061	0.48
219060	SEWAREN_1LD5	19.65
219064	SEWAREN_2LD2	22.3
219068	SEWAREN_3LD2	20.22
219071	SEWAREN_4LD1	23.43
218364	SEWAREN_G6	20.96
218344	TOSCO_G6	2.87
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
94150	VFT ENJECT	130.74
900801	W1-001	6.23
901801	W1-101 C	< 0.01
902251	W2-023	118.11

905291	W4-038 OP1	0.26
909441	X2-087 C	< 0.01
912111	X4-016	0.11
913101	Y1-026	62.83
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.01
915261	Y3-046 2	1.01
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.1
916151	Z1-059 C	6.06
916531	Z1-109	83.59
916581	Z1-116 C	106.39
917011	Z2-002 C	18.85
917511	Z2-089 C1	56.5
917513	Z2-089 C2	39.68

Appendix 14

(PSEG - PSEG) The METUCHEN-PRSNAVS_H 230 kV line (from bus 218469 to bus 218357 ckt 1) loads from 102.32% to 125.3% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'L_R-2218'. This project contributes approximately 199.94 MW to the thermal violation.

```
CONTINGENCY 'L_R-2218'                    /* LINDEN TO SEWARREN
  DISCONNECT BUS 218353                   /* MINUE R
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	15.78
219028	EDISON_134	15.56
219030	EDISON_212	15.57
219031	EDISON_234	16.28
219032	EDISON_312	16.71
219033	EDISON_334	15.83
219060	SEWAREN_1LD5	40.85
219064	SEWAREN_2LD2	46.35
219068	SEWAREN_3LD2	42.03
219071	SEWAREN_4LD1	48.71
218364	SEWAREN_G6	43.56
292096	V1-030 C2	0.04
292078	V1-034	0.26
292680	V3-069 C	0.02
902251	W2-023	245.51
902651	W2-052 C	< 0.01
905641	W4-080 C	0.19
915831	Y3-049 1	0.49
915841	Y3-049 2	0.49
915851	Y3-049 3	0.49
915861	Y3-049 4	0.49
915871	Y3-049 5	0.49
915881	Y3-049 6	0.49
916581	Z1-116 C	285.19
917511	Z2-089 C1	117.45
917513	Z2-089 C2	82.49

Appendix 15

(PSEG - PSEG) The NEWDOVR_H-FANWOOD_1 230 kV line (from bus 218355 to bus 218320 ckt 1) loads from 101.77% to 126.05% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.2
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.52
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
909461	X2-089 C	0.02
909462	X2-089 E	0.71
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917511	Z2-089 C1	117.93
917513	Z2-089 C2	82.83
917512	Z2-089 E	23.27

Appendix 16

(PSEG - PSEG) The SEWAREN-MINUEST_R 230 kV line (from bus 218311 to bus 218353 ckt 1) loads from 99.91% to 129.7% (**DC power flow**) of its normal rating (688 MVA) for non-contingency condition. This project contributes approximately 204.96 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	12.17
219028	EDISON_134	12.
219030	EDISON_212	12.
219031	EDISON_234	12.55
219032	EDISON_312	12.88
219033	EDISON_334	12.21
219060	SEWAREN_1LD5	41.88
219064	SEWAREN_2LD2	47.52
219068	SEWAREN_3LD2	43.09
219071	SEWAREN_4LD1	49.93
218364	SEWAREN_G6	44.66
292096	V1-030 C2	0.03
292078	V1-034	0.36
292680	V3-069 C	0.02
902251	W2-023	251.68
902651	W2-052 C	< 0.01
905641	W4-080 C	0.15
909461	X2-089 C	0.01
915831	Y3-049 1	0.38
915841	Y3-049 2	0.38
915851	Y3-049 3	0.38
915861	Y3-049 4	0.38
915871	Y3-049 5	0.38
915881	Y3-049 6	0.38
916581	Z1-116 C	227.52
917511	Z2-089 C1	120.4
917513	Z2-089 C2	84.56

Appendix 17

(PSEG - PSEG) The PRSNAVS_H-NEWDOVR_H 230 kV line (from bus 218357 to bus 218355 ckt 1) loads from 106.23% to 130.51% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.2
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.52
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
909461	X2-089 C	0.02
909462	X2-089 E	0.71
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917511	Z2-089 C1	117.93
917513	Z2-089 C2	82.83
917512	Z2-089 E	23.27

Appendix 18

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 120.41% to 136.06% (**DC power flow**) of its emergency rating (821 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 128.44 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
217136	BAYONNE_CTG1	0.4
217183	BAYONNE_CTG2	0.4
217184	BAYONNE_CTG3	0.4
217185	BAYONNE_STG4	0.61
219029	EDISON_112	9.04
219028	EDISON_134	8.91
219030	EDISON_212	8.92
219031	EDISON_234	9.32
219032	EDISON_312	9.57
219033	EDISON_334	9.07
217913	ESSEX_1012	7.07
217914	ESSEX_1034	7.07
217273	ESSEX_1112	8.41
217274	ESSEX_1134	7.67
217112	HUDSN_G2	6.38
218435	LINDEN_1GT	2.47
218426	LINDEN_2ST	6.58
218318	LINDEN_AB	0.49
218436	LINDEN_G11	3.75
218425	LINDEN_G12	1.9
218423	LINDEN_G21	3.26
218424	LINDEN_G22	3.36
218418	LINDEN_G5	1.91
218419	LINDEN_G6	1.91
219036	LINDEN_G7	1.06
219035	LINDEN_G8	1.01
290745	S-061	0.51
219060	SEWAREN_1LD5	26.24
219064	SEWAREN_2LD2	29.78
219068	SEWAREN_3LD2	27.
219071	SEWAREN_4LD1	31.29

218364	SEWAREN_G6	27.98
218344	TOSCO_G6	3.01
292094	V1-030 C1	0.02
292091	V1-030 CD	0.02
297068	V2-025 C	0.02
293433	V3-067 C	< 0.01
293428	V3-068 C	< 0.01
292680	V3-069 C	0.01
94150	VFT ENJECT	136.1
900801	W1-001	6.48
901801	W1-101 C	< 0.01
902251	W2-023	157.71
902651	W2-052 C	< 0.01
905291	W4-038 OP1	0.27
905641	W4-080 C	0.1
909441	X2-087 C	< 0.01
912111	X4-016	0.12
913101	Y1-026	65.78
915761	Y3-045 1	0.19
915771	Y3-045 2	0.19
915781	Y3-045 3	0.19
915791	Y3-045 4	0.19
915251	Y3-046 1	1.08
915261	Y3-046 2	1.08
915811	Y3-047 C2	0.23
915821	Y3-047 C3	0.23
915831	Y3-049 1	0.28
915841	Y3-049 2	0.28
915851	Y3-049 3	0.28
915861	Y3-049 4	0.28
915871	Y3-049 5	0.28
915881	Y3-049 6	0.28
915891	Y3-052 C1	0.19
915901	Y3-052 C2	0.19
915911	Y3-052 C3	0.19
915921	Y3-052 C4	0.19
916141	Z1-058	7.31
916151	Z1-059 C	6.46
916531	Z1-109	87.31
916581	Z1-116 C	160.9
917011	Z2-002 C	20.09
917511	Z2-089 C1	75.45
917513	Z2-089 C2	52.99

Appendix 19

(PSEG - PSEG) The METUCHEN-PRSNAVS_H 230 kV line (from bus 218469 to bus 218357 ckt 1) loads from 112.41% to 136.69% (**DC power flow**) of its emergency rating (870 MVA) for the tower line contingency outage of 'G2207+R2218'. This project contributes approximately 224.04 MW to the thermal violation.

```
CONTINGENCY 'G2207+R2218'                    /* LINDEN - DEAN & LINDEN - SEWARREN
  DISCONNECT BUS 218354                      /* MINUE STREET G
  DISCONNECT BUS 218353                      /* MINUE R
  DISCONNECT BUS 218396                      /* MINUE STREET LOAD LOSS
  DISCONNECT BUS 218397                      /* MINUE STREET LOAD LOSS
  END
```

Bus Number	Bus Name	Full Contribution
206679	28M&M S721	-0.67
206638	28PEAPACK	-0.27
219029	EDISON_112	16.08
219028	EDISON_134	15.85
219030	EDISON_212	15.86
219031	EDISON_234	16.59
219032	EDISON_312	17.02
219033	EDISON_334	16.13
94130	O66_NONFIRM	37.46
219060	SEWAREN_1LD5	41.02
219064	SEWAREN_2LD2	46.54
219068	SEWAREN_3LD2	42.21
219071	SEWAREN_4LD1	48.91
218364	SEWAREN_G6	43.74
292185	V1-030 E2	0.96
292101	V1-030 E4	0.07
292103	V1-030 E5	0.16
292107	V1-030 E7	0.13
292189	V1-030 EA	0.41
292078	V1-034	0.32
297021	V2-009 E1	0.26
297023	V2-009 E2	0.52
297025	V2-009 E3	0.3
297027	V2-009 E4	0.35
293378	V3-024 E	0.53
292666	V3-058 E	0.16
292668	V3-059 E	0.16
292680	V3-069 C	0.02
292681	V3-069 E	0.48
902002	W1-121 E	0.3

902251	W2-023	246.53
902651	W2-052 C	< 0.01
902652	W2-052 E	0.19
905641	W4-080 C	0.19
905642	W4-080 E	4.9
909452	X2-088 E	0.25
910612	X3-029 E	-0.57
910762	X3-052 E	-0.32
915831	Y3-049 1	0.5
915841	Y3-049 2	0.5
915851	Y3-049 3	0.5
915861	Y3-049 4	0.5
915871	Y3-049 5	0.5
915881	Y3-049 6	0.5
916402	Z1-096 E	0.35
916581	Z1-116 C	286.56
916582	Z1-116 E	23.72
917511	Z2-089 C1	117.94
917513	Z2-089 C2	82.83
917512	Z2-089 E	23.27

Appendix 20

(PSEG - PSEG) The MINUEST_R-LINDEN 230 kV line (from bus 218353 to bus 218300 ckt 1) loads from 108.79% to 138.57% (**DC power flow**) of its emergency rating (887 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 264.1 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	17.8
219028	EDISON_134	17.56
219030	EDISON_212	17.57
219031	EDISON_234	18.37
219032	EDISON_312	18.85
219033	EDISON_334	17.86
219060	SEWAREN_1LD5	53.96
219064	SEWAREN_2LD2	61.23
219068	SEWAREN_3LD2	55.52
219071	SEWAREN_4LD1	64.34
218364	SEWAREN_G6	57.54
292096	V1-030 C2	0.04
292078	V1-034	0.42
292680	V3-069 C	0.03
902251	W2-023	324.29
902651	W2-052 C	< 0.01
905641	W4-080 C	0.21
915831	Y3-049 1	0.55
915841	Y3-049 2	0.55
915851	Y3-049 3	0.55
915861	Y3-049 4	0.55
915871	Y3-049 5	0.55
915881	Y3-049 6	0.55
916581	Z1-116 C	327.39
917511	Z2-089 C1	155.14
917513	Z2-089 C2	108.96

Appendix 21

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 133.03% to 150.0% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 159.59 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1        /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1        /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1        /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1        /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.43
219028	EDISON_134	9.3
219030	EDISON_212	9.3
219031	EDISON_234	9.73
219032	EDISON_312	9.98
219033	EDISON_334	9.46
217913	ESSEX_1012	9.31
217914	ESSEX_1034	9.31
217273	ESSEX_1112	11.06
217274	ESSEX_1134	10.09
218426	LINDEN_2ST	7.58

218423	LINDEN_G21	3.76
218424	LINDEN_G22	3.87
218418	LINDEN_G5	2.2
218419	LINDEN_G6	2.2
290745	S-061	0.57
219060	SEWAREN_1LD5	29.22
219064	SEWAREN_2LD2	33.15
219068	SEWAREN_3LD2	30.06
219071	SEWAREN_4LD1	34.84
218364	SEWAREN_G6	31.16
218344	TOSCO_G6	3.38
293093	U2-077	303.38
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.56
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
94150	VFT ENJECT	151.69
900801	W1-001	7.22
901802	W1-101 E	0.2
902251	W2-023	175.61
902652	W2-052 E	0.12
905642	W4-080 E	3.01
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	73.93
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.24
915261	Y3-046 2	1.24
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.29
915841	Y3-049 2	0.29
915851	Y3-049 3	0.29
915861	Y3-049 4	0.29
915871	Y3-049 5	0.29
915881	Y3-049 6	0.29

915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24
915921	Y3-052 C4	0.24
916141	Z1-058	8.85
916151	Z1-059 C	7.44
916152	Z1-059 E	2.07
916531	Z1-109	97.78
916581	Z1-116 C	176.28
916582	Z1-116 E	14.59
917011	Z2-002 C	23.14
917012	Z2-002 E	6.2
917511	Z2-089 C1	84.01
917513	Z2-089 C2	59.
917512	Z2-089 E	16.58

Appendix 22

(PSEG - PSEG) The SEWAREN-MINUEST_R 230 kV line (from bus 218311 to bus 218353 ckt 1) loads from 119.62% to 151.4% (**DC power flow**) of its emergency rating (831 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 264.1 MW to the thermal violation.

```
CONTINGENCY 'L_H-2286'                    /* FANWOOD TO METUCHEN
  DISCONNECT BUS 218355                   /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                   /* REMOVE PIERSON H
  DISCONNECT BUS 218320                   /* REMOVE FANWOOD SECTION
1
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	17.8
219028	EDISON_134	17.56
219030	EDISON_212	17.57
219031	EDISON_234	18.37
219032	EDISON_312	18.85
219033	EDISON_334	17.86
219060	SEWAREN_1LD5	53.96
219064	SEWAREN_2LD2	61.23
219068	SEWAREN_3LD2	55.52
219071	SEWAREN_4LD1	64.34
218364	SEWAREN_G6	57.54
292096	V1-030 C2	0.04
292078	V1-034	0.42
292680	V3-069 C	0.03
902251	W2-023	324.29
902651	W2-052 C	< 0.01
905641	W4-080 C	0.21
915831	Y3-049 1	0.55
915841	Y3-049 2	0.55
915851	Y3-049 3	0.55
915861	Y3-049 4	0.55
915871	Y3-049 5	0.55
915881	Y3-049 6	0.55
916581	Z1-116 C	327.39
917511	Z2-089 C1	155.14
917513	Z2-089 C2	108.96

Appendix 23

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 149.38% to 167.71% (**DC power flow**) of its emergency rating (821 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 159.59 MW to the thermal violation.

```
CONTINGENCY 'G2207+H2286_LT'                    /*FANWOOD-METUCHEN &
LINDEN-DEANS
  DISCONNECT BUS 218354                         /* MINUE STREET G
  DISCONNECT BUS 218355                         /* NEW DOVER REMOVE H
  DISCONNECT BUS 218357                         /* REMOVE PIERSON H
  DISCONNECT BUS 218320                         /* REMOVE FANWOOD SECTION
1
  CLOSE LINE FROM BUS 218401 TO BUS 218402 CKT 1          /* PIERSON AVE
  CLOSE LINE FROM BUS 218428 TO BUS 218429 CKT 1          /* PIERSON AVE
  CLOSE LINE FROM BUS 218398 TO BUS 218399 CKT 1          /* NEW DOVER
  CLOSE LINE FROM BUS 218380 TO BUS 218381 CKT 1          /* FANWOOD
  CLOSE LINE FROM BUS 218396 TO BUS 218397 CKT 1          /* MINUE STREET
  INCREASE BUS 218410 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218411 LOAD BY 4 MW              /* TAKE ON LOAD AT
WARI NICO
  INCREASE BUS 218412 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218413 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  INCREASE BUS 218414 LOAD BY 8 MW              /* TAKE ON LOAD AT
WDB RDG
  DECREASE BUS 218396 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  DECREASE BUS 218397 LOAD BY 16 MW             /* PUSH OUT MVA MIN
UEST
  END
```

Bus Number	Bus Name	Full Contribution
219029	EDISON_112	9.43
219028	EDISON_134	9.3
219030	EDISON_212	9.3
219031	EDISON_234	9.73
219032	EDISON_312	9.98
219033	EDISON_334	9.46
217913	ESSEX_1012	9.31
217914	ESSEX_1034	9.31
217273	ESSEX_1112	11.06
217274	ESSEX_1134	10.09
218426	LINDEN_2ST	7.58

218423	LINDEN_G21	3.76
218424	LINDEN_G22	3.87
218418	LINDEN_G5	2.2
218419	LINDEN_G6	2.2
290745	S-061	0.57
219060	SEWAREN_1LD5	29.22
219064	SEWAREN_2LD2	33.15
219068	SEWAREN_3LD2	30.06
219071	SEWAREN_4LD1	34.84
218364	SEWAREN_G6	31.16
218344	TOSCO_G6	3.38
293093	U2-077	303.38
292094	V1-030 C1	0.02
292095	V1-030 E1	0.59
292185	V1-030 E2	0.56
292092	V1-030 ED	0.61
297069	V2-025 E	0.71
293444	V3-065 E	0.05
293434	V3-067 E	0.11
293429	V3-068 E	0.06
292681	V3-069 E	0.32
94150	VFT ENJECT	151.69
900801	W1-001	7.22
901802	W1-101 E	0.2
902251	W2-023	175.61
902652	W2-052 E	0.12
905642	W4-080 E	3.01
907402	X1-072 E	0.12
909442	X2-087 E	0.16
909462	X2-089 E	0.42
913101	Y1-026	73.93
915761	Y3-045 1	0.24
915771	Y3-045 2	0.24
915781	Y3-045 3	0.24
915791	Y3-045 4	0.24
915251	Y3-046 1	1.24
915261	Y3-046 2	1.24
915811	Y3-047 C2	0.3
915821	Y3-047 C3	0.3
915831	Y3-049 1	0.29
915841	Y3-049 2	0.29
915851	Y3-049 3	0.29
915861	Y3-049 4	0.29
915871	Y3-049 5	0.29
915881	Y3-049 6	0.29

915891	Y3-052 C1	0.24
915901	Y3-052 C2	0.24
915911	Y3-052 C3	0.24
915921	Y3-052 C4	0.24
916141	Z1-058	8.85
916151	Z1-059 C	7.44
916152	Z1-059 E	2.07
916531	Z1-109	97.78
916581	Z1-116 C	176.28
916582	Z1-116 E	14.59
917011	Z2-002 C	23.14
917012	Z2-002 E	6.2
917511	Z2-089 C1	84.01
917513	Z2-089 C2	59.
917512	Z2-089 E	16.58