Generation Interconnection

Impact Study Report

for

Queue Project AE2-232

OYSTER CREEK 230 KV II

112.4 MW Capacity / 400 MW Energy

February 2020

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between **Ocean Wind LLC**, the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Jersey Central Power and Light Company (JCPL).

2 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.

3 General

The Interconnection Customer (IC), has proposed an Offshore Wind generating facility located in Ocean County, New Jersey. The installed facilities will have a total capability of 400 MW with 112.4 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is November 23, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AE2-232
Project Name	OYSTER CREEK 230 KV II
Interconnection Customer	Ocean Wind LLC
State	New Jersey
County	Ocean
Transmission Owner	JCPL
MFO	400
MWE	400
MWC	112.4
Fuel	Offshore Wind
Basecase Study Year	2022

4 Point of Interconnection

The interconnection of the project at the Primary POI will be accomplished by constructing a new Direct Connection at the Oyster Creek 230 kV substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated facilities. The project will also require Direct and Non-Direct connection upgrades at the Oyster Creek 230 kV substation.

Attachment 1 shows a one-line diagram of the proposed Direct Connection facilities for the AE2-232 generation project to connect to the FirstEnergy ("FE") transmission system. Attachment 2 provides the proposed location for the point of interconnection. IC will be responsible for constructing all the facilities on its side of the POI, including the Attachment Facilities which connect the generator to the FE transmission system's Direct Connection facilities.

5 Cost Summary

The AE2-232 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$350,500
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$2,317,800
System Upgrades (Summer Peak)	$287,936,991.64[1]
System Upgrades (Light Load)	$99,570,816[2]
Total Costs	**$390,176,107.64**

The costs provided above exclude the Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross Up charge. If, at a future date, it is determined that the CIAC Federal Income Tax Gross Up charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

The required Attachment Facilities and Direct and Non-Direct Connection work for the interconnection of the AE2-232 generation project to the FE Transmission System is detailed in the following sections. The associated one-line with the generation project Attachment Facilities and the Primary Direct and Non-Direct Connection facilities are shown in Attachment 1.

Note: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than

[1] See "System Reinforcements – Summer Peak" Section 11.5 for details.
[2] See "System Reinforcements – Light Load" Section 14.5 for details.

5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

6 Transmission Owner Scope of Work

The interconnection of the project at the Primary POI will be accomplished by constructing a new Direct Connection at the Oyster Creek 230 kV substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated facilities. The project will also require Direct and Non-Direct Connection upgrades at the Oyster Creek 230 kV substation.

6.1 Attachment Facilities

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
Install Attachment Facilities associated with new line terminal at Oyster Creek substation for AE2-232 interconnection at Oyster Creek	$281,600
Review drawings, nameplates, and relay settings at Oyster Creek substation	$68,900
Total Attachment Facility Costs	$350,500

6.2 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**

6.3 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
Install new line terminal at Oyster Creek substation for AE2-232 interconnection at Oyster Creek	$1,866,200
Estimated SCADA work at Oyster Creek to support breaker and relay installations.	$59,700
Project Management.	$391,900
Total Non-Direct Connection Facility Costs	**$2,317,800**

7 Schedule

Based on the scope of work for the Attachment Facilities and the Direct and/or Non-Direct Connection facilities, it is expected to take a minimum of **15 months** after the signing of an Interconnection Construction Service Agreement to complete the installation. This includes the requirement for the IC to make a preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the interconnection substation. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined Direct Connection and network upgrades, and that all transmission system outages will be allowed when requested.

The schedule for the required Network Impact Reinforcements will be more clearly identified in future study phases. The estimate elapsed time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Transmission Owner Analysis

Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AE2-232 project did not contribute to any overloads on the FE transmission <100 kV system.

9 Interconnection Customer Requirements

9.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

Preliminary protection requirements will be provided as part of the Facilities Study. Detailed protection requirements will be provided once the project enters the construction phase.

9.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated 230 kV circuit breaker to protect the AE2-232 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.

2. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

3. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the FE Transmission System Control Center.

4. Compliance with the FE and PJM generator power factor and voltage control requirements.

5. The execution of a back-up service agreement to serve the customer load supplied from the AE2-232 generation project metering point when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

The IC will also be required to meet all PJM, ReliabilityFirst, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

9.3 Power Factor Requirements

The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the FE transmission system.

10 Revenue Metering and SCADA Requirements

10.1 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.

10.2 JCPL Requirements

The IC will be required to comply with all FE revenue metering requirements for generation interconnection customers which can be found in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

11 Network Impacts – Summer Peak

The Queue Project AE2-232 was evaluated as a 400.0 MW (Capacity 112.4 MW) injection at Oyster Creek 230kV in the JCPL area. Project AE2-232 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-232 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Load Flow

11.1 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466608	206305	28RAR RVR	230.0	JCP&L	218331	KILMER_I	230.0	PSE&G	1	PS_P1-2_#2LINE	single	813.0	99.72	101.6	AC	17.31

11.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466269	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	JC-P2-3-JCC-230-32A	breaker	564.0	85.04	104.46	DC	109.54
8466866	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	JC-P7-1-JCC-230-7A	tower	564.0	92.67	113.49	DC	117.4
8466904	206319	28WHITINGS	230.0	JCP&L	206720	28MANCHSTR	230.0	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	99.79	123.22	DC	203.46
8466905	206319	28WHITINGS	230.0	JCP&L	206720	28MANCHSTR	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	91.24	115.76	DC	213.1
8466917	206720	28MANCHSTR	230.0	JCP&L	206318	28VANHISVL	230.0	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	98.05	121.48	DC	203.46
8466918	206720	28MANCHSTR	230.0	JCP&L	206318	28VANHISVL	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	89.5	114.02	DC	213.1

11.3 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	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466169	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	1	JC-P2-3-JCC-230-13G	breaker	817.0	118.37	133.12	DC	120.09
8466886	206294	28LARRABEE	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	1	JC-P7-1-JCC-230-7A	tower	956.0	103.29	115.09	DC	112.74
8466875	206297	28MANITOU	230.0	JCP&L	206319	28WHITINGS	230.0	JCP&L	1	JC-P7-1-JCC-230-10A	tower	817.0	117.17	142.07	DC	203.31

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466876	206297	28MANITOU	230.0	JCP&L	206319	28WHITINGS	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	817.0	110.28	136.68	DC	215.68
8466865	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	JC-P7-1-JCC-230-13	tower	564.0	129.3	187.95	AC	369.8
8466292	206305	28RAR RVR	230.0	JCP&L	218331	KILMER_I	230.0	PSE&G	1	PS_P2-3_LNEPS_P1-2_2_LT	breaker	813.0	147.45	153.99	AC	61.6
8466330	206305	28RAR RVR	230.0	JCP&L	218332	KILMER_W	230.0	PSE&G	1	PS_P2-3_LNEPS_P1-2_1_LT	breaker	817.0	127.02	131.93	AC	46.47
8466606	206305	28RAR RVR	230.0	JCP&L	218331	KILMER_I	230.0	PSE&G	1	PS_P1-2_#2LINE_LT	single	813.0	100.47	102.35	AC	17.31
8466236	206314	28RED OAKA	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-26B	breaker	869.0	157.33	163.49	DC	62.64
8466237	206314	28RED OAKA	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-026A	breaker	869.0	143.77	149.96	DC	62.94
8466218	206315	28RED OAKB	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-26D	breaker	869.0	161.07	167.21	DC	62.31
8466219	206315	28RED OAKB	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-026C	breaker	869.0	147.55	153.72	DC	62.6
8466927	206318	28VANHISVL	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	108.33	125.44	DC	148.53
8466928	206318	28VANHISVL	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	104.81	122.88	DC	157.0
8466184	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	2	JC-P2-3-JCC-230-13D	breaker	817.0	128.76	154.4	DC	209.32
8466274	206410	28R11RINGB	230.0	JCP&L	206315	28RED OAKB	230.0	JCP&L	1	JC-P2-3-JCC-230-26D	breaker	869.0	115.41	121.62	DC	63.22
8466275	206410	28R11RINGB	230.0	JCP&L	206315	28RED OAKB	230.0	JCP&L	1	JC-P2-3-JCC-230-026C	breaker	869.0	103.34	109.58	DC	63.52
8466265	206411	28R11RINGA	230.0	JCP&L	206314	28RED OAKA	230.0	JCP&L	1	JC-P2-3-JCC-230-26B	breaker	869.0	119.39	125.62	DC	63.41
8466266	206411	28R11RINGA	230.0	JCP&L	206314	28RED OAKA	230.0	JCP&L	1	JC-P2-3-JCC-230-026A	breaker	869.0	106.68	112.94	DC	63.7
8466253	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P4-2 AE46	breaker	692.0	165.21	172.18	DC	56.71
8466870	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	JC-P7-1-JCC-230-13	tower	692.0	181.6	204.35	DC	157.41
8466871	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P7-1 AE13TOWER	tower	692.0	171.11	178.21	DC	57.87
8467011	227949	LEWIS #3	138.0	AE	227901	DOROTHY	138.0	AE	1	JC-P7-1-JCC-230-13	tower	205.0	164.7	179.93	AC	37.98
8466859	228502	MNOTLA 1	138.0	AE	228500	LANDIS	138.0	AE	1	JC-P7-1-JCC-230-13	tower	286.0	231.73	243.02	DC	37.97
8466885	228503	MNOTLA 2	138.0	AE	228502	MNOTLA 1	138.0	AE	1	JC-P7-1-JCC-230-13	tower	311.0	213.35	223.73	DC	37.98

11.4 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	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466494	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	2	JC-P1-2-JCC-230-017	operation	813.0	116.56	131.38	DC	120.09
8466496	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	2	Base Case	operation	678.0	91.33	102.95	DC	78.51
8466520	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	1	JC-P1-2-JCC-230-018	operation	817.0	106.64	120.2	DC	110.4
8466522	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	1	Base Case	operation	650.0	95.26	107.38	DC	78.51
8466658	206295	28LEISUR D	230.0	JCP&L	206323	28LAKEWOOD	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	869.0	81.74	100.78	DC	198.22
8466583	206296	28LEISUR U	230.0	JCP&L	206323	28LAKEWOOD	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	89.63	113.36	DC	197.29
8466548	206297	28MANITOU	230.0	JCP&L	206296	28LEISUR U	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	101.97	126.48	DC	200.26
8466554	206297	28MANITOU	230.0	JCP&L	206295	28LEISUR D	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	817.0	101.33	125.84	DC	200.25
8466589	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	X	JC-P1-2-JCC-230-004	operation	432.0	140.23	146.04	AC	29.54
8466591	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	Y	JC-P1-2-JCC-230-003	operation	432.0	140.23	146.04	AC	29.54
8466454	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	JC-P1-2-JCC-230-022	operation	817.0	172.19	206.02	DC	276.32
8466456	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	Base Case	operation	650.0	115.89	138.83	DC	149.14
8466476	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	2	JC-P1-2-JCC-230-021	operation	869.0	161.92	193.73	DC	276.38
8466478	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	2	Base Case	operation	709.0	106.37	127.44	DC	149.33
8466644	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	JC-P1-2-JCC-230-009	operation	564.0	82.04	100.95	DC	106.65
8466601	206305	28RAR RVR	230.0	JCP&L	218331	KILMER_I	230.0	PSE&G	1	PS_P1-2_#2LINE_LT	operation	813.0	147.45	153.99	AC	61.6
8466607	206305	28RAR RVR	230.0	JCP&L	218331	KILMER_I	230.0	PSE&G	1	Base Case	operation	678.0	119.52	125.34	AC	45.72
8466719	206305	28RAR RVR	230.0	JCP&L	218332	KILMER_W	230.0	PSE&G	1	PS_P1-2_#1LINE_LT	operation	817.0	124.34	129.26	AC	46.56
8466723	206305	28RAR RVR	230.0	JCP&L	218332	KILMER_W	230.0	PSE&G	1	Base Case	operation	650.0	101.89	105.45	AC	26.91

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466612	206314	28RED OAKA	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-027	operation	869.0	138.59	144.75	DC	62.56
8466614	206314	28RED OAKA	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	Base Case	operation	709.0	111.22	115.21	AC	33.45
8466593	206315	28RED OAKB	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-028	operation	869.0	142.41	148.54	DC	62.22
8466595	206315	28RED OAKB	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	Base Case	operation	709.0	101.51	105.46	AC	32.16
8466619	206316	28WINDSOR	230.0	JCP&L	219752	CLRKSVLL_1	230.0	PSE&G	1	PJM_P1_68	operation	813.0	107.45	114.14	DC	54.23
8466499	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	2	JC-P1-2-JCC-230-014	operation	817.0	128.36	154.02	DC	209.41
8466501	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	2	Base Case	operation	650.0	85.13	102.11	AC	114.5
8466531	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	JC-P1-2-JCC-230-013	operation	869.0	121.85	145.96	DC	209.43
8466533	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	Base Case	operation	709.0	78.25	93.86	AC	114.8
8466596	206326	28E WINDSR	230.0	JCP&L	206316	28WINDSOR	230.0	JCP&L	1	PJM_P1_68	operation	869.0	118.34	124.32	DC	51.75
8466598	206326	28E WINDSR	230.0	JCP&L	206316	28WINDSOR	230.0	JCP&L	1	Base Case	operation	706.0	100.34	106.28	DC	41.99
8466667	206410	28R11RINGB	230.0	JCP&L	206315	28RED OAKB	230.0	JCP&L	1	JC-P1-2-JCC-230-028	operation	869.0	98.53	104.73	DC	63.13
8466649	206411	28R11RINGA	230.0	JCP&L	206314	28RED OAKA	230.0	JCP&L	1	JC-P1-2-JCC-230-027	operation	869.0	102.29	108.51	DC	63.32
8466624	218331	KILMER_I	230.0	PSE&G	218333	LNELSN_I	230.0	PSE&G	1	PS_P1-2_#2LINE	operation	805.0	142.49	149.09	AC	61.6
8466629	218331	KILMER_I	230.0	PSE&G	218333	LNELSN_I	230.0	PSE&G	1	Base Case	operation	650.0	118.91	124.98	AC	45.72
8466634	218332	KILMER_W	230.0	PSE&G	218334	LNELSN_W	230.0	PSE&G	1	PS_P1-2_#1LINE	operation	679.0	140.77	146.69	AC	46.56
8466638	218332	KILMER_W	230.0	PSE&G	218334	LNELSN_W	230.0	PSE&G	1	Base Case	operation	523.0	117.39	121.82	AC	26.91
8466797	218522	MIDDLESEX_W	230.0	PSE&G	218313	GREENBK_W	230.0	PSE&G	1	PS_P1-2_#1LINE	operation	872.0	107.32	111.93	AC	46.56
8466662	219104	CLRKSVLL_2	230.0	PSE&G	217150	LAWRENCE	230.0	PSE&G	1	PJM_P1_68	operation	805.0	97.17	103.93	DC	54.23
8466579	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	Base Case	operation	650.0	121.41	126.65	DC	40.05
14264521	227900	CARDIFF	230.0	AE	228002	ORCHARD	230.0	AE	1	PS_P1-2_2310A	operation	906.0	85.48	88.63	DC	45.94

11.5 System Reinforcements – Summer Peak

<table>
<tr><th>ID</th><th>Index</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AE2-232</th><th>Upgrade Number</th></tr>
<tr><td>8466865,8466866,8466269</td><td>2</td><td>28OYSTER C 230.0 kV - CEDAR 230.0 kV Ckt 1</td><td>
ACE:
Upgrade#1: To mitigate the (ACE) Cedar - Oyster Creek 230 kV line 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 : 60 months
New Ratings: 1195/1195/1195
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($63,000,000)</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-000</td><td>184.75</td><td>17%</td><td>10,800,033</td><td>'JC-P7-1-JCC-230-13'</td><td>Tower</td></tr>
<tr><td>AE2-021</td><td>201.7</td><td>19%</td><td>11,788,551</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-022</td><td>117.6</td><td>11%</td><td>6,876,771</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-023</td><td>106.2</td><td>10%</td><td>6,205,737</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-205</td><td>12.0</td><td>1%</td><td>701,491</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-222</td><td>85.7</td><td>8%</td><td>5,009,813</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-232</td><td>369.8</td><td>34%</td><td>21,617,604</td><td>'JC-P7-1-JCC-230-13'</td><td>Tower</td></tr>
</table>
JCPL:
Upgrade#1: Replace substation conductor at Oyster Creek
Time: 24 Months
New Ratings: 650/799/799
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($585,000)</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-000</td><td>184.75</td><td>12%</td><td>71,966</td><td>'JC-P7-1-JCC-230-13'</td><td>Tower</td></tr>
<tr><td>AE2-021</td><td>201.7</td><td>13%</td><td>78,553</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-022</td><td>117.6</td><td>8%</td><td>45,823</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-023</td><td>106.2</td><td>7%</td><td>41,352</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-205</td><td>12.0</td><td>1%</td><td>4,674</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-222</td><td>85.7</td><td>6%</td><td>33,371</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-232</td><td>369.8</td><td>25%</td><td>144,048</td><td>'JC-P7-1-JCC-230-13'</td><td>Tower</td></tr>
<tr><td>AE2-251</td><td>400.1</td><td>27%</td><td>155,862</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-314</td><td>24.0</td><td>2%</td><td>9,352</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
</table>
Upgrade#2: Replace terminal equipment at Oyster Creek
</td><td>$63,000,000
$585,000
$1,430,000</td><td>$21,617,604
$144,048
$498,093</td><td>N6512
N6522
N6523</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td></td>
<td>Time: 24 Months
New Ratings: 913/1147/1147
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($1,430,000)</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-022</td><td>63.9</td><td>6%</td><td>86,085</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-023</td><td>106.2</td><td>10%</td><td>142,987</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-205</td><td>12.0</td><td>1%</td><td>16,163</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-222</td><td>85.7</td><td>8%</td><td>115,391</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-232</td><td>369.8</td><td>35%</td><td>498,093</td><td>'JC-P7-1-JCC-230-13'</td><td>Tower</td></tr>
<tr><td>AE2-251</td><td>400.1</td><td>38%</td><td>538,943</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
<tr><td>AE2-314</td><td>24.0</td><td>2%</td><td>32,337</td><td>AE_P4-2 AE6'</td><td>Breaker</td></tr>
</table></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8466292,8466608,8466606</td>
<td>1</td>
<td>28RAR RVR 230.0 kV - KILMER_I 230.0 kV Ckt 1</td>
<td>Upgrade#1: Replace substation conductor at Kilmer & Reconductor transmission line
Time: 15 Months
New Ratings: 1156/1334/1334
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($27,302,400)</th><th>SP/LL</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE1-238</td><td>161.2</td><td>27%</td><td>7,399,317</td><td>SP</td><td>PS_P2-3_LNEPS_P1-2_2_LT</td><td>breaker</td></tr>
<tr><td>AE2-000</td><td>125.66</td><td>21%</td><td>5,769,768</td><td>SP</td><td>PS_P2-3_LNEPS_P1-2_2_LT</td><td>breaker</td></tr>
<tr><td>AE2-024</td><td>163.62</td><td>28%</td><td>7,512,729</td><td>SP</td><td>PS_P2-3_LNEPS_P1-2_2_LT</td><td>breaker</td></tr>
<tr><td>AE2-025</td><td>82.59</td><td>14%</td><td>3,792,179</td><td>SP</td><td>PS_P2-3_LNEPS_P1-2_2_LT</td><td>breaker</td></tr>
<tr><td>AE2-232</td><td>61.6</td><td>10%</td><td>2,828,408</td><td>SP</td><td>PS_P2-3_LNEPS_P1-2_2_LT</td><td>breaker</td></tr>
</table></td>
<td>$27,302,400</td>
<td>$2,828,408</td>
<td>N6201</td>
</tr>
<tr>
<td>8466169</td>
<td>6</td>
<td>28LARRABEE 230.0 kV - 28SMITHBRG 230.0 kV Ckt 1</td>
<td>Upgrade#1: Reconductor the Larrabee to Smithburg 230 kV line ckt 1, upgrade substation conductor and replace wave trap
Time: 36 m
New Ratings: 913/1147/1147
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($46,800,000)</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-025</td><td>125.2</td><td>46%</td><td>21,478,592</td><td>'JC-P2-3-JCC-230-13G'</td><td>Breaker</td></tr>
<tr><td>AE2-222</td><td>27.5</td><td>10%</td><td>4,717,742</td><td>'JC-P2-3-JCC-230-13G'</td><td>Breaker</td></tr>
</table></td>
<td>$46,800,000</td>
<td>$20,603,666</td>
<td>N6487</td>
</tr>
</table>

			AE2-232	120.1	44%	20,603,666	'JC-P2-3-JCC-230-13G'	Breaker			
8466274,8466275	15	**28R11RINGB 230.0 kV - 28REDOAKB 230.0 kV Ckt 1**	Upgrade#1: Reconductor transmission line Time: 12 Months New Ratings: 1156/1334/1334 AE2-024 | 47.4 | 24% | 833,811 | SP | JC-P2-3-JCC-230-26D | Breaker AE2-025 | 84.46 | 43% | 1,484,792 | SP | JC-P2-3-JCC-230-26D | Breaker AE2-232 | 63.22 | 32% | 1,111,397 | SP | JC-P2-3-JCC-230-26D | Breaker							$3,430,000	$1,111,397	N6596
8466870,8466871,8466253	17	**CARDIFF 230.0 kV - NEWFRDM 230.0 kV Ckt 1**	Upgrade#1: 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. New Ratings: 796/932/932 (Rate A/ Rate B/ Rate C) Time Estimate : 36-60 months AE2-021 | 188.6 | 23.38% | 24,550,458 | JC-P7-1-JCC-230-13' | Tower AE2-022 | 149.8 | 18.57% | 19,497,713 | JC-P7-1-JCC-230-13' | Tower AE2-023 | 127.5 | 15.80% | 16,595,183 | JC-P7-1-JCC-230-13' | Tower AE2-024 | 39.8 | 4.93% | 5,180,300 | AE_P4-2 AE46 | Breaker AE2-025 | 20.1 | 2.49% | 2,614,880 | AE_P4-2 AE46 | Breaker AE2-091 | 7.2 | 0.89% | 937,140 | AE_P4-2 AE46 | Breaker AE2-205 | 13.6 | 1.69% | 1,770,153 | JC-P7-1-JCC-230-13' | Tower AE2-222 | 102.7 | 12.73% | 13,367,257 | JC-P7-1-JCC-230-13' | Tower AE2-232 | 157.4 | 19.51% | 20,486,916 | JC-P7-1-JCC-230-13' | Tower Upgrade#2: To mitigate the (ACE) Cardiff - New Freedom 230 kV line (from bus 227900 to bus 219100 ckt 1) overload, it will require various terminal reinforcements are required at Cardiff. New Ratings: 993/993/993 (Rate A/ Rate B/ Rate C) Time Estimate : 24-36 months AE2-022 | 98.5 | 9.41% | $37,632 | JC-P7-1-JCC-230-13' | Tower AE2-023 | 127.5 | 12.18% | $48,712 | JC-P7-1-JCC-230-13' | Tower AE2-091 | 7.2 | 0.69% | $2,751 | AE_P4-2 AE46 | breaker AE2-205 | 13.6 | 1.29% | $5,177 | JC-P7-1-JCC-230-13' | Tower AE2-222 | 102.7 | 9.80% | $39,218 | JC-P7-1-JCC-230-13' | Tower AE2-232 | 157.4 | 15.03% | $60,135 | JC-P7-1-JCC-230-13' | Tower AE2-251 | 509.6 | 48.67% | $194,693 | JC-P7-1-JCC-230-13' | Tower AE2-314 | 30.6 | 2.92% | $11,683 | JC-P7-1-JCC-230-13' | Tower Upgrade#3: To mitigate the (ACE) Cardiff New Freedom 230 kV line (from bus 227900 to bus 219100 ckt 1) overload, it will require various terminal reinforcements at Cardiff. New Ratings: 1195/1195/1195 (Rate A/ Rate B/ Rate C) Time Estimate : 24-36 months Queue | MW contribution | Percentage of Cost | Cost($600,000) | Contingency Name | Contingency Type							$105,000,000 $400,000 $600,000 $600,000 $29,246,746	$20,486,916 $60,135 $95,782 $124,386 $8,453,345	N6342 N6343 N6344 N6504 N6505

			AE2-022	37.5	3.80%	$22,826	JC-P7-1-JCC-230-13'	Tower
			AE2-023	127.5	12.93%	$77,587	JC-P7-1-JCC-230-13'	Tower
			AE2-091	7.2	0.73%	$4,381	AE_P4-2 AE46	breaker
			AE2-205	13.5	1.37%	$8,245	JC-P7-1-JCC-230-13'	Tower
			AE2-222	102.7	10.41%	$62,465	JC-P7-1-JCC-230-13'	Tower
			AE2-232	157.4	15.96%	$95,782	JC-P7-1-JCC-230-13'	Tower
			AE2-251	509.6	51.68%	$310,105	JC-P7-1-JCC-230-13'	Tower
			AE2-314	30.6	3.10%	$18,609	JC-P7-1-JCC-230-13'	Tower

Upgrade#4: To mitigate the (ACE) Cardiff New Freedom 230 kV line (from bus 227900 to bus 219100 ckt 1) overload, it will require various terminal reinforcements at Cardiff.
New Ratings: 1195/1427/1427 (Rate A/ Rate B/ Rate C)
Time Estimate : 24-36 months

Queue	MW contribution	Percentage of Cost	Cost($600,000)	Contingency Name	Contingency Type
AE2-222	61.7	8.12%	$48,735	JC-P7-1-JCC-230-13'	Tower
AE2-232	157.4	20.73%	$124,386	JC-P7-1-JCC-230-13'	Tower
AE2-251	509.6	67.12%	$402,713	JC-P7-1-JCC-230-13'	Tower
AE2-314	30.6	4.03%	$24,166	JC-P7-1-JCC-230-13'	Tower

Upgrade#5: PSEG Upgrade:
PSEG correct emergency rating is 887 MVA
Upgrade #1: Upgrade New Freedom terminal equipment to a minimum of 2000MVA SER
New Ratings: 1800/2000 (Rate A/ Rate B)
Time: 17 Months

Queue	**MW contribution**	**Percentage of Cost**	**Cost($29,246,746)**	Contingency Name	Contingency Type
AE2-022	143.5	26.35%	7,705,218	JC-P7-1-JCC-230-13'	Tower
AE2-023	127.5	23.41%	6,847,531	JC-P7-1-JCC-230-13'	Tower
AE2-205	13.6	2.49%	727,718	JC-P7-1-JCC-230-13'	Tower
AE2-222	102.7	18.85%	5,512,934	JC-P7-1-JCC-230-13'	Tower
AE2-232	157.4	28.90%	8,453,345	JC-P7-1-JCC-230-13'	Tower

8466904,8466905	3	**28WHITINGS 230.0 kV - 28MANCHSTR 230.0 kV Ckt 1**	Upgrade#1: Reconductor transmission line, replace relaying and metering at Whitings, replace Wave Trap at Whitings, replace circuit breaker at Whitings, replace substation conductor at Manchester, and replace terminal equipment at Manchester and Whitings Time: 19 Months New Ratings: 1288/1288/1288					$87,549,900	$87,549,900	N6578

Queue	**MW contribution**	**% of Cost**	**Cost ($87,549,000)**	**Contingency**	**Contingency Type**
AE2-232	201.7	100%	87,549,900	'JC-P7-1-JCC-230-10A'	tower

8467011	18	**LEWIS #3 138.0 kV - DOROTHY 138.0 kV Ckt 1**	Upgrade #1: To mitigate the (ACE) Dorothy to Lewis #3 138 kV line (from bus 227901 to bus 227949 ckt 1) overload, terminal reinforcement is required at both Dorothy & Lewis #3 substations. Time Estimate : 24-48 months New Ratings: 392/485/485					$500,000	$62,549	N6435

Queue	MW contribution	% of Cost	Cost ($500,000)	Contingency	Contingency Type
AE2-021	10.5	3%	17,281	'JC-P7-1-JCC-230-13'	tower
AE2-022	33.6	11%	55,335	'JC-P7-1-JCC-230-13'	tower
AE2-023	53.2	18%	87,532	'JC-P7-1-JCC-230-13'	tower
AE2-205	4.4	1%	7,197	'JC-P7-1-JCC-230-13'	tower
AE2-222	42.8	14%	70,454	'JC-P7-1-JCC-230-13'	tower
AE2-232	38.0	13%	62,549	'JC-P7-1-JCC-230-13'	tower
AE2-251	114.4	38%	188,355	'JC-P7-1-JCC-230-13'	tower
AE2-314	6.9	2%	11,298	'JC-P7-1-JCC-230-13'	tower

8466859	19	**MNOTLA 1 138.0 kV - LANDIS 138.0 kV Ckt 1**	Upgrade#1: To mitigate the (AE - AE) MNOTLA 1-LANDIS 138 kV ckt 1 overload will include rebuilding the Minotola to Landis 138 kV transmission line. Also, upgrades to the terminals at Minotola and Landis Substation will be required. Cost : Time Estimate : 36-38 months New Ratings: 478/559/559	$12,800,000 $200,000 $200,000 $300,000	$2,077,879 $29,219 $37,795 $71,223	N6515 N6517 N6570 N6571

Queue	MW contribution	% of Cost	Cost ($12,800,000)	Contingency	Contingency Type
AE2-020	8.82	3.77	482,668	'JC-P7-1-JCC-230-13'	tower
AE2-021	57.60	24.63	3,152,116	'JC-P7-1-JCC-230-13'	tower
AE2-022	33.60	14.37	1,838,735	'JC-P7-1-JCC-230-13'	tower
AE2-023	53.14	22.72	2,908,046	'JC-P7-1-JCC-230-13'	tower
AE2-222	42.77	18.29	2,340,556	'JC-P7-1-JCC-230-13'	tower
AE2-232	37.97	16.23	2,077,879	'JC-P7-1-JCC-230-13'	tower

Upgrade #2:To mitigate the (AE - AE) MNOTLA 1-LANDIS 138 kV line (from bus 228502 to bus 228500 ckt 1) overload, several terminal equipment reinforcement is required at both, Landis and Minotola substation.
Time Estimate : 12-24 months
New Ratings: 549/621/621

Queue	MW contribution	% of Cost	Cost ($200,000)	Contingency	Contingency Type
AE2-022	4.8	1.85	3,694	'JC-P7-1-JCC-230-13'	tower
AE2-023	53.14	20.45	40,895	'JC-P7-1-JCC-230-13'	tower
AE2-222	42.77	16.46	32,914	'JC-P7-1-JCC-230-13'	tower
AE2-232	37.97	14.61	29,219	'JC-P7-1-JCC-230-13'	tower
AE2-251	114.35	44.00	87,999	'JC-P7-1-JCC-230-13'	tower
AE2-314	6.86	2.64	5,279	'JC-P7-1-JCC-230-13'	tower

Upgrade #3: To mitigate the (AE - AE) MNOTLA 1-LANDIS 138 kV line (from bus 228502 to bus 228500 ckt 1) overload, several terminal equipment reinforcement is required at both, Landis and Minotola substation.
Time Estimate : 12-24 months
New Ratings: 549/662/662

Queue	MW contribution	% of Cost	Cost ($200,000)	Contingency	Contingency Type
AE2-222	41.74	20.77	41,550	'JC-P7-1-JCC-230-13'	tower
AE2-232	37.97	18.90	37,795	'JC-P7-1-JCC-230-13'	tower
AE2-251	114.35	56.91	113,827	'JC-P7-1-JCC-230-13'	tower
AE2-314	6.86	3.41	6,829	'JC-P7-1-JCC-230-13'	tower

Upgrade #4:
To mitigate the (AE - AE) MNOTLA 1-LANDIS 138 kV line (from bus 228502 to bus 228500 ckt 1) overload, several terminal equipment reinforcement is required at both, Landis and Minotola substation.
Time Estimate : 12-24 months
New Ratings: 717/717/717

Queue	MW contribution	% of Cost	Cost ($300,000)	Contingency	Contingency Type
AE2-222	0.75	0.47	1,407	'JC-P7-1-JCC-230-13'	tower
AE2-232	37.97	23.74	71,223	'JC-P7-1-JCC-230-13'	tower
AE2-251	114.35	71.50	214,502	'JC-P7-1-JCC-230-13'	tower
AE2-314	6.86	4.29	12,868	'JC-P7-1-JCC-230-13'	tower

8466876,8466875	8	**28MANITOU 230.0 kV - 28WHITINGS 230.0 kV Ckt 1**	Upgrade#1: Replace substation conductor. Rating: 709/869/869 Time Estimate : 12 months	$195,000 $ 34,450,000 $ 260,000 $715,000	$73,451.64 $23,456,571 $123,504 $327,228	N6413 N6417 N6536 N6575

Queue	MW contribution	Percentage of Cost	Cost(195,000)	Contingency Name	Contingency Type
AE2-021	2.3	0.42%	$824	'JC-P7-1-JCC-230-10A'	tower
AE2-022	52.8	9.78%	$19,076	'JC-P7-1-JCC-230-10A'	tower
AE2-023	50.0	9.27%	$18,069	'JC-P7-1-JCC-230-10A'	tower
AE2-222	40.9	7.58%	$14,789	'JC-P7-1-JCC-230-10A'	tower
AE2-232	203.3	37.67%	$73,451.64	'JC-P7-1-JCC-230-10A'	tower
AE2-251	179.6	33.28%	$64,896.55	'JC-P7-1-JCC-230-10A'	tower
AE2-314	10.8	2.00%	$3,894.59	'JC-P7-1-JCC-230-10A'	tower

Upgrade#2:
Replace substation conductor, Reconductor Transmission Line
Rating: 815/923/923
Time Estimate : 30 months

Queue	MW contribution	Percentage of Cost	Cost($34,500,000)	Contingency Name	Contingency Type
AE2-022	4.77	1.60%	$550,331	'JC-P7-1-JCC-230-10A'	tower
AE2-023	50.0	16.73%	$5,770,286	'JC-P7-1-JCC-230-10A'	tower
AE2-222	40.9	13.69%	$4,722,811	'JC-P7-1-JCC-230-10A'	tower
AE2-232	203.3	67.99%	$23,456,571	'JC-P7-1-JCC-230-10A'	tower

Upgrade#3:
Replace substation conductor, reconductor Transmission Line, replace Wave Trap, and replace relaying and metering
Ratings: 830/1000/1000
Time: 30 Months

Queue	MW contribution	Percentage of Cost	Cost($260,000)	Contingency Name	Contingency Type
AE2-222	34.3	8.01%	$20,828	'JC-P7-1-JCC-230-10A'	tower
AE2-232	203.3	47.50%	$123,504	'JC-P7-1-JCC-230-10A'	tower
AE2-251	179.6	41.97%	$109,119	'JC-P7-1-JCC-230-10A'	tower
AE2-314	10.8	2.52%	$6,548	'JC-P7-1-JCC-230-10A'	tower

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<td>Upgrade#4: Replace circuit breakers, substation switches, current transformers and relaying and metering
Ratings: 1538/1538/1538
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>Cost($715,000)</th><th>Contingency Name</th><th>Contingency Type</th></tr>
<tr><td>AE2-232</td><td>160.7</td><td>45.77%</td><td>327,228</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr>
<tr><td>AE2-251</td><td>179.6</td><td>51.16%</td><td>365,819</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr>
<tr><td>AE2-314</td><td>10.8</td><td>3.07%</td><td>21,954</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr>
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<tr>
<td>8466218,8466219</td>
<td>12</td>
<td>28RED OAKB 230.0 kV - 28RAR RVR 230.0 kV Ckt 1</td>
<td>Queue Project AE2-232 presently does not receive cost allocation for this upgrade.
Upgrade#1:
Reconductor existing sections of 1590 ACSR 45/7 (Segment 3, Position 2; Segment 7, Position 1) with 1590 ACSS 45/7.
Time: 30 months.
New Rating: 1156/1334/1334

Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AE2-232 could receive cost allocation.

Note 2: Although Queue Project AE2-232 may not have cost responsibility for this upgrade, Queue Project AE2-232 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-232 comes into service prior to completion of the upgrade, Queue Project AE2-232 will need an interim study

Upgrade#2:
Reinforcement: Reconductor transmission line.
Time: 15 Months
New Ratings: 1162/1519/1519
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($22,361,800)</th><th>Analysis</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-025</td><td>63.6</td><td>51%</td><td>11,300,711</td><td>SP</td><td>'JC-P2-3-JCC-230-26D'</td><td>breaker</td></tr>
<tr><td>AE2-232</td><td>62.3</td><td>49%</td><td>11,061,089</td><td>SP</td><td>'JC-P2-3-JCC-230-26D'</td><td>breaker</td></tr>
</table>
</td>
<td>$3,900,000
$22,361,800</td>
<td>$11,061,089</td>
<td>N6204
N6550</td>
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<tr>
<td>8466886</td>
<td>7</td>
<td>28LARRABEE 230.0 kV - 28ATLANTIC 230.0 kV Ckt 1</td>
<td>Upgrade#1: Replace terminal equipment at Atlantic
Time: 12 Months
New Ratings: 1114/1285/1285
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($130,000)</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-025</td><td>7.5</td><td>3%</td><td>3,647</td><td>'JC-P7-1-JCC-230-7A'</td><td>tower</td></tr>
<tr><td>AE2-222</td><td>28.1</td><td>10%</td><td>13,582</td><td>'JC-P7-1-JCC-230-7A'</td><td>tower</td></tr>
<tr><td>AE2-232</td><td>112.7</td><td>42%</td><td>54,491</td><td>'JC-P7-1-JCC-230-7A'</td><td>tower</td></tr>
<tr><td>AE2-251</td><td>120.6</td><td>45%</td><td>58,280</td><td>'JC-P7-1-JCC-230-7A'</td><td>tower</td></tr>
</table>
</td>
<td>$130,000</td>
<td>$54,491</td>
<td>N6533</td>
</tr>
</table>

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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8466330</td><td>10</td><td>28RAR RVR 230.0 kV - KILMER_W 230.0 kV Ckt 1</td><td>Upgrade#1: Replace substation conductor at Kilmer & Reconductor transmission line
Time: 15 Months
New Ratings: 1156/1334/1334
<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($25,879,300)</th><th>SP/LL</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE2-000</td><td>68.9</td><td>23%</td><td>5,939,101</td><td>SP</td><td>'PS_P2-3_LNEPS_P1-2_1_LT'</td><td>breaker</td></tr><tr><td>AE2-024</td><td>122.74</td><td>41%</td><td>10,587,731</td><td>SP</td><td>'PS_P2-3_LNEPS_P1-2_1_LT'</td><td>breaker</td></tr><tr><td>AE2-025</td><td>61.95</td><td>21%</td><td>5,343,897</td><td>SP</td><td>'PS_P2-3_LNEPS_P1-2_1_LT'</td><td>breaker</td></tr><tr><td>AE2-232</td><td>46.47</td><td>15%</td><td>4,008,570</td><td>SP</td><td>'PS_P2-3_LNEPS_P1-2_1_LT'</td><td>breaker</td></tr></table></td><td>$25,879,300</td><td>$4,008,570</td><td>N6202</td></tr>
<tr><td>8466236,8466237</td><td>11</td><td>28RED OAKA 230.0 kV - 28RAR RVR 230.0 kV Ckt 1</td><td>Upgrade#1: Reconductor transmission line.
Time: 30 Months
New Ratings: 1156/1334/1334
<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($12,528,000)</th><th>SP/LL</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE1-238</td><td>238.3</td><td>34%</td><td>4,309,260</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr><tr><td>AE2-000</td><td>127.8</td><td>18%</td><td>2,310,656</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr><tr><td>AE2-024</td><td>166.2</td><td>24%</td><td>3,004,938</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr><tr><td>AE2-025</td><td>83.87</td><td>12%</td><td>1,516,391</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr><tr><td>AE2-222</td><td>14.1</td><td>2%</td><td>254,932</td><td>LL</td><td>'JC-P1-2-JCC-230-027'</td><td>single</td></tr><tr><td>AE2-232</td><td>62.6</td><td>9%</td><td>1,131,824</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr></table>
Upgrade#2: Reconductor transmission line.
Time: 15 Months
New Ratings: 1306/1593/1593
<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($5,004,900)</th><th>SP/LL</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE2-025</td><td>31.5</td><td>33%</td><td>1,673,682</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr><tr><td>AE2-232</td><td>62.6</td><td>67%</td><td>3,331,218</td><td>SP</td><td>JC-P2-3-JCC-230-26B'</td><td>breaker</td></tr></table></td><td>$12,528,000
$5,004,900</td><td>$1,131,824
$3,331,218</td><td>N5870
N6203</td></tr>
<tr><td>8466885</td><td>20</td><td>MNOTLA 2 138.0 kV - MNOTLA 1 138.0 kV Ckt 1</td><td>Upgrade #1:
To mitigate the (AE - AE) MNOTLA 2 to MNOTLA 1 138 kV line (from bus 228503 to bus 228502 ckt 1) overload will require substation reinforcements at Minotola Substation.
Time Estimate : 18 months
New Ratings: 550/621/621

Queue Project AE2-232 presently does not receive cost allocation for this upgrade.

Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AE2-232 could receive cost allocation.</td><td>$1,300,000
$400,000</td><td>$75,296</td><td>N6192
N6520</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>Note 2: Although Queue Project AE2-232 may not have cost responsibility for this upgrade, Queue Project AE2-232 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-232 comes into service prior to completion of the upgrade, Queue Project AE2-232 will need an interim study

Upgrade #2:
To mitigate the (AE - AE) MNOTLA 2-MNOTLA 1 138 kV line (from bus 228503 to bus 228502 ckt 1) overload will require terminal reinforcements at Minotola Substation.
Cost : $400,000
Time Estimate : 12-18 months
New Ratings: 605/717/717

<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($400,000)</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE2-222</td><td>42.5</td><td>21.08</td><td>84,334</td><td>'JC-P7-1-JCC-230-13'</td><td>tower</td></tr><tr><td>AE2-232</td><td>37.98</td><td>18.82</td><td>75,296</td><td>'JC-P7-1-JCC-230-13'</td><td>tower</td></tr><tr><td>AE2-251</td><td>114.37</td><td>56.69</td><td>226,768</td><td>'JC-P7-1-JCC-230-13'</td><td>tower</td></tr><tr><td>AE2-314</td><td>6.86</td><td>3.40</td><td>13,602</td><td>'JC-P7-1-JCC-230-13'</td><td>tower</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>8466918,8466917</td><td>4</td><td>28MANCHSTR 230.0 kV - 28VANHISVL 230.0 kV Ckt 1</td><td>Upgrade#1: Reconductor transmission line, replace substation conductor at Manchester, and replace terminal equipment at Manchester
Time: 18 Months
New Ratings: 1162/1519/1519

<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($39,704,300)</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE2-232</td><td>186.6</td><td>100%</td><td>39,704,300</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr></table></td><td>$39,704,300</td><td>$39,704,300</td><td>N6579</td></tr>
<tr><td>8466927,8466928</td><td>13</td><td>28VANHISVL 230.0 kV - 28LARRABEE 230.0 kV Ckt 1</td><td>Upgrade#1: Reconductor transmission line, replace Wave Trap at Larrabee, replace relaying and metering at Larrabee and replace terminal equipment at Larrabee
Time: 20 Months
New Ratings: 1162/1434/1434

<table><tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($41,445,000)</th><th>Contingency</th><th>Contingency Type</th></tr><tr><td>AE2-023</td><td>45.8</td><td>20%</td><td>8,127,309</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr><tr><td>AE2-222</td><td>39.3</td><td>17%</td><td>6,972,253</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr><tr><td>AE2-232</td><td>148.5</td><td>64%</td><td>26,345,537</td><td>'JC-P7-1-JCC-230-10A'</td><td>tower</td></tr></table></td><td>$41,445,100</td><td>$26,345,537</td><td>N6537</td></tr>
<tr><td>8466184</td><td>14</td><td>28LAKEWOOD 230.0 kV -</td><td>Upgrade #1: Replace Substation Conductor. Reconductor Transmission line.
Time Estimate : 12 months
New Ratings: 731/917/917</td><td>$195,000
$20,150,000</td><td>$62,095
$11,973,197</td><td>N6411
N6415</td></tr>
</table>

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<tr>
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<td>28LARRABEE 230.0 kV Ckt 2</td>
<td>
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($195,000)</th><th>Contingency</th><th>Type</th></tr>
<tr><td>AE2-021</td><td>86.9</td><td>13.22</td><td>25,785</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-022</td><td>56.8</td><td>8.64</td><td>16,850</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-023</td><td>54.8</td><td>8.34</td><td>16,268</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-222</td><td>44.4</td><td>6.75</td><td>13,156</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-232</td><td>209.3</td><td>31.84</td><td>62,095</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-251</td><td>193.5</td><td>29.44</td><td>57,402</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-314</td><td>11.6</td><td>1.77</td><td>3,444</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
</table>
Upgrade #2:
Replace Substation Conductor, reconductor Transmission line, replace Substation Terminal Disconnect Switch and replace Wave Trap.
Time Estimate : 24 months
New Ratings: 1593/1593/1593
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($20,150,000)</th><th>Contingency</th><th>Type</th></tr>
<tr><td>AE2-022</td><td>43.8</td><td>12.43</td><td>2,505,379</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-023</td><td>54.8</td><td>15.56</td><td>3,134,584</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-222</td><td>44.4</td><td>12.59</td><td>2,536,840</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
<tr><td>AE2-232</td><td>209.3</td><td>59.42</td><td>11,973,197</td><td>'JC-P2-3-JCC-230-13D'</td><td>breaker</td></tr>
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<tr>
<td>8466266,8466265</td>
<td>16</td>
<td>28R11RINGA 230.0 kV - 28REDOAKA 230.0 kV Ckt 1</td>
<td>
Upgrade#1: Reconductor transmission line
Time: 18 Months
New Ratings: 1156/1334/1334
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($1,290,900)</th><th>SP/LL</th><th>Contingency</th><th>Contingency Type</th></tr>
<tr><td>AE2-024</td><td>81.6</td><td>36%</td><td>458,604</td><td>SP</td><td>JC-P2-3-JCC-230-26B</td><td>Breaker</td></tr>
<tr><td>AE2-025</td><td>84.72</td><td>37%</td><td>476,022</td><td>SP</td><td>JC-P2-3-JCC-230-26B</td><td>Breaker</td></tr>
<tr><td>AE2-232</td><td>63.408</td><td>28%</td><td>356,275</td><td>SP</td><td>JC-P2-3-JCC-230-26B</td><td>Breaker</td></tr>
</table>
</td>
<td>$1,290,900</td>
<td>$356,275</td>
<td>N6597</td>
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<tr>
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<td>TOTAL COST</td>
<td>$589,853,346.00</td>
<td>$287,936,991.64</td>
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11.6 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.

11.7 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466292	206305	28RAR RVR	JCP&L	218331	KILMER_I	PSE&G	1	PS_P2-3_LNEPS_P1-2_2_LT	breaker	813.0	147.45	153.99	AC	61.6

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**29.4263**
206329	28S RIV G3	6.2831
206350	28RRCT1&2	4.9828
206351	28RRCT3&4	4.6658
206362	28RDOAKCT1	11.4740
206363	28RDOAKCT2	11.4491
206364	28RDOAKCT3	11.4491
206365	28RDOAKST1	16.0819
206403	28W4-009	49.7099
206412	28R11	181.0571
901032	W1-024E OP1	0.3945
901112	W1-032 E OP1	0.2369
901422	W1-113 E	0.7207
901912	W1-112E OP1	0.7097
901982	W1-119 E	1.2450
901991	W1-120C	0.8479
901992	W1-120E	1.3834
902032	W1-124E	2.9356
902082	W1-129E	0.3352
902322	W2-019 E	0.3964
902912	W2-078 E	0.8952
902952	W2-082 E OP1	1.1390
903982	W3-079 E	0.7347
905252	W4-025 E	0.4758
905502	W4-060 E OP1	2.0318
907082	X1-037 E	2.0818
907272	X1-085 E	0.3493
912102	X4-015 E	0.3352
912182	X4-031 E	0.4259
914092	Y2-051 E	0.5135
917612	Z2-102 E	0.9088
918452	AA1-060 E	2.5670
919662	AA2-048 E	1.3751
919672	AA2-049 E	0.8356
920732	AA2-184 E	4.7716
924852	AB2-139 E	0.0706
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**8.2299**
927131	AC1-207 C	0.8510
927132	AC1-207 E	1.4241
930891	AB1-138 C	0.5214
930892	AB1-138 E	0.8689

Bus #	Bus	MW Impact
931122	AB1-163 E	0.7112
934841	AD1-113	36.2411
937261	AD2-165	16.4597
939121	AE1-142 C O1	1.1637
939122	AE1-142 E O1	1.6746
939981	AE1-238 C	51.8957
939982	AE1-238 E	136.3127
940161	AE2-000 C O1	30.0154
940162	AE2-000 E O1	76.7990
940401	AE2-024 C O1	24.4772
940402	AE2-024 E O1	114.5996
940411	AE2-025 C	12.3561
940412	AE2-025 E	57.8446
940691	AE2-056 C	0.3163
940692	AE2-056 E	0.2768
940701	AE2-057 C	0.0991
940702	AE2-057 E	0.0991
940921	AE2-081 C	0.3361
940922	AE2-081 E	0.3460
940931	AE2-082 C	0.5730
940932	AE2-082 E	0.6067
942201	AE2-232 C O1	14.7132
942202	AE2-232 E O1	37.6468
DUCKCREEK	DUCKCREEK	0.7796
NEWTON	NEWTON	0.9318
G-007A	G-007A	124.1066
CHILHOWEE	CHILHOWEE	0.1164
TVA	TVA	1.1515
PRAIRIE	PRAIRIE	1.7332
O-066	O-066	33.6029
COFFEEN	COFFEEN	0.3567
CARR	CARR	1.1286
ROWAN /* 35% REVERSE 4479078	ROWAN /* 35% REVERSE 4479078	0.0000
EDWARDS	EDWARDS	0.3559
CHEOAH	CHEOAH	0.3258
TILTON	TILTON	0.4265
SANTEETLA	SANTEETLA	0.0956
SMITHLAND	SMITHLAND	0.1375
COTTONWOOD	COTTONWOOD	1.3860
HAMLET	HAMLET	0.3576
BLUEG	BLUEG	3.3868
UNIONPOWER	UNIONPOWER	0.5112
CANNELTON	CANNELTON	0.2049
GIBSON	GIBSON	0.1397
CALDERWOOD	CALDERWOOD	0.3554
FARMERCITY	FARMERCITY	0.2352
TRIMBLE	TRIMBLE	0.3762
RENSSELAER	RENSSELAER	0.8930
AE1-042	AE1-042	0.0000
CATAWBA	CATAWBA	0.2212

11.8 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466865	206302	28OYSTER C	JCP&L	227955	CEDAR	AE	1	JC-P7-1-JCC-230-13	tower	564.0	129.3	187.95	AC	369.8

Bus #	Bus	MW Impact
206360	28O CRK C1	4.1628
206361	28O CRK C2	2.4716
940161	AE2-000 C O1	211.9879
940162	AE2-000 E O1	542.4042
942201	AE2-232 C O1	103.9138
942202	AE2-232 E O1	265.8862
DUCKCREEK	DUCKCREEK	0.0415
NEWTON	NEWTON	0.0498
G-007A	G-007A	1.0237
CHILHOWEE	CHILHOWEE	0.0066
VFT	VFT	1.0255
TVA	TVA	0.0647
PRAIRIE	PRAIRIE	0.0930
COFFEEN	COFFEEN	0.0190
EDWARDS	EDWARDS	0.0189
CHEOAH	CHEOAH	0.0185
TILTON	TILTON	0.0227
SANTEETLA	SANTEETLA	0.0054
SMITHLAND	SMITHLAND	0.0074
CBM-N	CBM-N	0.0722
COTTONWOOD	COTTONWOOD	0.0777
HAMLET	HAMLET	0.0224
BLUEG	BLUEG	0.1804
UNIONPOWER	UNIONPOWER	0.0289
CANNELTON	CANNELTON	0.0110
GIBSON	GIBSON	0.0075
CALDERWOOD	CALDERWOOD	0.0202
FARMERCITY	FARMERCITY	0.0126
TRIMBLE	TRIMBLE	0.0200
CATAWBA	CATAWBA	0.0137
NYISO	NYISO	0.3132

11.9 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466904	206319	28WHITINGS	JCP&L	206720	28MANCHSTR	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	99.79	123.22	DC	203.46

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.6982
206306	28LKWD G1	6.0990
206308	28LKWD G2	6.0990
206312	28LKWD G3	3.9668
206325	**28O C GEN (Deativation : 09/17/18)**	**114.3468**
206360	28O CRK C1	2.2904
206361	28O CRK C2	1.3599
206366	28LKWD CT1	11.5617
206367	28LKWD CT2	11.5617
227801	ONTC&DCT	4.4825
227842	MARINGEN	0.0688
227843	MARINGEN E	0.5468
227927	V4-067C	0.0182
227928	V4-067E	0.2274
228014	PVILLEG	0.0730
292063	V1-021 E	0.0246
293404	V3-036	0.6387
902432	W2-030 E	0.7049
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**42.7634**
915022	Y3-012 E	1.0253
917612	Z2-102 E	0.6480
924701	AB2-122 C	0.0983
924702	AB2-122 E	0.1684
930001	AB1-001 C	0.1199
930002	AB1-001 E	0.1970
930891	AB1-138 C	1.3460
930892	AB1-138 E	2.2433
931122	AB1-163 E	0.7800
933962	AD1-019 E	0.8826
934351	AD1-059	1.0896
938781	AE1-104 C O1	11.6140
938782	AE1-104 E O1	29.7143
939121	AE1-142 C O1	4.4464
939122	AE1-142 E O1	6.3984
940161	AE2-000 C O1	116.6357
940162	AE2-000 E O1	298.4308
940361	AE2-020 C	15.9586
940362	AE2-020 E	74.7191
940371	AE2-021 C	15.9586
940372	AE2-021 E	74.7191

Bus #	Bus	MW Impact
940381	AE2-022 C	9.3092
940382	AE2-022 E	43.5861
940391	AE2-023 C	7.4965
940392	AE2-023 E	35.0947
942101	AE2-222 C	11.5221
942102	AE2-222 E	29.4819
942201	AE2-232 C O1	57.1734
942202	AE2-232 E O1	146.2906
942381	AE2-251 C	50.5564
942382	AE2-251 E	129.3596
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**6.4770**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**4.3180**
DUCKCREEK	DUCKCREEK	0.2430
NEWTON	NEWTON	0.2903
CHILHOWEE	CHILHOWEE	0.0357
G-007	G-007	3.1343
TVA	TVA	0.3553
PRAIRIE	PRAIRIE	0.5373
O-066	O-066	9.5633
COFFEEN	COFFEEN	0.1110
CARR	CARR	0.3745
EDWARDS	EDWARDS	0.1108
CHEOAH	CHEOAH	0.0996
TILTON	TILTON	0.1329
SANTEETLA	SANTEETLA	0.0293
SMITHLAND	SMITHLAND	0.0425
COTTONWOOD	COTTONWOOD	0.4263
HAMLET	HAMLET	0.1075
BLUEG	BLUEG	1.0521
UNIONPOWER	UNIONPOWER	0.1569
CANNELTON	CANNELTON	0.0636
GIBSON	GIBSON	0.0435
CALDERWOOD	CALDERWOOD	0.1092
FARMERCITY	FARMERCITY	0.0732
TRIMBLE	TRIMBLE	0.1169
RENSSELAER	RENSSELAER	0.2963
CATAWBA	CATAWBA	0.0668

11.10 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466917	206720	28MANCHSTR	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	98.05	121.48	DC	203.46

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.6982
206306	28LKWD G1	6.0990
206308	28LKWD G2	6.0990
206312	28LKWD G3	3.9668
206325	**28O C GEN (Deativation : 09/17/18)**	**114.3468**
206360	28O CRK C1	2.2904
206361	28O CRK C2	1.3599
206366	28LKWD CT1	11.5617
206367	28LKWD CT2	11.5617
227801	ONTC&DCT	4.4825
227842	MARINGEN	0.0688
227843	MARINGEN E	0.5468
227927	V4-067C	0.0182
227928	V4-067E	0.2274
228014	PVILLEG	0.0730
292063	V1-021 E	0.0246
293404	V3-036	0.6387
902432	W2-030 E	0.7049
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**42.7634**
915022	Y3-012 E	1.0253
917612	Z2-102 E	0.6480
924701	AB2-122 C	0.0983
924702	AB2-122 E	0.1684
930001	AB1-001 C	0.1199
930002	AB1-001 E	0.1970
930891	AB1-138 C	1.3460
930892	AB1-138 E	2.2433
931122	AB1-163 E	0.7800
933962	AD1-019 E	0.8826
934351	AD1-059	1.0896
938781	AE1-104 C O1	11.6140
938782	AE1-104 E O1	29.7143
939121	AE1-142 C O1	4.4464
939122	AE1-142 E O1	6.3984
940161	AE2-000 C O1	116.6357
940162	AE2-000 E O1	298.4308
940361	AE2-020 C	15.9586
940362	AE2-020 E	74.7191
940371	AE2-021 C	15.9586
940372	AE2-021 E	74.7191

Bus #	Bus	MW Impact
940381	AE2-022 C	9.3092
940382	AE2-022 E	43.5861
940391	AE2-023 C	7.4965
940392	AE2-023 E	35.0947
942101	AE2-222 C	11.5221
942102	AE2-222 E	29.4819
942201	AE2-232 C O1	57.1734
942202	AE2-232 E O1	146.2906
942381	AE2-251 C	50.5564
942382	AE2-251 E	129.3596
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**6.4770**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**4.3180**
DUCKCREEK	DUCKCREEK	0.2430
NEWTON	NEWTON	0.2903
CHILHOWEE	CHILHOWEE	0.0357
G-007	G-007	3.1343
TVA	TVA	0.3553
PRAIRIE	PRAIRIE	0.5373
O-066	O-066	9.5633
COFFEEN	COFFEEN	0.1110
CARR	CARR	0.3745
EDWARDS	EDWARDS	0.1108
CHEOAH	CHEOAH	0.0996
TILTON	TILTON	0.1329
SANTEETLA	SANTEETLA	0.0293
SMITHLAND	SMITHLAND	0.0425
COTTONWOOD	COTTONWOOD	0.4263
HAMLET	HAMLET	0.1075
BLUEG	BLUEG	1.0521
UNIONPOWER	UNIONPOWER	0.1569
CANNELTON	CANNELTON	0.0636
GIBSON	GIBSON	0.0435
CALDERWOOD	CALDERWOOD	0.1092
FARMERCITY	FARMERCITY	0.0732
TRIMBLE	TRIMBLE	0.1169
RENSSELAER	RENSSELAER	0.2963
CATAWBA	CATAWBA	0.0668

11.11 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466169	206294	28LARRABEE	JCP&L	206309	28SMITHBRG	JCP&L	1	JC-P2-3-JCC-230-13G	breaker	817.0	118.37	133.12	DC	120.09

Bus #	Bus	MW Impact
206271	28MCRC/REC	0.1764
206280	28LAKEHURS	0.5863
206306	28LKWD G1	3.9240
206308	28LKWD G2	3.9240
206312	28LKWD G3	2.5522
206325	**28O C GEN (Deativation : 09/17/18)**	**67.4895**
206360	28O CRK C1	1.3518
206361	28O CRK C2	0.8026
206366	28LKWD CT1	7.4386
206367	28LKWD CT2	7.4386
206412	28R11	31.1205
207144	28HOW_X1-037	0.1231
207145	28FRN_Y2-051	0.0789
207204	28HOL_W1-112	0.0292
207206	28TIN_W1-124	0.1921
207207	28JCB_W1-129	0.0526
207208	28JCB_W4-025	0.0720
227801	ONTC&DCT	3.0064
227843	MARINGEN E	0.3117
227928	V4-067E	0.1290
293404	V3-036	0.4284
901912	W1-112E OP1	0.3622
901981	W1-119 C	0.2000
901982	W1-119 E	2.4640
901991	W1-120C	1.6780
901992	W1-120E	2.7378
902032	W1-124E	2.3670
902082	W1-129E	0.6478
902321	W2-019 C	0.0626
902322	W2-019 E	0.7602
902432	W2-030 E	0.4739
902951	W2-082 C OP1	0.1786
902952	W2-082 E OP1	2.2000
903981	W3-079 C	0.1112
903982	W3-079 E	1.3883
905252	W4-025 E	0.9194
905502	W4-060 E OP1	0.4608
907082	X1-037 E	1.5113
912101	X4-015 C	0.0526
912102	X4-015 E	0.6478

Bus #	Bus	MW Impact
912182	X4-031 E	0.4206
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**29.4347**
914092	Y2-051 E	0.9718
915022	Y3-012 E	0.5845
917611	Z2-102 C	0.1471
917612	Z2-102 E	1.8126
918452	AA1-060 E	3.0564
919662	AA2-048 E	2.2087
919672	AA2-049 E	0.5727
920732	AA2-184 E	3.7378
924701	AB2-122 C	0.0557
924702	AB2-122 E	0.0956
924852	AB2-139 E	-0.0282
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**1.4146**
927131	AC1-207 C	-0.3601
930001	AB1-001 C	0.0683
930002	AB1-001 E	0.1122
930891	AB1-138 C	1.1304
930892	AB1-138 E	1.8839
931122	AB1-163 E	1.4414
933962	AD1-019 E	0.5919
934351	AD1-059	0.7010
937261	AD2-165	2.8291
938781	AE1-104 C O1	7.9941
938782	AE1-104 E O1	20.4529
939121	AE1-142 C O1	2.6736
939122	AE1-142 E O1	3.8474
939981	AE1-238 C	46.1453
939982	AE1-238 E	121.2082
940161	AE2-000 C O1	68.8404
940162	AE2-000 E O1	176.1391
940361	AE2-020 C	8.9714
940362	AE2-020 E	42.0048
940371	AE2-021 C	8.9714
940372	AE2-021 E	42.0048
940381	AE2-022 C	5.2333
940382	AE2-022 E	24.5028
940391	AE2-023 C	5.1600
940392	AE2-023 E	24.1562
940401	AE2-024 C O1	57.5050
940402	AE2-024 E O1	269.2319
940411	AE2-025 C	29.0285
940412	AE2-025 E	135.8959
940691	AE2-056 C	0.2263
940692	AE2-056 E	0.1980
940701	AE2-057 C	0.0358
940702	AE2-057 E	0.0358
940921	AE2-081 C	0.2404
940922	AE2-081 E	0.2475
942101	AE2-222 C	6.5686
942102	AE2-222 E	16.8072
942201	AE2-232 C O1	33.7447

Bus #	Bus	MW Impact
942202	AE2-232 E O1	86.3433
942381	AE2-251 C	28.4212
942382	AE2-251 E	72.7220
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**3.6412**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**2.4274**
DUCKCREEK	DUCKCREEK	0.3846
NEWTON	NEWTON	0.4604
G-007A	G-007A	16.0081
CHILHOWEE	CHILHOWEE	0.0573
TVA	TVA	0.5688
PRAIRIE	PRAIRIE	0.8550
O-066	O-066	5.6465
COFFEEN	COFFEEN	0.1760
CARR	CARR	0.3620
EDWARDS	EDWARDS	0.1754
CHEOAH	CHEOAH	0.1607
TILTON	TILTON	0.2104
SANTEETLA	SANTEETLA	0.0472
SMITHLAND	SMITHLAND	0.0679
COTTONWOOD	COTTONWOOD	0.6825
HAMLET	HAMLET	0.1765
BLUEG	BLUEG	1.6683
UNIONPOWER	UNIONPOWER	0.2521
CANNELTON	CANNELTON	0.1011
GIBSON	GIBSON	0.0689
CALDERWOOD	CALDERWOOD	0.1753
FARMERCITY	FARMERCITY	0.1162
TRIMBLE	TRIMBLE	0.1853
RENSSELAER	RENSSELAER	0.2867
CATAWBA	CATAWBA	0.1088

11.12 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466886	206294	28LARRABEE	JCP&L	206286	28ATLANTIC	JCP&L	1	JC-P7-1-JCC-230-7A	tower	956.0	103.29	115.09	DC	112.74

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.5412
206306	28LKWD G1	3.6635
206308	28LKWD G2	3.6635
206312	28LKWD G3	2.3828
206325	**28O C GEN (Deativation : 09/17/18)**	**63.3576**
206360	28O CRK C1	1.2691
206361	28O CRK C2	0.7535
206366	28LKWD CT1	6.9449
206367	28LKWD CT2	6.9449
207145	28FRN_Y2-051	0.0697
207207	28JCB_W1-129	0.0498
207208	28JCB_W4-025	0.0682
227801	ONTC&DCT	3.0720
227843	MARINGEN E	0.3185
227928	V4-067E	0.1315
292063	V1-021 E	0.0184
293404	V3-036	0.4377
901981	W1-119 C	0.1891
901982	W1-119 E	2.3292
901991	W1-120C	1.5862
901992	W1-120E	2.5880
902082	W1-129E	0.6137
902321	W2-019 C	0.0593
902322	W2-019 E	0.7206
902432	W2-030 E	0.4853
902951	W2-082 C OP1	0.1692
902952	W2-082 E OP1	2.0843
903981	W3-079 C	0.0913
903982	W3-079 E	1.1405
904432	W3-124 E	0.1096
905252	W4-025 E	0.8710
905792	W4-103 E	0.2687
907272	X1-085 E	0.1919
912101	X4-015 C	0.0498
912102	X4-015 E	0.6137
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**30.7114**
914092	Y2-051 E	0.8584
915022	Y3-012 E	0.5971
917611	Z2-102 C	0.1390
917612	Z2-102 E	1.7123
918452	AA1-060 E	3.0312

Bus #	Bus	MW Impact
919662	AA2-048 E	1.8144
919672	AA2-049 E	0.2855
924701	AB2-122 C	0.0568
924702	AB2-122 E	0.0974
930001	AB1-001 C	0.0697
930002	AB1-001 E	0.1146
930891	AB1-138 C	1.0434
930892	AB1-138 E	1.7390
931122	AB1-163 E	1.2880
933962	AD1-019 E	0.6048
934351	AD1-059	0.6545
938781	AE1-104 C O1	8.3408
938782	AE1-104 E O1	21.3399
939121	AE1-142 C O1	2.4986
939122	AE1-142 E O1	3.5956
940161	AE2-000 C O1	64.6259
940162	AE2-000 E O1	165.3555
940361	AE2-020 C	10.6951
940362	AE2-020 E	50.0752
940371	AE2-021 C	10.6951
940372	AE2-021 E	50.0752
940381	AE2-022 C	6.2388
940382	AE2-022 E	29.2105
940391	AE2-023 C	5.3838
940392	AE2-023 E	25.2039
940401	AE2-024 C O1	53.6521
940402	AE2-024 E O1	251.1935
940411	AE2-025 C	27.0836
940412	AE2-025 E	126.7909
942101	AE2-222 C	6.7112
942102	AE2-222 E	17.1721
942201	AE2-232 C O1	31.6788
942202	AE2-232 E O1	81.0572
942381	AE2-251 C	33.8819
942382	AE2-251 E	86.6941
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**4.3407**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**2.8938**
DUCKCREEK	DUCKCREEK	0.0864
NEWTON	NEWTON	0.1009
CHILHOWEE	CHILHOWEE	0.0098
G-007	G-007	9.2022
TVA	TVA	0.1050
PRAIRIE	PRAIRIE	0.1808
O-066	O-066	18.0095
COFFEEN	COFFEEN	0.0386
CARR	CARR	0.6303
EDWARDS	EDWARDS	0.0399
CHEOAH	CHEOAH	0.0270
TILTON	TILTON	0.0473
SANTEETLA	SANTEETLA	0.0079
SMITHLAND	SMITHLAND	0.0138
COTTONWOOD	COTTONWOOD	0.1281

Bus #	Bus	MW Impact
HAMLET	HAMLET	0.0178
BLUEG	BLUEG	0.3707
UNIONPOWER	UNIONPOWER	0.0453
CANNELTON	CANNELTON	0.0219
GIBSON	GIBSON	0.0153
CALDERWOOD	CALDERWOOD	0.0300
FARMERCITY	FARMERCITY	0.0248
TRIMBLE	TRIMBLE	0.0412
RENSSELAER	RENSSELAER	0.4988
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0137

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466875	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-10A	tower	817.0	117.17	142.07	DC	203.31

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.2703
206306	28LKWD G1	6.1436
206308	28LKWD G2	6.1436
206312	28LKWD G3	3.9958
206325	**28O C GEN (Deativation : 09/17/18)**	**114.2591**
206360	28O CRK C1	2.2886
206361	28O CRK C2	1.3588
206366	28LKWD CT1	11.6463
206367	28LKWD CT2	11.6463
227801	ONTC&DCT	4.4750
227842	MARINGEN	0.0687
227843	MARINGEN E	0.5459
227927	V4-067C	0.0182
227928	V4-067E	0.2270
228014	PVILLEG	0.0729
292063	V1-021 E	0.0246
293404	V3-036	0.6376
902432	W2-030 E	0.7037
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**42.6836**
915022	Y3-012 E	1.0236
924701	AB2-122 C	0.0981
924702	AB2-122 E	0.1682
930001	AB1-001 C	0.1197
930002	AB1-001 E	0.1967
930891	AB1-138 C	0.5210
930892	AB1-138 E	0.8684
933962	AD1-019 E	0.8811
934351	AD1-059	1.0976
938781	AE1-104 C O1	11.5924
938782	AE1-104 E O1	29.6589
939121	AE1-142 C O1	3.9362
939122	AE1-142 E O1	5.6642
940161	AE2-000 C O1	116.5463
940162	AE2-000 E O1	298.2020
940361	AE2-020 C	15.9330
940362	AE2-020 E	74.5995
940371	AE2-021 C	15.9330
940372	AE2-021 E	74.5995
940381	AE2-022 C	9.2943
940382	AE2-022 E	43.5164

Bus #	Bus	MW Impact
940391	AE2-023 C	7.4825
940392	AE2-023 E	35.0292
942101	AE2-222 C	11.5027
942102	AE2-222 E	29.4323
942201	AE2-232 C O1	57.1296
942202	AE2-232 E O1	146.1785
942381	AE2-251 C	50.4755
942382	AE2-251 E	129.1525
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**6.4666**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**4.3111**
DUCKCREEK	DUCKCREEK	0.2395
NEWTON	NEWTON	0.2862
CHILHOWEE	CHILHOWEE	0.0352
G-007	G-007	3.1017
TVA	TVA	0.3500
PRAIRIE	PRAIRIE	0.5295
O-066	O-066	9.4557
COFFEEN	COFFEEN	0.1094
CARR	CARR	0.3701
EDWARDS	EDWARDS	0.1092
CHEOAH	CHEOAH	0.0981
TILTON	TILTON	0.1310
SANTEETLA	SANTEETLA	0.0288
SMITHLAND	SMITHLAND	0.0419
COTTONWOOD	COTTONWOOD	0.4200
HAMLET	HAMLET	0.1058
BLUEG	BLUEG	1.0371
UNIONPOWER	UNIONPOWER	0.1545
CANNELTON	CANNELTON	0.0627
GIBSON	GIBSON	0.0429
CALDERWOOD	CALDERWOOD	0.1076
FARMERCITY	FARMERCITY	0.0721
TRIMBLE	TRIMBLE	0.1152
RENSSELAER	RENSSELAER	0.2928
CATAWBA	CATAWBA	0.0658

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466330	206305	28RAR RVR	JCP&L	218332	KILMER_W	PSE&G	1	PS_P2-3_LNEPS_P1-2_1_LT	breaker	817.0	127.02	131.93	AC	46.47

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**22.1997**
206329	28S RIV G3	4.6017
206350	28RRCT1&2	3.6458
206351	28RRCT3&4	3.4139
206362	28RDOAKCT1	8.4019
206363	28RDOAKCT2	8.3837
206364	28RDOAKCT3	8.3837
206365	28RDOAKST1	11.7760
206403	28W4-009	36.3715
206412	28R11	132.6054
901032	W1-024E OP1	0.2964
901112	W1-032 E OP1	0.1797
901422	W1-113 E	0.5442
901912	W1-112E OP1	0.5234
901982	W1-119 E	0.9458
901991	W1-120C	0.6441
901992	W1-120E	1.0508
902032	W1-124E	2.1743
902082	W1-129E	0.2550
902322	W2-019 E	0.3016
902912	W2-078 E	0.6728
902952	W2-082 E OP1	0.8665
903982	W3-079 E	0.5499
905252	W4-025 E	0.3620
905502	W4-060 E OP1	1.4940
907082	X1-037 E	1.5501
907272	X1-085 E	0.2665
912102	X4-015 E	0.2550
912182	X4-031 E	0.3164
914092	Y2-051 E	0.3845
917612	Z2-102 E	0.6900
918452	AA1-060 E	1.9552
919662	AA2-048 E	1.0293
919672	AA2-049 E	0.6189
920732	AA2-184 E	3.5334
924852	AB2-139 E	0.0529
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**6.0275**
927131	AC1-207 C	0.6370
927132	AC1-207 E	1.0661
930891	AB1-138 C	0.3920
930892	AB1-138 E	0.6534

Bus #	Bus	MW Impact
931122	AB1-163 E	0.5351
934841	AD1-113	26.5167
937261	AD2-165	12.0550
937512	AD2-210 E	0.1823
939121	AE1-142 C O1	0.8757
939122	AE1-142 E O1	1.2602
939981	AE1-238 C	38.4642
939982	AE1-238 E	101.0326
940161	AE2-000 C O1	22.6441
940162	AE2-000 E O1	57.9384
940401	AE2-024 C O1	18.3615
940402	AE2-024 E O1	85.9667
940411	AE2-025 C	9.2689
940412	AE2-025 E	43.3920
940691	AE2-056 C	0.2356
940692	AE2-056 E	0.2061
940701	AE2-057 C	0.0738
940702	AE2-057 E	0.0738
940921	AE2-081 C	0.2503
940922	AE2-081 E	0.2576
940931	AE2-082 C	0.4296
940932	AE2-082 E	0.4548
942201	AE2-232 C O1	11.0998
942202	AE2-232 E O1	28.4014
DUCKCREEK	DUCKCREEK	0.4664
NEWTON	NEWTON	0.5558
G-007A	G-007A	90.8077
CHILHOWEE	CHILHOWEE	0.0680
TVA	TVA	0.6772
PRAIRIE	PRAIRIE	1.0306
O-066	O-066	43.0855
COFFEEN	COFFEEN	0.2130
CARR	CARR	1.2267
ROWAN /* 35% REVERSE 4479078	ROWAN /* 35% REVERSE 4479078	0.0000
EDWARDS	EDWARDS	0.2132
CHEOAH	CHEOAH	0.1902
TILTON	TILTON	0.2552
SANTEETLA	SANTEETLA	0.0559
SMITHLAND	SMITHLAND	0.0816
COTTONWOOD	COTTONWOOD	0.8169
HAMLET	HAMLET	0.2030
BLUEG	BLUEG	2.0240
UNIONPOWER	UNIONPOWER	0.3005
CANNELTON	CANNELTON	0.1221
GIBSON	GIBSON	0.0834
CALDERWOOD	CALDERWOOD	0.2080
FARMERCITY	FARMERCITY	0.1400
TRIMBLE	TRIMBLE	0.2248
RENSSELAER	RENSSELAER	0.9706
AE1-042	AE1-042	0.0000
CATAWBA	CATAWBA	0.1267

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466236	206314	28RED OAKA	JCP&L	206305	28RAR RVR	JCP&L	1	JC-P2-3-JCC-230-26B	breaker	869.0	157.33	163.49	DC	62.64

Bus #	Bus	MW Impact
206201	28JERSVGEN	0.0495
206271	28MCRC/REC	0.2705
206325	**28O C GEN (Deativation : 09/17/18)**	**29.9250**
206327	28S RIV G1	5.2873
206328	28S RIV G2	5.2873
206329	28S RIV G3	7.9651
206358	28PARLN1&2	3.3656
206359	28PARLN3&4	4.3516
206363	28RDOAKCT2	14.7622
206364	28RDOAKCT3	14.7622
206412	28R11	270.0324
207144	28HOW_X1-037	0.1761
207145	28FRN_Y2-051	0.0496
207204	28HOL_W1-112	0.0614
207206	28TIN_W1-124	0.2973
901112	W1-032 E OP1	0.1702
901912	W1-112E OP1	0.7625
901982	W1-119 E	1.2041
901991	W1-120C	0.8200
901992	W1-120E	1.3378
902032	W1-124E	3.6630
902082	W1-129E	0.3218
902322	W2-019 E	0.3795
902952	W2-082 E OP1	1.0932
903981	W3-079 C	0.0702
903982	W3-079 E	0.8772
905252	W4-025 E	0.4567
907082	X1-037 E	2.1612
912102	X4-015 E	0.3218
912182	X4-031 E	0.5099
914092	Y2-051 E	0.6113
917612	Z2-102 E	0.8811
918452	AA1-060 E	2.1358
919662	AA2-048 E	1.3955
919672	AA2-049 E	0.8862
920732	AA2-184 E	5.9224
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**12.2742**
930891	AB1-138 C	0.5264
930892	AB1-138 E	0.8774
931122	AB1-163 E	0.7120
937261	AD2-165	24.5484

Bus #	Bus	MW Impact
939121	AE1-142 C O1	1.1814
939122	AE1-142 E O1	1.7001
939981	AE1-238 C	67.3853
939982	AE1-238 E	176.9986
940161	AE2-000 C O1	30.5241
940162	AE2-000 E O1	78.1006
940401	AE2-024 C O1	29.2422
940402	AE2-024 E O1	136.9089
940411	AE2-025 C	14.7615
940412	AE2-025 E	69.1053
940691	AE2-056 C	0.3264
940692	AE2-056 E	0.2856
940701	AE2-057 C	0.0935
940702	AE2-057 E	0.0935
940921	AE2-081 C	0.3468
940922	AE2-081 E	0.3570
942201	AE2-232 C O1	14.9625
942202	AE2-232 E O1	38.2849
DUCKCREEK	DUCKCREEK	0.3167
NEWTON	NEWTON	0.3760
CHILHOWEE	CHILHOWEE	0.0446
G-007	G-007	30.0877
TVA	TVA	0.4480
PRAIRIE	PRAIRIE	0.6922
O-066	O-066	33.8855
COFFEEN	COFFEEN	0.1438
CARR	CARR	1.0286
EDWARDS	EDWARDS	0.1444
CHEOAH	CHEOAH	0.1246
TILTON	TILTON	0.1732
SANTEETLA	SANTEETLA	0.0366
SMITHLAND	SMITHLAND	0.0545
COTTONWOOD	COTTONWOOD	0.5418
HAMLET	HAMLET	0.1271
BLUEG	BLUEG	1.3677
UNIONPOWER	UNIONPOWER	0.1982
CANNELTON	CANNELTON	0.0822
GIBSON	GIBSON	0.0565
CALDERWOOD	CALDERWOOD	0.1365
FARMERCITY	FARMERCITY	0.0945
TRIMBLE	TRIMBLE	0.1519
RENSSELAER	RENSSELAER	0.8140
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0808

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466218	206315	28RED OAKB	JCP&L	206305	28RAR RVR	JCP&L	1	JC-P2-3-JCC-230-26D	breaker	869.0	161.07	167.21	DC	62.31

Bus #	Bus	MW Impact
206201	28JERSVGEN	0.0494
206271	28MCRC/REC	0.2696
206325	**28O C GEN (Deativation : 09/17/18)**	**29.7645**
206327	28S RIV G1	5.1776
206328	28S RIV G2	5.1776
206329	28S RIV G3	7.7997
206358	28PARLN1&2	3.4117
206359	28PARLN3&4	4.4111
206362	28RDOAKCT1	14.7935
206365	28RDOAKST1	20.7343
206412	28R11	264.4268
207144	28HOW_X1-037	0.1756
207145	28FRN_Y2-051	0.0494
207204	28HOL_W1-112	0.0615
207206	28TIN_W1-124	0.2963
901112	W1-032 E OP1	0.1692
901912	W1-112E OP1	0.7642
901982	W1-119 E	1.1973
901991	W1-120C	0.8154
901992	W1-120E	1.3304
902032	W1-124E	3.6506
902082	W1-129E	0.3199
902322	W2-019 E	0.3774
902952	W2-082 E OP1	1.0869
903981	W3-079 C	0.0699
903982	W3-079 E	0.8730
905252	W4-025 E	0.4541
907082	X1-037 E	2.1552
912102	X4-015 E	0.3199
912182	X4-031 E	0.5081
914092	Y2-051 E	0.6083
917612	Z2-102 E	0.8761
918452	AA1-060 E	2.1232
919662	AA2-048 E	1.3889
919672	AA2-049 E	0.8832
920732	AA2-184 E	5.9034
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**12.0194**
930891	AB1-138 C	0.5237
930892	AB1-138 E	0.8729
931122	AB1-163 E	0.7083
937261	AD2-165	24.0388

Bus #	Bus	MW Impact
939121	AE1-142 C O1	1.1752
939122	AE1-142 E O1	1.6912
939981	AE1-238 C	67.0658
939982	AE1-238 E	176.1594
940161	AE2-000 C O1	30.3604
940162	AE2-000 E O1	77.6817
940401	AE2-024 C O1	29.0932
940402	AE2-024 E O1	136.2112
940411	AE2-025 C	14.6862
940412	AE2-025 E	68.7532
940691	AE2-056 C	0.3255
940692	AE2-056 E	0.2848
940701	AE2-057 C	0.0933
940702	AE2-057 E	0.0933
940921	AE2-081 C	0.3458
940922	AE2-081 E	0.3560
942201	AE2-232 C O1	14.8823
942202	AE2-232 E O1	38.0795
DUCKCREEK	DUCKCREEK	0.3431
NEWTON	NEWTON	0.4092
CHILHOWEE	CHILHOWEE	0.0489
G-007	G-007	30.0006
TVA	TVA	0.4900
PRAIRIE	PRAIRIE	0.7542
O-066	O-066	33.9259
COFFEEN	COFFEEN	0.1564
CARR	CARR	1.0338
EDWARDS	EDWARDS	0.1570
CHEOAH	CHEOAH	0.1366
TILTON	TILTON	0.1884
SANTEETLA	SANTEETLA	0.0401
SMITHLAND	SMITHLAND	0.0595
COTTONWOOD	COTTONWOOD	0.5922
HAMLET	HAMLET	0.1415
BLUEG	BLUEG	1.4880
UNIONPOWER	UNIONPOWER	0.2170
CANNELTON	CANNELTON	0.0895
GIBSON	GIBSON	0.0615
CALDERWOOD	CALDERWOOD	0.1496
FARMERCITY	FARMERCITY	0.1029
TRIMBLE	TRIMBLE	0.1653
RENSSELAER	RENSSELAER	0.8180
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0893

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466927	206318	28VANHISVL	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	108.33	125.44	DC	148.53

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.5071
206306	28LKWD G1	4.3927
206308	28LKWD G2	4.3927
206312	28LKWD G3	2.8571
206325	**28O C GEN (Deativation : 09/17/18)**	**83.4750**
206360	28O CRK C1	1.6720
206361	28O CRK C2	0.9927
206366	28LKWD CT1	8.3272
206367	28LKWD CT2	8.3272
207207	28JCB_W1-129	0.0811
207208	28JCB_W4-025	0.1110
227801	ONTC&DCT	4.2938
227842	MARINGEN	0.0659
227843	MARINGEN E	0.4452
227927	V4-067C	0.0173
227928	V4-067E	0.2159
228014	PVILLEG	0.0698
292063	V1-021 E	0.0262
292099	V1-030 E3	0.0873
293404	V3-036	0.6118
901981	W1-119 C	0.3015
901982	W1-119 E	3.7140
901991	W1-120C	2.5293
901992	W1-120E	4.1267
902082	W1-129E	0.9992
902321	W2-019 C	0.0972
902322	W2-019 E	1.1810
902432	W2-030 E	0.6790
902691	W2-056 C	0.0728
902692	W2-056 E	0.8966
902842	W2-071E	0.1536
902951	W2-082 C OP1	0.2756
902952	W2-082 E OP1	3.3950
903152	W2-102 E	0.4689
904042	V4-005 E	0.1945
904431	W3-124 C	0.0198
904432	W3-124 E	0.2448
905252	W4-025 E	1.4182
905791	W4-103 C	0.0487
905792	W4-103 E	0.6002

Bus #	Bus	MW Impact
907272	X1-085 E	0.2884
912101	X4-015 C	0.0811
912102	X4-015 E	0.9992
913332	Y1-075 E	0.1813
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**43.3637**
915022	Y3-012 E	0.8347
917611	Z2-102 C	0.2201
917612	Z2-102 E	2.7117
918452	AA1-060 E	4.8972
919672	AA2-049 E	0.4254
924701	AB2-122 C	0.0933
924702	AB2-122 E	0.1599
924852	AB2-139 E	-0.0355
927131	AC1-207 C	-0.4554
930001	AB1-001 C	0.1146
930002	AB1-001 E	0.1883
930102	AB1-025 E	0.4634
930891	AB1-138 C	0.9777
930892	AB1-138 E	1.6295
931122	AB1-163 E	0.8209
932361	AC2-050 C O1	0.3560
932362	AC2-050 E O1	0.5808
933962	AD1-019 E	0.8454
934351	AD1-059	0.7848
938781	AE1-104 C O1	11.7771
938782	AE1-104 E O1	30.1315
939121	AE1-142 C O1	3.2201
939122	AE1-142 E O1	4.6337
940161	AE2-000 C O1	85.1460
940162	AE2-000 E O1	217.8593
940361	AE2-020 C	14.8675
940362	AE2-020 E	69.6109
940371	AE2-021 C	14.8675
940372	AE2-021 E	69.6109
940381	AE2-022 C	8.6727
940382	AE2-022 E	40.6064
940391	AE2-023 C	7.6017
940392	AE2-023 E	35.5873
942101	AE2-222 C	9.3804
942102	AE2-222 E	24.0017
942201	AE2-232 C O1	41.7375
942202	AE2-232 E O1	106.7945
942381	AE2-251 C	47.1001
942382	AE2-251 E	120.5159
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**6.0342**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**4.0228**
DUCKCREEK	DUCKCREEK	0.1739
NEWTON	NEWTON	0.2046
CHILHOWEE	CHILHOWEE	0.0214
G-007	G-007	9.9403
TVA	TVA	0.2223
PRAIRIE	PRAIRIE	0.3694

Bus #	Bus	MW Impact
O-066	O-066	25.7557
COFFEEN	COFFEEN	0.0782
CARR	CARR	0.9493
EDWARDS	EDWARDS	0.0798
CHEOAH	CHEOAH	0.0591
TILTON	TILTON	0.0951
SANTEETLA	SANTEETLA	0.0173
SMITHLAND	SMITHLAND	0.0285
COTTONWOOD	COTTONWOOD	0.2730
HAMLET	HAMLET	0.0477
BLUEG	BLUEG	0.7465
UNIONPOWER	UNIONPOWER	0.0968
CANNELTON	CANNELTON	0.0445
GIBSON	GIBSON	0.0308
CALDERWOOD	CALDERWOOD	0.0650
FARMERCITY	FARMERCITY	0.0507
TRIMBLE	TRIMBLE	0.0835
RENSSELAER	RENSSELAER	0.7515
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0333

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466184	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P2-3-JCC-230-13D	breaker	817.0	128.76	154.4	DC	209.32

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.6205
206306	28LKWD G1	7.9977
206308	28LKWD G2	7.9977
206312	28LKWD G3	5.2018
206325	**28O C GEN (Deativation : 09/17/18)**	**117.6401**
206360	28O CRK C1	2.3564
206361	28O CRK C2	1.3990
206366	28LKWD CT1	15.1612
206367	28LKWD CT2	15.1612
227801	ONTC&DCT	4.8483
227842	MARINGEN	0.0744
227843	MARINGEN E	0.5914
227927	V4-067C	0.0197
227928	V4-067E	0.2455
228014	PVILLEG	0.0789
292063	V1-021 E	0.0273
293404	V3-036	0.6908
901982	W1-119 E	1.0236
901991	W1-120C	0.6971
901992	W1-120E	1.1374
902432	W2-030 E	0.7633
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**46.8060**
915022	Y3-012 E	1.1090
917612	Z2-102 E	0.8260
924701	AB2-122 C	0.1061
924702	AB2-122 E	0.1818
930001	AB1-001 C	0.1296
930002	AB1-001 E	0.2130
930891	AB1-138 C	1.1962
930892	AB1-138 E	1.9937
931122	AB1-163 E	0.6140
933962	AD1-019 E	0.9546
934351	AD1-059	1.4288
938781	AE1-104 C O1	12.7120
938782	AE1-104 E O1	32.5234
939121	AE1-142 C O1	4.4395
939122	AE1-142 E O1	6.3885
940161	AE2-000 C O1	119.9950
940162	AE2-000 E O1	307.0260
940361	AE2-020 C	17.1645

Bus #	Bus	MW Impact
940362	AE2-020 E	80.3655
940371	AE2-021 C	17.1645
940372	AE2-021 E	80.3655
940381	AE2-022 C	10.0126
940382	AE2-022 E	46.8799
940391	AE2-023 C	8.2052
940392	AE2-023 E	38.4124
942101	AE2-222 C	12.4629
942102	AE2-222 E	31.8891
942201	AE2-232 C O1	58.8200
942202	AE2-232 E O1	150.5040
942381	AE2-251 C	54.3769
942382	AE2-251 E	139.1351
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**6.9664**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**4.6443**
DUCKCREEK	DUCKCREEK	0.3063
NEWTON	NEWTON	0.3650
CHILHOWEE	CHILHOWEE	0.0443
G-007	G-007	5.1461
TVA	TVA	0.4427
PRAIRIE	PRAIRIE	0.6742
O-066	O-066	14.7454
COFFEEN	COFFEEN	0.1395
CARR	CARR	0.5682
EDWARDS	EDWARDS	0.1396
CHEOAH	CHEOAH	0.1241
TILTON	TILTON	0.1676
SANTEETLA	SANTEETLA	0.0365
SMITHLAND	SMITHLAND	0.0533
COTTONWOOD	COTTONWOOD	0.5334
HAMLET	HAMLET	0.1311
BLUEG	BLUEG	1.3276
UNIONPOWER	UNIONPOWER	0.1959
CANNELTON	CANNELTON	0.0801
GIBSON	GIBSON	0.0549
CALDERWOOD	CALDERWOOD	0.1354
FARMERCITY	FARMERCITY	0.0917
TRIMBLE	TRIMBLE	0.1475
RENSSELAER	RENSSELAER	0.4497
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0822

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466274	206410	28R11RINGB	JCP&L	206315	28RED OAKB	JCP&L	1	JC-P2-3-JCC-230-26D	breaker	869.0	115.41	121.62	DC	63.22

Bus #	Bus	MW Impact
206201	28JERSVGEN	0.0500
206271	28MCRC/REC	0.2718
206325	**28O C GEN (Deativation : 09/17/18)**	**30.2021**
206327	28S RIV G1	5.1973
206328	28S RIV G2	5.1973
206329	28S RIV G3	7.8295
206358	28PARLN1&2	3.4249
206359	28PARLN3&4	4.4283
206367	28LKWD CT2	3.8342
206412	28R11	265.4344
207144	28HOW_X1-037	0.1776
207145	28FRN_Y2-051	0.0500
207204	28HOL_W1-112	0.0620
207206	28TIN_W1-124	0.2986
901112	W1-032 E OP1	0.1729
901912	W1-112E OP1	0.7699
901982	W1-119 E	1.2190
901991	W1-120C	0.8301
901992	W1-120E	1.3544
902032	W1-124E	3.6790
902082	W1-129E	0.3259
902322	W2-019 E	0.3846
902952	W2-082 E OP1	1.1074
903981	W3-079 C	0.0707
903982	W3-079 E	0.8831
905252	W4-025 E	0.4626
907082	X1-037 E	2.1792
912102	X4-015 E	0.3259
912182	X4-031 E	0.5127
914092	Y2-051 E	0.6154
917612	Z2-102 E	0.8918
918452	AA1-060 E	2.1690
919662	AA2-048 E	1.4050
919672	AA2-049 E	0.8901
920732	AA2-184 E	5.9492
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**12.0652**
930891	AB1-138 C	0.5307
930892	AB1-138 E	0.8845
931122	AB1-163 E	0.7181
937261	AD2-165	24.1304

Bus #	Bus	MW Impact
939121	AE1-142 C O1	1.1912
939122	AE1-142 E O1	1.7141
939981	AE1-238 C	67.5788
939982	AE1-238 E	177.5069
940161	AE2-000 C O1	30.8067
940162	AE2-000 E O1	78.8237
940401	AE2-024 C O1	29.4487
940402	AE2-024 E O1	137.8755
940411	AE2-025 C	14.8657
940412	AE2-025 E	69.5932
940691	AE2-056 C	0.3291
940692	AE2-056 E	0.2880
940701	AE2-057 C	0.0944
940702	AE2-057 E	0.0944
940921	AE2-081 C	0.3497
940922	AE2-081 E	0.3600
942201	AE2-232 C O1	15.1011
942202	AE2-232 E O1	38.6393
DUCKCREEK	DUCKCREEK	0.0760
NEWTON	NEWTON	0.0885
CHILHOWEE	CHILHOWEE	0.0075
G-007	G-007	29.7570
TVA	TVA	0.0840
PRAIRIE	PRAIRIE	0.1550
O-066	O-066	32.3646
COFFEEN	COFFEEN	0.0338
CARR	CARR	0.9485
EDWARDS	EDWARDS	0.0352
CHEOAH	CHEOAH	0.0205
TILTON	TILTON	0.0422
SANTEETLA	SANTEETLA	0.0060
SMITHLAND	SMITHLAND	0.0116
COTTONWOOD	COTTONWOOD	0.1050
HAMLET	HAMLET	0.0081
BLUEG	BLUEG	0.3257
UNIONPOWER	UNIONPOWER	0.0359
CANNELTON	CANNELTON	0.0189
GIBSON	GIBSON	0.0135
CALDERWOOD	CALDERWOOD	0.0229
FARMERCITY	FARMERCITY	0.0217
TRIMBLE	TRIMBLE	0.0362
RENSSELAER	RENSSELAER	0.7507
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0081

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466265	206411	28R11RINGA	JCP&L	206314	28RED OAKA	JCP&L	1	JC-P2-3-JCC-230-26B	breaker	869.0	119.39	125.62	DC	63.41

Bus #	Bus	MW Impact
206201	28JERSVGEN	0.0500
206271	28MCRC/REC	0.2723
206325	**28O C GEN (Deativation : 09/17/18)**	**30.2900**
206327	28S RIV G1	5.3037
206328	28S RIV G2	5.3037
206329	28S RIV G3	7.9898
206358	28PARLN1&2	3.3766
206359	28PARLN3&4	4.3658
206367	28LKWD CT2	3.8459
206412	28R11	270.8684
207144	28HOW_X1-037	0.1777
207145	28FRN_Y2-051	0.0501
207204	28HOL_W1-112	0.0618
207206	28TIN_W1-124	0.2992
901112	W1-032 E OP1	0.1733
901912	W1-112E OP1	0.7673
901982	W1-119 E	1.2222
901991	W1-120C	0.8323
901992	W1-120E	1.3580
902032	W1-124E	3.6866
902082	W1-129E	0.3268
902322	W2-019 E	0.3855
902952	W2-082 E OP1	1.1103
903981	W3-079 C	0.0709
903982	W3-079 E	0.8855
905252	W4-025 E	0.4638
907082	X1-037 E	2.1812
912102	X4-015 E	0.3268
912182	X4-031 E	0.5137
914092	Y2-051 E	0.6172
917612	Z2-102 E	0.8942
918452	AA1-060 E	2.1740
919662	AA2-048 E	1.4088
919672	AA2-049 E	0.8919
920732	AA2-184 E	5.9604
925541	**AC1-029 (Withdrawn : 11/27/2019)**	**12.3122**
930891	AB1-138 C	0.5323
930892	AB1-138 E	0.8871
931122	AB1-163 E	0.7201
937261	AD2-165	24.6244

Bus #	Bus	MW Impact
939121	AE1-142 C O1	1.1947
939122	AE1-142 E O1	1.7192
939981	AE1-238 C	67.8127
939982	AE1-238 E	178.1215
940161	AE2-000 C O1	30.8963
940162	AE2-000 E O1	79.0531
940401	AE2-024 C O1	29.5387
940402	AE2-024 E O1	138.2971
940411	AE2-025 C	14.9111
940412	AE2-025 E	69.8060
940691	AE2-056 C	0.3294
940692	AE2-056 E	0.2882
940701	AE2-057 C	0.0944
940702	AE2-057 E	0.0944
940921	AE2-081 C	0.3500
940922	AE2-081 E	0.3603
942201	AE2-232 C O1	15.1450
942202	AE2-232 E O1	38.7518
DUCKCREEK	DUCKCREEK	0.0944
NEWTON	NEWTON	0.1092
CHILHOWEE	CHILHOWEE	0.0102
G-007	G-007	29.8851
TVA	TVA	0.1103
PRAIRIE	PRAIRIE	0.1937
O-066	O-066	32.5867
COFFEEN	COFFEEN	0.0418
CARR	CARR	0.9577
EDWARDS	EDWARDS	0.0431
CHEOAH	CHEOAH	0.0280
TILTON	TILTON	0.0517
SANTEETLA	SANTEETLA	0.0082
SMITHLAND	SMITHLAND	0.0147
COTTONWOOD	COTTONWOOD	0.1365
HAMLET	HAMLET	0.0161
BLUEG	BLUEG	0.4008
UNIONPOWER	UNIONPOWER	0.0476
CANNELTON	CANNELTON	0.0234
GIBSON	GIBSON	0.0166
CALDERWOOD	CALDERWOOD	0.0311
FARMERCITY	FARMERCITY	0.0269
TRIMBLE	TRIMBLE	0.0445
RENSSELAER	RENSSELAER	0.7579
DEARBORN /* 35% REVERSE 4540149	DEARBORN /* 35% REVERSE 4540149	0.0000
CATAWBA	CATAWBA	0.0133

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466870	227900	CARDIFF	AE	219100	NEWFRDM	PSE&G	1	JC-P7-1-JCC-230-13	tower	692.0	181.6	204.35	DC	157.41

Bus #	Bus	MW Impact
206360	28O CRK C1	1.7720
206361	28O CRK C2	1.0521
227801	ONTC&DCT	13.2089
227842	MARINGEN	0.1722
227843	MARINGEN E	1.1634
227927	V4-067C	0.0488
227928	V4-067E	0.6096
228261	V4-054E	0.5938
228712	V2-041E	0.3591
292063	V1-021 E	0.0613
293404	V3-036	1.8821
902092	W1-130E	0.7989
902431	W2-030 C	0.1726
902432	W2-030 E	2.1262
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**108.8253**
915022	Y3-012 E	2.1813
924531	AB2-102 C	33.2201
924532	AB2-102 E	0.7382
924701	AB2-122 C	0.2634
924702	AB2-122 E	0.4515
930001	AB1-001 C	0.2529
930002	AB1-001 E	0.4157
931191	AB1-169A	71.8033
933962	AD1-019 E	2.6007
938421	AE1-061 C	0.6443
938422	AE1-061 E	0.6443
938781	AE1-104 C O1	29.5557
938782	AE1-104 E O1	75.6177
939301	AE1-161 C	1.4970
939302	AE1-161 E	2.2455
939501	AE1-179 C O1	3.9279
939502	AE1-179 E O1	2.7720
940001	AE1-240 C O1	3.2755
940002	AE1-240 E O1	2.3380
940161	AE2-000 C O1	90.2364
940162	AE2-000 E O1	230.8841
940361	AE2-020 C	45.2040
940362	AE2-020 E	211.6485
940371	AE2-021 C	45.2040
940372	AE2-021 E	211.6485
940381	AE2-022 C	26.3690

Bus #	Bus	MW Impact
940382	AE2-022 E	123.4616
940391	AE2-023 C	19.0773
940392	AE2-023 E	89.3098
941001	AE2-091 C	2.3761
941002	AE2-091 E	1.2397
941931	AE2-205 C	6.9098
941932	AE2-205 E	4.6065
942101	AE2-222 C	28.8449
942102	AE2-222 E	73.8061
942201	AE2-232 C O1	44.2328
942202	AE2-232 E O1	113.1792
942381	AE2-251 C	143.2055
942382	AE2-251 E	366.4226
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**18.3466**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**12.2311**
DUCKCREEK	DUCKCREEK	0.0898
NEWTON	NEWTON	0.1078
CHILHOWEE	CHILHOWEE	0.0136
G-007	G-007	0.2331
TVA	TVA	0.1330
PRAIRIE	PRAIRIE	0.1989
O-066	O-066	1.6825
COFFEEN	COFFEEN	0.0412
CARR	CARR	0.0742
EDWARDS	EDWARDS	0.0410
CHEOAH	CHEOAH	0.0375
TILTON	TILTON	0.0491
SANTEETLA	SANTEETLA	0.0110
SMITHLAND	SMITHLAND	0.0159
COTTONWOOD	COTTONWOOD	0.1596
HAMLET	HAMLET	0.0420
BLUEG	BLUEG	0.3908
UNIONPOWER	UNIONPOWER	0.0593
CANNELTON	CANNELTON	0.0234
GIBSON	GIBSON	0.0161
CALDERWOOD	CALDERWOOD	0.0415
FARMERCITY	FARMERCITY	0.0269
TRIMBLE	TRIMBLE	0.0434
RENSSELAER	RENSSELAER	0.0590
CATAWBA	CATAWBA	0.0259

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8467011	227949	LEWIS #3	AE	227901	DOROTHY	AE	1	JC-P7-1-JCC-230-13	tower	205.0	164.7	179.93	AC	37.98

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.4963
227842	MARINGEN	0.0718
227843	MARINGEN E	0.5705
227927	V4-067C	0.0154
227928	V4-067E	0.1916
228014	PVILLEG	0.0773
228712	V2-041E	0.1187
292063	V1-021 E	0.0236
293404	V3-036	0.7831
902431	W2-030 C	0.0676
902432	W2-030 E	0.8323
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**53.3673**
915022	Y3-012 E	1.0697
924531	AB2-102 C	10.7138
924532	AB2-102 E	0.2381
924701	AB2-122 C	0.0828
924702	AB2-122 E	0.1420
930001	AB1-001 C	0.1270
930002	AB1-001 E	0.2087
933962	AD1-019 E	1.0822
938423	AE1-061 EBAT	3.5740
938781	AE1-104 C O1	14.4939
938782	AE1-104 E O1	37.0825
939303	AE1-161 EBAT	9.7945
940161	AE2-000 C O1	18.5043
940162	AE2-000 E O1	47.3461
940361	AE2-020 C	8.6231
940362	AE2-020 E	40.3739
940371	AE2-021 C	8.6231
940372	AE2-021 E	40.3739
940381	AE2-022 C	5.0301
940382	AE2-022 E	23.5514
940391	AE2-023 C	9.3554
940392	AE2-023 E	43.7970
941931	AE2-205 C	2.2285
941932	AE2-205 E	1.4857
942101	AE2-222 C	12.0203
942102	AE2-222 E	30.7567
942201	AE2-232 C O1	9.0706
942202	AE2-232 E O1	23.2090
942381	AE2-251 C	27.3178

Bus #	Bus	MW Impact
942382	AE2-251 E	69.8985
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**3.4998**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**2.3332**
DUCKCREEK	DUCKCREEK	0.0092
NEWTON	NEWTON	0.0111
CHILHOWEE	CHILHOWEE	0.0014
G-007	G-007	0.0052
TVA	TVA	0.0140
PRAIRIE	PRAIRIE	0.0207
O-066	O-066	0.2086
COFFEEN	COFFEEN	0.0042
CARR	CARR	0.0099
EDWARDS	EDWARDS	0.0042
CHEOAH	CHEOAH	0.0040
TILTON	TILTON	0.0050
SANTEETLA	SANTEETLA	0.0012
SMITHLAND	SMITHLAND	0.0017
COTTONWOOD	COTTONWOOD	0.0168
HAMLET	HAMLET	0.0040
BLUEG	BLUEG	0.0401
UNIONPOWER	UNIONPOWER	0.0062
CANNELTON	CANNELTON	0.0024
GIBSON	GIBSON	0.0017
CALDERWOOD	CALDERWOOD	0.0044
FARMERCITY	FARMERCITY	0.0028
TRIMBLE	TRIMBLE	0.0045
RENSSELAER	RENSSELAER	0.0078
CATAWBA	CATAWBA	0.0025

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466859	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	JC-P7-1-JCC-230-13	tower	286.0	231.73	243.02	DC	37.97

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.4955
227842	MARINGEN	0.0718
227843	MARINGEN E	0.5704
227927	V4-067C	0.0154
227928	V4-067E	0.1916
228014	PVILLEG	0.0773
228712	V2-041E	0.1187
292063	V1-021 E	0.0236
293404	V3-036	0.7830
902091	W1-130C	0.3234
902092	W1-130E	3.9840
902431	W2-030 C	0.0676
902432	W2-030 E	0.8322
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**53.3584**
915022	Y3-012 E	1.0696
924531	AB2-102 C	10.7100
924532	AB2-102 E	0.2380
924701	AB2-122 C	0.0828
924702	AB2-122 E	0.1419
930001	AB1-001 C	0.1270
930002	AB1-001 E	0.2087
931191	AB1-169A	350.6360
933962	AD1-019 E	1.0820
938421	AE1-061 C	3.2129
938422	AE1-061 E	3.2129
938781	AE1-104 C O1	14.4915
938782	AE1-104 E O1	37.0763
939303	AE1-161 EBAT	9.7955
940161	AE2-000 C O1	18.5004
940162	AE2-000 E O1	47.3361
940361	AE2-020 C	8.6213
940362	AE2-020 E	40.3654
940371	AE2-021 C	8.6213
940372	AE2-021 E	40.3654
940381	AE2-022 C	5.0291
940382	AE2-022 E	23.5465
940391	AE2-023 C	9.3538
940392	AE2-023 E	43.7897
941931	AE2-205 C	2.2277
941932	AE2-205 E	1.4851
942101	AE2-222 C	12.0187

Bus #	Bus	MW Impact
942102	AE2-222 E	30.7524
942201	AE2-232 C O1	9.0687
942202	AE2-232 E O1	23.2041
942381	AE2-251 C	27.3120
942382	AE2-251 E	69.8838
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**3.4990**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**2.3327**
DUCKCREEK	DUCKCREEK	0.0115
NEWTON	NEWTON	0.0138
CHILHOWEE	CHILHOWEE	0.0018
G-007	G-007	0.0074
TVA	TVA	0.0175
PRAIRIE	PRAIRIE	0.0258
O-066	O-066	0.2221
COFFEEN	COFFEEN	0.0053
CARR	CARR	0.0107
EDWARDS	EDWARDS	0.0052
CHEOAH	CHEOAH	0.0050
TILTON	TILTON	0.0063
SANTEETLA	SANTEETLA	0.0015
SMITHLAND	SMITHLAND	0.0021
COTTONWOOD	COTTONWOOD	0.0210
HAMLET	HAMLET	0.0052
BLUEG	BLUEG	0.0501
UNIONPOWER	UNIONPOWER	0.0078
CANNELTON	CANNELTON	0.0030
GIBSON	GIBSON	0.0021
CALDERWOOD	CALDERWOOD	0.0055
FARMERCITY	FARMERCITY	0.0035
TRIMBLE	TRIMBLE	0.0056
RENSSELAER	RENSSELAER	0.0084
CATAWBA	CATAWBA	0.0032

11.24 Index 20

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466885	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	JC-P7-1-JCC-230-13	tower	311.0	213.35	223.73	DC	37.98

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.4963
227842	MARINGEN	0.0718
227843	MARINGEN E	0.5705
227927	V4-067C	0.0154
227928	V4-067E	0.1916
228014	PVILLEG	0.0773
228712	V2-041E	0.1187
292063	V1-021 E	0.0236
293404	V3-036	0.7831
902431	W2-030 C	0.0676
902432	W2-030 E	0.8323
913341	**Y1-077 (Withdrawn : 12/18/2019)**	**53.3673**
915022	Y3-012 E	1.0697
924531	AB2-102 C	10.7138
924532	AB2-102 E	0.2381
924701	AB2-122 C	0.0828
924702	AB2-122 E	0.1420
930001	AB1-001 C	0.1270
930002	AB1-001 E	0.2087
931191	AB1-169A	350.6470
933962	AD1-019 E	1.0822
938423	AE1-061 EBAT	3.5740
938781	AE1-104 C O1	14.4939
938782	AE1-104 E O1	37.0825
939303	AE1-161 EBAT	9.7945
940161	AE2-000 C O1	18.5043
940162	AE2-000 E O1	47.3461
940361	AE2-020 C	8.6231
940362	AE2-020 E	40.3739
940371	AE2-021 C	8.6231
940372	AE2-021 E	40.3739
940381	AE2-022 C	5.0301
940382	AE2-022 E	23.5514
940391	AE2-023 C	9.3554
940392	AE2-023 E	43.7970
941931	AE2-205 C	2.2285
941932	AE2-205 E	1.4857
942101	AE2-222 C	12.0203
942102	AE2-222 E	30.7567
942201	AE2-232 C O1	9.0706
942202	AE2-232 E O1	23.2090

Bus #	Bus	MW Impact
942381	AE2-251 C	27.3178
942382	AE2-251 E	69.8985
942941	**AE2-314 C (Withdrawn : 12/16/2019)**	**3.4998**
942942	**AE2-314 E (Withdrawn : 12/16/2019)**	**2.3332**
DUCKCREEK	DUCKCREEK	0.0092
NEWTON	NEWTON	0.0111
CHILHOWEE	CHILHOWEE	0.0014
G-007	G-007	0.0052
TVA	TVA	0.0140
PRAIRIE	PRAIRIE	0.0207
O-066	O-066	0.2086
COFFEEN	COFFEEN	0.0042
CARR	CARR	0.0099
EDWARDS	EDWARDS	0.0042
CHEOAH	CHEOAH	0.0040
TILTON	TILTON	0.0050
SANTEETLA	SANTEETLA	0.0012
SMITHLAND	SMITHLAND	0.0017
COTTONWOOD	COTTONWOOD	0.0168
HAMLET	HAMLET	0.0040
BLUEG	BLUEG	0.0401
UNIONPOWER	UNIONPOWER	0.0062
CANNELTON	CANNELTON	0.0024
GIBSON	GIBSON	0.0017
CALDERWOOD	CALDERWOOD	0.0044
FARMERCITY	FARMERCITY	0.0028
TRIMBLE	TRIMBLE	0.0045
RENSSELAER	RENSSELAER	0.0078
CATAWBA	CATAWBA	0.0025

Affected Systems

11.25 Affected Systems

11.25.1 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

11.25.2 MISO

MISO Impacts to be determined during later study phases (as applicable).

11.25.3 TVA

TVA Impacts to be determined during later study phases (as applicable).

11.25.4 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

11.25.5 NYISO

NYISO Impacts to be determined during later study phases (as applicable).

11.26 Contingency Definitions – Summer Peak

Contingency Name	Contingency Definition
JC-P7-1-JCC-230-7A	CONTINGENCY 'JC-P7-1-JCC-230-7A' /* SMITHBURG - LARRABEE 230 LINES DISCONNECT BRANCH FROM BUS 206309 TO BUS 206294 CKT 1 DISCONNECT BRANCH FROM BUS 206309 TO BUS 206294 CKT 2 END
PS_P1-2_#1LINE	CONTINGENCY 'PS_P1-2_#1LINE' /* LAKE NELSON TO RARITIAN RIVER DISCONNECT BUS 218331 /* KILMER #1 END
PS_P2-3_LNEPS_P1-2_1_LT	CONTINGENCY 'PS_P2-3_LNEPS_P1-2_1_LT' /* STUCK BREAKER ON LAKE NELSON I LINE DISCONNECT BUS 218312 /* GREEN BROOK STATION DISCONNECT BUS 218301 /* MIDDLE LOSS OF BUS DISCONNECT BUS 218333 /* LAKE NELSON BUS I DISCONNECT BUS 218331 /* REMOVE KILMER LINE #1 CLOSE LINE FROM BUS 218384 TO BUS 218387 CKT Z /* KILMER CLOSE LINE FROM BUS 218385 TO BUS 218386 CKT Z /* KILMER MOVE 8 MW LOAD FROM BUS 218387 TO BUS 218399 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO NEWDOVR T2 MOVE 8 MW LOAD FROM BUS 218385 TO BUS 218393 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO MDWRD T2 MOVE 8 MW LOAD FROM BUS 218386 TO BUS 218347 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO BNNTLANE T2 CLOSE LINE FROM BUS 218388 TO BUS 218389 CKT Z /* LAKE NELSON MOVE 8 MW LOAD FROM BUS 218389 TO BUS 218384 /* INTERSTATION TIE TRANSFER LOAD FROM LNELSN TO KILMER T2 MOVE 8 MW LOAD FROM BUS 218388 TO BUS 218385 /* INTERSTATION TIE TRANSFER LOAD FROM LNELSN TO KILMER T4 CLOSE LINE FROM BUS 218382 TO BUS 218383 CKT Z /* GREENBROOK MOVE 8 MW LOAD FROM BUS 218382 TO BUS 218406 /* INTERSTATION TIE TRANSFER LOAD FROM GREENBK TO SOMRVLLE T2 MOVE 8 MW LOAD FROM BUS 218382 TO BUS 218386 /* INTERSTATION TIE TRANSFER LOAD FROM GREENBK TO KILMER T1 MOVE 8 MW LOAD FROM BUS 218383 TO BUS 218395 /* INTERSTATION TIE TRANSFER LOAD FROM GREENBK TO SOUTH SECOND ST.(METUCHEN 26KV IM) 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
JC-P1-2-JCC-230-018	CONTINGENCY 'JC-P1-2-JCC-230-018' /* LARRABEE - SMITHBURG (H2008) 230 KV DISCONNECT BRANCH FROM BUS 206309 TO BUS 206294 CKT 2 DISCONNECT BRANCH FROM BUS 200017 TO BUS 206309 CKT 4 /* SMITHBURG SMITHBURG 500 230 END
JC-P1-2-JCC-230-019	CONTINGENCY 'JC-P1-2-JCC-230-019' /* LEISURE VILLAGE - MANITOU (A2027) 230 KV DISCONNECT BRANCH FROM BUS 206295 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206277 CKT 7 END

Contingency Name	Contingency Definition
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
PS_P1-2_#2LINE_LT	CONTINGENCY 'PS_P1-2_#2LINE_LT' /* LAKE NELSON TO RARITIAN RIVER DISCONNECT BUS 218332 /* REMOVE KILMER CLOSE LINE FROM BUS 218384 TO BUS 218387 CKT Z /* KILMER CLOSE LINE FROM BUS 218385 TO BUS 218386 CKT Z /* KILMER MOVE 8 MW LOAD FROM BUS 218384 TO BUS 218383 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO GREENBK T1 MOVE 8 MW LOAD FROM BUS 218387 TO BUS 218399 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO NEWDOVR T2 MOVE 8 MW LOAD FROM BUS 218385 TO BUS 218393 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO MDWRD T2 MOVE 8 MW LOAD FROM BUS 218386 TO BUS 218347 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO BNNTLANE T2 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-P2-3-JCC-230-13G	CONTINGENCY 'JC-P2-3-JCC-230-13G' /* LARRABEE NW BUS & LARRABEE-SMITHBURG (D2004) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 2 /* 28LARRABEE 230 28SMITHBRG 230 REMOVE LOAD 7 FROM BUS 206294 /* 28LARRABEE 230 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 9 /* 28LARRABEE 230 28LARR CD 35 END
JC-P2-3-JCC-230-13D	CONTINGENCY 'JC-P2-3-JCC-230-13D' /* LARRABEE SE BUS & LARRABEE-LAKEWOOD (K2011) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206274 CKT 4 /* 28LARRABEE 230 28LARR AB 35 REMOVE SWSHUNT FROM BUS 206294 BLOCK 1 STEP 1 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206323 CKT 1 /* 28LARRABEE 230 28LAKEWOOD 230 END
JC-P7-1-JCC-230-10A	CONTINGENCY 'JC-P7-1-JCC-230-10A' /* LAKEWOOD - LARRABEE 230 KV LINES DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 2 DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 1 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206274 CKT 3 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 12 /* LARRABEE 12 FUTURE BREAKER AND A HALF SET BUS 206294 LOAD TO 38 MW /* LARRABEE 8 FUTURE BREAKER AND A HALF END

Contingency Name	Contingency Definition
JC-P2-3-JCC-230-32A	CONTINGENCY 'JC-P2-3-JCC-230-32A' /* SMITHBURG-E.WINDSOR & SMITHBURG-LARRABEE (D2004) 230 KV DISCONNECT BRANCH FROM BUS 206309 TO BUS 206326 CKT 1 DISCONNECT BRANCH FROM BUS 206309 TO BUS 206294 CKT 1 END
AE_P7-1 AE13TOWER	CONTINGENCY 'AE_P7-1 AE13TOWER' DISCONNECT BRANCH FROM BUS 228500 TO BUS 228502 CKT 1 /* LANDIS TO MINO 138 KV DISCONNECT BRANCH FROM BUS 228002 TO BUS 227900 CKT 1 /* ORCH TO CARD 230 KV 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-P2-3-JCC-230-47D	CONTINGENCY 'JC-P2-3-JCC-230-47D' /* LARRABEE-ATLANTIC (Y2025) AND OCEANVIEW BANK 2 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206286 CKT Y /* 28OCEANVW 230 ATLANTIC 230 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206273 CKT 2 /* 28OCEANVW 230 OCEANVIE 230 END
JC-P2-3-JCC-230-47C	CONTINGENCY 'JC-P2-3-JCC-230-47C' /* LARRABEE-ATLANTIC (Y2025) AND OCEANVIEW BANK 1 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206286 CKT Y /* 28OCEANVW 230 ATLANTIC 230 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206273 CKT 1 /* 28OCEANVW 230 OCEANVIE 230 END
JC-P2-3-JCC-230-26D	CONTINGENCY 'JC-P2-3-JCC-230-26D' /* RARITAN RIVER B146 STUCK BREAKER DISCONNECT BUS 206314 /* RED OAK 230 KV A TAP DISCONNECT BUS 206363 /* RED OAK 230 KV #2 DISCONNECT BUS 206364 /* RED OAK 230 KV #3 DISCONNECT BRANCH FROM BUS 206305 TO BUS 206303 CKT 13 /* RARITAN RIVER #13 230/115 KV TRANSFORMER DISCONNECT BUS 206403 /* WOODBRIDGE 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
JC-P7-1-JCC-230-12	CONTINGENCY 'JC-P7-1-JCC-230-12' /* LEISURE VILLAGE-MANITOU A2027 & C2029 DISCONNECT BRANCH FROM BUS 206295 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206277 CKT 7 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206276 CKT 3 SET BUS 206296 LOAD TO 0 MW END

Contingency Name	Contingency Definition
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
PS_P2-3_LNEPS_P1-2_2_LT	CONTINGENCY 'PS_P2-3_LNEPS_P1-2_2_LT' /* LAKE NELSON LINE #2 STUCK BREAKER DISCONNECT BUS 218334 /* LAKE NELSON LOSS OF BUS W SIDE DISCONNECT BUS 218522 /* REMOVE MIDDLESEX DISCONNECT BUS 218332 /* REMOVE KILMER CLOSE LINE FROM BUS 218384 TO BUS 218387 CKT Z /* KILMER CLOSE LINE FROM BUS 218385 TO BUS 218386 CKT Z /* KILMER MOVE 8 MW LOAD FROM BUS 218384 TO BUS 218383 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO GREENBK T1 MOVE 8 MW LOAD FROM BUS 218387 TO BUS 218399 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO NEWDOVR T2 MOVE 8 MW LOAD FROM BUS 218385 TO BUS 218393 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO MDWRD T2 MOVE 8 MW LOAD FROM BUS 218386 TO BUS 218347 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO BNNTLANE T2 CLOSE LINE FROM BUS 218388 TO BUS 218389 CKT Z /* LAKE NELSON MOVE 8 MW LOAD FROM BUS 218389 TO BUS 218384 /* INTERSTATION TIE TRANSFER LOAD FROM LNELSN TO KILMER T2 MOVE 8 MW LOAD FROM BUS 218388 TO BUS 218385 /* INTERSTATION TIE TRANSFER LOAD FROM LNELSN TO KILMER T4 END
PS_P1-2_#2LINE	CONTINGENCY 'PS_P1-2_#2LINE' /* LAKE NELSON TO RARITIAN RIVER DISCONNECT BUS 218332 /* KILMER LINE #2 END
JC-P1-2-JCC-230-009	CONTINGENCY 'JC-P1-2-JCC-230-009' /* EAST WINDSOR - SMITHBRG (E2005) 230 KV DISCONNECT BRANCH FROM BUS 206326 TO BUS 206309 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-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-230-020	CONTINGENCY 'JC-P1-2-JCC-230-020' /* LEISURE VILLAGE - MANITOU (C2029) 230 KV DISCONNECT BRANCH FROM BUS 206296 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206276 CKT 3 SET BUS 206296 LOAD TO 0 MW END
Base Case	

Contingency Name	Contingency Definition
JC-P1-2-JCC-230-003	CONTINGENCY 'JC-P1-2-JCC-230-003' /* FUTURE ATLANTIC - OCEANVIEW (X2024) 230 KV DISCONNECT BRANCH FROM BUS 206286 TO BUS 206300 CKT X /* ATLANTIC 230.00 OCEANV 230.00 END
JC-P1-2-JCC-230-004	CONTINGENCY 'JC-P1-2-JCC-230-004' /* FUTURE ATLANTIC - OCEANVIEW (Y2025) 230 KV DISCONNECT BRANCH FROM BUS 206286 TO BUS 206300 CKT Y /* ATLANTIC 230.00 OCEANV 230.00 END
JC-P1-2-JCC-230-028	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
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
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_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
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

Contingency Name	Contingency Definition
PS_P1-2_#1LINE_LT	CONTINGENCY 'PS_P1-2_#1LINE_LT' /* LAKE NELSON TO RARITIAN RIVER DISCONNECT BUS 218331 /* KILMER LINE #1 CLOSE LINE FROM BUS 218384 TO BUS 218387 CKT Z /* KILMER CLOSE LINE FROM BUS 218385 TO BUS 218386 CKT Z /* KILMER MOVE 8 MW LOAD FROM BUS 218384 TO BUS 218383 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO GREENBK T1 MOVE 8 MW LOAD FROM BUS 218387 TO BUS 218399 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO NEWDOVR T2 MOVE 8 MW LOAD FROM BUS 218385 TO BUS 218393 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO MDWRD T2 MOVE 8 MW LOAD FROM BUS 218386 TO BUS 218347 /* INTERSTATION TIE TRANSFER LOAD FROM KILMER TO BNNTLANE T2 END
AE_P4-2 AE46	CONTINGENCY 'AE_P4-2 AE46' /*ORCHARD 230 BUS BREAKER D DISCONNECT BRANCH FROM BUS 228002 TO BUS 228310 CKT 1 /* ORCHARD TO CHURCHTOWN 230 230 DISCONNECT BRANCH FROM BUS 200063 TO BUS 228002 CKT 1 /*ORCHARD ORCHARD 500 230 T1 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-230-026C	CONTINGENCY 'JC-P2-3-JCC-230-026C' /* RARITAN RIVER B145 STUCK BREAKER DISCONNECT BUS 206314 /* RED OAK 230 KV A TAP DISCONNECT BUS 206363 /* RED OAK 230 KV #2 DISCONNECT BUS 206364 /* RED OAK 230 KV #3 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

Short Circuit

12 Short Circuit

The following Breakers are overduty:

None.

Stability

13 Stability Analysis and Reactive Power Requirement

To be finalized in Facilities Study phase.

Light Load Flow

14 Network Impacts – Light Load Analysis

The Queue Project AE2-232 was evaluated as a 400.0 MW (Capacity 400.0 MW) injection Oyster Creek 230 kV in the JCPL area. Project AE2-232 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-232 was studied with a commercial probability of 100%. Potential network impacts were as follows:

14.1 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
7239014	200064	PCHBTM1S	500.0	PJM	200004	CNASTONE	500.0	PJM	1	Base Case	single	2826.0	99.79	102.59	AC	85.3
14877806	206297	28MANITOU	230.0	JCP&L	206296	28LEISUR U	230.0	JCP&L	1	JC-P1-2-JCC-230-019	single	817.0	87.62	106.03	AC	159.92
14877810	206297	28MANITOU	230.0	JCP&L	206296	28LEISUR U	230.0	JCP&L	1	JC-P1-2-JCC-230-016	single	817.0	87.13	105.48	AC	159.88
14877832	206297	28MANITOU	230.0	JCP&L	206295	28LEISUR D	230.0	JCP&L	1	JC-P1-2-JCC-230-020	single	817.0	87.37	105.75	AC	159.92
14877758	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	Base Case	single	650.0	87.96	105.74	AC	119.19
14878604	213922	RICHMOND	230.0	PECO	214012	WANEETA3	230.0	PECO	1	Base Case	single	760.0	98.29	102.42	AC	35.57
14878605	213922	RICHMOND	230.0	PECO	214012	WANEETA3	230.0	PECO	1	PS_P1-2_5015	single	1180.0	97.09	100.67	AC	45.6

14.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466876	206297	28MANITOU	230.0	JCP&L	206319	28WHITINGS	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	817.0	89.56	110.28	AC	172.4
8466928	206318	28VANHISVL	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	86.7	100.83	AC	125.1

14.3 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	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
7238148	200064	PCHBTM1S	500.0	PJM	200004	CNASTONE	500.0	PJM	1	PECO_P4_PEACH035	breaker	3525.0	109.33	111.77	AC	91.94
8466241	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	X	JC-P2-3-JCC-230-47D	breaker	432.0	129.94	134.59	AC	23.64
8466242	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	X	JC-P2-3-JCC-230-47C	breaker	432.0	128.31	132.96	AC	23.63
14878070	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	Y	JC-P1-2-JCC-230-003	single	432.0	128.09	133.41	AC	23.6
14878073	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	X	JC-P1-2-JCC-230-004	single	432.0	128.09	133.41	AC	23.6

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466459	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	JC-P1-2-JCC-230-022	single	817.0	131.44	157.88	AC	220.83
8466481	206302	28OYSTER C	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	2	JC-P1-2-JCC-230-021	single	869.0	123.59	148.45	AC	220.86
8466865	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	JC-P7-1-JCC-230-13	tower	564.0	100.96	145.06	AC	295.98
8466236	206314	28RED OAKA	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-26B	breaker	869.0	106.45	112.09	AC	49.98
8466237	206314	28RED OAKA	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-026A	breaker	869.0	106.45	112.09	AC	49.98
8466616	206314	28RED OAKA	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-027	single	869.0	109.64	115.4	AC	49.58
8466218	206315	28RED OAKB	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-26D	breaker	869.0	111.51	117.13	AC	49.61
8466219	206315	28RED OAKB	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P2-3-JCC-230-026C	breaker	869.0	111.5	117.13	AC	49.61
8466594	206315	28RED OAKB	230.0	JCP&L	206305	28RARITAN RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-028	single	869.0	114.63	120.37	AC	49.21
8466253	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P4-2 AE46	breaker	692.0	124.67	128.93	AC	45.78
8466870	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	JC-P7-1-JCC-230-13	tower	692.0	137.98	153.98	AC	125.96
8466873	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P7-1 AE15TOWER	tower	692.0	124.77	129.56	AC	46.54
14264078	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P4-2 AE9	breaker	692.0	114.35	118.79	AC	43.58
14877889	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P1-2 ORCH-CARD	single	692.0	113.04	117.36	AC	42.3
14878123	227949	LEWIS #3	138.0	AE	227901	DOROTHY	138.0	AE	1	Base Case	single	154.0	108.25	112.37	AC	7.94
14878125	227949	LEWIS #3	138.0	AE	227901	DOROTHY	138.0	AE	1	PS_P1-2_2310A	single	205.0	115.8	120.11	AC	12.0

14.4 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	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878820	200064	PCHBTM1S	500.0	PJM	200004	CNASTONE	500.0	PJM	1	Base Case	operation	2826.0	99.79	102.59	AC	85.3
14878823	200064	PCHBTM1S	500.0	PJM	200004	CNASTONE	500.0	PJM	1	FUR RUN_TRANSFORMERS	operation	3525.0	97.16	99.72	AC	96.86
8466494	206294	28LARRABEE	230.0	JCP&L	206309	28SMITHBRG	230.0	JCP&L	2	JC-P1-2-JCC-230-017	operation	813.0	86.07	94.38	AC	96.45
8466658	206295	28LEISUR D	230.0	JCP&L	206323	28LAKEWOOD	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	869.0	73.06	89.68	AC	158.29

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
8466583	206296	28LEISUR U	230.0	JCP&L	206323	28LAKEWOOD	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	81.1	99.0	AC	157.55
8466548	206297	28MANITOU	230.0	JCP&L	206296	28LEISUR U	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	87.55	105.97	AC	159.92
8466554	206297	28MANITOU	230.0	JCP&L	206295	28LEISUR D	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	817.0	87.36	105.73	AC	159.92
8466589	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	X	JC-P1-2-JCC-230-004	operation	432.0	123.44	128.08	AC	23.6
8466591	206300	28OCEANVW	230.0	JCP&L	206286	28ATLANTIC	230.0	JCP&L	Y	JC-P1-2-JCC-230-003	operation	432.0	123.44	128.08	AC	23.6
8466454	206302	28OYSTERC	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	JC-P1-2-JCC-230-022	operation	817.0	131.22	157.66	AC	220.83
8466456	206302	28OYSTERC	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	1	Base Case	operation	650.0	86.52	104.21	AC	119.19
8466476	206302	28OYSTERC	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	2	JC-P1-2-JCC-230-021	operation	869.0	123.38	148.24	AC	220.86
8466478	206302	28OYSTERC	230.0	JCP&L	206297	28MANITOU	230.0	JCP&L	2	Base Case	operation	709.0	79.42	95.65	AC	119.34
8466612	206314	28RED OAKA	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-027	operation	869.0	106.18	111.78	AC	49.58
8466593	206315	28RED OAKB	230.0	JCP&L	206305	28RAR RVR	230.0	JCP&L	1	JC-P1-2-JCC-230-028	operation	869.0	111.26	116.84	AC	49.21
8466499	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	2	JC-P1-2-JCC-230-014	operation	817.0	79.34	97.37	AC	168.14
8466531	206323	28LAKEWOOD	230.0	JCP&L	206294	28LARRABEE	230.0	JCP&L	1	JC-P1-2-JCC-230-013	operation	869.0	74.74	91.8	AC	168.16
8466789	213922	RICHMOND	230.0	PECO	214012	WANEETA3	230.0	PECO	1	Base Case	operation	760.0	95.54	99.69	AC	35.57
14264635	213922	RICHMOND	230.0	PECO	214012	WANEETA3	230.0	PECO	1	PS_P1-2_5015	operation	1180.0	84.46	87.6	AC	45.6
8466578	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	AE_P1-2 ORCH-CARD	operation	692.0	112.66	116.95	AC	42.3
14264530	227949	LEWIS #3	138.0	AE	227901	DOROTHY	138.0	AE	1	PS_P1-2_2310A	operation	205.0	115.8	120.11	AC	12.0
14264532	227949	LEWIS #3	138.0	AE	227901	DOROTHY	138.0	AE	1	Base Case	operation	154.0	101.21	105.4	AC	7.94

14.5 System Reinforcements – Light Load

<table>
<tr><th>ID</th><th>Index</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost allocated to AE2-232</th><th>Upgrade Number</th></tr>
<tr><td>14877806, 14877810</td><td>5</td><td>28MANITOU 230.0 kV - 28LEISUR U 230.0 kV Ckt 1</td><td>Reconductor transmission line .

Replace Wave Traps at Leisure Village and Manitou

Replace relaying and metering at Lesiure Village and Manitou.

Replace circuit breaker at Leisure Village.

Rating: 913/1147/1147

Time Estimate : 18 months

AE2-232 is the driver for this upgrade.</td><td>$6,050,000</td><td>$6,050,000</td><td>N6432</td></tr>
<tr><td>14877832</td><td>6</td><td>28MANITOU 230.0 kV - 28LEISUR D 230.0 kV Ckt 1</td><td>Reconductor transmission line.

Replace substation conductor at Leisure Village and Manitou.

Replace Wave Traps at Leisure Village and Manitou.

Replace metering at Manitou

Rating: 913/1147/1147

Time Estimate : 18 months

AE2-232 is the driver for this upgrade.</td><td>$16,333,700</td><td>$16,333,700</td><td>N6433</td></tr>
<tr><td>14878604, 14878605</td><td>11</td><td>RICHMOND 230.0 kV - WANEETA3 230.0 kV Ckt 1</td><td>Add a second pair of underground cables in parallel with the existing underground portion of the Richmond - Waneeta 230 kV line.

Cost: $19,000,000

Time: 84 Months

New Ratings: 1026/1247/1337

Cost Allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($19,000,000)</th></tr>
<tr><td>AE2-021</td><td>102.2</td><td>30%</td><td>5,632,244</td></tr>
<tr><td>AE2-022</td><td>64.8</td><td>19%</td><td>3,572,984</td></tr>
<tr><td>AE2-023</td><td>85.2</td><td>25%</td><td>4,694,915</td></tr>
<tr><td>AE2-205</td><td>15.1</td><td>4%</td><td>832,554</td></tr>
<tr><td>AE2-222</td><td>56.6</td><td>16%</td><td>3,118,922</td></tr>
<tr><td>AE2-232</td><td>20.8</td><td>6%</td><td>1,148,381</td></tr>
</table></td><td>$19,000,000</td><td>$1,148,381</td><td>N6477</td></tr>
<tr><td>8466876</td><td>16</td><td>28MANITOU 230.0 kV - 28WHITING</td><td>Please refer to the summer peak system impact study report for AE2-232</td><td>$0</td><td>$0</td><td>-</td></tr>
</table>

<table>
<tr><td></td><td></td><td>S 230.0 kV Ckt 1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>8466928</td><td>17</td><td>28VANHISVL 230.0 kV - 28LARRABEE 230.0 kV Ckt 1</td><td>Please refer to the summer peak system impact study report for AE2-232</td><td>$0</td><td>$0</td><td>-</td></tr>
<tr><td>7239014, 7238148</td><td>1</td><td>PCHBTM1S 500.0 kV - CNASTONE 500.0 kV Ckt 1</td><td>Reinforcement:
Expand Peach Bottom 500 kV station to build a new 500 kV line between Beach Bottom and Conastone.

New Ratings: 2920/3707/4157

Cost: $130,500,000

Time: 84 Months

Cost Allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($130,500,000)</th></tr>
<tr><td>AE2-024</td><td>75.5</td><td>22%</td><td>28,629,777</td></tr>
<tr><td>AE2-025</td><td>97.7</td><td>28%</td><td>37,028,205</td></tr>
<tr><td>AE2-222</td><td>79.1</td><td>23%</td><td>29,994,173</td></tr>
<tr><td>AE2-232</td><td>91.9</td><td>27%</td><td>34,847,845</td></tr>
</table></td><td>$130,500,000</td><td>$34,847,845</td><td>N6559</td></tr>
<tr><td>8466241, 8466242, 14878073</td><td>24</td><td>28OCEANVW 230.0 kV - 28ATLANTIC Ckt X</td><td>Line rating updated to 709/869/985 MVA (Rate A/ Rate B/ Rate C). No reinforcements required.</td><td>$0</td><td>$0</td><td>-</td></tr>
<tr><td>14878070</td><td>25</td><td>28OCEANVW 230.0 kV - 28ATLANTIC Ckt Y</td><td>Line rating updated to 709/869/985 MVA (Rate A/ Rate B/ Rate C). No reinforcements required.</td><td>$0</td><td>$0</td><td>-</td></tr>
</table>

<table>
<tr>
<td>14877758, 8466459</td>
<td>7</td>
<td>28OYSTER C 230.0 kV - 28MANITOU 230.0 kV Ckt 1</td>
<td>Reinforcement:
Replace Wave Traps at Manitou and Oyster Creek, replace relaying and metering at Manitou and Oyster Creek, replace substation conductor at Manitou and Oyster Creek, replace terminal equipment at Manitou and Oyster Creek, and replace relaying at Oyster Creek.

New Ratings: 1162/1519/1519

Cost: $74,056,800

Time: 24 Months

Cost allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($74,056,800)</th></tr>
<tr><td>AE2-020</td><td>1.6</td><td>0.3%</td><td>243,595</td></tr>
<tr><td>AE2-021</td><td>100.3</td><td>21%</td><td>15,391,818</td></tr>
<tr><td>AE2-022</td><td>58.5</td><td>12%</td><td>8,977,282</td></tr>
<tr><td>AE2-023</td><td>55.9</td><td>12%</td><td>8,578,291</td></tr>
<tr><td>AE2-222</td><td>45.5</td><td>9%</td><td>6,982,330</td></tr>
<tr><td>AE2-232</td><td>220.8</td><td>46%</td><td>33,883,484</td></tr>
</table>
</td>
<td>$74,056,800</td>
<td>$33,883,484</td>
<td>N6547</td>
</tr>
<tr>
<td>8466481</td>
<td>8</td>
<td>28OYSTER C 230.0 kV - 28MANITOU 230.0 kV Ckt 2</td>
<td>Reinforcement:
Reconductor transmission line, replace Wave Traps at Manitou and Oyster Creek, replace relaying and metering at Manitou and Oyster Creek, and replace terminal switches at Manitou and Oyster Creek.

New Ratings: 1306/1603/1603

Cost: $14,215,900

Time: 18 Months

Cost allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>% of Cost</th><th>Cost ($14,215,900)</th></tr>
<tr><td>AE2-021</td><td>48.9</td><td>11%</td><td>1,617,324</td></tr>
<tr><td>AE2-022</td><td>58.5</td><td>14%</td><td>1,936,512</td></tr>
<tr><td>AE2-023</td><td>55.9</td><td>13%</td><td>1,849,511</td></tr>
<tr><td>AE2-222</td><td>45.5</td><td>11%</td><td>1,505,147</td></tr>
<tr><td>AE2-232</td><td>220.9</td><td>51%</td><td>7,307,406</td></tr>
</table>
</td>
<td>$14,215,900</td>
<td>$7,307,406</td>
<td>N6549</td>
</tr>
<tr>
<td>8466865</td>
<td>26</td>
<td>CEDAR 230.0 kV - 28OYSTER C 230.0 kV Ckt 1</td>
<td>Please refer to the summer peak system impact study report for AE2-232</td>
<td>$0</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>8466218, 8466219, 8466594</td>
<td>28</td>
<td>28RED OAKB 230.0 kV - 28RAR</td>
<td>Please refer to the summer peak system impact study report for AE2-232</td>
<td>$0</td>
<td>$0</td>
<td>-</td>
</tr>
</table>

		RVR 230.0 kV Ckt 1				
8466236, 8466237, 8466616	27	**28RED OAKA 230.0 kV - 28RAR RVR 230.0 kV Ckt 1**	Please refer to the summer peak system impact study report for AE2-232	$0	$0	-
8466253, 8466870, 8466873, 14264078, 14877889	14	**CARDIFF 230.0 kV – NEWFRDM 230.0 kV Ckt 1**	Please refer to the summer peak system impact study report for AE2-232	$0	$0	-
14878125, 14878123	29	**LEWIS #3 138.0 kV - DOROTHY 138.0 kV Ckt 1**	Please refer to the summer peak system impact study report for AE2-232	$0	$0	-
			Total Cost	**$260,156,400**	**$99,570,816**	

14.6 Flow Gate Details

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.

14.7 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
7238148	200064	PCHBTM1S	PJM	200004	CNASTONE	PJM	1	PECO_P4_PEACH035	breaker	3525.0	109.33	111.77	AC	91.94

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**64.5895**
208972	BECR K09	0.3024
209027	LOR2_Q27	1.1519
209029	WAYM IPP	0.5285
211418	BUMO	5.8641
211770	PEFO 1	3.2139
211771	PEFO 2	3.2139
212266	LOR1	0.3230
917001	Z1-116 C	163.9320
917002	Z1-116 E	0.9772
917662	Z2-107 E	2.9548
918452	AA1-060 E	5.7188
918802	AA1-099 E	0.4198
919662	AA2-048 E	1.9189
919672	AA2-049 E	0.8003
919742	AA2-060 E	1.2517
919752	AA2-061 E	1.6689
919982	AA2-082 E	3.8250
920272	AA2-123 E	2.1012
925242	AB2-178 E	2.0792
925951	AC1-071 C	1.0582
925952	AC1-071 E	7.0844
927181	AC1-212 C	0.1965
927182	AC1-212 E	1.8617
930192	AB1-055 E	0.2132
930201	AB1-056 C O1	20.7188
930202	AB1-056 E O1	59.0034
931942	AB1-182 E	2.8936
933322	AC2-144 E	0.0507
933332	AC2-145 E	0.0437
935071	AD1-143 C1	0.7085
935072	AD1-143 E1	4.2458
935081	AD1-143 C2	0.0248
935082	AD1-143 E2	0.5945
935091	AD1-143 C3	0.7116
935092	AD1-143 E3	4.2644
935101	AD1-143 C4	0.0249
935102	AD1-143 E4	0.5971
936192	AD2-025 E	0.4932
936391	**AD2-049 C (Withdrawn : 10/21/2019)**	**1.3082**
936451	AD2-059 C	0.0907
936452	AD2-059 E	0.2845
936721	AD2-091	5.1180

Bus #	Bus	MW Impact
936751	AD2-096 O1	5.1505
937492	AD2-205 E	0.4492
937512	AD2-210 E	0.4536
937522	AD2-213 E O1	4.7442
937561	AD2-077 C O1	22.2250
937562	AD2-077 E O1	22.2250
938171	AE1-026 C O1	3.0696
938172	AE1-026 E O1	12.2784
938231	AE1-037 FTIR	246.7104
938282	AE1-041 E	0.1222
938331	AE1-051	1.4774
938341	AE1-052	1.0411
938412	AE1-060 E	4.0228
938421	AE1-061 C	1.6554
938422	AE1-061 E	1.6554
938431	AE1-062 C	3.3053
938432	AE1-062 E	3.3053
938651	AE1-087 C	6.4088
938652	AE1-087 E	1.6022
938661	AE1-088	2.5468
938711	AE1-093	4.3756
938752	AE1-101 E	6.6575
938781	AE1-104 C O1	32.3847
938782	AE1-104 E O1	82.8557
938871	AE1-115 C	3.3318
938872	AE1-115 E	3.3318
938891	AE1-117 C O1	13.3491
938892	AE1-117 E O1	35.5439
938901	AE1-118 C O1	13.3491
938902	AE1-118 E O1	35.5439
939151	AE1-145 C	3.2151
939152	AE1-145 E	4.8227
939301	AE1-161 C	6.6292
939302	AE1-161 E	9.9438
939421	AE1-174 C	0.2630
939422	AE1-174 E	0.3945
939712	AE1-202 E	0.6977
939732	AE1-204 E	0.4620
939942	AE1-230 E	0.9507
939951	AE1-231 C	0.0612
939952	AE1-231 E	0.7034
939981	AE1-238 C	48.0978
939982	AE1-238 E	126.3369
940012	AE1-243 E	3.8290
940022	AE1-244 E	3.8147
940062	AE1-248 E O1	19.5555
940082	AE1-250 E	17.8635
940102	AE1-252 E	7.8713
940161	AE2-000 C O1	52.7060
940162	AE2-000 E O1	134.8565
940263	AE2-008 BAT	8.3312
940271	AE2-010	0.9247

Bus #	Bus	MW Impact
940301	AE2-014 C	291.6360
940353	AE2-019 BAT	24.2964
940361	AE2-020 C O1	27.9622
940362	AE2-020 E O1	130.9211
940371	AE2-021 C O1	27.9622
940372	AE2-021 E O1	130.9211
940381	AE2-022 C O1	16.3113
940382	AE2-022 E O1	76.3707
940391	AE2-023 C O1	20.9033
940392	AE2-023 E O1	97.8582
940401	AE2-024 C O1	34.0475
940402	AE2-024 E O1	159.4068
940411	AE2-025 C O1	17.1872
940412	AE2-025 E O1	80.4612
940543	AE2-040 BAT	2.2842
940553	AE2-041 BAT	5.2892
940592	AE2-046 E	3.5412
940653	AE2-052	2.6148
940663	AE2-053 BAT	2.5140
940741	AE2-061	3.8183
941002	AE2-091 E O1	3.3637
941343	AE2-130 BAT	21.1540
941533	AE2-150 BAT	2.6128
941593	AE2-156 BAT	13.0360
941693	AE2-169 BAT	3.4475
941703	AE2-170 BAT	5.2280
941713	AE2-171 BAT	3.1413
941723	AE2-172 BAT	4.1824
941733	AE2-173 BAT	5.2560
941833	AE2-188 BAT	5.4604
941963	AE2-208 BAT	2.7073
942043	AE2-216 BAT	5.6298
942101	AE2-222 C O1	22.5106
942102	AE2-222 E O1	56.5478
942201	AE2-232 C O1	25.8358
942202	AE2-232 E O1	66.1066
942251	AE2-237 C	5.0957
942252	AE2-237 E	17.5284
942381	AE2-251 C O1	88.5838
942382	AE2-251 E O1	226.6610
942553	AE2-270 BAT	19.6755
942603	AE2-276 BAT	5.2825
942683	AE2-284 BAT	7.7865
942771	AE2-295 C O1	2.6812
942772	AE2-295 E O1	15.5553
942821	AE2-301 C	1.6074
942822	AE2-301 E	2.4110
943013	AE2-324 BAT	2.0519
943023	AE2-325 BAT	5.4152
943033	AE2-326 BAT	5.8715
943043	AE2-327 BAT	5.4278
943082	AE2-335 E	6.5330

Bus #	Bus	MW Impact
943213	AE2-000A BAT	7.7041
AC1-131	AC1-131	9.1635
AD2-098	AD2-098	0.7428

14.8 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14877970	206294	28LARRABEE	JCP&L	206309	28SMITHBRG	JCP&L	2	JC-P1-2-JCC-230-017	single	813.0	86.16	95.12	AC	96.45

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**67.7570**
918452	AA1-060 E	3.0920
919662	AA2-048 E	2.2724
919672	AA2-049 E	0.5797
938421	AE1-061 C	0.2829
938422	AE1-061 E	0.2829
938781	AE1-104 C O1	7.6375
938782	AE1-104 E O1	19.5405
939981	AE1-238 C	37.1322
939982	AE1-238 E	97.5339
940161	AE2-000 C O1	55.2906
940162	AE2-000 E O1	141.4698
940361	AE2-020 C O1	8.5442
940362	AE2-020 E O1	40.0044
940371	AE2-021 C O1	8.5442
940372	AE2-021 E O1	40.0044
940381	AE2-022 C O1	4.9841
940382	AE2-022 E O1	23.3359
940391	AE2-023 C O1	4.9298
940392	AE2-023 E O1	23.0786
940401	AE2-024 C O1	46.1095
940402	AE2-024 E O1	215.8798
940411	AE2-025 C O1	23.2761
940412	AE2-025 E O1	108.9662
942101	AE2-222 C O1	6.3450
942102	AE2-222 E O1	15.9390
942201	AE2-232 C O1	27.1028
942202	AE2-232 E O1	69.3484
942381	AE2-251 C O1	27.0677
942382	AE2-251 E O1	69.2587

14.9 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878046	206295	28LEISURD	JCP&L	206323	28LAKEWOOD	JCP&L	1	JC-P1-2-JCC-230-020	single	869.0	72.85	89.5	AC	158.29

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**111.1996**
938421	AE1-061 C	0.3893
938422	AE1-061 E	0.3893
938781	AE1-104 C O1	11.4378
938782	AE1-104 E O1	29.2635
939301	AE1-161 C	1.1660
939302	AE1-161 E	1.7490
940161	AE2-000 C O1	90.7404
940162	AE2-000 E O1	232.1736
940361	AE2-020 C O1	13.0828
940362	AE2-020 E O1	61.2544
940371	AE2-021 C O1	13.0828
940372	AE2-021 E O1	61.2544
940381	AE2-022 C O1	7.6316
940382	AE2-022 E O1	35.7317
940391	AE2-023 C O1	7.3828
940392	AE2-023 E O1	34.5622
941002	AE2-091 E O1	0.6556
942101	AE2-222 C O1	9.6347
942102	AE2-222 E O1	24.2029
942201	AE2-232 C O1	44.4798
942202	AE2-232 E O1	113.8114
942381	AE2-251 C O1	41.4459
942382	AE2-251 E O1	106.0485

14.10 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14877915	206296	28LEISUR U	JCP&L	206323	28LAKEWOOD	JCP&L	1	JC-P1-2-JCC-230-019	single	817.0	81.04	98.98	AC	157.55

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**110.6758**
938421	AE1-061 C	0.3873
938422	AE1-061 E	0.3873
938781	AE1-104 C O1	11.3825
938782	AE1-104 E O1	29.1219
939301	AE1-161 C	1.1600
939302	AE1-161 E	1.7400
940161	AE2-000 C O1	90.3130
940162	AE2-000 E O1	231.0800
940361	AE2-020 C O1	13.0189
940362	AE2-020 E O1	60.9554
940371	AE2-021 C O1	13.0189
940372	AE2-021 E O1	60.9554
940381	AE2-022 C O1	7.5944
940382	AE2-022 E O1	35.5573
940391	AE2-023 C O1	7.3470
940392	AE2-023 E O1	34.3949
941002	AE2-091 E O1	0.6522
942101	AE2-222 C O1	9.5875
942102	AE2-222 E O1	24.0845
942201	AE2-232 C O1	44.2703
942202	AE2-232 E O1	113.2753
942381	AE2-251 C O1	41.2436
942382	AE2-251 E O1	105.5308

14.11 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14877806	206297	28MANITOU	JCP&L	206296	28LEISUR U	JCP&L	1	JC-P1-2-JCC-230-019	single	817.0	87.62	106.03	AC	159.92

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**112.3416**
919662	AA2-048 E	0.5094
938421	AE1-061 C	0.3930
938422	AE1-061 E	0.3930
938781	AE1-104 C O1	11.5505
938782	AE1-104 E O1	29.5517
939301	AE1-161 C	1.1766
939302	AE1-161 E	1.7649
940161	AE2-000 C O1	91.6723
940162	AE2-000 E O1	234.5580
940361	AE2-020 C O1	13.2122
940362	AE2-020 E O1	61.8604
940371	AE2-021 C O1	13.2122
940372	AE2-021 E O1	61.8604
940381	AE2-022 C O1	7.7071
940382	AE2-022 E O1	36.0852
940391	AE2-023 C O1	7.4555
940392	AE2-023 E O1	34.9026
941002	AE2-091 E O1	0.6616
942101	AE2-222 C O1	9.7304
942102	AE2-222 E O1	24.4432
942201	AE2-232 C O1	44.9366
942202	AE2-232 E O1	114.9802
942381	AE2-251 C O1	41.8560
942382	AE2-251 E O1	107.0976

14.12 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14877832	206297	28MANITOU	JCP&L	206295	28LEISURD	JCP&L	1	JC-P1-2-JCC-230-020	single	817.0	87.37	105.75	AC	159.92

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**112.3416**
919662	AA2-048 E	0.5033
938421	AE1-061 C	0.3930
938422	AE1-061 E	0.3930
938781	AE1-104 C O1	11.5505
938782	AE1-104 E O1	29.5517
939301	AE1-161 C	1.1766
939302	AE1-161 E	1.7649
940161	AE2-000 C O1	91.6723
940162	AE2-000 E O1	234.5580
940361	AE2-020 C O1	13.2130
940362	AE2-020 E O1	61.8644
940371	AE2-021 C O1	13.2130
940372	AE2-021 E O1	61.8644
940381	AE2-022 C O1	7.7076
940382	AE2-022 E O1	36.0876
940391	AE2-023 C O1	7.4555
940392	AE2-023 E O1	34.9026
941002	AE2-091 E O1	0.6617
942101	AE2-222 C O1	9.7304
942102	AE2-222 E O1	24.4432
942201	AE2-232 C O1	44.9366
942202	AE2-232 E O1	114.9802
942381	AE2-251 C O1	41.8587
942382	AE2-251 E O1	107.1045

14.13 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466459	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	1	JC-P1-2-JCC-230-022	single	817.0	131.44	157.88	AC	220.83

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**155.1300**
918452	AA1-060 E	1.0574
919662	AA2-048 E	0.6218
938421	AE1-061 C	0.4989
938422	AE1-061 E	0.4989
938781	AE1-104 C O1	15.2430
938782	AE1-104 E O1	38.9989
938871	AE1-115 C	0.5351
938872	AE1-115 E	0.5351
939301	AE1-161 C	1.4388
939302	AE1-161 E	2.1582
940161	AE2-000 C O1	126.5883
940162	AE2-000 E O1	323.8959
940361	AE2-020 C O1	17.6588
940362	AE2-020 E O1	82.6799
940371	AE2-021 C O1	17.6588
940372	AE2-021 E O1	82.6799
940381	AE2-022 C O1	10.3010
940382	AE2-022 E O1	48.2299
940391	AE2-023 C O1	9.8389
940392	AE2-023 E O1	46.0604
941002	AE2-091 E O1	0.8300
942101	AE2-222 C O1	12.9517
942102	AE2-222 E O1	32.5355
942201	AE2-232 C O1	62.0520
942202	AE2-232 E O1	158.7736
942381	AE2-251 C O1	55.9428
942382	AE2-251 E O1	143.1420

14.14 Index 8

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466481	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	2	JC-P1-2-JCC-230-021	single	869.0	123.59	148.45	AC	220.86

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**155.1570**
918452	AA1-060 E	1.0576
919662	AA2-048 E	0.6219
938421	AE1-061 C	0.4989
938422	AE1-061 E	0.4989
938781	AE1-104 C O1	15.2459
938782	AE1-104 E O1	39.0064
938871	AE1-115 C	0.5352
938872	AE1-115 E	0.5352
939301	AE1-161 C	1.4390
939302	AE1-161 E	2.1585
940161	AE2-000 C O1	126.6103
940162	AE2-000 E O1	323.9523
940361	AE2-020 C O1	17.6622
940362	AE2-020 E O1	82.6959
940371	AE2-021 C O1	17.6622
940372	AE2-021 E O1	82.6959
940381	AE2-022 C O1	10.3030
940382	AE2-022 E O1	48.2393
940391	AE2-023 C O1	9.8408
940392	AE2-023 E O1	46.0692
941002	AE2-091 E O1	0.8301
942101	AE2-222 C O1	12.9545
942102	AE2-222 E O1	32.5423
942201	AE2-232 C O1	62.0628
942202	AE2-232 E O1	158.8012
942381	AE2-251 C O1	55.9536
942382	AE2-251 E O1	143.1696

14.15 Index 9

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466504	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P1-2-JCC-230-014	single	817.0	79.17	97.29	AC	168.14

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**118.1189**
938421	AE1-061 C	0.4135
938422	AE1-061 E	0.4135
938781	AE1-104 C O1	12.1497
938782	AE1-104 E O1	31.0848
939301	AE1-161 C	1.2386
939302	AE1-161 E	1.8579
940161	AE2-000 C O1	96.3867
940162	AE2-000 E O1	246.6205
940361	AE2-020 C O1	13.8968
940362	AE2-020 E O1	65.0659
940371	AE2-021 C O1	13.8968
940372	AE2-021 E O1	65.0659
940381	AE2-022 C O1	8.1065
940382	AE2-022 E O1	37.9551
940391	AE2-023 C O1	7.8423
940392	AE2-023 E O1	36.7133
941002	AE2-091 E O1	0.6963
942101	AE2-222 C O1	10.2347
942102	AE2-222 E O1	25.7101
942201	AE2-232 C O1	47.2476
942202	AE2-232 E O1	120.8932
942381	AE2-251 C O1	44.0248
942382	AE2-251 E O1	112.6472

14.16 Index 10

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878020	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P1-2-JCC-230-013	single	869.0	74.58	91.73	AC	168.16

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**118.1302**
938421	AE1-061 C	0.4136
938422	AE1-061 E	0.4136
938781	AE1-104 C O1	12.1517
938782	AE1-104 E O1	31.0898
939301	AE1-161 C	1.2388
939302	AE1-161 E	1.8582
940161	AE2-000 C O1	96.3959
940162	AE2-000 E O1	246.6440
940361	AE2-020 C O1	13.8977
940362	AE2-020 E O1	65.0699
940371	AE2-021 C O1	13.8977
940372	AE2-021 E O1	65.0699
940381	AE2-022 C O1	8.1070
940382	AE2-022 E O1	37.9574
940391	AE2-023 C O1	7.8435
940392	AE2-023 E O1	36.7192
941002	AE2-091 E O1	0.6964
942101	AE2-222 C O1	10.2354
942102	AE2-222 E O1	25.7118
942201	AE2-232 C O1	47.2521
942202	AE2-232 E O1	120.9047
942381	AE2-251 C O1	44.0275
942382	AE2-251 E O1	112.6541

14.17 Index 11

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878604	213922	RICHMOND	PECO	214012	WANEETA3	PECO	1	Base Case	single	760.0	98.29	102.42	AC	35.57

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**24.9888**
918452	AA1-060 E	2.6144
919662	AA2-048 E	0.6434
919672	AA2-049 E	0.2332
937561	AD2-077 C O1	7.0360
937562	AD2-077 E O1	7.0360
938231	AE1-037 FTIR	56.4960
938421	AE1-061 C	0.9739
938422	AE1-061 E	0.9739
938431	AE1-062 C	2.0868
938432	AE1-062 E	2.0868
938781	AE1-104 C O1	16.4939
938782	AE1-104 E O1	42.1994
938871	AE1-115 C	2.0913
938872	AE1-115 E	2.0913
939301	AE1-161 C	4.0640
939302	AE1-161 E	6.0960
939981	AE1-238 C	14.1084
939982	AE1-238 E	37.0581
940161	AE2-000 C O1	20.3912
940162	AE2-000 E O1	52.1741
940301	AE2-014 C	55.0680
940361	AE2-020 C O1	14.0382
940362	AE2-020 E O1	65.7277
940371	AE2-021 C O1	14.0382
940372	AE2-021 E O1	65.7277
940381	AE2-022 C O1	8.1889
940382	AE2-022 E O1	38.3412
940391	AE2-023 C O1	10.6463
940392	AE2-023 E O1	49.8403
940401	AE2-024 C O1	11.2598
940402	AE2-024 E O1	52.7170
940411	AE2-025 C O1	5.6839
940412	AE2-025 E O1	26.6091
941002	AE2-091 E O1	1.8835
942101	AE2-222 C O1	11.5269
942102	AE2-222 E O1	28.9563
942201	AE2-232 C O1	9.9955
942202	AE2-232 E O1	25.5757
942381	AE2-251 C O1	44.4726
942382	AE2-251 E O1	113.7930
943082	AE2-335 E	4.6358

14.18 Index 12

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878872	214206	RICHRE29	PECO	213922	RICHMOND	PECO	1	PECO_P1-2_5025/* $ CHESCO $ PECO_P1-2_5025 $ L	single	1336.0	89.63	92.81	AC	45.29

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**31.8182**
917001	Z1-116 C	37.9182
917002	Z1-116 E	0.2260
918452	AA1-060 E	3.0870
919662	AA2-048 E	0.7967
919672	AA2-049 E	0.2915
930201	AB1-056 C O1	7.2221
930202	AB1-056 E O1	20.5672
936192	AD2-025 E	0.1047
936451	AD2-059 C	0.0243
936452	AD2-059 E	0.0764
937561	AD2-077 C O1	5.1480
937562	AD2-077 E O1	5.1480
938231	AE1-037 FTIR	62.3040
938282	AE1-041 E	0.0283
938421	AE1-061 C	1.3014
938422	AE1-061 E	1.3014
938431	AE1-062 C	2.6607
938432	AE1-062 E	2.6607
938651	AE1-087 C	2.1634
938652	AE1-087 E	0.5408
938781	AE1-104 C O1	22.6183
938782	AE1-104 E O1	57.8685
938871	AE1-115 C	2.8101
938872	AE1-115 E	2.8101
938891	AE1-117 C O1	4.6463
938892	AE1-117 E O1	12.3716
938901	AE1-118 C O1	4.6460
938902	AE1-118 E O1	12.3707
939151	AE1-145 C	1.1088
939152	AE1-145 E	1.6632
939301	AE1-161 C	5.4060
939302	AE1-161 E	8.1090
939981	AE1-238 C	17.6328
939982	AE1-238 E	46.3155
940161	AE2-000 C O1	25.9641
940162	AE2-000 E O1	66.4332
940301	AE2-014 C	66.3600

Bus #	Bus	MW Impact
940361	AE2-020 C O1	19.0485
940362	AE2-020 E O1	89.1865
940371	AE2-021 C O1	19.0485
940372	AE2-021 E O1	89.1865
940381	AE2-022 C O1	11.1116
940382	AE2-022 E O1	52.0255
940391	AE2-023 C O1	14.5994
940392	AE2-023 E O1	68.3467
940401	AE2-024 C O1	13.9831
940402	AE2-024 E O1	65.4674
940411	AE2-025 C O1	7.0587
940412	AE2-025 E O1	33.0449
941002	AE2-091 E O1	2.5668
942101	AE2-222 C O1	15.6469
942102	AE2-222 E O1	39.3059
942201	AE2-232 C O1	12.7273
942202	AE2-232 E O1	32.5655
942381	AE2-251 C O1	60.3453
942382	AE2-251 E O1	154.4067
942821	AE2-301 C	0.5530
942822	AE2-301 E	0.8294
943082	AE2-335 E	6.0900

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878853	219125	CAMDEN	PSE&G	214206	RICHRE29	PECO	1	PECO_P1-2_5014/* $ CHESCO $ PECO_P1-2_5014 $ L	single	1336.0	89.85	93.04	AC	45.29

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**31.8182**
917001	Z1-116 C	37.9182
917002	Z1-116 E	0.2260
918452	AA1-060 E	3.0870
919662	AA2-048 E	0.7967
919672	AA2-049 E	0.2915
930201	AB1-056 C O1	7.2221
930202	AB1-056 E O1	20.5672
936192	AD2-025 E	0.1047
936451	AD2-059 C	0.0243
936452	AD2-059 E	0.0764
937561	AD2-077 C O1	5.1480
937562	AD2-077 E O1	5.1480
938231	AE1-037 FTIR	62.3040
938282	AE1-041 E	0.0283
938421	AE1-061 C	1.3014
938422	AE1-061 E	1.3014
938431	AE1-062 C	2.6607
938432	AE1-062 E	2.6607
938651	AE1-087 C	2.1634
938652	AE1-087 E	0.5408
938781	AE1-104 C O1	22.6183
938782	AE1-104 E O1	57.8685
938871	AE1-115 C	2.8101
938872	AE1-115 E	2.8101
938891	AE1-117 C O1	4.6463
938892	AE1-117 E O1	12.3716
938901	AE1-118 C O1	4.6460
938902	AE1-118 E O1	12.3707
939151	AE1-145 C	1.1088
939152	AE1-145 E	1.6632
939301	AE1-161 C	5.4060
939302	AE1-161 E	8.1090
939981	AE1-238 C	17.6328
939982	AE1-238 E	46.3155
940161	AE2-000 C O1	25.9641
940162	AE2-000 E O1	66.4332
940301	AE2-014 C	66.3600

Bus #	Bus	MW Impact
940361	AE2-020 C O1	19.0485
940362	AE2-020 E O1	89.1865
940371	AE2-021 C O1	19.0485
940372	AE2-021 E O1	89.1865
940381	AE2-022 C O1	11.1116
940382	AE2-022 E O1	52.0255
940391	AE2-023 C O1	14.5994
940392	AE2-023 E O1	68.3467
940401	AE2-024 C O1	13.9831
940402	AE2-024 E O1	65.4674
940411	AE2-025 C O1	7.0587
940412	AE2-025 E O1	33.0449
940741	AE2-061	1.0928
941002	AE2-091 E O1	2.5668
942101	AE2-222 C O1	15.6469
942102	AE2-222 E O1	39.3059
942201	AE2-232 C O1	12.7273
942202	AE2-232 E O1	32.5655
942381	AE2-251 C O1	60.3453
942382	AE2-251 E O1	154.4067
942821	AE2-301 C	0.5530
942822	AE2-301 E	0.8294
943082	AE2-335 E	6.0900

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466870	227900	CARDIFF	AE	219100	NEWFRDM	PSE&G	1	JC-P7-1-JCC-230-13	tower	692.0	137.98	153.98	AC	125.96

Bus #	Bus	MW Impact
938421	AE1-061 C	0.7582
938422	AE1-061 E	0.7582
938781	AE1-104 C O1	27.8239
938782	AE1-104 E O1	71.1870
938871	AE1-115 C	0.6276
938872	AE1-115 E	0.6276
939301	AE1-161 C	1.7618
939302	AE1-161 E	2.6427
940161	AE2-000 C O1	72.2057
940162	AE2-000 E O1	184.7495
940361	AE2-020 C O1	36.1709
940362	AE2-020 E O1	169.3547
940371	AE2-021 C O1	36.1709
940372	AE2-021 E O1	169.3547
940381	AE2-022 C O1	21.0997
940382	AE2-022 E O1	98.7902
940391	AE2-023 C O1	17.9595
940392	AE2-023 E O1	84.0768
941002	AE2-091 E O1	1.2329
942101	AE2-222 C O1	23.3880
942102	AE2-222 E O1	58.7520
942201	AE2-232 C O1	35.3943
942202	AE2-232 E O1	90.5641
942381	AE2-251 C O1	114.5887
942382	AE2-251 E O1	293.2002

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466169	206294	28LARRABEE	JCP&L	206309	28SMITHBRG	JCP&L	1	JC-P2-3-JCC-230-13G	breaker	817.0	86.39	94.87	AC	96.45

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**67.7547**
918452	AA1-060 E	3.0802
919662	AA2-048 E	2.2170
919672	AA2-049 E	0.5762
938421	AE1-061 C	0.2829
938422	AE1-061 E	0.2829
938781	AE1-104 C O1	6.4919
938782	AE1-104 E O1	16.6094
939981	AE1-238 C	37.1286
939982	AE1-238 E	97.5245
940161	AE2-000 C O1	55.2888
940162	AE2-000 E O1	141.4651
940361	AE2-020 C O1	8.5442
940362	AE2-020 E O1	40.0044
940371	AE2-021 C O1	8.5442
940372	AE2-021 E O1	40.0044
940381	AE2-022 C O1	4.9841
940382	AE2-022 E O1	23.3359
940391	AE2-023 C O1	4.1903
940392	AE2-023 E O1	19.6168
940401	AE2-024 C O1	46.1505
940402	AE2-024 E O1	216.0716
940411	AE2-025 C O1	23.2967
940412	AE2-025 E O1	109.0630
942101	AE2-222 C O1	5.3927
942102	AE2-222 E O1	13.5467
942201	AE2-232 C O1	27.1019
942202	AE2-232 E O1	69.3461
942381	AE2-251 C O1	27.0677
942382	AE2-251 E O1	69.2587

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466876	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-12	tower	817.0	89.56	110.28	AC	172.4

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**121.1133**
938421	AE1-061 C	0.3782
938422	AE1-061 E	0.3782
938781	AE1-104 C O1	11.7204
938782	AE1-104 E O1	29.9866
939301	AE1-161 C	1.0758
939302	AE1-161 E	1.6137
940161	AE2-000 C O1	98.8301
940162	AE2-000 E O1	252.8724
940361	AE2-020 C O1	13.6362
940362	AE2-020 E O1	63.8459
940371	AE2-021 C O1	13.6362
940372	AE2-021 E O1	63.8459
940381	AE2-022 C O1	7.9545
940382	AE2-022 E O1	37.2434
940391	AE2-023 C O1	7.5652
940392	AE2-023 E O1	35.4162
941002	AE2-091 E O1	0.5325
942101	AE2-222 C O1	9.9880
942102	AE2-222 E O1	25.0904
942201	AE2-232 C O1	48.4453
942202	AE2-232 E O1	123.9579
942381	AE2-251 C O1	43.1994
942382	AE2-251 E O1	110.5350

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466928	206318	28VANHISVL	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	86.7	100.83	AC	125.1

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**87.8833**
918452	AA1-060 E	4.7696
919662	AA2-048 E	1.0388
938421	AE1-061 C	0.4640
938422	AE1-061 E	0.4640
938431	AE1-062 C	0.7683
938432	AE1-062 E	0.7683
938781	AE1-104 C O1	11.5592
938782	AE1-104 E O1	29.5741
938871	AE1-115 C	0.6621
938872	AE1-115 E	0.6621
939301	AE1-161 C	1.5846
939302	AE1-161 E	2.3769
940161	AE2-000 C O1	71.7140
940162	AE2-000 E O1	183.4916
940361	AE2-020 C O1	12.4296
940362	AE2-020 E O1	58.1965
940371	AE2-021 C O1	12.4296
940372	AE2-021 E O1	58.1965
940381	AE2-022 C O1	7.2506
940382	AE2-022 E O1	33.9480
940391	AE2-023 C O1	7.4611
940392	AE2-023 E O1	34.9290
941002	AE2-091 E O1	0.6941
942101	AE2-222 C O1	9.3422
942102	AE2-222 E O1	23.4682
942201	AE2-232 C O1	35.1533
942202	AE2-232 E O1	89.9475
942381	AE2-251 C O1	39.3769
942382	AE2-251 E O1	100.7543
943082	AE2-335 E	1.0367

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466905	206319	28WHITINGS	JCP&L	206720	28MANCHSTR	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	77.71	96.91	AC	170.35

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**119.6723**
938421	AE1-061 C	0.3740
938422	AE1-061 E	0.3740
938781	AE1-104 C O1	11.5854
938782	AE1-104 E O1	29.6412
939301	AE1-161 C	1.0642
939302	AE1-161 E	1.5963
940161	AE2-000 C O1	97.6543
940162	AE2-000 E O1	249.8638
940361	AE2-020 C O1	13.4787
940362	AE2-020 E O1	63.1083
940371	AE2-021 C O1	13.4787
940372	AE2-021 E O1	63.1083
940381	AE2-022 C O1	7.8626
940382	AE2-022 E O1	36.8132
940391	AE2-023 C O1	7.4781
940392	AE2-023 E O1	35.0083
941002	AE2-091 E O1	0.5267
942101	AE2-222 C O1	9.8725
942102	AE2-222 E O1	24.8003
942201	AE2-232 C O1	47.8689
942202	AE2-232 E O1	122.4831
942381	AE2-251 C O1	42.7003
942382	AE2-251 E O1	109.2581

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466918	206720	28MANCHSTR	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	77.08	96.28	AC	170.35

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**119.6723**
938421	AE1-061 C	0.3740
938422	AE1-061 E	0.3740
938781	AE1-104 C O1	11.5854
938782	AE1-104 E O1	29.6412
939301	AE1-161 C	1.0642
939302	AE1-161 E	1.5963
940161	AE2-000 C O1	97.6543
940162	AE2-000 E O1	249.8638
940361	AE2-020 C O1	13.4787
940362	AE2-020 E O1	63.1083
940371	AE2-021 C O1	13.4787
940372	AE2-021 E O1	63.1083
940381	AE2-022 C O1	7.8626
940382	AE2-022 E O1	36.8132
940391	AE2-023 C O1	7.4781
940392	AE2-023 E O1	35.0083
941002	AE2-091 E O1	0.5267
942101	AE2-222 C O1	9.8725
942102	AE2-222 E O1	24.8003
942201	AE2-232 C O1	47.8689
942202	AE2-232 E O1	122.4831
942381	AE2-251 C O1	42.7003
942382	AE2-251 E O1	109.2581

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14264333	214010	WANEETA2	PECO	213817	N PHILA	PECO	1	PECO_P4_CHICH045/* $ DELCO $ PECO_P4_CHICH045 $ STBK	breaker	621.0	93.0	95.78	AC	20.36

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**12.1546**
918452	AA1-060 E	1.4576
919662	AA2-048 E	0.3702
938421	AE1-061 C	0.5522
938422	AE1-061 E	0.5522
938431	AE1-062 C	1.1548
938432	AE1-062 E	1.1548
938781	AE1-104 C O1	8.0373
938782	AE1-104 E O1	20.5632
938871	AE1-115 C	1.1965
938872	AE1-115 E	1.1965
939301	AE1-161 C	2.3002
939302	AE1-161 E	3.4503
940161	AE2-000 C O1	9.9183
940162	AE2-000 E O1	25.3776
940301	AE2-014 C	33.6000
940361	AE2-020 C O1	6.8051
940362	AE2-020 E O1	31.8619
940371	AE2-021 C O1	6.8051
940372	AE2-021 E O1	31.8619
940381	AE2-022 C O1	3.9696
940382	AE2-022 E O1	18.5861
940391	AE2-023 C O1	5.1878
940392	AE2-023 E O1	24.2866
940401	AE2-024 C O1	5.5185
940402	AE2-024 E O1	25.8370
940411	AE2-025 C O1	2.7857
940412	AE2-025 E O1	13.0413
941002	AE2-091 E O1	1.0789
942101	AE2-222 C O1	5.5931
942102	AE2-222 E O1	14.0501
942201	AE2-232 C O1	4.8618
942202	AE2-232 E O1	12.4401
942381	AE2-251 C O1	21.5584
942382	AE2-251 E O1	55.1619
943082	AE2-335 E	2.6344

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14264848	227900	CARDIFF	AE	228002	ORCHARD	AE	1	JC-P7-1-JCC-230-13	tower	906.0	70.19	77.52	AC	89.56

Bus #	Bus	MW Impact
938421	AE1-061 C	0.4549
938422	AE1-061 E	0.4549
938781	AE1-104 C O1	14.3359
938782	AE1-104 E O1	36.6781
940161	AE2-000 C O1	51.3375
940162	AE2-000 E O1	131.3551
940361	AE2-020 C O1	25.8453
940362	AE2-020 E O1	121.0098
940371	AE2-021 C O1	25.8453
940372	AE2-021 E O1	121.0098
940381	AE2-022 C O1	15.0764
940382	AE2-022 E O1	70.5890
940391	AE2-023 C O1	9.2534
940392	AE2-023 E O1	43.3194
942101	AE2-222 C O1	15.2212
942102	AE2-222 E O1	38.2364
942201	AE2-232 C O1	25.1650
942202	AE2-232 E O1	64.3902
942381	AE2-251 C O1	81.8776
942382	AE2-251 E O1	209.5017

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466859	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	JC-P7-1-JCC-230-13	tower	286.0	78.61	87.09	AC	30.38

Bus #	Bus	MW Impact
938421	AE1-061 C	3.2131
938422	AE1-061 E	3.2131
938781	AE1-104 C O1	11.5961
938782	AE1-104 E O1	29.6685
939301	AE1-161 C	3.9174
939302	AE1-161 E	5.8761
940161	AE2-000 C O1	14.8034
940162	AE2-000 E O1	37.8769
940361	AE2-020 C O1	6.8985
940362	AE2-020 E O1	32.2991
940371	AE2-021 C O1	6.8985
940372	AE2-021 E O1	32.2991
940381	AE2-022 C O1	4.0241
940382	AE2-022 E O1	18.8411
940391	AE2-023 C O1	7.4849
940392	AE2-023 E O1	35.0406
942101	AE2-222 C O1	9.7447
942102	AE2-222 E O1	24.4793
942201	AE2-232 C O1	7.2565
942202	AE2-232 E O1	18.5672
942381	AE2-251 C O1	21.8542
942382	AE2-251 E O1	55.9188

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466885	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	JC-P7-1-JCC-230-13	tower	311.0	72.58	80.5	AC	30.38

Bus #	Bus	MW Impact
938421	AE1-061 C	1.7869
938422	AE1-061 E	1.7869
938781	AE1-104 C O1	11.5961
938782	AE1-104 E O1	29.6685
939301	AE1-161 C	3.9174
939302	AE1-161 E	5.8761
940161	AE2-000 C O1	14.8034
940162	AE2-000 E O1	37.8769
940361	AE2-020 C O1	6.8985
940362	AE2-020 E O1	32.2991
940371	AE2-021 C O1	6.8985
940372	AE2-021 E O1	32.2991
940381	AE2-022 C O1	4.0241
940382	AE2-022 E O1	18.8411
940391	AE2-023 C O1	7.4849
940392	AE2-023 E O1	35.0406
942101	AE2-222 C O1	9.7447
942102	AE2-222 E O1	24.4793
942201	AE2-232 C O1	7.2565
942202	AE2-232 E O1	18.5672
942381	AE2-251 C O1	21.8542
942382	AE2-251 E O1	55.9188

14.30 Index 24

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466241	206300	28OCEANVW	JCP&L	206286	28ATLANTIC	JCP&L	X	JC-P2-3-JCC-230-47D	breaker	432.0	129.94	134.59	AC	23.64

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**14.1170**
919662	AA2-048 E	0.5585
939981	AE1-238 C	121.2768
939982	AE1-238 E	318.5537
940161	AE2-000 C O1	11.5197
940162	AE2-000 E O1	29.4749
940401	AE2-024 C O1	9.4547
940402	AE2-024 E O1	44.2658
940411	AE2-025 C O1	4.7727
940412	AE2-025 E O1	22.3433
942201	AE2-232 C O1	5.6468
942202	AE2-232 E O1	14.4486
942381	AE2-251 C O1	6.5670
942382	AE2-251 E O1	16.8032

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878070	206300	28OCEANVW	JCP&L	206286	28ATLANTIC	JCP&L	Y	JC-P1-2-JCC-230-003	single	432.0	128.09	133.41	AC	23.6

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**16.5812**
919662	AA2-048 E	0.6348
919672	AA2-049 E	0.2027
939981	AE1-238 C	120.1968
939982	AE1-238 E	315.7169
940161	AE2-000 C O1	13.5305
940162	AE2-000 E O1	34.6200
940401	AE2-024 C O1	11.0785
940402	AE2-024 E O1	51.8681
940411	AE2-025 C O1	5.5924
940412	AE2-025 E O1	26.1806
942201	AE2-232 C O1	6.6325
942202	AE2-232 E O1	16.9707
942381	AE2-251 C O1	6.5556
942382	AE2-251 E O1	16.7739

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466865	206302	28OYSTER C	JCP&L	227955	CEDAR	AE	1	JC-P7-1-JCC-230-13	tower	564.0	100.96	145.06	AC	295.98

Bus #	Bus	MW Impact
940161	AE2-000 C O1	169.6710
940162	AE2-000 E O1	434.1298
942201	AE2-232 C O1	83.1706
942202	AE2-232 E O1	212.8102

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466616	206314	28RED OAKA	JCP&L	206305	28RAR RVR	JCP&L	1	JC-P1-2-JCC-230-027	single	869.0	109.64	115.4	AC	49.58

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**34.8283**
918452	AA1-060 E	2.0758
919662	AA2-048 E	1.3821
919672	AA2-049 E	0.8818
933332	AC2-145 E	0.0113
937512	AD2-210 E	0.1337
938781	AE1-104 C O1	5.0677
938782	AE1-104 E O1	12.9657
939981	AE1-238 C	53.7480
939982	AE1-238 E	141.1781
940161	AE2-000 C O1	28.4204
940162	AE2-000 E O1	72.7179
940361	AE2-020 C O1	5.3092
940362	AE2-020 E O1	24.8582
940371	AE2-021 C O1	5.3092
940372	AE2-021 E O1	24.8582
940381	AE2-022 C O1	3.0970
940382	AE2-022 E O1	14.5006
940391	AE2-023 C O1	3.2711
940392	AE2-023 E O1	15.3134
940401	AE2-024 C O1	23.1603
940402	AE2-024 E O1	108.4341
940411	AE2-025 C O1	11.6913
940412	AE2-025 E O1	54.7325
942101	AE2-222 C O1	4.0161
942102	AE2-222 E O1	10.0887
942201	AE2-232 C O1	13.9313
942202	AE2-232 E O1	35.6463
942381	AE2-251 C O1	16.8195
942382	AE2-251 E O1	43.0365

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
8466594	206315	28RED OAKB	JCP&L	206305	28RAR RVR	JCP&L	1	JC-P1-2-JCC-230-028	single	869.0	114.63	120.37	AC	49.21

Bus #	Bus	MW Impact
206325	**28O C GEN (Deativation : 09/17/18)**	**34.5675**
918452	AA1-060 E	2.0570
919662	AA2-048 E	1.3733
919672	AA2-049 E	0.8779
933332	AC2-145 E	0.0113
937512	AD2-210 E	0.1343
938781	AE1-104 C O1	4.9939
938782	AE1-104 E O1	12.7768
939981	AE1-238 C	53.4330
939982	AE1-238 E	140.3507
940161	AE2-000 C O1	28.2076
940162	AE2-000 E O1	72.1735
940361	AE2-020 C O1	5.2411
940362	AE2-020 E O1	24.5392
940371	AE2-021 C O1	5.2411
940372	AE2-021 E O1	24.5392
940381	AE2-022 C O1	3.0573
940382	AE2-022 E O1	14.3146
940391	AE2-023 C O1	3.2234
940392	AE2-023 E O1	15.0903
940401	AE2-024 C O1	23.0014
940402	AE2-024 E O1	107.6899
940411	AE2-025 C O1	11.6111
940412	AE2-025 E O1	54.3569
942101	AE2-222 C O1	3.9628
942102	AE2-222 E O1	9.9548
942201	AE2-232 C O1	13.8270
942202	AE2-232 E O1	35.3794
942253	AE2-237 BAT	5.3864
942381	AE2-251 C O1	16.6037
942382	AE2-251 E O1	42.4843

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
14878125	227949	LEWIS #3	AE	227901	DOROTHY	AE	1	PS_P1-2_2310A	single	205.0	115.8	120.11	AC	12.0

Bus #	Bus	MW Impact
938421	AE1-061 C	1.7687
938422	AE1-061 E	1.7687
938781	AE1-104 C O1	12.7402
938782	AE1-104 E O1	32.5956
939301	AE1-161 C	3.9184
939302	AE1-161 E	5.8776
940161	AE2-000 C O1	5.8472
940162	AE2-000 E O1	14.9609
940361	AE2-020 C O1	9.9372
940362	AE2-020 E O1	46.5269
940371	AE2-021 C O1	9.9372
940372	AE2-021 E O1	46.5269
940381	AE2-022 C O1	5.7967
940382	AE2-022 E O1	27.1407
940391	AE2-023 C O1	8.2234
940392	AE2-023 E O1	38.4977
942101	AE2-222 C O1	10.6843
942102	AE2-222 E O1	26.8397
942201	AE2-232 C O1	2.8662
942202	AE2-232 E O1	7.3338
942381	AE2-251 C O1	31.4810
942382	AE2-251 E O1	80.5510

14.36 Queue Dependencies

Queue Number	Project Name	Status
AE2-171	Makahoy 138 kV	Active
AE2-237	Vernon-Sugar Loaf #2 115 kV	Active
AE2-025	Larrabee 230 kV II	Active
AE2-237	Vernon-Sugar Loaf #2 115 kV	Active
AE1-060	Kittatinny-Newton 34.5 kV	Active
AE1-238	Oceanview Wind 230 kV	Active
AE1-238	Oceanview Wind 230 kV	Active
AE2-023	BL England 138 kV	Active
AE2-020	Cardiff-Cedar 230 kV I	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AB2-178	Beckjord 138kV	Suspended
AE1-117	Bethany 138 kV	Active
AE2-061	Rock Springs 500 kV	In Service
AE1-145	Wallops Island 69 kV	Active
AA2-049	Atlantic-Oceanview 34kV	Suspended
AE1-115	Churchtown 69 kV	Active
AE1-145	Wallops Island 69 kV	Active
AE1-252	Loretto-Wilton Center	Active
AE2-000	N/A	N/A
AE2-276	Sullivan 345kV	Active
AE2-053	Kerr Dam-Ridge Road 115 kV	Active
AC2-144	Newburgh 12.47kV	Suspended
AE2-091	Newport 69 kV	Active
AA2-048	Allenwood-Larrabee 34kV	Suspended
AE1-088	Five Points-Pantego 115 kV	Active
AE2-021	Cardiff-Cedar 230 kV II	Active
AE1-104	BL England 138 kV	Active
AB1-055	Balls Gap 34.5kV	In Service
AA2-082	Alpha 34.5kV	In Service
AA1-099	Clinton Co. 34.5kV	In Service
AE2-010	Paper Tap 69 kV	Active
AE1-026	Cashie 230 kV	Active
AE1-026	Cashie 230 kV	Active
AE2-173	McLean 345 kV	Active
AE1-174	Light Foot 34.5 kV	Active
AC1-212	Minster 69kV	Engineering and Procurement
AC1-212	Minster 69kV	Engineering and Procurement
AE1-174	Light Foot 34.5 kV	Active
AE2-284	Kenzie Creek-Colby 138 kV	Active
AD2-213	East Flemington-Lebanon 34.5 kV	Active
AE2-150	Bakers Pond-Bell Ave 115 kV	Active
AE2-270	Hopewell-Surry 230 kV	Active
AE2-324	Galion-Roberts South II 138 kV	Active
AE2-237	Vernon-Sugar Loaf #2 115 kV	Active
AE2-024	Larrabee 230 kV I	Active
AE1-093	Elk 138 kV	Active

Queue Number	Project Name	Status
AD2-077	Buxmont 69 kV	Active
AD2-077	Buxmont 69 kV	Active
AE2-000A	N/A	N/A
AE2-021	Cardiff-Cedar 230 kV II	Active
AA2-123	Marengo 34kV	In Service
AD1-143	Hauto-Siegfried 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AE1-115	Churchtown 69 kV	Active
AD1-143	Hauto-Siegfried 69 kV	Active
AE2-232	Oyster Creek 230 kV II	Active
AE2-022	Cardiff-Cedar 230 kV III	Active
AB1-182	Bear Creek	Engineering and Procurement
AD2-205	Byllesby 69 kV	In Service
AE2-041	Harmony Village 230 kV	Active
AE2-216	Hardin Switch 345 kV	Active
AE2-301	Crisfield 25 kV	Active
AE2-295	Eldred 230 kV	Active
AE2-301	Crisfield 25 kV	Active
AE2-251	Cardiff 230 kV	Active
AB1-056	Indian River 230kV I	Engineering and Procurement
AE1-244	Gilbert Storage 34.5 kV	Active
AE2-172	Mississinewa-Gaston 138 kV	Active
AE2-156	Yadkin 115 kV	Active
AE1-101	McConnellsburg-Texas Eastern 138 kV	Active
AE1-117	Bethany 138 kV	Active
AE2-008	Elderberry-Dumont 345 kV	Active
AE1-104	BL England 138 kV	Active
AE2-170	Gaston-Desoto 138 kV	Active
AE2-169	Delaware-Van Buren 138 kV	Active
AE2-040	Sapony 34.5 kV	Active
AE2-014	Sewaren 230 kV	Active
AD2-091	Hardin Tap 345kV	Active
AD2-098	PJM-WEC	Confirmed
AE2-222	Higbee 69 kV	Active
AD2-096	Marysville 345kV	Active
AE1-204	Waukegan 13 kV	Active
AB1-056	Indian River 230kV I	Engineering and Procurement
AE1-161	Landis 138 kV	Active
AE1-250	Smith Mountain-E. Danville 138 kV	Active
AE1-161	Landis 138 kV	Active
AE1-230	Shockoe 69 kV	Active
AA2-060	Branchville-Sussex #1 34kV	Engineering and Procurement
AE2-019	New Road 115kV	Active
AD2-049	Newport News 23kV	Withdrawn
AE1-087	Todd 69 kV	Active
AE2-208	Chavies-Bonnyman 69 kV	Active
AE2-325	Valley 138 kV	Active
AA1-060	Great Adventure 34.5kV	In Service
AE1-087	Todd 69 kV	Active
AE1-037	Deans 500kV	Active
AE1-248	Bell Avenue 115 kV	Active

Queue Number	Project Name	Status
AE1-231	Hughesville 69 kV	Active
AE2-022	Cardiff-Cedar 230 kV III	Active
AE1-231	Hughesville 69 kV	Active
AE2-000	N/A	N/A
AE2-222	Higbee 69 kV	Active
AE1-202	Effort Mountain 12.47 kV	Active
AE2-024	Larrabee 230 kV I	Active
AE2-052	Disputanta-Poe 115 kV	Active
AC1-071	Paupack-Lackawanna 230kV	Suspended
AD2-059	Chapel Street 138 kV	Active
AD2-059	Chapel Street 138 kV	Active
AC1-071	Paupack-Lackawanna 230kV	Suspended
AE1-041	Edison 4kV	Under Construction
AC1-131	PJM-CPLE	Confirmed
AE1-061	Minotola 12 kV	Active
AE1-061	Minotola 12 kV	Active
AE2-023	BL England 138 kV	Active
AE2-251	Cardiff 230 kV	Active
Z1-116	Metuchen 230kV	Engineering and Procurement
Z1-116	Metuchen 230kV	Engineering and Procurement
AE2-326	Jacksons Ferry 138 kV	Active
AE2-327	Biers Run-Circleville 138 kV	Active
AE2-020	Cardiff-Cedar 230 kV I	Active
AE2-232	Oyster Creek 230 kV II	Active
AA2-061	Branchville-Sussex #2 34.5kV	Engineering and Procurement
AE2-046	Harwood-East Hazelton 69 kV	Active
AE2-295	Eldred 230 kV	Active
AE1-051	East Carbondale-Lackawanna 69kV	Active
AE1-052	William 138 kV	Active
AE1-062	Silver Lake 69 kV	Active
AE2-335	Gloucester Solar II	Active
AE1-062	Silver Lake 69 kV	Active
AE2-130	Rockport 765 kV	Active
AE1-243	Warren Glen Storage 34.5 kV	Active
AE2-025	Larrabee 230 kV II	Active
AE1-118	Bethany-138th Street 138 kV	Active
AE1-118	Bethany-138th Street 138 kV	Active
AE2-188	Mitchell DP-Mountain Run 115 kV	Active
AC2-145	Beach Glen 4.8kV	Suspended
Z2-107	East Carbondale-Lackawanna 69kV	Suspended
AD2-210	Cedar Knolls 12.5 kV	Engineering and Procurement
AD2-025	Hillsborough 13 kV	Active

14.37 Contingency Definitions – Light Load

Contingency Name	Contingency Definition
PECO_P1-2_5025/* $ CHESCO $ PECO_P1-2_5025 $ L	CONTINGENCY 'PECO_P1-2_5025/* $ CHESCO $ PECO_P1-2_5025 $ L' TRIP BRANCH FROM BUS 200010 TO BUS 200051 CKT 1 /* KEENEY 500.00 ROCKSPGS 500.00 $ CHESCO $ PECO_P1-2_5025 $ L 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
Base Case	
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
JC-P1-2-JCC-230-019	CONTINGENCY 'JC-P1-2-JCC-230-019' /* LEISURE VILLAGE - MANITOU (A2027) 230 KV DISCONNECT BRANCH FROM BUS 206295 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206277 CKT 7 END
JC-P1-2-JCC-230-016	CONTINGENCY 'JC-P1-2-JCC-230-016' /* LAKEWOOD - LEISURE VILLAGE (D2030) 230 KV DISCONNECT BRANCH FROM BUS 206323 TO BUS 206295 CKT 1 DISCONNECT BRANCH FROM BUS 206295 TO BUS 206276 CKT 4 SET BUS 206295 LOAD TO 0 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-230-014	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-230-015	CONTINGENCY 'JC-P1-2-JCC-230-015' /* LAKEWOOD - LEISURE VILLAGE (U2021) 230 KV DISCONNECT BRANCH FROM BUS 206323 TO BUS 206296 CKT 1 DISCONNECT BRANCH FROM BUS 206323 TO BUS 206282 CKT 6 DISCONNECT BUS 206999 DISCONNECT BUS 207110 DISCONNECT BUS 207010 DISCONNECT BUS 207111 END

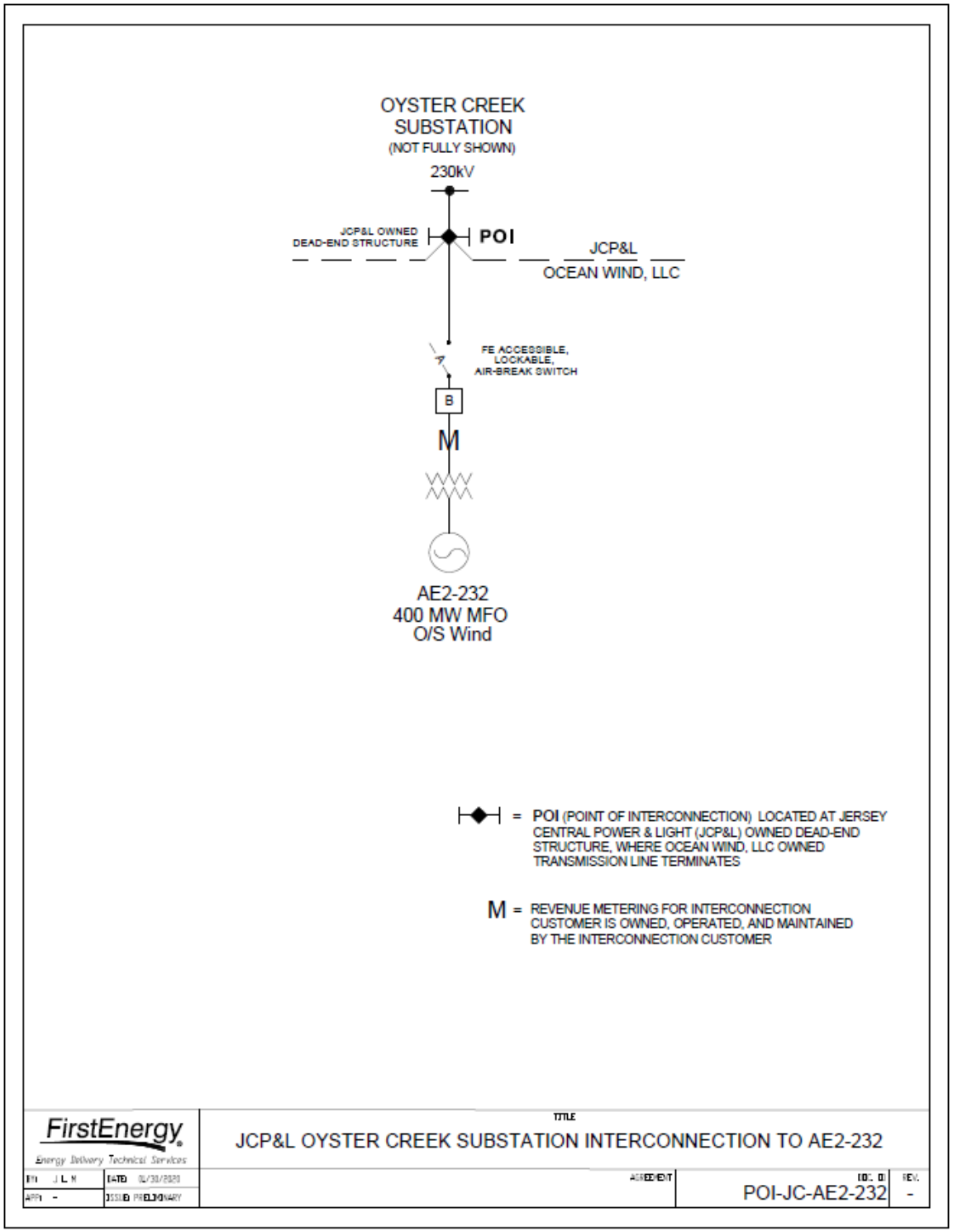
Contingency Name	Contingency Definition
JC-P1-2-JCC-230-013	CONTINGENCY 'JC-P1-2-JCC-230-013' /* LAKEWOOD - LARRABEE (K2011) 230 KV DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 2 END
FURNACE RUN CONASTONE 230KV	CONTINGENCY 'FURNACE RUN CONASTONE 230KV' /* FURNACE RUN TO CONASTONE 230KV DISCONNECT BRANCH FROM BUS 270073 TO BUS 220963 CKT 1 DISCONNECT BRANCH FROM BUS 270073 TO BUS 220963 CKT 2 END
AE_P1-2 DOR-LEWIS	CONTINGENCY 'AE_P1-2 DOR-LEWIS' OPEN LINE FROM BUS 227901 TO BUS 227949 CIRCUIT 1 / END
PECO_P4_PEACH035	CONTINGENCY 'PECO_P4_PEACH035' /*$ CHESCO $ PECO_P4_PEACH035 $ STBK TRIP BRANCH FROM BUS 200066 TO BUS 270072 CKT 1 /* PCHBTM1N 500.00 FUR RUN_500 500.00 $ CHESCO $ PECO_P4_PEACH035 $ STBK TRIP BRANCH FROM BUS 200066 TO BUS 213866 CKT 1 /* PCHBTM1N 500.00 PCHBTM 230.00 $ CHESCO $ PECO_P4_PEACH035 $ STBK REMOVE MACHINE 1 FROM BUS 213794 /* MDYRN5-6 13.80 $ CHESCO $ PECO_P4_PEACH035 $ STBK REMOVE MACHINE 2 FROM BUS 213794 /* MDYRN5-6 13.80 $ CHESCO $ PECO_P4_PEACH035 $ STBK REMOVE MACHINE 1 FROM BUS 213795 /* MDYRN7-8 13.80 $ CHESCO $ PECO_P4_PEACH035 $ STBK REMOVE MACHINE 2 FROM BUS 213795 /* MDYRN7-8 13.80 $ CHESCO $ PECO_P4_PEACH035 $ STBK SET BUS 213867 LOAD TO 0 PERCENT /* PCHBTM 35.00 $ CHESCO $ PECO_P4_PEACH035 $ STBK END
PECO_P2-2_CHI230B1/* $ DELCO $ PECO_P2-2_CHI230B1 $ B	CONTINGENCY 'PECO_P2-2_CHI230B1/* $ DELCO $ PECO_P2-2_CHI230B1 $ B' DISCONNECT BUS 213489 /* CHICHST1 230.00 $ DELCO $ PECO_P2-2_CHI230B1 $ B END
JC-P2-3-JCC-230-47D	CONTINGENCY 'JC-P2-3-JCC-230-47D' /* LARRABEE-ATLANTIC (Y2025) AND OCEANVIEW BANK 2 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206286 CKT Y /* 28OCEANVW 230 ATLANTIC 230 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206273 CKT 2 /* 28OCEANVW 230 OCEANVIE 230 END
JC-P2-3-JCC-230-47C	CONTINGENCY 'JC-P2-3-JCC-230-47C' /* LARRABEE-ATLANTIC (Y2025) AND OCEANVIEW BANK 1 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206286 CKT Y /* 28OCEANVW 230 ATLANTIC 230 DISCONNECT BRANCH FROM BUS 206300 TO BUS 206273 CKT 1 /* 28OCEANVW 230 OCEANVIE 230 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

Contingency Name	Contingency Definition
JC-P2-3-JCC-230-26D	CONTINGENCY 'JC-P2-3-JCC-230-26D' /* RARITAN RIVER B146 STUCK BREAKER DISCONNECT BUS 206314 /* RED OAK 230 KV A TAP DISCONNECT BUS 206363 /* RED OAK 230 KV #2 DISCONNECT BUS 206364 /* RED OAK 230 KV #3 DISCONNECT BRANCH FROM BUS 206305 TO BUS 206303 CKT 13 /* RARITAN RIVER #13 230/115 KV TRANSFORMER DISCONNECT BUS 206403 /* WOODBRIDGE 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
JC-P2-3-JCC-230-13G	CONTINGENCY 'JC-P2-3-JCC-230-13G' /* LARRABEE NW BUS & LARRABEE-SMITHBURG (D2004) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 2 /* 28LARRABEE 230 28SMITHBRG 230 REMOVE LOAD 7 FROM BUS 206294 /* 28LARRABEE 230 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 9 /* 28LARRABEE 230 28LARR CD 35 END
JC-P7-1-JCC-230-12	CONTINGENCY 'JC-P7-1-JCC-230-12' /* LEISURE VILLAGE-MANITOU A2027 & C2029 DISCONNECT BRANCH FROM BUS 206295 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206277 CKT 7 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206276 CKT 3 SET BUS 206296 LOAD TO 0 MW 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
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-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

Contingency Name	Contingency Definition
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-230-020	CONTINGENCY 'JC-P1-2-JCC-230-020' /* LEISURE VILLAGE - MANITOU (C2029) 230 KV DISCONNECT BRANCH FROM BUS 206296 TO BUS 206297 CKT 1 DISCONNECT BRANCH FROM BUS 206296 TO BUS 206276 CKT 3 SET BUS 206296 LOAD TO 0 MW END
PECO_P4_CHICH045/* $ DELCO $ PECO_P4_CHICH045 $ STBK	CONTINGENCY 'PECO_P4_CHICH045/* $ DELCO $ PECO_P4_CHICH045 $ STBK' DISCONNECT BUS 213489 /* CHICHST1 230.00 $ DELCO $ PECO_P4_CHICH045 $ STBK DISCONNECT BUS 213627 /* FOULK8 230.00 $ DELCO $ PECO_P4_CHICH045 $ STBK END
JC-P1-2-JCC-230-003	CONTINGENCY 'JC-P1-2-JCC-230-003' /* FUTURE ATLANTIC - OCEANVIEW (X2024) 230 KV DISCONNECT BRANCH FROM BUS 206286 TO BUS 206300 CKT X /* ATLANTIC 230.00 OCEANV 230.00 END
PS_P1-2_5015	CONTINGENCY 'PS_P1-2_5015' /* HOPE CREEK TO RED LION TRIP LINE FROM BUS 200027 TO BUS 200029 CKT 1 /* HOPE CREEK TO RED LION END
JC-P1-2-JCC-230-004	CONTINGENCY 'JC-P1-2-JCC-230-004' /* FUTURE ATLANTIC - OCEANVIEW (Y2025) 230 KV DISCONNECT BRANCH FROM BUS 206286 TO BUS 206300 CKT Y /* ATLANTIC 230.00 OCEANV 230.00 END
JC-P1-2-JCC-230-028	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
AE_P1-2 ORCH-CARD	CONTINGENCY 'AE_P1-2 ORCH-CARD' OPEN LINE FROM BUS 228002 TO BUS 227900 CIRCUIT 1 / END

Contingency Name	Contingency Definition
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
AE_P4-2 AE9	CONTINGENCY 'AE_P4-2 AE9' /*CARDIFF TO ORCHARD BREAKER NEW1 DISCONNECT BRANCH FROM BUS 228002 TO BUS 227900 CKT 1 /* CARDIFF TO ORCHARD 230 230 DISCONNECT BRANCH FROM BUS 227900 TO BUS 227934 CKT 1 /*CARDIFF CARDIFF 230 138 T7 END
JC-P7-1-JCC-230-11A	CONTINGENCY 'JC-P7-1-JCC-230-11A' /* LAKEWOOD - LEISURE V 230 KV LINES DISCONNECT BRANCH FROM BUS 206323 TO BUS 206295 CKT 1 DISCONNECT BRANCH FROM BUS 206323 TO BUS 206296 CKT 1 DISCONNECT BRANCH FROM BUS 206323 TO BUS 206282 CKT 6 DISCONNECT BRANCH FROM BUS 206282 TO BUS 206999 CKT 1 SET BUS 206295 LOAD TO 0 MW DISCONNECT BUS 206999 DISCONNECT BUS 207110 DISCONNECT BUS 207010 DISCONNECT BUS 207111 END
FUR RUN_TRANSFORMERS	CONTINGENCY 'FUR RUN_TRANSFORMERS' /* FURNACE RUN TRANSFORMERS #1 AND #2 500/230 KV DISCONNECT BRANCH FROM BUS 270072 TO BUS 270073 CKT 1 DISCONNECT BRANCH FROM BUS 270072 TO BUS 270073 CKT 2 END
AE_P4-2 AE46	CONTINGENCY 'AE_P4-2 AE46' /*ORCHARD 230 BUS BREAKER D DISCONNECT BRANCH FROM BUS 228002 TO BUS 228310 CKT 1 /* ORCHARD TO CHURCHTOWN 230 230 DISCONNECT BRANCH FROM BUS 200063 TO BUS 228002 CKT 1 /*ORCHARD ORCHARD 500 230 T1 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-230-026C	CONTINGENCY 'JC-P2-3-JCC-230-026C' /* RARITAN RIVER B145 STUCK BREAKER DISCONNECT BUS 206314 /* RED OAK 230 KV A TAP DISCONNECT BUS 206363 /* RED OAK 230 KV #2 DISCONNECT BUS 206364 /* RED OAK 230 KV #3 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

15 Attachment 1 – One Line Diagram



16 Attachment 2 – Project Location