

***Generation Interconnection
Feasibility Study Report***

For

***PJM Generation Interconnection Request
Queue Position Z1-059***

Linden 2 – 230 kV

February 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 an uprate to the Linden generating facility located at Union, New Jersey. The installed facilities will have a total capability of 23 MW with 18 MW of this output being recognized by PJM as capacity. The proposed in-service date for this project is March 1, 2014. **This study does not imply a Public Service Electric & Gas commitment to this in-service date.**

Point of Interconnection

Z1-059 will retain its existing interconnect with the PSE&G transmission system.

Cost Summary

The Z1-059 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$ 0
Direct Connection Network Upgrades	\$ 0
Non Direct Connection Network Upgrades	\$ 0
Total Costs	\$ 0

In addition, the Z1-059 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	\$ 58,200,000

Description	Total Cost
Previously Identified Upgrades	\$ 551,600,000
Total Costs	\$ 609,800,000

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

Attachment Facilities

The existing attachment facilities are adequate for this update.

Interconnection Customer Requirements

None.

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>

Network Impacts

The Queue Project #Z1-059 was studied as a 23.0MW (Capacity 18.0MW) injection at Linden 230 kV substation in the PSEG area. Project #Z1-059 was evaluated for compliance with reliability criteria for summer peak conditions in 2017. Potential network impacts were as follows:

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Description
36PS	CONTINGENCY '36PS' /* DEANS-WESTFIELD 230KV & FANWOOD-METUCHEN 230KV DCTL DISCONNECT BRANCH FROM BUS 218306 TO BUS 218356 CKT 1/* Deans- Newdov DISCONNECT BRANCH FROM BUS 218356 TO BUS 218305 CKT 1/* Newdov- Westfield DISCONNECT BRANCH FROM BUS 218320 TO BUS 218355 CKT 1/*Fanwood- Newdov DISCONNECT BRANCH FROM BUS 218355 TO BUS 218357 CKT 1/*Newdov- PRNS Ave DISCONNECT BRANCH FROM BUS 218357 TO BUS 218469 CKT 1/* PRNS Ave-Metuch MOVE 100 PERCENT LOAD FROM BUS 218381 TO BUS 218380 /* FANWOOD T1 T2 MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG T1 T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG T1 KILMER T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG T1 NEWDVR T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG T1 LAFAYET T2 MOVE 100 PERCENT LOAD FROM BUS 218415 TO BUS 218416 /* WESTFIELD T1 T2 END

Contingency Name	Description
PS_GO	CONTINGENCY 'PS_GO' /*DEANS-LINDENG_ WOODBRIDGE TO SEWAREN O DISCONNECT BRANCH FROM BUS 218354 TO BUS 218306 CKT 2 /* PRSN AVG DEANS 230 230 DISCONNECT BRANCH FROM BUS 218354 TO BUS 218300 CKT 1 /* MINUESTG LINDEN 230 230 DISCONNECT BRANCH FROM BUS 218357 TO BUS 218355 CKT 1 /*PRSB AVG NEW DOVER 230 230 DISCONNECT BRANCH FROM BUS 218355 TO BUS 218320 CKT 1 /* NEW DOVER FANWOOD 230 230 DISCONNECT BRANCH FROM BUS 218320 TO BUS 216950 CKT 1 /* FANWOOD ROSELAND 230 230 MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG T1 T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG T1 KILMER T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG T1 NEWDVR T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG T1 LAFAYET T2 MOVE 52 PERCENT LOAD FROM BUS 218396 TO BUS 218397 /* MINUESTR T2 T1 MOVE 24 PERCENT LOAD FROM BUS 218396 TO BUS 218410 /* MINUESTR T2 WARINAN T1 MOVE 24 PERCENT LOAD FROM BUS 218396 TO BUS 218414 /* MINUESTR T2 WDBRDG T1 END
PS51B	CONTINGENCY 'PS51B' /* METUCHEN - FANWOOD 230 (NEW O-1315) DISCONNECT BRANCH FROM BUS 218469 TO BUS 218357 CKT 1 /* METUCHEN PRSN AVG 230 230 DISCONNECT BRANCH FROM BUS 218357 TO BUS 218355 CKT 1 /* PRSN AVG NEW DOVER 230 230 DISCONNECT BRANCH FROM BUS 218355 TO BUS 218320 CKT 1 /* NEW DOVER FANWOOD 230 230 MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG T1 T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG T1 KILMER T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG T1 NEWDVR T2 MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG T1 LAFAYET T2 END
PS8C	CONTINGENCY 'PS8C' DISCONNECT BRANCH FROM BUS 218343 TO BUS 218441 CKT 1 /* TOSCO G22 230 230 END

Generator Deliverability

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

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
1	N-1	PS8C	PSEG - PSEG	PRSN AVG-NEWDOVRO 230 kV line	218357	218355	1	DC	99.88	100.4 2	ER	870	4.7

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.)

None.

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None.

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

None.

Contribution to Previously Identified Overloads

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

#	Contingency		Affected Area	Facility Description	Bus		Circuit	Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To			Initial	Final	Type	MVA	
2	DCTL	36PS	PSEG - PSEG	SPRINGRD-W.ORANGE 230 kV line	216911	216914	1	DC	100	101	ER	789	7.88

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA	
3	Non	Non	PSEG - PSEG	G22_MTX5-WARINANC 230 kV line	218441	218316	1	DC	109.5	110.6 4	NR	667	7.6
4	N-1	PS51B	PSEG - PSEG	G22_MTX5-WARINANC 230 kV line	218441	218316	1	DC	113.9	114.9 4	ER	821	8.51
5	DCTL	36PS	PSEG - PSEG	ALDENE2-SPRINGRD 230 kV line	218345	216911	1	DC	108.8 9	109.8 8	ER	789	7.88
6	DCTL	36PS	PSEG - PSEG	WARINANC-ALDENE1 230 kV line	218316	217122	1	DC	148.1 7	149.3 2	ER	887	10.18
7	DCTL	PS_GO	PSEG - PSEG	G22_MTX5-WARINANC 230 kV line	218441	218316	1	DC	164.6 7	166.2 4	ER	821	13.02

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	PRSN AVG-NEWDOVRO 230 kV line	Re-conductor PRSN AVG – New Dover 230 kV overhead line. Estimated Cost: \$58.2M; Estimated Time: 42 months	Pending	\$ 58,200,000
Total New Network Upgrades				\$ 58,200,000

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
#2, 5	SPRINGRD-W.ORANGE 230 kV line	Build new Aldene – West Orange 230 kV cable. Estimated Cost: \$449.5M; Estimated Time: 48 months	Pending	\$ 449,500,000
#3, 4, 7	G22_MTX5-WARINANC 230 kV line	Re-conductor Warinanco – VFT (U-2273) 230 kV overhead line. Estimated Cost: \$36.4M; Estimated Time: 38 months	Pending	\$ 36,400,000
#6	WARINANC-ALDENE1 230 kV line	Re-conductor Aldene – Warinanco (N-2240) 230 kV overhead line. Estimated Cost: \$65.7M; Estimated Time: 42 months	Pending	\$ 65,700,000
Total New Network Upgrades				\$ 551,600,000

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

#	Contingency		Affected Area	Facility Description	Bus			Power Flow	Loading %		Rating		MW Contribution
	Type	Name			From	To	Circuit		Initial	Final	Type	MVA	
8	Non	Non	PSEG - PSEG	LINDEN-TOSCO 230 kV line	218300	218343	1	DC	107.7 3	108.7 7	NR	936	9.72
9	Non	Non	PSEG - PSEG	TOSCO-G22_MTX5 230 kV line	218343	218441	1	DC	114.8 8	115.9 1	NR	936	9.71
10	Non	Non	PSEG - PSEG	SPRINGRD-W.ORANGE 230 kV line	216911	216914	1	DC	125.5 7	126.8	NR	512	6.3
11	Non	Non	PSEG - PSEG	WARINANC-ALDENE1 230 kV line	218316	217122	1	DC	138.8	140.1 3	NR	732	9.71
12	Non	Non	PSEG - PSEG	ALDENE2-SPRINGRD 230 kV line	218345	216911	1	DC	139.2 6	140.4 9	NR	512	6.3
13	Non	Non	PSEG - PSEG	G22_MTX5-WARINANC 230 kV line	218441	218316	1	DC	157.8 9	159.3 5	NR	667	9.71

Attachment 1

System Configuration

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 PRSN AVG-NEWDVRO 230 kV line (from bus 218357 to bus 218355 ckt 1) loads from 99.88% to 100.42% (**DC power flow**) of its emergency rating (870 MVA) for the single line contingency outage of 'PS8C'. This project contributes approximately 4.7 MW to the thermal violation.

CONTINGENCY 'PS8C'

DISCONNECT BRANCH FROM BUS 218343 TO BUS 218441 CKT 1
G22 230 230
END

/* TOSCO

Bus Number	Bus Name	Full Contribution
218326	EDISON 1	39.05
218327	EDISON 2	39.04
218328	EDISON 3	39.05
218423	LINDNCT1	1.52
218424	LINDNCT2	1.52
218425	LINDNCT3	1.52
218426	LINDNST1	2.98
290745	S-061	0.2
218360	SEWAREN1	36.22
218361	SEWAREN2	41.09
218362	SEWAREN3	37.26
218363	SEWAREN4	43.18
218364	SEWAREN6	38.62
218344	TOSCONUG	1.16
292094	V1-030 C1	< 0.01
292096	V1-030 C2	0.02
292078	V1-034	0.39
292680	V3-069 C	0.01
902251	W2-023	217.66
902651	W2-052 C	< 0.01
905641	W4-080 C	0.11
909461	X2-089 C	0.01
913101	Y1-026	40.77
915251	Y3-049 1	0.04
915253	Y3-049 3	0.04
915271	Y3-051 C	1.57
915272	Y3-051 E1	19.85
916251	Z1-033	53.31
916191	Z1-059 C	4.7

Appendix 2

(PSEG - PSEG) The SPRINGRD-W.ORANGE 230 kV line (from bus 216911 to bus 216914 ckt 1) loads from 100% to 101% (**DC power flow**) of its emergency rating (789 MVA) for the tower line contingency outage of '36PS'. This project contributes approximately 7.88 MW to the thermal violation.

CONTINGENCY '36PS'

/* DEANS-WESTFIELD 230KV & FANWOOD-METUCHEN 230KV DCTL

DISCONNECT BRANCH FROM BUS 218306 TO BUS 218356 CKT 1/* Deans-Newdov

DISCONNECT BRANCH FROM BUS 218356 TO BUS 218305 CKT 1/* Newdov-Westfield

DISCONNECT BRANCH FROM BUS 218320 TO BUS 218355 CKT 1/*Fanwood-Newdov

DISCONNECT BRANCH FROM BUS 218355 TO BUS 218357 CKT 1/*Newdov-PRNS Ave

DISCONNECT BRANCH FROM BUS 218357 TO BUS 218469 CKT 1/* PRNS Ave-Metuch

MOVE 100 PERCENT LOAD FROM BUS 218381 TO BUS 218380

/* FANWOOD T1 T2

MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG

T1 T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG

T1 KILMER T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG

T1 NEWDVR T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG

T1 LAFAYET T2

MOVE 100 PERCENT LOAD FROM BUS 218415 TO BUS 218416

/* WESTFIELD T1 T2

END

Bus Number	Bus Name	Full Contribution
218307	ALDENE	0.02
218376	ALDENEAB	13.88
218326	EDISON 1	21.04
218327	EDISON 2	21.04
218328	EDISON 3	21.04
218423	LINDNCT1	2.00
218424	LINDNCT2	2.00
218425	LINDNCT3	2.00
218426	LINDNST1	3.91
206679	M&M S721	-0.61
94130	O66_NONFIRM	42.50
206638	PEAPACK	-0.24
290745	S-061	0.28
218360	SEWAREN1	21.63
218361	SEWAREN2	24.55
218362	SEWAREN3	22.26
218363	SEWAREN4	25.79

218364	SEWAREN6	23.07
218344	TOSCONUG	1.7
293093	U2-077	235.97
292094	V1-030 C1	0.01
292095	V1-030 E1	0.49
292185	V1-030 E2	0.48
292101	V1-030 E4	0.04
292103	V1-030 E5	0.10
292107	V1-030 E7	0.07
292189	V1-030 EA	0.36
292078	V1-034	0.36
297021	V2-009 E1	0.14
297023	V2-009 E2	0.28
297025	V2-009 E3	0.22
297027	V2-009 E4	0.19
293378	V3-024 E	0.56
292666	V3-058 E	0.13
292668	V3-059 E	0.13
292681	V3-069 E	0.24
900801	W1-001	5.62
902251	W2-023	130.01
902652	W2-052 E	0.09
905642	W4-080 E	2.29
909452	X2-088 E	0.13
910612	X3-029 E	-0.51
910712	X3-052 E	-0.31
912221	X4-044 C	5.1
912222	X4-044 E	4.12
913101	Y1-026	58.6
915271	Y3-051 C	2.05
915272	Y3-051 E1	26.03
916251	Z1-033	9.38
916191	Z1-059 C	6.16
916192	Z1-059 E	1.71

Appendix 3

(PSEG - PSEG) The G22_MTX5-WARINANC 230 kV line (from bus 218441 to bus 218316 ckt 1) loads from 109.5% to 110.64% (**DC power flow**) of its normal rating (667 MVA) for non-contingency condition. This project contributes approximately 7.6 MW to the thermal violation.

Bus Number	Bus Name	Full Contribution
218326	EDISON 1	18.84
218327	EDISON 2	18.84
218328	EDISON 3	18.84

218423	LINDNCT1	2.46
218424	LINDNCT2	2.46
218425	LINDNCT3	2.46
218426	LINDNST1	4.82
290745	S-061	0.36
218360	SEWAREN1	23.86
218361	SEWAREN2	27.07
218362	SEWAREN3	24.54
218363	SEWAREN4	28.44
218364	SEWAREN6	25.44
218344	TOSCONUG	2.12
292094	V1-030 C1	0.01
292096	V1-030 C2	0.01
292078	V1-034	0.23
292680	V3-069 C	< 0.01
900801	W1-001	7.19
902251	W2-023	143.36
902651	W2-052 C	< 0.01
905641	W4-080 C	0.05
909461	X2-089 C	< 0.01
913101	Y1-026	74.36
915251	Y3-049 1	0.02
915253	Y3-049 3	0.02
915271	Y3-051 C	2.53
915272	Y3-051 E1	32.08
916251	Z1-033	31.81
916191	Z1-059 C	7.6

Appendix 4

(PSEG - PSEG) The G22_MTX5-WARINANC 230 kV line (from bus 218441 to bus 218316 ckt 1) loads from 113.9% to 114.94% (**DC power flow**) of its emergency rating (821 MVA) for the single line contingency outage of 'PS51B'. This project contributes approximately 8.51 MW to the thermal violation.

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CONTINGENCY 'PS51B'                                /* METUCHEN - FANWOOD 230
(NEW O-1315)
  DISCONNECT BRANCH FROM BUS 218469 TO BUS 218357 CKT 1      /*
METUCHEN PRSN AVG 230 230
  DISCONNECT BRANCH FROM BUS 218357 TO BUS 218355 CKT 1      /* PRSN AVG
NEW DOVER 230 230
  DISCONNECT BRANCH FROM BUS 218355 TO BUS 218320 CKT 1      /* NEW
DOVER FANWOOD 230 230
  MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402          /* PRSN AVG
T1 T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384          /* PRSN AVG
T1 KILMER T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399          /* PRSN AVG
T1 NEWDVR T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390          /* PRSN AVG
T1 LAFAYET T2
END
  
```

Bus Number	Bus Name	Full Contribution
218326	EDISON 1	30.48
218327	EDISON 2	30.48
218328	EDISON 3	30.48
218423	LINDNCT1	2.76
218424	LINDNCT2	2.76
218425	LINDNCT3	2.76
218426	LINDNST1	5.4
290745	S-061	0.39
218360	SEWAREN1	34.07
218361	SEWAREN2	38.65
218362	SEWAREN3	35.05
218363	SEWAREN4	40.62
218364	SEWAREN6	36.33
218344	TOSCONUG	2.33
292094	V1-030 C1	0.02
292096	V1-030 C2	0.02
292078	V1-034	0.35
292680	V3-069 C	0.01
900801	W1-001	7.83
902251	W2-023	204.73

902651	W2-052 C	< 0.01
905641	W4-080 C	0.08
913101	Y1-026	81.48
915251	Y3-049 1	0.03
915253	Y3-049 3	0.03
915271	Y3-051 C	2.84
915272	Y3-051 E1	35.93
916251	Z1-033	47.15
916191	Z1-059 C	8.51

Appendix 5

(PSEG - PSEG) The ALDENE2-SPRINGRD 230 kV line (from bus 218345 to bus 216911 ckt 1) loads from 108.89% to 109.88% (**DC power flow**) of its emergency rating (789 MVA) for the tower line contingency outage of '36PS'. This project contributes approximately 7.88 MW to the thermal violation.

CONTINGENCY '36PS'

/* DEANS-WESTFIELD 230KV & FANWOOD-METUCHEN 230KV DCTL

DISCONNECT BRANCH FROM BUS 218306 TO BUS 218356 CKT 1/* Deans-Newdov

DISCONNECT BRANCH FROM BUS 218356 TO BUS 218305 CKT 1/* Newdov-Westfield

DISCONNECT BRANCH FROM BUS 218320 TO BUS 218355 CKT 1/*Fanwood-Newdov

DISCONNECT BRANCH FROM BUS 218355 TO BUS 218357 CKT 1/*Newdov-PRNS Ave

DISCONNECT BRANCH FROM BUS 218357 TO BUS 218469 CKT 1/* PRNS Ave-Metuch

MOVE 100 PERCENT LOAD FROM BUS 218381 TO BUS 218380

/* FANWOOD T1 T2

MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG

T1 T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG

T1 KILMER T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG

T1 NEWDVR T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG

T1 LAFAYET T2

MOVE 100 PERCENT LOAD FROM BUS 218415 TO BUS 218416

/* WESTFIELD T1 T2

END

Bus Number	Bus Name	Full Contribution
218307	ALDENE	0.02
218376	ALDENEAB	13.88
218326	EDISON 1	21.04
218327	EDISON 2	21.04
218328	EDISON 3	21.04
218423	LINDNCT1	2.00
218424	LINDNCT2	2.00
218425	LINDNCT3	2.00
218426	LINDNST1	3.91
206679	M&M S721	-0.61
94130	O66_NONFIRM	42.50
206638	PEAPACK	-0.24
290745	S-061	0.28
218360	SEWAREN1	21.63
218361	SEWAREN2	24.55
218362	SEWAREN3	22.26
218363	SEWAREN4	25.79

218364	SEWAREN6	23.07
218344	TOSCONUG	1.7
293093	U2-077	235.97
292094	V1-030 C1	0.01
292095	V1-030 E1	0.49
292185	V1-030 E2	0.48
292101	V1-030 E4	0.04
292103	V1-030 E5	0.10
292107	V1-030 E7	0.07
292189	V1-030 EA	0.36
292078	V1-034	0.36
297021	V2-009 E1	0.14
297023	V2-009 E2	0.28
297025	V2-009 E3	0.22
297027	V2-009 E4	0.19
293378	V3-024 E	0.56
292666	V3-058 E	0.13
292668	V3-059 E	0.13
292681	V3-069 E	0.24
900801	W1-001	5.62
902251	W2-023	130.01
902652	W2-052 E	0.09
905642	W4-080 E	2.29
909452	X2-088 E	0.13
910612	X3-029 E	-0.51
910712	X3-052 E	-0.31
912221	X4-044 C	5.1
912222	X4-044 E	4.12
913101	Y1-026	58.6
915271	Y3-051 C	2.05
915272	Y3-051 E1	26.03
916251	Z1-033	9.38
916191	Z1-059 C	6.16
916192	Z1-059 E	1.71

Appendix 6

(PSEG - PSEG) The WARINANC-ALDENE1 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 148.17% to 149.32% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of '36PS'. This project contributes approximately 10.18 MW to the thermal violation.

CONTINGENCY '36PS'

/* DEANS-WESTFIELD 230KV & FANWOOD-METUCHEN 230KV DCTL

DISCONNECT BRANCH FROM BUS 218306 TO BUS 218356 CKT 1/* Deans-Newdov

DISCONNECT BRANCH FROM BUS 218356 TO BUS 218305 CKT 1/* Newdov-Westfield
DISCONNECT BRANCH FROM BUS 218320 TO BUS 218355 CKT 1/*Fanwood-Newdov
DISCONNECT BRANCH FROM BUS 218355 TO BUS 218357 CKT 1/*Newdov-PRNS Ave
DISCONNECT BRANCH FROM BUS 218357 TO BUS 218469 CKT 1/* PRNS Ave-Metuch
MOVE 100 PERCENT LOAD FROM BUS 218381 TO BUS 218380

/* FANWOOD T1 T2

MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402 /* PRSN AVG
T1 T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384 /* PRSN AVG
T1 KILMER T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399 /* PRSN AVG
T1 NEWDVR T2

MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390 /* PRSN AVG
T1 LAFAYET T2

MOVE 100 PERCENT LOAD FROM BUS 218415 TO BUS 218416

/* WESTFIELD T1 T2

END

Bus Number	Bus Name	Full Contribution
218326	EDISON 1	32.1
218327	EDISON 2	32.1
218328	EDISON 3	32.1
218423	LINDNCT1	2.58
218424	LINDNCT2	2.58
218425	LINDNCT3	2.58
218426	LINDNST1	5.06
206679	M&M S721	-0.89
94130	O66_NONFIRM	53.43
206638	PEAPACK	-0.35
290745	S-061	0.37
218360	SEWAREN1	33.23
218361	SEWAREN2	37.7
218362	SEWAREN3	34.19
218363	SEWAREN4	39.62
218364	SEWAREN6	35.44
218344	TOSCONUG	2.16
293093	U2-077	304.91
292094	V1-030 C1	0.01
292095	V1-030 E1	0.63
292185	V1-030 E2	0.73
292101	V1-030 E4	0.06
292103	V1-030 E5	0.15
292107	V1-030 E7	0.1
292189	V1-030 EA	0.52
292078	V1-034	0.45
297021	V2-009 E1	0.21

297023	V2-009 E2	0.42
297025	V2-009 E3	0.33
297027	V2-009 E4	0.28
293378	V3-024 E	0.85
292666	V3-058 E	0.2
292668	V3-059 E	0.2
292681	V3-069 E	0.37
900801	W1-001	7.26
902002	W1-121 E	0.29
902251	W2-023	199.71
902652	W2-052 E	0.13
905642	W4-080 E	3.53
909452	X2-088 E	0.2
909462	X2-089 E	0.49
910612	X3-029 E	-0.76
910712	X3-052 E	-0.45
913101	Y1-026	75.73
915271	Y3-051 C	2.66
915272	Y3-051 E1	33.65
916251	Z1-033	62.05
916191	Z1-059 C	7.97
916192	Z1-059 E	2.21

Appendix 7

(PSEG - PSEG) The G22_MTX5-WARINANC 230 kV line (from bus 218441 to bus 218316 ckt 1) loads from 164.67% to 166.24% (**DC power flow**) of its emergency rating (821 MVA) for the tower line contingency outage of 'PS_GO'. This project contributes approximately 13.02 MW to the thermal violation.

```

CONTINGENCY 'PS_GO'                                /*DEANS-LINDENG_
WOODBIDGE TO SEWAREN O
  DISCONNECT BRANCH FROM BUS 218354 TO BUS 218306 CKT 2    /* PRSN AVG
DEANS 230 230
  DISCONNECT BRANCH FROM BUS 218354 TO BUS 218300 CKT 1    /*
MINUESTG LINDEN 230 230
  DISCONNECT BRANCH FROM BUS 218357 TO BUS 218355 CKT 1    /*PRSB AVG
NEW DOVER 230 230
  DISCONNECT BRANCH FROM BUS 218355 TO BUS 218320 CKT 1    /* NEW
DOVER FANWOOD 230 230
  DISCONNECT BRANCH FROM BUS 218320 TO BUS 216950 CKT 1    /* FANWOOD
ROSELAND 230 230
  MOVE 49 PERCENT LOAD FROM BUS 218401 TO BUS 218402        /* PRSN AVG
T1 T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218384        /* PRSN AVG
T1 KILMER T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218399        /* PRSN AVG
T1 NEWDVR T2
  MOVE 17 PERCENT LOAD FROM BUS 218401 TO BUS 218390        /* PRSN AVG
T1 LAFAYET T2
  MOVE 52 PERCENT LOAD FROM BUS 218396 TO BUS 218397        /* MINUESTR
T2 T1
  MOVE 24 PERCENT LOAD FROM BUS 218396 TO BUS 218410        /* MINUESTR
T2 WARINAN T1
  MOVE 24 PERCENT LOAD FROM BUS 218396 TO BUS 218414        /* MINUESTR
T2 WDBRDG T1
END
  
```

Bus Number	Bus Name	Full Contribution
218326	EDISON 1	32.66
218327	EDISON 2	32.64
218328	EDISON 3	32.66
218423	LINDNCT1	3.3
218424	LINDNCT2	3.3
218425	LINDNCT3	3.3
218426	LINDNST1	6.46
206679	M&M S721	-0.55
94130	O66_NONFIRM	32.5
206638	PEAPACK	-0.22
290745	S-061	0.46

218360	SEWAREN1	39.35
218361	SEWAREN2	44.64
218362	SEWAREN3	40.48
218363	SEWAREN4	46.91
218364	SEWAREN6	41.96
218344	TOSCONUG	2.73
293093	U2-077	382.28
292094	V1-030 C1	0.02
292095	V1-030 E1	0.81
292185	V1-030 E2	0.75
292101	V1-030 E4	0.05
292107	V1-030 E7	0.1
292189	V1-030 EA	0.31
292078	V1-034	0.28
297021	V2-009 E1	0.2
297023	V2-009 E2	0.41
297025	V2-009 E3	0.23
293378	V3-024 E	0.82
292666	V3-058 E	0.12
292668	V3-059 E	0.12
292681	V3-069 E	0.43
900801	W1-001	9.1
902251	W2-023	236.46
902652	W2-052 E	0.15
905642	W4-080 E	4.03
909452	X2-088 E	0.19
909462	X2-089 E	0.56
910712	X3-052 E	-0.28
913101	Y1-026	95.4
915271	Y3-051 C	3.4
915272	Y3-051 E1	43.03
916251	Z1-033	37.75
916191	Z1-059 C	10.19
916192	Z1-059 E	2.83