Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position Z2-002

Linden 230 kV

August 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 existing generating facility located in Linden, New Jersey. This request will uprate the Linden facility by 71 MW (56 MWC). After the uprate, the installed facility will have a total capability of 1570 MW with 1566.2 MW being recognized by PJM as capacity. The proposed in-service date for this project is March 1, 2015. **This study does not imply a PSE&G commitment to this in-service date.**

Point of Interconnection

Z2-002 is already connected to the PSE&G transmission system at the Linden 230 kV substation.

Cost Summary

The Z2-002 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 Z2-002 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 7,600,000

Description	Total Cost
Previously Identified Upgrades	$ 102,100,000
Total Costs	**$ 109,700,000**

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

Attachment Facilities

This uprate is being achieved through thermal upgrades on the hot gas path side of Linden 2 and administrative corrections for Linden 5 & 6. The existing attachment facilities are adequate for this uprate.

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 Z2-002 was studied as a 71.0 MW (Capacity 56.0 MW) injection at the Linden 230 kV substation in the PSEG area. Project Z2-002 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project Z2-002 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
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
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

Generator Deliverability

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

#	Contingency Type	Contingency Name	Affected Area	Facility Description	Bus From	Bus To	Cir.	Power Flow	Loading % Initial	Loading % Final	Rating Type	Rating MVA	MW Contribution	Ref
1	N-1	L_H-2286	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	99.5	101.36	ER	1081	20.12	2

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
2	DCTL	G2207+H2 286_LT	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	97.4	100.12	ER	1081	29.5	3

Short Circuit

(Summary of impacted circuit breakers)

New circuit breakers found to be over-duty:

None.

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

None.

Contribution to Previously Identified Overloads

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

#	Contingency 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
3	Non	Non	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	100.9	102.92	NR	936	18.85	1
4	N-1	L_H-2286	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	107.59	109.45	ER	1081	20.12	4
5	N-1	L_H-2286	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	104.86	107.12	ER	887	20.09	5
6	DCTL	G2207+H2 286_LT	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	106.48	109.21	ER	1081	29.5	6
7	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	112.42	115.24	NR	667	18.85	7
8	N-1	L_H-2286	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	117.97	120.41	ER	821	20.09	8
9	DCTL	G2207+H2 286_LT	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	138.72	142.03	ER	887	29.34	9
10	DCTL	G2207+H2 286_LT	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	155.52	159.1	ER	821	29.34	10

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, 2, 3, 4, 6	TOSCO_2-Z1-109 TAP 230 kV line	Re-conductor Tosco – VFT (S-2270) 230 kV overhead cable. Estimated Cost: $7.6M; Estimated Time: 48 months	Pending	**$ 7,600,000**
			Total New Network Upgrades	**$ 7,600,000**

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
#5, 9	WARINICO_2-ALDENE_5 230 kV line	Re-conductor Aldene - Warinanco (N-2240) 230 kV overhead cable. Estimated Cost: $65.7M; Estimated Time: 48 months	Pending	**$ 65,700,000**
#7, 8, 10	VFT 1-WARINICO_1 230 kV line	Re-conductor Warinanco – VFT (U-2273) 230 kV overhead cable. Estimated Cost: $36.4M; Estimated Time: 48 months	Pending	**$ 36,400,000**
			Total New Network Upgrades	**$ 102,100,000**

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	Facility Description	Bus	Cir.	Power	Loading %	Rating	MW

	Type	Name	Area		From	To		Flow	Initial	Final	Type	MVA	Contribution
11	Non	Non	PSEG - PSEG	TOSCO_2-Z1-109 TAP 230 kV line	218343	916530	1	DC	90.75	93.31	NR	936	23.9
12	Non	Non	PSEG - PSEG	Z1-109 TAP-VFT 2 230 kV line	916530	218441	1	DC	99.68	102.24	NR	936	23.9
13	N-1	L_G-2285/* ALDENE TO SPRINGFIELD ROAD	PSEG - PSEG	MCARTER-WORANGE 230 kV line	217170	216914	1	DC	101.72	104.4	ER	550	14.75
14	N-1	L_N-2292_LT	PSEG - PSEG	ALDENE_2-STANTER_1 230 kV line	218307	218430	1	DC	104.05	106.88	ER	558	15.8
15	N-1	L_N-2292_LT	PSEG - PSEG	STANTER_2-MCARTER 230 kV line	217101	217170	1	DC	105.57	108.43	ER	550	15.8
16	Non	Non	PSEG - PSEG	WARINICO_2-ALDENE_5 230 kV line	218316	217122	1	DC	131.37	134.63	NR	732	23.9
17	Non	Non	PSEG - PSEG	VFT 1-WARINICO_1 230 kV line	219050	219049	1	DC	149.91	153.49	NR	667	23.9

Attachment 1

System Configuration

Attachment 2

Flowgate Appendices

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to 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 Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 100.9% to 102.92% (**DC power flow**) of its normal rating (936 MVA) for non-contingency condition. This project contributes approximately 18.85 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

Appendix 2

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 99.5% to 101.36% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 20.12 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

Appendix 3

(PSEG - PSEG) The TOSCO_2-Z1-109 TAP 230 kV line (from bus 218343 to bus 916530 ckt 1) loads from 97.4% to 100.12% (**DC power flow**) of its emergency rating (1081 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 29.5 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

Appendix 4

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 107.59% to 109.45% (**DC power flow**) of its emergency rating (1081 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 20.12 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

Appendix 5

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 104.86% to 107.12% (**DC power flow**) of its emergency rating (887 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 20.09 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

Appendix 6

(PSEG - PSEG) The Z1-109 TAP-VFT 2 230 kV line (from bus 916530 to bus 218441 ckt 1) loads from 106.48% to 109.21% (**DC power flow**) of its emergency rating (1081 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 29.5 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

Appendix 7

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 112.42% to 115.24% (**DC power flow**) of its normal rating (667 MVA) for non-contingency condition. This project contributes approximately 18.85 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

Appendix 8

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 117.97% to 120.41% (**DC power flow**) of its emergency rating (821 MVA) for the single line contingency outage of 'L_H-2286'. This project contributes approximately 20.09 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

Appendix 9

(PSEG - PSEG) The WARINICO_2-ALDENE_5 230 kV line (from bus 218316 to bus 217122 ckt 1) loads from 138.72% to 142.03% (**DC power flow**) of its emergency rating (887 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 29.34 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

Appendix 10

(PSEG - PSEG) The VFT 1-WARINICO_1 230 kV line (from bus 219050 to bus 219049 ckt 1) loads from 155.52% to 159.1% (**DC power flow**) of its emergency rating (821 MVA) for the tower line contingency outage of 'G2207+H2286_LT'. This project contributes approximately 29.34 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

