Revised Generation Interconnection

Impact Study Report

for

Queue Project AE2-222

HIGBEE 69 KV

84.3 MW Capacity / 300.0 MW Energy

February, 2020

Rev 1: May 2021

Rev 2: April 2022

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1 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, 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 System Impact Study is performed.

The System Impact 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.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2 Revision History

The AE2-222 System Impact Study was revised in May 2021 to correct the scope and cost estimate for PJM Network Upgrade Number n6559 (Build a second Conastone – Peach Bottom 500 kV line). The upgrade was identified as a required System Reinforcement in the Light Load Analysis section of this report. Only the PECO portion of the cost estimate was included in the original report from February 2020. The correction includes estimates for both the PECO and BGE sections of the new line. See Section 22 for “Light Load System Reinforcements” for the updated scope and cost for PJM Network Upgrade n6559.

The report was further updated in April 2022 to reflect the results of PJM’s retool analysis.

3 General

Ocean Wind LLC, the Interconnection Customer (IC), has proposed a 300.0 MW Energy (843 MW Capacity) offshore wind generating facility to be located at Latitude: 39.0951370, Longitude: -74.3529178 in the Atlantic Ocean off the coast of Atlantic County, New Jersey. The planned in-service date, as requested by the IC is November 23, 2022. This date is dependent on completion of PJM studies and the Transmission Owner's construction schedule for network upgrades.

Queue Number	**AE2-222**
Project Name	HIGBEE 69 KV
Interconnection Customer	Ocean Wind LLC
State	New Jersey
County	Atlantic
Transmission Owner	AEC
MFO	300
MWE	300
MWC	84.3
Fuel	Offshore Wind
Basecase Study Year	2022

3.1 Point of Interconnection

The Point of Interconnection (POI) will be located at a customer owned breaker located within 500ft of ACE's 69kV Higbee Substation where it will interconnect to an existing 69 kV bus position (see the single line diagram).

3.2 Cost Summary

The AE2-222 project will be responsible for the following costs associated with the physical interconnection of the project:

Description	Total Cost
Attachment Facilities	$0
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$900,000
Total Costs	**$900,000**

In addition, the AE2-222 project may be responsible for a contribution to the following costs associated with network upgrades:

Description	Total Cost
System Upgrades (Summer Peak and Light Load)	**$272,732,609**

4 Transmission Owner Scope of Work

Attachment Facilities

Construct an attachment line from the Higbee Substation to the Point of Interconnection.

The estimated cost for the attachment facilities work is given below.

Direct Connection Network Upgrades

None

The estimated cost for the Direct Connection Network upgrade work is given below.

Non-Direct Connection Network Upgrades

Substation Interconnection Scope:

At Higbee Substation, establish a 69 kV terminal at the open position for Interconnecting Customer. The existing 69kv circuit breaker is identified as A 69 BKR.

Estimate: $900,000
Construction Time: 24-36 months

Major Equipment Included in Estimate:

- 69kv CVT Alstom Model OTCF-072.SR Qty. 3
- 69kV CVT Stand Qty. 3
- Digital Type Relays Schweitzer (SEL 451) (SEL 311c) Qty. 1
- Pair Test Switches Qty. 1
- 2- 2” PVC schedule 40 Qty. 2
- Relay Panel, Transmission Bus, FL/BU Qty. 1
- Relay Panel, Transmission Line, FL/BU Qty. 2
- Insulators, 69 kV Qty. 3
- Control Panel, 69 kV Circuit Breaker (10”) Qty. 1
- 69kV Underground Riser Qty. 1
- 69 kV Lightning Arresters Qty. 3
- 69 kV Lightning Arresters Stands Qty. 3
- SCADA Communications Panel Qty: 1

Estimate Assumptions:

- Space available in Control Enclosure for New Relay Panel.
- Developer to purchase required land and is available for use.
- No new land will need to be purchased.
- Site clearing and grading performed by Developer.
- Existing AC and DC system is adequate.
- Grounding, environmental and soil studies not included.
- Fiber to point of interconnection is not included in this study
- Fiber optic cable necessary is 1,000 linear feet.

The estimated cost for the non-Direct Connection Network upgrade work is given below.

5 Attachment Facilities Cost Estimate

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Construct an attachment line from the Higbee Substation to the Point of Interconnection.	Included in Non-Direct costs
Total Attachment Facility Costs	**$0**

6 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Total Direct Connection Facility Costs	**$0**

7 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
At Higbee Substation, establish a 69 kV terminal at the open position for Interconnecting Customer. The existing 69kv circuit breaker is identified as A 69 BKR.	$900,000
Total Non-Direct Connection Facility Costs	**$900,000**

Atlantic City Electric Costs

Cost estimates will further be refined as a part of the Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by ACE in connection with the AE2-222 project.

ACE reserves the right to reassess issues presented in this document and, upon appropriate justification, submit additional costs related to the AE2-222 project.

8 Schedule

ACE will require 24-36 months to establish a 69 kV terminal at the Higbee Substation.

9 Transmission Owner Analysis

PHI Standards

"Pepco Holdings, Inc. (PHI) Power Delivery Technical Considerations Covering Parallel Operations of Customer Owned Generation Interconnected with the PHI Power Delivery System", dated October 13, 2016.

"Operations and Modifications Requirements of Atlantic City Electric Company, Delmarva Power & Light Company, Potomac Electric Power Company (Pepco) – Companies of Pepco Holdings, Inc.", dated October 10, 2011.

Special Operating Requirements

1. ACE will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by ACE.

2. ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by ACE.

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.IV of Schedule H to the Interconnection Service Agreement.

10 Interconnection Customer Requirements

The IC is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report, and is the responsibility of the IC. Protective relaying and metering design and installation must comply with ACE's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

ACE requires that an IC circuit breaker is located within 500 feet of the ACE substation to facilitate the relay protection scheme between ACE and the IC at the Point of Interconnection (POI).

Additional Interconnection Customer Responsibilities:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.IV of Schedule H to the Interconnection Service Agreement.

Special Operating Requirements

4. ACE will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by ACE.

5. ACE reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by ACE.

11 Revenue Metering and SCADA Requirements

11.1 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 Section 8 of Attachment O.

11.2 AEC Requirements

Metering

A three phase 69 kV revenue metering point will need to be established within the Interconnection Customer Facilities at the Point of Interconnection. The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per the ACE's specifications. The secondary wiring connections at instrument transformers will be completed by the Interconnection Customer and inspected by ACE, while the connections at the metering enclosure will be completed by ACE. The metering control cable and meter cabinets will be supplied by ACE and installed by the Interconnection Customer. The Interconnection Customer will install conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined during construction. The Interconnection Customer will provide 120V power to the meter cabinet. ACE will provide, program, install, and own the primary & backup solid state multi-function meters for the new metering position.
Each meter will be equipped with load profile, telemetry, and DNP outputs. The Interconnection Customer will be provided with one-meter DNP output for each meter. ACE will supply a wireless modem for MV90 interrogation. In the event that a wireless modem is unable to reliably communicate, the IC will be required to make provisions for a POTS (Plain Old Telephone Service) line or equivalent technology approved by ACE within approximately three feet of the ACE metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and ACE require directly to PJM. The Interconnection Customer will grant permission for PJM to send ACE the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

ACE's revenue meters will be the official meters and must be the source for reporting generation output to PJM. The Interconnection Customer is responsible for installing telemetry equipment necessary to obtain the revenue meter data and submitting the data to PJM.

Required Relaying and Communications

New protection relays are required for the new terminals.

Front line and back-up line protection will be required. One relay panel for each generator terminal will be required for front line and back-up protection.

A breaker control relay on a breaker control panel will be required for the control and operation of each new 69 kV circuit breaker (1 total).

The project will require re-wiring and adjustment of existing relay schemes to accommodate the new 69 kV substation position.

12 Summer Peak Analysis

The Queue Project AE2-222 was evaluated as a 300.0 MW (Capacity 84.3 MW) injection at the Higbee 69 kV Substation in the AEC area. Project AE2-222 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-222 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

12.1 Generation Deliverability

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

None

12.2 Multiple Facility Contingency

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

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
1	DCTL	JC-P7-1-JCC-230-13	AE - PSEG	CARDIFF-NEWFRDM 230 kV line	227900	219100	1	AC	98.82	114.06	ER	692	102.65	1
2	LFFB	AE_P4-2 AE7	AE - AE	CARDIFF-CEDAR 230 kV line	227900	227955	1	AC	95.28	103.35	ER	805	66.08	2
3	LFFB	AE_P4-2 AE6	AE - AE	CARDIFF-CEDAR 230 kV line	227900	227955	1	AC	95.26	103.34	ER	805	66.11	

12.3 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)

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
4	LFFB	AE_P4-2 AE7	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	113.89	128.51	ER	564	85.65	3
5	LFFB	AE_P4-2 AE6	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	113.88	128.5	ER	564	85.67	

12.4 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.

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
6	N-1	JC-P1-2-JCC-230-017	JCPL - JCPL	28LARRABEE-28SMITHBRG 230 kV line	206294	206309	2	AC	77.96	82.32	ER	813	27.52	
7	N-1	JC-P1-2-JCC-230-022	JCPL - JCPL	28OYSTER C-28MANITOU 230 kV line	206302	206297	1	AC	118.7	125.33	ER	817	57.1	
8	Non	Non	JCPL - JCPL	28OYSTER C-28MANITOU 230 kV line	206302	206297	1	AC	79.11	83.57	NR	650	30.82	
9	N-1	JC-P1-2-JCC-230-021	JCPL - JCPL	28OYSTER C-28MANITOU 230 kV line	206302	206297	2	AC	111.61	117.85	ER	869	57.11	
10	N-1	PJM_P1_68	JCPL - PSEG	28WINDSOR-CLRKSVLL_1 230 kV line	206316	219752	1	AC	91.73	93.76	ER	813	19.67	
11	N-1	JC-P1-2-JCC-230-013	JCPL - JCPL	28LAKEWOOD-28LARRABEE 230 kV line	206323	206294	1	AC	87.21	91.12	ER	869	44.38	
12	N-1	JC-P1-2-JCC-230-014	JCPL - JCPL	28LAKEWOOD-28LARRABEE 230 kV line	206323	206294	2	AC	91.79	95.91	ER	817	44.38	
13	N-1	PJM_P1_68	JCPL - JCPL	28E WINDSR-28WINDSOR 230 kV line	206326	206316	1	AC	99.54	101.42	ER	869	19.53	
14	Non	Non	PECO - PECO	RICHMOND-WANEETA3 230 kV line	213922	214012	1	AC	90.91	96.61	NR	760	50.47	
15	N-1	PECO_P1-2_5014/* $ CHESCO $ PECO_P1-2_5014 $ L	PSEG - PSEG	NEWFRDM-HILLTOP_3 230 kV line	219100	219704	1	AC	105.17	108.43	ER	740	28.4	
16	N-1	PS_P1-2_U-2299_LT	PSEG - PSEG	CUTHBERT-CAMDEN 230 kV line	219108	219125	1	AC	94.77	98.27	ER	771	31.15	
17	Non	Non	PSEG - PSEG	CUTHBERT-CAMDEN 230 kV line	219108	219125	1	AC	84.76	87.97	NR	500	18.52	
18	Non	Non	PSEG - PSEG	GLOUCSTR-CAMDEN 230 kV line	219110	219125	1	AC	97.89	101.2	NR	500	19.1	
19	N-1	PS_P1-2_D-2282_LT	PSEG - PSEG	GLOUCSTR-CAMDEN 230 kV line	219110	219125	1	AC	86.12	89	ER	771	25.71	
20	N-1	PS_P1-2_D-2282_LT	PSEG - PSEG	GLOUCSTR-CUTHBERT_2 230 kV line	219110	219753	1	AC	96.24	99.34	ER	771	27.61	
21	Non	Non	PSEG - PSEG	GLOUCSTR-CUTHBERT_2 230 kV line	219110	219753	1	AC	89.88	92.73	NR	500	16.49	
22	N-1	PS_P1-2_C-2308_LT	PSEG - PSEG	GLOUCSTR-CUTHBERT_4 230 kV line	219110	219755	1	AC	102.85	106.18	ER	758	29.12	

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
23	Non	Non	PSEG - PSEG	GLOUCSTR-CUTHBERT_4 230 kV line	219110	219755	1	AC	92.83	95.8	NR	550	18.86	
24	N-1	PECO_P1-2_5014/* $ CHESCO $ PECO_P1-2_5014 $ L	PSEG - PSEG	HILLTOP_1-BEAVERBK_1 230 kV line	219702	219101	1	AC	87.9	91.08	ER	740	26.66	
25	N-1	PS_P1-2_Z-2305_LT	PSEG - PSEG	CUTHBERT_3-CAMDEN 230 kV line	219754	219125	1	AC	90.17	93.49	ER	792	30.39	
26	N-1	AE_P1-2 HIG-MARV	AE - AE	HIGBEE#3-HIGBEE#2 69 kV line	227802	227811	1	AC	21.6	161.19	ER	146	214.46	
27	Non	Non	AE - AE	HIGBEE#3-HIGBEE#2 69 kV line	227802	227811	1	AC	10.32	134.9	NR	146	194.37	
28	N-1	AE_P1-3 HIG 1 XFR	AE - AE	HIGBEE#1-HIGBEE#3 69 kV line	227810	227802	1	AC	33.66	180.46	ER	146	220.66	
29	Non	Non	AE - AE	HIGBEE#1-HIGBEE#3 69 kV line	227810	227802	1	AC	23.27	169.82	NR	146	220.66	
30	N-1	AE_P1-2 HIG-MARV	AE - AE	HIGBEE#2-ONTAR #2 69 kV line	227811	227813	1	AC	26.35	133.18	ER	143	159.39	
31	Non	Non	AE - AE	HIGBEE#2-ONTAR #2 69 kV line	227811	227813	1	AC	15.74	111.88	NR	143	143.48	
32	N-1	AE_P1-2 CARD-CEDAR	AE - PSEG	CARDIFF-NEWFRDM 230 kV line	227900	219100	1	AC	76.29	91.39	ER	692	96.06	
33	Non	Non	AE - PSEG	CARDIFF-NEWFRDM 230 kV line	227900	219100	1	AC	56.07	69.05	NR	650	78.41	
34	N-1	PS_P1-2_2310A	AE - AE	CARDIFF-CEDAR 230 kV line	227900	227955	1	AC	94.54	102.83	ER	805	67.88	
35	Non	Non	AE - AE	CARDIFF-CEDAR 230 kV line	227900	227955	1	AC	101.27	108.01	NR	650	44.98	
36	N-1	PS_P1-2_2310A	AE - AE	LEWIS #3-DOROTHY 138 kV line	227949	227901	1	AC	56.81	81.91	ER	205	46.86	
37	Non	Non	AE - AE	LEWIS #3-DOROTHY 138 kV line	227949	227901	1	DC	50.32	74.33	NR	154	36.98	

12.5 Summer Peak System Reinforcements

New System Reinforcements

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

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr><td>CARDIFF - CEDAR 230 kV Ckt. 1</td><td>Project ID: (at2317r0001) n6412
Description: To mitigate the (ACE) Cardiff - Cedar 230 kV line (from bus 940360 to bus 227955 Ckt 1) overload, it will require increasing the emergency rating of the Cardiff to Cedar 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor.
Time Estimate: 48-60 Months
Ratings: 1003/1003/1003 MVA
Type: FAC
Total Cost: $120,000,000
Notes: This project is the driver for this reinforcement and is allocated 100% of the cost.
<table>
<tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AE2-222</td><td>27.43</td><td>100%</td><td>$120,000,000</td></tr>
</table></td><td>$120,000,000</td><td>$120,000,000</td><td>N6412</td></tr>
<tr><td></td><td>Total Cost</td><td>$120,000,000</td><td>$120,000,000</td><td></td></tr>
</table>

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)

(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr><td>CEDAR-28OYSTER C 230 kV Ckt. 1</td><td>ACE Reinforcement:
Project ID: (at2318r0001) n6512
Description: To mitigate the (ACE) Cedar - Oyster Creek 230 kV line (from bus 227955 to bus 206302 Ckt 1) overload, it will require increasing the emergency rating of the Cedar to Oyster Creek 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. In addition, various terminal reinforcements are required at Cedar.
Time Estimate: 36-60 Months
Ratings: 1195/1195/1195 MVA
Type: FAC
Total Cost: $63,000,000
Notes: This project is the driver for this reinforcement and is allocated 100% of the cost.
<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-022</td><td>81.40</td><td>48.73%</td><td>$30,698,593</td></tr><tr><td>AE2-222</td><td>85.65</td><td>51.27%</td><td>$32,301,407</td></tr></table>
JCPL Reinforcement:
Project ID: n6522
Description: Replace substation conductor at Oyster Creek.
Time Estimate: 24 Months
Ratings: 650/799/799 MVA
Type: FAC
Total Cost: $585,000
<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-022</td><td>81.4</td><td>48.73%</td><td>$285,071</td></tr><tr><td>AE2-222</td><td>85.65</td><td>51.27%</td><td>299,929</td></tr></table></td><td>$63,585,000</td><td>$32,601,336</td><td>N6512
N6522</td></tr>
<tr><td></td><td>Total Cost</td><td>$63,585,000</td><td>$32,601,336</td><td></td></tr>
</table>

13 Light Load Analysis

13.1 Generation Deliverability

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

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
1	N-1	JC-P1-2-JCC-230-022	JCPL - JCPL	28OYSTER C-28MANITOU 230 kV line	206302	206297	1	AC	98.83	104.21	ER	817	45.49	4
2	N-1	AE_P1-2 1LEW-HIGBEE	AE - AE	HIGBEE#3-HIGBEE#2 69 kV line	227802	227811	1	AC	12.52	129.52	ER	146	214.1	5
3	N-1	AE_P1-2 HIG-MARV	AE - AE	HIGBEE#3-HIGBEE#2 69 kV line	227802	227811	1	AC	10.79	124.42	ER	146	171.57	
4	N-1	AE_P1-2 1LEW-HIGBEE	AE - AE	HIGBEE#1-HIGBEE#3 69 kV line	227810	227802	1	AC	7.19	152.27	ER	146	240	6
5	N-1	AE_P1-3 HIG 1 XFR	AE - AE	HIGBEE#1-HIGBEE#3 69 kV line	227810	227802	1	AC	18.34	135.72	ER	146	176.52	
6	N-1	AE_P1-2 1LEW-HIGBEE	AE - AE	HIGBEE#2-ONTAR #2 69 kV line	227811	227813	1	AC	3.16	103.1	ER	143	156.31	7
7	N-1	AE_P1-2 HIG-MARV	AE - AE	HIGBEE#2-ONTAR #2 69 kV line	227811	227813	1	AC	15.14	100.81	ER	143	127.51	
8	N-1	PS_P1-2_2310A	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	95.78	107.5	ER	564	69.12	
9	Non	Non	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	98.52	108.72	NR	464	49.66	
10	N-1	PECO_P1-2_5038/* $ CHESCO $ PECO_P1-2_5038 $ L	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	97.35	106.11	ER	564	51.75	

13.2 Multiple Facility Contingency

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

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
11	LFFB	JC-P2-3-JCC-230-26B	JCPL - JCPL	28RED OAKA-28RAR RVR 230 kV line	206314	206305	1	AC	99.09	100.47	ER	869	14.26	

13.3 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)

ID	CONT Type	CONT Name	Area	Facility	FROM BUS #	TO BUS#	CKT ID	AC|DC	PRE Project Loading %	POST Project Loading %	Rating Type	Rating MVA	MW Impact	Appx.
12	N-1	JC-P1-2-JCC-230-027	JCPL - JCPL	28RED OAKA-28RAR RVR 230 kV line	206314	206305	1	AC	101.52	103.16	ER	869	14.1	8
13	LFFB	JC-P2-3-JCC-230-026A	JCPL - JCPL	28RED OAKA-28RAR RVR 230 kV line	206314	206305	1	AC	99.09	100.46	ER	869	14.26	
14	DCTL	AE_P7-1 AE15TOWER	AE - PSEG	CARDIFF-NEWFRDM 230 kV line	227900	219100	1	AC	97.28	105.65	ER	692	92.85	
15	LFFB	AE_P4-2 AE7	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	95.88	107.46	ER	564	68.26	9
16	LFFB	AE_P4-2 AE6	AE - JCPL	CEDAR-28OYSTER C 230 kV line	227955	206302	1	AC	95.87	107.46	ER	564	68.27	10

13.4 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.

None

13.5 Light Load System Reinforcements

New System Reinforcements

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

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr><td>28OYSTER C 230.0 kV - 28MANITOU 230.0 kV Ckt 1</td><td>Project ID: JCP&L-0009a (N6547)
Description: Manitou - Oyster Creek Ckt N1028 230 kV Line. Replace the substation conductor and the transmission line.
Time Estimate: 36 Months
Ratings: 815/923/923 MVA
Type: FAC
Total Cost: $52,322,963

<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-222</td><td>35.61</td><td>100%</td><td>$52,322,963</td></tr></table></td><td>$52,322,963</td><td>$52,322,963</td><td>N6547</td></tr>
<tr><td>HIGBEE#3-HIGBEE#2 69 kV Ckt. 1</td><td>Project ID: n6560
Description: To mitigate the (ACE) Higbee #3 to Higbee #2 69 kV line (from bus 227802 to bus 227811 Ckt 234) overload, terminal reinforcement is required at Higbee substation.
Time Estimate: 24-36 Months
Ratings: 157/200/200 MVA
Type: FAC
Cost: $700,000
Notes: This project is the driver for this reinforcement and is allocated 100% of the cost.

<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-222</td><td>214.1</td><td>100%</td><td>$700,000</td></tr></table></td><td>$700,000</td><td>$700,000</td><td>N6560</td></tr>
</table>

<table>
<tr>
<td>HIGBEE#1-
HIGBEE#3
69 kV Ckt. 1</td>
<td><u>Project ID</u>: n6543
<u>Description</u>: To mitigate the (ACE) Higbee #1 to Higbee #3 69 kV line (from bus 227810 to bus 2278102ckt 234) overload, terminal reinforcement is required at Higbee substation.
<u>Time Estimate</u>: 24-36 Months
<u>Ratings</u>: 157/200/200 MVA
<u>Type</u>: FAC
<u>Cost:</u> $700,000
<u>Notes</u>: This project is the driver for this reinforcement and is allocated 100% of the cost.

<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-222</td><td>240</td><td>100%</td><td>$700,000</td></tr></table></td>
<td>$700,000</td>
<td>$700,000</td>
<td>N6543</td>
</tr>
<tr>
<td>HIGBEE#2-
ONTAR #2
69 kV Ckt. 1</td>
<td><u>Project ID</u>: n6541
<u>Description</u>: To mitigate the (ACE) Ontario to Higbee #2 69 kV line (from bus 227813 to bus 227811 Ckt 234) overload, terminal reinforcement is required at Ontario substation.
<u>Time Estimate</u>: 12-24 Months
<u>Ratings</u>: 119/146/146 MVA
<u>Type</u>: FAC
<u>Cost:</u> $250,000
<u>Notes</u>: This project is the driver for this reinforcement and is allocated 100% of the cost.

<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-222</td><td>156.3</td><td>100%</td><td>$250,000</td></tr></table>
<u>Project ID</u>: n6542
<u>Description</u>: To mitigate the (ACE) Ontario to Higbee #2 69 kV line (from bus 227813 to bus 227811 Ckt 234) overload, it will require increasing the emergency rating of the Ontario to Higbee 69 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor
<u>Time Estimate</u>: 12-24 Months
<u>Ratings</u>: 149/149/149 MVA
<u>Type</u>: FAC
<u>Cost:</u> $500,000
<u>Notes</u>: This project is the driver for this reinforcement and is allocated 100% of the cost.

<table><tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr><tr><td>AE2-222</td><td>156.3</td><td>100%</td><td>$500,000</td></tr></table></td>
<td>$750,000</td>
<td>$750,000</td>
<td>N6541
N6542</td>
</tr>
<tr>
<td></td>
<td>Total Cost</td>
<td>$54,472,963</td>
<td>$54,472,963</td>
<td></td>
</tr>
</table>

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)

(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

<table>
<tr><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocation</th><th>Upgrade Number</th></tr>
<tr>
<td>CARDIFF – NEWFRDM 230 kV Ckt. 1</td>
<td>
<u>Project ID</u>: (at2310r0001) N6342
<u>Description</u>: To mitigate the (ACE) Cardiff - New Freedom 230 kV line (from bus 227900 to bus 219100 Ckt 1) overload, it will require increasing the emergency rating of the Cardiff to New Freedom 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor.
<u>Time Estimate</u>: 36-60 Months
<u>Ratings</u>: 796/932/932 MVA
<u>Type</u>: FAC
<u>Total Cost:</u> $105,000,000
<u>Notes</u>: This project is the driver for this reinforcement and is allocated 100% of the cost.

<table>
<tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AE2-022</td><td>66.79</td><td>44.85%</td><td>$47,092,500</td></tr>
<tr><td>AE2-222</td><td>82.14</td><td>55.15%</td><td>$57,907,500</td></tr>
</table>

<u>Project ID</u>: r_PS_I004a_NF (N6505)
<u>Description</u>: Upgrade New Freedom 230kV terminal equipment to achieve a SER of 1593 MVA
<u>Time Estimate</u>: 24-36 Months
<u>Ratings</u>: 1593/1593 MVA
<u>Type</u>: FAC
<u>Total Cost:</u> $1,033,138

<table>
<tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AE2-022</td><td>66.79</td><td>44.85%</td><td>$463,327</td></tr>
<tr><td>AE2-222</td><td>82.14</td><td>55.15%</td><td>$569,811</td></tr>
</table>
</td>
<td>$106,033,138</td>
<td>$58,477,311</td>
<td>N6342
N6505</td>
</tr>
<tr>
<td>28RED OAKA-28RAR RVR 230 kV Ckt. 1</td>
<td>
<u>Project ID</u>: N5870
<u>Description</u>: Reconductor Red Oak Tap – Raritan River 230 kV transmission line segment of the T1034 line, approximately 2.6 miles.
<u>Time Estimate</u>: 30 Months
<u>Ratings</u>: 1156/1334/1334 MVA
<u>Type</u>: FAC
<u>Total Cost:</u> $12,528,000

<table>
<tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AE2-025</td><td>13.1</td><td>48.1%</td><td>$6,026,535</td></tr>
<tr><td>AE2-222</td><td>14.1</td><td>51.9%</td><td>$6,501,465</td></tr>
</table>
</td>
<td>$12,528,000</td>
<td>$6,501,465</td>
<td>N5870</td>
</tr>
</table>

<table>
<tr>
<td>28RED OAKB-28RAR RVR 230 kV Ckt. 1</td>
<td><u>Project ID</u>: N6204
<u>Description</u>: Reconductor existing sections of 1590 ACSR 45/7 (Segment 3, Position 2; segment 7, Position 1) with 1590 ACSS 45/7.
<u>Time Estimate</u>: 30 Months
<u>Ratings</u>: 1156/1334/1334 MVA
<u>Type</u>: FAC
<u>Total Cost:</u> $3,900,000

<table>
<tr><th>Queue</th><th>MW</th><th>Cost (%)</th><th>Cost ($)</th></tr>
<tr><td>AE2-025</td><td>65.97</td><td>82.5%</td><td>$3,220,466</td></tr>
<tr><td>AE2-222</td><td>13.92</td><td>17.5%</td><td>$679,534</td></tr>
</table>
</td>
<td>$3,900,000</td>
<td>$679,534</td>
<td>N6204</td>
</tr>
<tr>
<td></td>
<td>Total Cost</td>
<td>$122,461,138</td>
<td>$65,658,310</td>
<td></td>
</tr>
</table>

14 Flow Gate Details

The following indices 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.

14.1 Appendix 1

(AE - PSEG) The CARDIFF-NEWFRDM 230 kV line (from bus 227900 to bus 219100 ckt 1) loads from 98.82% to 114.06% (AC power flow) of its emergency rating (692 MVA) for the tower line contingency outage of 'JC-P7-1-JCC-230-13'. This project contributes approximately 102.65 MW to the thermal violation.

CONTINGENCY 'JC-P7-1-JCC-230-13' /* MANITOU-OYSTER CREEK 230 LINES & OYSTER GEN
DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 1
DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2
DISCONNECT BRANCH FROM BUS 206302 TO BUS 206325 CKT 1
END

Bus Number	*Bus Name*	*Full Contribution*
206360	*28O CRK C1*	*2.07*
206361	*28O CRK C2*	*1.34*
933962	*AD1-019 E*	*2.6*
938421	*AE1-061 C*	*0.42*
938422	*AE1-061 E*	*0.76*
938781	*AE1-104 C O1*	*34.77*
938782	*AE1-104 E O1*	*88.97*
939301	*AE1-161 C*	*1.76*
939302	*AE1-161 E*	*2.64*
939501	*AE1-179 C O1*	*4.62*
939502	*AE1-179 E O1*	*3.26*
939931	*AE1-229 C O1*	*6.97*
939932	*AE1-229 E O1*	*4.72*
940001	*AE1-240 C O1*	*3.85*
940002	*AE1-240 E O1*	*2.75*
940161	*AE2-000 C O1*	*90.24*
940162	*AE2-000 E O1*	*230.89*
940361	*AE2-020 C*	*45.21*
940362	*AE2-020 E*	*211.65*

940371	*AE2-021 C*	*45.21*
940372	*AE2-021 E*	*211.65*
940381	*AE2-022 C*	*22.42*
940382	*AE2-022 E*	*104.99*
942101	*AE2-222 C*	*28.85*
942102	*AE2-222 E*	*73.81*
942381	*AE2-251 C*	*143.21*
942382	*AE2-251 E*	*366.43*
LTF	*BLUEG*	*0.39*
LTF	*CALDERWOOD*	*0.04*
LTF	*CANNELTON*	*0.02*
LTF	*CARR*	*0.07*
LTF	*CATAWBA*	*0.03*
LTF	*CHEOAH*	*0.04*
LTF	*CHILHOWEE*	*0.01*
LTF	*COFFEEN*	*0.04*
LTF	*COTTONWOOD*	*0.16*
LTF	*DUCKCREEK*	*0.09*
LTF	*EDWARDS*	*0.04*
LTF	*FARMERCITY*	*0.03*
LTF	*G-007*	*0.23*
LTF	*GIBSON*	*0.02*
LTF	*HAMLET*	*0.04*
227842	*MARINGEN*	*0.2*
227843	*MARINGEN E*	*1.37*
LTF	*NEWTON*	*0.11*
LTF	*O-066*	*1.68*
227801	*ONTC&DCT*	*13.21*
LTF	*PRAIRIE*	*0.2*
LTF	*RENSSELAER*	*0.06*
LTF	*SANTEETLA*	*0.01*
LTF	*SMITHLAND*	*0.02*
LTF	*TILTON*	*0.05*
LTF	*TRIMBLE*	*0.04*
LTF	*TVA*	*0.13*
LTF	*UNIONPOWER*	*0.06*
292063	*V1-021 E*	*0.07*
228721	*V2-035E*	*0.1*
228712	*V2-041E*	*0.42*
293404	*V3-036*	*1.88*
228261	*V4-054E*	*0.7*
227927	*V4-067C*	*0.06*

227928	*V4-067E*	*0.61*
902092	*W1-130E*	*0.94*
902431	*W2-030 C*	*0.2*
902432	*W2-030 E*	*2.13*
915022	*Y3-012 E*	*2.57*
930001	*AB1-001 C*	*0.3*
930002	*AB1-001 E*	*0.49*
924531	*AB2-102 C*	*39.09*
924532	*AB2-102 E*	*0.87*

14.2 Appendix 2

(AE - AE) The CARDIFF-CEDAR 230 kV line (from bus 227900 to bus 227955 ckt 1) loads from 95.28% to 103.35% (AC power flow) of its emergency rating (805 MVA) for the line fault with failed breaker contingency outage of 'AE_P4-2 AE7'. This project contributes approximately 66.08 MW to the thermal violation.

CONTINGENCY 'AE_P4-2 AE7' /*CARDIFF TO NEW FREEDOM BREAKER V
DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230
DISCONNECT BRANCH FROM BUS 227900 TO BUS 227910 CKT 1 /*CARDIFF CARDIFF 230 69 T1
END

Bus Number	*Bus Name*	*Full Contribution*
933962	*AD1-019 E*	*1.68*
938421	*AE1-061 C*	*0.33*
938422	*AE1-061 E*	*0.6*
938781	*AE1-104 C O1*	*24.3*
938782	*AE1-104 E O1*	*62.17*
938871	*AE1-115 C*	*0.64*
938872	*AE1-115 E*	*0.64*
939301	*AE1-161 C*	*1.65*
939302	*AE1-161 E*	*2.47*
939501	*AE1-179 C O1*	*3.77*
939502	*AE1-179 E O1*	*2.66*
939931	*AE1-229 C O1*	*6.65*
939932	*AE1-229 E O1*	*4.51*
940001	*AE1-240 C O1*	*3.14*
940002	*AE1-240 E O1*	*2.24*
940361	*AE2-020 C*	*33.44*
940362	*AE2-020 E*	*156.56*
940371	*AE2-021 C*	*33.44*
940372	*AE2-021 E*	*156.56*
940381	*AE2-022 C*	*16.59*
940382	*AE2-022 E*	*77.66*
942101	*AE2-222 C*	*18.57*
942102	*AE2-222 E*	*47.51*
942381	*AE2-251 C*	*105.93*
942382	*AE2-251 E*	*271.05*
942571	*AE2-272*	*0.05*
LTF	*CARR*	*0.4*
LTF	*CBM-S1*	*0.07*
LTF	*CBM-S2*	*0.07*
LTF	*CBM-W1*	*0.05*

LTF	*CBM-W2*	*0.42*
LTF	*CIN*	*0.03*
LTF	*CPLE*	*0.03*
228202	*CUMB CT*	*1.27*
LTF	*G-007*	*3.98*
LTF	*IPL*	*0.02*
LTF	*LGEE*	*< 0.01*
227842	*MARINGEN*	*0.13*
227843	*MARINGEN E*	*0.88*
LTF	*MEC*	*0.06*
LTF	*MECS*	*< 0.01*
LTF	*O-066*	*10.98*
227801	*ONTC&DCT*	*8.51*
228203	*P06*	*1.37*
228014	*PVILLEG*	*0.14*
LTF	*RENSSELAER*	*0.32*
292062	*V1-021 C*	*0.05*
292063	*V1-021 E*	*0.05*
228721	*V2-035E*	*0.1*
228712	*V2-041E*	*0.32*
228357	*V2-046E*	*0.76*
293404	*V3-036*	*1.21*
228261	*V4-054E*	*0.59*
227927	*V4-067C*	*0.04*
227928	*V4-067E*	*0.4*
902092	*W1-130E*	*0.75*
902431	*W2-030 C*	*0.13*
902432	*W2-030 E*	*1.4*
LTF	*WEC*	*< 0.01*
915022	*Y3-012 E*	*1.65*
919662	*AA2-048 E*	*0.53*
930001	*AB1-001 C*	*0.19*
930002	*AB1-001 E*	*0.31*
930891	*AB1-138 C*	*-0.37*
924531	*AB2-102 C*	*29.97*
924532	*AB2-102 E*	*0.67*

14.3 Appendix 3

(AE - JCPL) The CEDAR-28OYSTER C 230 kV line (from bus 227955 to bus 206302 ckt 1) loads from 113.89% to 128.51% (AC power flow) of its emergency rating (564 MVA) for the line fault with failed breaker contingency outage of 'AE_P4-2 AE7'. This project contributes approximately 85.65 MW to the thermal violation.

CONTINGENCY 'AE_P4-2 AE7' /*CARDIFF TO NEW FREEDOM BREAKER V
DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230
DISCONNECT BRANCH FROM BUS 227900 TO BUS 227910 CKT 1 /*CARDIFF CARDIFF 230 69 T1
END

Bus Number	*Bus Name*	*Full Contribution*
933962	*AD1-019 E*	*2.17*
938421	*AE1-061 C*	*0.39*
938422	*AE1-061 E*	*0.72*
938781	*AE1-104 C O1*	*28.94*
938782	*AE1-104 E O1*	*74.05*
938871	*AE1-115 C*	*0.72*
938872	*AE1-115 E*	*0.72*
939301	*AE1-161 C*	*1.94*
939302	*AE1-161 E*	*2.91*
939501	*AE1-179 C O1*	*4.37*
939502	*AE1-179 E O1*	*3.08*
939931	*AE1-229 C O1*	*7.63*
939932	*AE1-229 E O1*	*5.17*
940001	*AE1-240 C O1*	*3.64*
940002	*AE1-240 E O1*	*2.6*
940361	*AE2-020 C*	*35.49*
940362	*AE2-020 E*	*166.18*
940371	*AE2-021 C*	*35.49*
940372	*AE2-021 E*	*166.18*
940381	*AE2-022 C*	*17.61*
940382	*AE2-022 E*	*82.43*
942101	*AE2-222 C*	*24.07*
942102	*AE2-222 E*	*61.58*
942381	*AE2-251 C*	*112.44*
942382	*AE2-251 E*	*287.71*
942571	*AE2-272*	*0.06*
LTF	*CARR*	*0.45*
LTF	*CBM-S1*	*0.07*
LTF	*CBM-S2*	*0.07*
LTF	*CBM-W1*	*0.05*

LTF	*CBM-W2*	*0.45*
LTF	*CIN*	*0.03*
LTF	*CPLE*	*0.03*
228202	*CUMB CT*	*1.48*
LTF	*G-007*	*4.48*
LTF	*IPL*	*0.02*
LTF	*LGEE*	*< 0.01*
227842	*MARINGEN*	*0.17*
227843	*MARINGEN E*	*1.14*
LTF	*MEC*	*0.06*
LTF	*O-066*	*12.38*
227801	*ONTC&DCT*	*11.02*
228203	*P06*	*1.58*
228014	*PVILLEG*	*0.18*
LTF	*RENSSELAER*	*0.36*
292062	*V1-021 C*	*0.06*
292063	*V1-021 E*	*0.06*
228721	*V2-035E*	*0.11*
228712	*V2-041E*	*0.38*
228357	*V2-046E*	*0.87*
293404	*V3-036*	*1.57*
228261	*V4-054E*	*0.68*
227927	*V4-067C*	*0.04*
227928	*V4-067E*	*0.48*
902092	*W1-130E*	*0.89*
902431	*W2-030 C*	*0.17*
902432	*W2-030 E*	*1.74*
LTF	*WEC*	*< 0.01*
915022	*Y3-012 E*	*2.14*
919662	*AA2-048 E*	*0.6*
930001	*AB1-001 C*	*0.25*
930002	*AB1-001 E*	*0.41*
930891	*AB1-138 C*	*-0.42*
924531	*AB2-102 C*	*34.6*
924532	*AB2-102 E*	*0.77*

14.4 Appendix 4

(JCPL - JCPL) The 28OYSTER C-28MANITOU 230 kV line (from bus 206302 to bus 206297 ckt 1) loads from 98.83% to 104.21% (AC power flow) of its emergency rating (817 MVA) for the single line contingency outage of 'JC-P1-2-JCC-230-022'. This project contributes approximately 45.49 MW to the thermal violation.

CONTINGENCY 'JC-P1-2-JCC-230-022' /* MANITOU - OYSTER CREEK (O1019) 230 KV
DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2
END

Bus Number	*Bus Name*	*Full Contribution*
938421	*AE1-061 C*	*0.5*
938422	*AE1-061 E*	*0.5*
938781	*AE1-104 C O1*	*15.24*
938782	*AE1-104 E O1*	*39.*
938871	*AE1-115 C*	*0.54*
938872	*AE1-115 E*	*0.54*
939301	*AE1-161 C*	*1.44*
939302	*AE1-161 E*	*2.16*
940161	*AE2-000 C O1*	*126.59*
940162	*AE2-000 E O1*	*323.9*
940361	*AE2-020 C O1*	*17.66*
940362	*AE2-020 E O1*	*82.68*
940371	*AE2-021 C O1*	*17.66*
940372	*AE2-021 E O1*	*82.68*
940381	*AE2-022 C O1*	*8.76*
940382	*AE2-022 E O1*	*41.01*
942101	*AE2-222 C O1*	*12.78*
942102	*AE2-222 E O1*	*32.71*
942381	*AE2-251 C O1*	*55.94*
942382	*AE2-251 E O1*	*143.14*
918452	*AA1-060 E*	*1.06*
919662	*AA2-048 E*	*0.62*

14.5 Appendix 5

(AE - AE) The HIGBEE#3-HIGBEE#2 69 kV line (from bus 227802 to bus 227811 ckt 1) loads from 12.52% to 129.52% (AC power flow) of its emergency rating (146 MVA) for the single line contingency outage of 'AE_P1-2 1LEW-HIGBEE'. This project contributes approximately 214.1 MW to the thermal violation.

CONTINGENCY 'AE_P1-2 1LEW-HIGBEE'
OPEN LINE FROM BUS 227918 TO BUS 227810 CIRCUIT 1 /
END

Bus Number	*Bus Name*	*Full Contribution*
942101	*AE2-222 C O1*	*60.16*
942102	*AE2-222 E O1*	*153.94*

14.6 Appendix 6

(AE - AE) The HIGBEE#1-HIGBEE#3 69 kV line (from bus 227810 to bus 227802 ckt 1) loads from 7.19% to 152.27% (AC power flow) of its emergency rating (146 MVA) for the single line contingency outage of 'AE_P1-2 1LEW-HIGBEE'. This project contributes approximately 240.0 MW to the thermal violation.

CONTINGENCY 'AE_P1-2 1LEW-HIGBEE'
OPEN LINE FROM BUS 227918 TO BUS 227810 CIRCUIT 1 /
END

Bus Number	*Bus Name*	*Full Contribution*
942101	*AE2-222 C O1*	*67.44*
942102	*AE2-222 E O1*	*172.56*

14.7 Appendix 7

(AE - AE) The HIGBEE#2-ONTAR #2 69 kV line (from bus 227811 to bus 227813 ckt 1) loads from 3.16% to 103.1% (AC power flow) of its emergency rating (143 MVA) for the single line contingency outage of 'AE_P1-2 1LEW-HIGBEE'. This project contributes approximately 156.31 MW to the thermal violation.

CONTINGENCY 'AE_P1-2 1LEW-HIGBEE'
OPEN LINE FROM BUS 227918 TO BUS 227810 CIRCUIT 1 /
END

Bus Number	*Bus Name*	*Full Contribution*
942101	*AE2-222 C O1*	*43.92*
942102	*AE2-222 E O1*	*112.39*

14.8 Appendix 8

(JCPL - JCPL) The 28RED OAKA-28RAR RVR 230 kV line (from bus 206314 to bus 206305 ckt 1) loads from 101.52% to 103.16% (AC power flow) of its emergency rating (869 MVA) for the single line contingency outage of 'JC-P1-2-JCC-230-027'. This project contributes approximately 14.1 MW to the thermal violation.

CONTINGENCY 'JC-P1-2-JCC-230-027' /* RARITAN RIVER - RED OAK - R11 (G1047) 230 KV LINE
DISCONNECT BRANCH FROM BUS 206305 TO BUS 206315 CKT 1
DISCONNECT BRANCH FROM BUS 206315 TO BUS 206410 CKT 1
DISCONNECT BUS 206315
DISCONNECT BUS 206362
DISCONNECT BUS 206365
END

Bus Number	*Bus Name*	*Full Contribution*
937512	*AD2-210 E*	*0.13*
938781	*AE1-104 C O1*	*5.07*
938782	*AE1-104 E O1*	*12.97*
939981	*AE1-238 C*	*53.75*
939982	*AE1-238 E*	*141.18*
940161	*AE2-000 C O1*	*28.42*
940162	*AE2-000 E O1*	*72.72*
940361	*AE2-020 C O1*	*5.31*
940362	*AE2-020 E O1*	*24.86*
940371	*AE2-021 C O1*	*5.31*
940372	*AE2-021 E O1*	*24.86*
940381	*AE2-022 C O1*	*2.63*
940382	*AE2-022 E O1*	*12.33*
940401	*AE2-024 C O1*	*23.16*
940402	*AE2-024 E O1*	*108.43*
940411	*AE2-025 C O1*	*11.69*
940412	*AE2-025 E O1*	*54.73*
942101	*AE2-222 C O1*	*3.96*
942102	*AE2-222 E O1*	*10.14*
942381	*AE2-251 C O1*	*16.82*
942382	*AE2-251 E O1*	*43.04*
918452	*AA1-060 E*	*2.08*
919662	*AA2-048 E*	*1.38*

14.9 Appendix 9

(JCPL - JCPL) The 28RED OAKB-28RAR RVR 230 kV line (from bus 206315 to bus 206305 ckt 1) loads from 106.67% to 108.3% (AC power flow) of its emergency rating (869 MVA) for the single line contingency outage of 'JC-P1-2-JCC-230-028'. This project contributes approximately 13.92 MW to the thermal violation.

CONTINGENCY 'JC-P1-2-JCC-230-028' /* RARITAN RIVER - RED OAK - SOUTH RIVER JCT(T1034) 230 KV
DISCONNECT BRANCH FROM BUS 206305 TO BUS 206314 CKT 1 /* 28RAR RVR 230.00 28RED OAKA 230.00
DISCONNECT BRANCH FROM BUS 206314 TO BUS 206411 CKT 1 /* 28RED OAKA 230.00 28R11RINGA 230.00 .
DISCONNECT BUS 206314 /* 28RED OAKA 230.00
DISCONNECT BUS 206363 /* 28RDOAKCT2 18.00
DISCONNECT BUS 206364 /* 28RDOAKCT3 18.00
END

Bus Number	*Bus Name*	*Full Contribution*
937512	*AD2-210 E*	*0.13*
938781	*AE1-104 C O1*	*4.99*
938782	*AE1-104 E O1*	*12.78*
939981	*AE1-238 C*	*53.43*
939982	*AE1-238 E*	*140.35*
940161	*AE2-000 C O1*	*28.21*
940162	*AE2-000 E O1*	*72.17*
940361	*AE2-020 C O1*	*5.24*
940362	*AE2-020 E O1*	*24.54*
940371	*AE2-021 C O1*	*5.24*
940372	*AE2-021 E O1*	*24.54*
940381	*AE2-022 C O1*	*2.6*
940382	*AE2-022 E O1*	*12.17*
940401	*AE2-024 C O1*	*23.*
940402	*AE2-024 E O1*	*107.69*
940411	*AE2-025 C O1*	*11.61*
940412	*AE2-025 E O1*	*54.36*
942101	*AE2-222 C O1*	*3.91*
942102	*AE2-222 E O1*	*10.01*
942253	*AE2-237 BAT*	*5.39*
942381	*AE2-251 C O1*	*16.6*
942382	*AE2-251 E O1*	*42.48*
918452	*AA1-060 E*	*2.06*

919662	*AA2-048 E*	*1.37*

14.10 Appendix 10

(AE - PSEG) The CARDIFF-NEWFRDM 230 kV line (from bus 227900 to bus 219100 ckt 1) loads from 108.13% to 118.14% (AC power flow) of its emergency rating (692 MVA) for the tower line contingency outage of 'JC-P7-1-JCC-230-13'. This project contributes approximately 82.14 MW to the thermal violation.

CONTINGENCY 'JC-P7-1-JCC-230-13' /* MANITOU-OYSTER CREEK 230 LINES & OYSTER GEN
DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 1
DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2
DISCONNECT BRANCH FROM BUS 206302 TO BUS 206325 CKT 1
END

Bus Number	*Bus Name*	*Full Contribution*
938421	*AE1-061 C*	*0.76*
938422	*AE1-061 E*	*0.76*
938781	*AE1-104 C O1*	*27.82*
938782	*AE1-104 E O1*	*71.19*
938871	*AE1-115 C*	*0.63*
938872	*AE1-115 E*	*0.63*
939301	*AE1-161 C*	*1.76*
939302	*AE1-161 E*	*2.64*
940161	*AE2-000 C O1*	*72.21*
940162	*AE2-000 E O1*	*184.75*
940361	*AE2-020 C O1*	*36.17*
940362	*AE2-020 E O1*	*169.35*
940371	*AE2-021 C O1*	*36.17*
940372	*AE2-021 E O1*	*169.35*
940381	*AE2-022 C O1*	*17.94*
940382	*AE2-022 E O1*	*84.*
942101	*AE2-222 C O1*	*23.08*
942102	*AE2-222 E O1*	*59.06*
942381	*AE2-251 C O1*	*114.59*
942382	*AE2-251 E O1*	*293.2*

15 Affected Systems

None

16 Contingencies

Contingency Name	Description
AE_P1-2 CARD-CEDAR	CONTINGENCY 'AE_P1-2 CARD-CEDAR' OPEN LINE FROM BUS 227900 TO BUS 227955 CIRCUIT 1 / END
AE_P1-2 HIG-MARV	CONTINGENCY 'AE_P1-2 HIG-MARV' OPEN LINE FROM BUS 227802 TO BUS 227804 CIRCUIT 1 / END
AE_P1-3 HIG 1 XFR	CONTINGENCY 'AE_P1-3 HIG 1 XFR' OPEN LINE FROM BUS 227825 TO BUS 227810 CIRCUIT 1 / CLOSE LINE FROM BUS 227825 TO BUS 227826 CIRCUIT 1 / END
AE_P4-2 AE6	CONTINGENCY 'AE_P4-2 AE6' /*CARDIFF TO NEW FREEDOM BREAKER W DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227911 CKT 1 /*CARDIFF CARDIFF 230 69 T2 END
AE_P4-2 AE7	CONTINGENCY 'AE_P4-2 AE7' /*CARDIFF TO NEW FREEDOM BREAKER V DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227910 CKT 1 /*CARDIFF CARDIFF 230 69 T1 END
JC-P1-2-JCC-230-013	CONTINGENCY 'JC-P1-2-JCC-230-013' /* LAKEWOOD - LARRABEE (K2011) 230 KV DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 2 END
JC-P1-2-JCC-230-014	CONTINGENCY 'JC-P1-2-JCC-230-014' /* FUTURE BREAKERS LAKEWOOD - LARRABEE (Z2026) 230 KV & LAR BK 8 & 12 DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 1 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 12 SET BUS 206294 LOAD TO 38 MW END
JC-P1-2-JCC-230-017	CONTINGENCY 'JC-P1-2-JCC-230-017' /* FUTURE BREAKERS LARRABEE - SMITHBURG (D2004) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 1 END

JC-P1-2-JCC-230-021	CONTINGENCY 'JC-P1-2-JCC-230-021' /* MANITOU - OYSTER CREEK (N1028) 230 KV DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 1 END
JC-P1-2-JCC-230-022	CONTINGENCY 'JC-P1-2-JCC-230-022' /* MANITOU - OYSTER CREEK (O1019) 230 KV DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2 END
JC-P7-1-JCC-230-13	CONTINGENCY 'JC-P7-1-JCC-230-13' /* MANITOU-OYSTER CREEK 230 LINES & OYSTER GEN DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2 DISCONNECT BRANCH FROM BUS 206302 TO BUS 206325 CKT 1 END
PECO_P1-2_5014/* $ CHESCO $ PECO_P1-2_5014 $ L	CONTINGENCY 'PECO_P1-2_5014/* $ CHESCO $ PECO_P1-2_5014 $ L' TRIP BRANCH FROM BUS 200065 TO BUS 200051 CKT 1 /* PCHBTM2S 500.00 ROCKSPGS 500.00 $ CHESCO $ PECO_P1-2_5014 $ L END/* $ CHESCO $ PECO_P1-2_5014 $ L 11. (PSEG - PSEG) The CUTHBERT-CAMDEN 230 kV line (from bus 219108 to bus 219125 ckt 1) loads from 94.77% to 98.27% (AC power flow) of its emergency rating (771 MVA) for the single line contingency outage of 'PS_P1-2_U-2299_LT'. This project contributes approximately 31.15 MW to the thermal violation. CONTINGENCY 'PS_P1-2_U-2299_LT' /* CAMDEN CUTBERTH DISCONNECT BUS 219754 /* CUTHBERTH SECTION 3 CLOSE LINE FROM BUS 219176 TO BUS 219179 CKT Z /* CUTBERTH MOVE 8 MW LOAD FROM BUS 219176 TO BUS 219170 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO CINN T2 MOVE 8 MW LOAD FROM BUS 219176 TO BUS 219676 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO MAPLE SHADE MOVE 8 MW LOAD FROM BUS 219179 TO BUS 219677 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO MAPLE SHADE MOVE 8 MW LOAD FROM BUS 219179 TO BUS 219724 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO LAWNSIDE END

PECO_P4_PEACH215/* $ CHESCO $ PECO_P4_PEACH215 $ STBK	CONTINGENCY 'PECO_P4_PEACH215/* $ CHESCO $ PECO_P4_PEACH215 $ STBK' TRIP BRANCH FROM BUS 200065 TO BUS 200051 CKT 1 /* PCHBTM2S 500.00 ROCKSPGS 500.00 $ CHESCO $ PECO_P4_PEACH215 $ STBK REMOVE MACHINE 1 FROM BUS 200034 /* PCHBTM 2 22.00 $ CHESCO $ PECO_P4_PEACH215 $ STBK END/* $ CHESCO $ PECO_P4_PEACH215 $ STBK Note: PSEG indicated rating of this line is 732/886 MVA (Not a violation) 3. (AE - JCPL) The CEDAR-28OYSTER C 230 kV line (from bus 227955 to bus 206302 ckt 1) loads from 113.89% to 128.51% (AC power flow) of its emergency rating (564 MVA) for the line fault with failed breaker contingency outage of 'AE_P4-2 AE7'. This project contributes approximately 85.65 MW to the thermal violation. CONTINGENCY 'AE_P4-2 AE7' /*CARDIFF TO NEW FREEDOM BREAKER V DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227910 CKT 1 /*CARDIFF CARDIFF 230 69 T1 END
PJM_P1_68	CONTINGENCY 'PJM_P1_68' /* NOT VALID FROM 2009 DISCONNECT BRANCH FROM BUS 200028 TO BUS 200006 CKT 1 /* WINDSOR DEANS 500 500 DISCONNECT BRANCH FROM BUS 200006 TO BUS 218306 CKT 2 /* DEANS DEANS 500 230 END
PS_P1-2_2310A	CONTINGENCY 'PS_P1-2_2310A' /* NEW FREEDOM TO CARDIFF TIELINE TRIP LINE FROM BUS 219100 TO BUS 227900 CKT 1 /* NEW FREEDOM TO CARDIFF END
PS_P1-2_C-2308_LT	CONTINGENCY 'PS_P1-2_C-2308_LT' /* CUTHBERT TO GLOUCESTER DISCONNECT BUS 219753 /* CUTHBERTH SECTOIN 2 CLOSE LINE FROM BUS 219177 TO BUS 219178 CKT Z /* CUTHBERT MOVE 8 MW LOAD FROM BUS 219178 TO BUS 219678 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO MAPLE SHADE MOVE 8 MW LOAD FROM BUS 219177 TO BUS 219677 /* INTERSTATION TIE TRANSFER LOAD FROM CUTHBERT TO MAPLE SHADE END

Contingency Name	Description
AE_P1-2 1LEW-HIGBEE	CONTINGENCY 'AE_P1-2 1LEW-HIGBEE' OPEN LINE FROM BUS 227918 TO BUS 227810 CIRCUIT 1 / END
AE_P1-2 HIG-MARV	CONTINGENCY 'AE_P1-2 HIG-MARV' OPEN LINE FROM BUS 227802 TO BUS 227804 CIRCUIT 1 / END
AE_P1-3 HIG 1 XFR	CONTINGENCY 'AE_P1-3 HIG 1 XFR' OPEN LINE FROM BUS 227825 TO BUS 227810 CIRCUIT 1 / CLOSE LINE FROM BUS 227825 TO BUS 227826 CIRCUIT 1 / END
AE_P4-2 AE6	CONTINGENCY 'AE_P4-2 AE6' /*CARDIFF TO NEW FREEDOM BREAKER W DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227911 CKT 1 /*CARDIFF CARDIFF 230 69 T2 END
AE_P4-2 AE7	CONTINGENCY 'AE_P4-2 AE7' /*CARDIFF TO NEW FREEDOM BREAKER V DISCONNECT BRANCH FROM BUS 219100 TO BUS 227900 CKT 1 /*NEW FREEDOM TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227910 CKT 1 /*CARDIFF CARDIFF 230 69 T1 END
AE_P7-1 AE15TOWER	CONTINGENCY 'AE_P7-1 AE15TOWER' DISCONNECT BRANCH FROM BUS 227901 TO BUS 227949 CKT 1 /* DOR TO LEW 138 KV DISCONNECT BRANCH FROM BUS 228002 TO BUS 227900 CKT 1 /* ORCH TO CARD 230 KV END
JC-P1-2-JCC-230-022	CONTINGENCY 'JC-P1-2-JCC-230-022' /* MANITOU - OYSTER CREEK (O1019) 230 KV DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2 END
JC-P1-2-JCC-230-027	CONTINGENCY 'JC-P1-2-JCC-230-027' /* RARITAN RIVER - RED OAK - R11 (G1047) 230 KV LINE DISCONNECT BRANCH FROM BUS 206305 TO BUS 206315 CKT 1 DISCONNECT BRANCH FROM BUS 206315 TO BUS 206410 CKT 1 DISCONNECT BUS 206315 DISCONNECT BUS 206362 DISCONNECT BUS 206365 END

JC-P2-3-JCC-230-026A	CONTINGENCY 'JC-P2-3-JCC-230-026A' /* RARITAN RIVER B143 STUCK BREAKER DISCONNECT BUS 206315 /* RED OAK 230 KV B TAP DISCONNECT BUS 206362 /* RED OAK 230 KV #1 DISCONNECT BUS 206365 /* RED OAK 230 KV #4 DISCONNECT BRANCH FROM BUS 206305 TO BUS 206303 CKT 17 /* RARITAN RIVER #17 230/115 KV TRANSFORMER DISCONNECT BUS 206350 /* SAYREVILLE GENERATOR DISCONNECT BUS 206351 /* SAYREVILLE GENERATOR END
JC-P2-3-JCC-230-26B	CONTINGENCY 'JC-P2-3-JCC-230-26B' /* RARITAN RIVER B144 STUCK BREAKER DISCONNECT BUS 206315 /* RED OAK 230 KV B TAP DISCONNECT BUS 206362 /* RED OAK 230 KV #1 DISCONNECT BUS 206365 /* RED OAK 230 KV #4 DISCONNECT BRANCH FROM BUS 206305 TO BUS 206303 CKT 13 /* RARITAN RIVER #13 230/115 KV TRANSFORMER DISCONNECT BUS 206403 /* WOODBRIDGE GENERATOR END
PECO_P1-2_5038/* $ CHESCO $ PECO_P1-2_5038 $ L	CONTINGENCY 'PECO_P1-2_5038/* $ CHESCO $ PECO_P1-2_5038 $ L' TRIP BRANCH FROM BUS 200012 TO BUS 200028 CKT 1 /* NFREEDOM 500.00 WINDSOR 500.00 $ CHESCO $ PECO_P1-2_5038 $ L END/* $ CHESCO $ PECO_P1-2_5038 $ L Note: Violation driven by Summer Peak. Refer to Summer Peak analysis. Multiple Facility Contingency (Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output) 1. (JCPL - JCPL) The 28RED OAKA-28RAR RVR 230 kV line (from bus 206314 to bus 206305 ckt 1) loads from 99.09% to 100.47% (AC power flow) of its emergency rating (869 MVA) for the line fault with failed breaker contingency outage of 'JC-P2-3-JCC-230-26B'. This project contributes approximately 14.26 MW to the thermal violation. CONTINGENCY 'JC-P2-3-JCC-230-26B' /* RARITAN RIVER B144 STUCK BREAKER DISCONNECT BUS 206315 /* RED OAK 230 KV B TAP DISCONNECT BUS 206362 /* RED OAK 230 KV #1 DISCONNECT BUS 206365 /* RED OAK 230 KV #4 DISCONNECT BRANCH FROM BUS 206305 TO BUS 206303 CKT 13 /* RARITAN RIVER #13 230/115 KV TRANSFORMER DISCONNECT BUS 206403 /* WOODBRIDGE GENERATOR END

PS_P1-2_2310A	CONTINGENCY 'PS_P1-2_2310A' /* NEW FREEDOM TO CARDIFF TIELINE TRIP LINE FROM BUS 219100 TO BUS 227900 CKT 1 /* NEW FREEDOM TO CARDIFF END

17 Short Circuit

The following Breakers are overdutied:

None

18 Stability Analysis

To be completed during Facilities Study phase.

19 Single Line Diagram