Generation Interconnection
Feasibility Study Report
Queue Position AE2-020

The Interconnection Customer (IC) has proposed a 604.8 MW Energy (106.4 MW Capacity) offshore wind generating facility to be located at Latitude: 39.4145000, Longitude: -74.0521000 in the Atlantic Ocean off the coast of Atlantic County, New Jersey. At the IC's request, PJM studied the AE2-020 project at both a Primary and Secondary Point of Interconnection. The project was studied at a commercial probability of 53% with the results provided below. The planned in-service date, as requested by the IC during the project kick-off call, is December 1, 2024. This date is dependent on completion of PJM studies (System Impact and Facilities) and the Transmission Owner's construction schedule for network upgrades.

Point(s) of Interconnection

The Interconnection Customer requested a Primary and Secondary Point of Interconnection (POI) be evaluated for the AE2-020 project.

Primary Point of Interconnection

PJM studied the AE2-020 project as an injection into the Atlantic City Electric Company (ACE) transmission system as a tap of the Cardiff (PSSE bus #227900) to Cedar (PSSE bus #227955) 230 kV circuit and evaluated it for compliance with reliability criteria for summer peak conditions in 2022. The AE2-020 project will connect with the ACE transmission system at a new 230 kV three breaker ring bus substation to be constructed adjacent to the Cardiff - Cedar 230 kV line (2317).

Transmission Owner Scope of Attachment Facilities Work

Substation Interconnection Estimate

Scope: Build a new 230 kV substation with a 3-position ring bus. Two of the positions on the ring bus will be transmission line terminals for the tie-in of Line 2317 to the substation. The other position will be a terminal configured for the interconnection of a generator.

Estimate: $11,800,000
Construction Time: 24-36 months

Major Equipment Included in Estimate:

- Control Enclosure, 20' x 15' Qty. 1
- Power Circuit Breaker, 230 kV, 3000A, 50kA, 3 cycle Qty. 3
- Disconnect Switch, 230 kV, 3000A, with ground switch, Manual Wormgear, Gang operated, Arcing Horns Qty. 6
- Disconnect Switch, 230 kV, 3000A, with ground switch, Manual Wormgear, Gang operated, Quick Break Whips Qty. 3
- Surge Arresters, 230kv Qty. 9
- CT/VT Combination Units, 230 kV Qty. 3

- CVT, 230 kV Qty. 9
- Disconnect Switch Stand, High, 230 kV, Steel Qty. 6
- CT/VT Stand, Single Phase, Low, 230 kV, Steel Qty. 3
- CVT Stand, Single Phase, Low, 230 kV, Steel Qty. 9
- SSVT, 230 kV/240-120 V Qty. 1
- SSVT Stand, Single Phase Qty. 1
- Relay Panel, Transmission Line, FL/BU (20") Qty. 2
- Relay Panel, Differential Protection, FL/BU (20") Qty. 1
- Control Panel, 230 kV Circuit Breaker (10") Qty. 3
- Take-off structure, 230 kV Qty. 3
- Bus Support Structure, 3 phase, 230 kV, Steel Qty. 8
- SCADA Communications Panel Qty: 1

Estimate Assumptions:

- Developer to purchase required land and is available for use.
- Land purchase for the substation is not included.
- Site clearing and grading performed by Developer.
- Grounding, environmental and soil studies not included.
- Fiber to point of interconnection is not included in this study

Required Relaying and Communications

New protection relays are required for the new terminals.

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

New protection relays are required for the new line terminals. Frontline and Backup line protection will be required. A 20" relay panel will be required for each transmission line (2 total).

A breaker control relay on a breaker control panel will be required for the control and operation of each new 230 kV circuit breaker (3 total).

The project will require re-wiring and adjustment of existing relay schemes at Cardiff and Cedar to accommodate the new 230 kV substation.

Metering

A three phase 230 kV revenue metering point will need to be established within the IC facility between the POI disconnect switch and the IC generation breaker.

The metering instrument transformers will be specified by ACE but all equipment and labor will be supplied by the IC. The ACE scope would include the programming and installation of the meters, both primary and backup, and all required wiring work needed to connect the secondary wiring conductors at the metering enclosure. The materials that ACE's Meter Department provides will be

the meter enclosures, control cable, the meters, the output devices, and miscellaneous material at the cabinet.

The IC will purchase and install all metering instrument transformers, as well as construct a metering structure per ACE's specifications. The secondary wiring connections at the instrument transformers will be completed by the IC's contractors and inspected by ACE, while the secondary wiring work at the metering enclosure will be completed by ACE's meter technicians. The metering control cable and meter cabinets will be supplied by ACE and installed by the IC's contractors. ACE's meter technicians will program and install two solid state multi-function meters (Primary & Backup) for each new metering position. Each meter will be equipped with load profile, telemetry, and DNP outputs. The IC will be provided with one (1) meter DNP output.

The IC will be required to make provisions for a POTS (plain old telephone service) line within approximately three (3) feet of each ACE metering position to facilitate remote interrogation and data collection.

Interconnection Customer Scope of Direct Connection Work

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

ACE Interconnection Customer Scope of Direct Connection Work Requirements:

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

Special Operating Requirements

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

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

Additional Interconnection Customer Responsibilities:

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

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

Summer Peak Analysis - 2022

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

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

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
8276815	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	1	JC-P1-2-JCC-230-022	single	817.0	95.98	100.53	DC	37.23

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	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
8277232	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-12	tower	817.0	91.64	111.76	DC	164.32
8277283	206318	28VANHISVL	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	90.81	105.26	DC	125.5
8277260	206319	28WHITINGS	JCP&L	206720	28MANCHSTR	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	84.85	102.62	DC	154.33
8277273	206720	28MANCHSTR	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	83.11	100.88	DC	154.33
8277181	940360	AE2-020 TAP	AE	227900	CARDIFF	AE	1	JC-P7-1-JCC-230-13	tower	805.0	96.25	152.34	DC	553.39

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	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
8277231	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-10A	tower	817.0	101.29	120.17	DC	154.16
8276540	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P2-3-JCC-230-13D	breaker	817.0	110.48	130.29	DC	161.75
1977237	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P1-2 OYCK-CEDAR	single	311.0	107.62	111.03	DC	10.6
1977238	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P1-2 CARD-CEDAR-B	single	311.0	108.81	111.9	DC	9.61
1977458	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P7-1 AE6TOWER	tower	311.0	126.14	132.19	DC	41.65
8277241	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	JC-P7-1-JCC-230-13	tower	311.0	121.18	129.55	DC	57.81

Summer Peak Load Flow Analysis Reinforcements

System Reinforcements

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

ID	Index	Facility	Upgrade Description	Cost
1977458,1977238,1977237, 8277241	2	**MNOTLA 2 138.0 kV - MNOTLA 1 138.0 kV Ckt 1**	**asminotolar0001 (17) : To mitigate the (AE - AE) MNOTLA 2-MNOTLA 1 138 kV line (from bus 228503 to bus 228502 ckt 1) overload will require substation reinforcements at Minotola Substation.** **Project Type : FAC** **Cost : $1,300,000** **Time Estimate : 18.0 Months**	$1,300,000
8276815	1	**28OYSTER C 230.0 kV - 28MANITOU 230.0 kV Ckt 1**	**JCP&L-008A (580) : Reconductor existing sections of 1590 ACSR 45/7 Miscellaneous TDL (MTDL) with 1590 ACSS 45/7.** **Project Type : FAC** **Cost : $195,000** **Time Estimate : 12.0 Months**	$195,000

ID	Index	Facility	Upgrade Description	Cost
8276540	8	28LAKEWOOD 230.0 kV - 28LARRABEE 230.0 kV Ckt 2	JCP&L-020B (640) : Reconductor existing sections of 1590 ACSR 45/7 Miscellaneous TDL (MTDL) with 1590 ACSS 45/7. Reconductor existing section of 1590 ACSR 45/7 with 1590 ACSS 45/7. Replace 1600 Amp Generic Z2026 LN Disconnect Switch. Replace 2000 Amp Generic Wave Trap. All new terminal equipment should be rated above 1065 MVA (Rate B). Project Type : FAC Cost : $20,150,000 Time Estimate : 24.0 Months	$20,150,000
8277181	7	AE2-020 TAP 230.0 kV - CARDIFF 230.0 kV Ckt 1	at2317r0001 (30) : To mitigate the (ACE) Cardiff Cedar 230 kV line (from bus 940360 to bus 227955 ckt 1) overload, it will require increasing the emergency rating of the Cardiff to Cedar 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. Project Type : FAC Cost : $66,000,000 Time Estimate : 48-60 Months as2317r0003 (36) : To mitigate the (ACE) AE2-020 TAP Cardiff 230 kV line (from bus 940360 to bus 227955 ckt 1) overload, various terminal reinforcements are required at Cardiff. Project Type : FAC Cost : $200,000 Time Estimate : 24-36 Months as2317r0005 (39) : To mitigate the (ACE) AE2-020 TAP Cardiff 230 kV line (from bus 940360 to bus 227955 ckt 1) overload, various terminal reinforcements are required at Cardiff. Project Type : FAC Cost : $1,500,000 Time Estimate : 24-36 Months	$67,700,000
8277231,8277232	3	28MANITOU 230.0 kV - 28WHITINGS 230.0 kV Ckt 1	JCP&L-007C (566) : Reconductor existing sections of 1590 ACSR 45/7 Miscellaneous TDL (MTDL) with 1590 ACSS 45/7. Reconductor existing sections of 1590 ACSR 45/7 with 1590 ACSS 45/7. Replace 2000 Amp Generic Wave Trap. Replace 10 Amp DFR (Older) VN a Relay. Replace 10 Amp BV B Meter. All new terminal equipment should be rated above 982 MVA (Rate B). Project Type : FAC Cost : $34,710,000 Time Estimate : 30.0 Months	$34,710,000

ID	Index	Facility	Upgrade Description	Cost
8277283	4	28VANHISVL 230.0 kV - 28LARRABEE 230.0 kV Ckt 1	JCP&L-018A (613) : Reconductor existing section of 1590 ACSR 45/7 with 1590 ACSS 45/7. Project Type : FAC Cost : $29,250,000 Time Estimate : 30.0 Months	$29,250,000
8277260	5	28WHITINGS 230.0 kV - 28MANCHSTR 230.0 kV Ckt 1	JCP&L-019A (627) : Reconductor existing sections of 1590 ACSR 45/7 with 1590 ACSS 45/7. Project Type : FAC Cost : $49,400,000 Time Estimate : 36.0 Months	$49,400,000
8277273	6	28MANCHSTR 230.0 kV - 28VANHISVL 230.0 kV Ckt 1	JCP&L-024A (654) : Reconductor existing section of 1590 ACSR 45/7 with 1590 ACSS 45/7. Project Type : FAC Cost : $23,400,000 Time Estimate : 24.0 Months	$23,400,000
			TOTAL COST	$226,105,000

Steady-State Voltage Requirements

To be performed during later study phases as required.

Short Circuit

No issues identified.

Stability and Reactive Power Requirement

To be performed during later study phases as required.

Light Load Analysis - 2022

To be performed during later study phases (as required by PJM Manual 14B).

Delivery of Energy Portion of Interconnection Request

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. Only the most severely overloaded conditions are listed. 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 will study all overload conditions associated with the overloaded element(s) identified.

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
8276904	206297	28MANITOU	JCP&L	206296	28LEISUR U	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	82.43	101.47	DC	155.54
8276910	206297	28MANITOU	JCP&L	206295	28LEISUR D	JCP&L	1	JC-P1-2-JCC-230-020	operation	817.0	81.79	100.83	DC	155.54
8276810	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	1	JC-P1-2-JCC-230-022	operation	817.0	147.37	173.26	DC	211.55
8276812	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	1	Base Case	operation	650.0	99.56	117.13	DC	114.18
8276832	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	2	JC-P1-2-JCC-230-021	operation	869.0	138.58	162.93	DC	211.58
8276834	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	2	Base Case	operation	709.0	91.4	107.53	DC	114.32
8276855	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P1-2-JCC-230-014	operation	817.0	110.08	129.9	DC	161.81
8276887	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P1-2-JCC-230-013	operation	869.0	104.67	123.3	DC	161.83
1977121	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	Base Case	operation	464.0	76.09	125.93	DC	231.22
8276839	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	AE_P1-2 CARD-CEDAR-A	operation	564.0	19.77	101.72	DC	547.85
1977198	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	AE_P1-2 OY CK-CEDAR	operation	286.0	118.53	128.01	DC	60.2
1977200	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	Base Case	operation	230.0	137.05	144.17	DC	36.31
1977234	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P1-2 OY CK-CEDAR	operation	311.0	112.6	121.32	DC	60.21
1977239	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	Base Case	operation	311.0	101.44	106.7	DC	36.32
1977172	940360	AE2-020 TAP	AE	227955	CEDAR	AE	1	Base Case	operation	650.0	72.9	109.44	DC	237.53

Atlantic City Electric Costs

Cost estimates will further be refined as a part of the Impact Study and Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by ACE in connection with the AE2-020 project.

Secondary Point of Interconnection

PJM studied the AE2-020 project into the Atlantic City Electric Company (ACE) system at the Cardiff 230 kV Substation (PSSE bus #227955) and evaluated it for compliance with reliability criteria for summer peak conditions in 2022.

Summer Peak Analysis - 2022

Transmission Network Impacts

Potential transmission network impacts are as follows:

Generator Deliverability

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

None

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	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
1977079	219100	NEWFRDM	PSE&G	219704	HILLTOP_3	PSE&G	1	PECO_P4_PEACH205/* $ CHESCO $ PECO_P4_PEACH205 $ STBK	breaker	740.0	94.94	103.2	DC	60.81
1976901	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	JC-P2-3-JCC-500-002D	breaker	564.0	86.33	111.41	DC	141.42
1976902	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	JC-P2-3-JCC-500-002B	breaker	564.0	84.05	109.3	DC	142.38

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	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
1977201	228502	MNOTLA1	AE	228500	LANDIS	AE	1	AE_P1-2 OY CK-CEDAR	single	286.0	115.15	118.77	DC	10.36
1977237	228503	MNOTLA2	AE	228502	MNOTLA1	AE	1	AE_P1-2 OY CK-CEDAR	single	311.0	107.62	110.95	DC	10.37
1977458	228503	MNOTLA2	AE	228502	MNOTLA1	AE	1	AE_P7-1 AE6TOWER	tower	311.0	126.18	133.61	DC	51.18
8277241	228503	MNOTLA2	AE	228502	MNOTLA1	AE	1	JC-P7-1-JCC-230-13	tower	311.0	109.99	118.31	DC	57.46
14083199	228503	MNOTLA2	AE	228502	MNOTLA1	AE	1	AE_P1-2 CARD-CEDAR	single	311.0	108.85	111.94	DC	9.61

Delivery of Energy Portion of Interconnection Request

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. Only the most severely overloaded conditions are listed. 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 will study all overload conditions associated with the overloaded element(s) identified.

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
1977389	219110	GLOUCSTR	PSE&G	219755	CUTHBERT_4	PSE&G	1	PS_P1-2_C-2308_LT	operation	758.0	97.2	100.5	DC	54.44

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
1977121	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	Base Case	operation	464.0	75.81	105.42	DC	137.4
1977122	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	PECO_P1-2_5038/* $ CHESCO $ PECO_P1-2_5038 $ L	operation	564.0	83.39	108.7	DC	142.75
1977198	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	AE_P1-2 OY CK-CEDAR	operation	286.0	118.53	127.8	DC	58.88
1977200	228502	MNOTLA 1	AE	228500	LANDIS	AE	1	Base Case	operation	230.0	137.05	145.81	DC	44.69
1977234	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P1-2 OY CK-CEDAR	operation	311.0	112.6	121.13	DC	58.9
1977239	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	Base Case	operation	311.0	101.44	107.91	DC	44.7

Primary POI 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.

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
8276815	206302	28OYSTER C	JCP&L	206297	28MANITOU	JCP&L	1	JC-P1-2-JCC-230-022	single	817.0	95.98	100.53	DC	37.23

Bus #	Bus	MW Impact
206325	28O C GEN	425.09
206360	28O CRK C1	2.86
206361	28O CRK C2	1.61
227801	ONTC&DCT	7.33
227842	MARINGEN	0.09
227927	V4-067C	0.02
228014	PVILLEG	0.09
228201	CARL#2CT	0.24

Bus #	Bus	MW Impact
228202	CUMB CT	0.69
228203	P06	0.73
228206	SHRMN CT	0.63
228251	CARLLS#4	0.03
228260	V4-054C	0.07
228702	WEST CT	0.28
228711	V2-041C	0.02
228717	S121	0.38
228727	W2-039G	0.69
292062	V1-021 C	0.03
902091	W1-130C	0.05
902431	W2-030 C	0.09
913341	Y1-077	8.57
924531	AB2-102 C	23.48
924701	AB2-122 C	0.14
930001	AB1-001 C	0.02
931191	AB1-169A	55.59
938311	AE1-046 C	0.2
938421	AE1-061 C	0.5
938781	AE1-104 C O1	21.94
939501	AE1-179 C O1	3.06
940001	AE1-240 C O1	2.55
940161	AE2-000 C O1	158.31
940361	AE2-020 C O1	37.23
940371	AE2-021 C O1	37.23
940381	AE2-022 C O1	21.72
940391	AE2-023 C O1	12.33
940961	AE2-087 C	0.12
940963	AE2-087 BAT	0.08
941001	AE2-091 C O1	1.92
941121	AE2-106 C	0.13
941123	AE2-106 BAT	0.08
941931	AE2-205 C O1	4.88
942101	AE2-222 C O1	16.22
942201	AE2-232 C O1	77.6
942941	AE2-314 C	8.98
BLUEG	BLUEG	0.2
CALDERWOOD	CALDERWOOD	0.01
CANNELTON	CANNELTON	0.01
CARR	CARR	0.48
CATAWBA	CATAWBA	0.0
CHEOAH	CHEOAH	0.01
CHILHOWEE	CHILHOWEE	0.0
COFFEEN	COFFEEN	0.02
COTTONWOOD	COTTONWOOD	0.06
CPLE	CPLE	0.0
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.02
ELMERSMITH	ELMERSMITH	0.02
FARMERCITY	FARMERCITY	0.01
GIBSON	GIBSON	0.01
HAMLET	HAMLET	0.0

Bus #	Bus	MW Impact
NEWTON	NEWTON	0.05
PRAIRIE	PRAIRIE	0.09
RENSSELAER	RENSSELAER	0.38
SANTEETLA	SANTEETLA	0.0
SMITHLAND	SMITHLAND	0.01
TATANKA	TATANKA	0.02
TILTON	TILTON	0.03
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.05
UNIONPOWER	UNIONPOWER	0.02

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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
1977458	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P7-1 AE6TOWER	tower	311.0	126.14	132.19	DC	41.65

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.51
227842	MARINGEN	0.07
227843	MARINGEN E	0.57
227928	V4-067E	0.18
228014	PVILLEG	0.07
293404	V3-036	0.79
902432	W2-030 E	0.83
913341	Y1-077	8.38
915022	Y3-012 E	1.07
924701	AB2-122 C	0.08
924702	AB2-122 E	0.14
930001	AB1-001 C	0.02
930002	AB1-001 E	0.21
931191	AB1-169A	349.68
933962	AD1-019 E	1.09
938311	AE1-046 C	1.27
938312	AE1-046 E	0.64
938421	AE1-061 C	1.8
938422	AE1-061 E	1.8
938781	AE1-104 C O1	21.46
938782	AE1-104 E O1	54.89
939301	AE1-161 C	3.99
939302	AE1-161 E	5.98
940361	AE2-020 C O1	7.33
940362	AE2-020 E O1	34.32
940371	AE2-021 C O1	7.33
940372	AE2-021 E O1	34.32
940381	AE2-022 C O1	4.28
940382	AE2-022 E O1	20.02
940391	AE2-023 C O1	12.06
940392	AE2-023 E O1	56.46

Bus #	Bus	MW Impact
940973	AE2-088 BAT	0.12
942101	AE2-222 C O1	12.22
942102	AE2-222 E O1	30.69
942941	AE2-314 C	3.66
942942	AE2-314 E	2.44
BLUEG	BLUEG	0.2
CALDERWOOD	CALDERWOOD	0.02
CANNELTON	CANNELTON	0.01
CATAWBA	CATAWBA	0.01
CBM-N	CBM-N	0.07
CHEOAH	CHEOAH	0.02
CHILHOWEE	CHILHOWEE	0.01
COFFEEN	COFFEEN	0.02
COTTONWOOD	COTTONWOOD	0.09
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.02
ELMERSMITH	ELMERSMITH	0.02
FARMERCITY	FARMERCITY	0.01
G-007A	G-007A	1.2
GIBSON	GIBSON	0.01
HAMLET	HAMLET	0.02
NEWTON	NEWTON	0.06
NYISO	NYISO	0.32
PRAIRIE	PRAIRIE	0.1
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.01
TATANKA	TATANKA	0.03
TILTON	TILTON	0.03
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.07
UNIONPOWER	UNIONPOWER	0.03
VFT	VFT	1.07

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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
8277231	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-10A	tower	817.0	101.29	120.17	DC	154.16

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.25
206306	28LKWD G1	5.65
206308	28LKWD G2	5.65
206312	28LKWD G3	3.48
206325	28O C GEN	312.75
206360	28O CRK C1	2.1
206361	28O CRK C2	1.18
206366	28LKWD CT1	10.71

Bus #	Bus	MW Impact
206367	28LKWD CT2	10.71
227801	ONTC&DCT	5.25
227842	MARINGEN	0.06
227843	MARINGEN E	0.54
227927	V4-067C	0.02
227928	V4-067E	0.23
228014	PVILLEG	0.07
292063	V1-021 E	0.03
293404	V3-036	0.75
902432	W2-030 E	0.83
915022	Y3-012 E	1.02
924701	AB2-122 C	0.1
924702	AB2-122 E	0.17
930001	AB1-001 C	0.01
930002	AB1-001 E	0.2
930891	AB1-138 C	0.52
930892	AB1-138 E	0.87
933962	AD1-019 E	1.03
934351	AD1-059	1.01
938781	AE1-104 C O1	15.62
938782	AE1-104 E O1	39.95
939121	AE1-142 C O1	3.93
939122	AE1-142 E O1	5.66
940161	AE2-000 C O1	116.48
940162	AE2-000 E O1	298.02
940361	AE2-020 C O1	27.13
940362	AE2-020 E O1	127.03
940371	AE2-021 C O1	27.13
940372	AE2-021 E O1	127.03
940381	AE2-022 C O1	15.83
940382	AE2-022 E O1	74.1
940391	AE2-023 C O1	8.78
940392	AE2-023 E O1	41.1
942101	AE2-222 C O1	11.63
942102	AE2-222 E O1	29.21
942201	AE2-232 C O1	57.09
942202	AE2-232 E O1	146.09
942941	AE2-314 C	6.45
942942	AE2-314 E	4.3
BLUEG	BLUEG	1.2
CALDERWOOD	CALDERWOOD	0.13
CANNELTON	CANNELTON	0.07
CARR	CARR	0.38
CATAWBA	CATAWBA	0.08
CHEOAH	CHEOAH	0.11
CHILHOWEE	CHILHOWEE	0.04
COFFEEN	COFFEEN	0.13
COTTONWOOD	COTTONWOOD	0.49
DUCKCREEK	DUCKCREEK	0.28
EDWARDS	EDWARDS	0.13
ELMERSMITH	ELMERSMITH	0.12
FARMERCITY	FARMERCITY	0.08

Bus #	Bus	MW Impact
G-007	G-007	3.14
GIBSON	GIBSON	0.05
HAMLET	HAMLET	0.12
NEWTON	NEWTON	0.33
O-066	O-066	9.67
PRAIRIE	PRAIRIE	0.61
RENSSELAER	RENSSELAER	0.3
SANTEETLA	SANTEETLA	0.03
SMITHLAND	SMITHLAND	0.05
TATANKA	TATANKA	0.15
TILTON	TILTON	0.15
TRIMBLE	TRIMBLE	0.13
TVA	TVA	0.41
UNIONPOWER	UNIONPOWER	0.18

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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
8277283	206318	28VANHISVL	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	90.81	105.26	DC	125.5

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.47
206306	28LKWD G1	4.04
206308	28LKWD G2	4.04
206312	28LKWD G3	2.49
206325	28O C GEN	228.42
206360	28O CRK C1	1.54
206361	28O CRK C2	0.86
206366	28LKWD CT1	7.66
206367	28LKWD CT2	7.66
207207	28JCB_W1-129	0.07
207208	28JCB_W4-025	0.1
227801	ONTC&DCT	5.04
227842	MARINGEN	0.06
227843	MARINGEN E	0.52
227927	V4-067C	0.02
227928	V4-067E	0.22
228014	PVILLEG	0.06
292063	V1-021 E	0.03
292099	V1-030 E3	0.1
293404	V3-036	0.72

Bus #	Bus	MW Impact
901981	W1-119 C	0.28
901982	W1-119 E	3.71
901991	W1-120C	2.53
901992	W1-120E	4.12
902082	W1-129E	1.0
902321	W2-019 C	0.09
902322	W2-019 E	1.18
902432	W2-030 E	0.8
902691	W2-056 C	0.07
902692	W2-056 E	0.89
902842	W2-071E	0.18
902951	W2-082 C OP1	0.25
902952	W2-082 E OP1	3.39
903152	W2-102 E	0.55
904042	V4-005 E	0.23
904431	W3-124 C	0.02
904432	W3-124 E	0.24
905252	W4-025 E	1.42
905791	W4-103 C	0.04
905792	W4-103 E	0.6
907272	X1-085 E	0.34
912101	X4-015 C	0.07
912102	X4-015 E	1.0
913332	Y1-075 E	0.21
915022	Y3-012 E	0.98
917611	Z2-102 C	0.2
917612	Z2-102 E	2.71
917682	Z2-109 E	2.06
918452	AA1-060 E	4.89
919672	AA2-049 E	0.43
924701	AB2-122 C	0.09
924702	AB2-122 E	0.16
930001	AB1-001 C	0.01
930002	AB1-001 E	0.19
930102	AB1-025 E	0.54
930891	AB1-138 C	0.98
930892	AB1-138 E	1.63
931122	AB1-163 E	0.82
932361	AC2-050 C O1	0.42
932362	AC2-050 E O1	0.68
933962	AD1-019 E	0.99
934351	AD1-059	0.72
936541	AD2-069 C	0.21
936542	AD2-069 E	0.1
938781	AE1-104 C O1	15.87
938782	AE1-104 E O1	40.58
939121	AE1-142 C O1	3.22
939122	AE1-142 E O1	4.63
940161	AE2-000 C O1	85.07
940162	AE2-000 E O1	217.67
940311	AE2-015 C O1	1.07
940312	AE2-015 E O1	0.53

Bus #	Bus	MW Impact
940361	AE2-020 C O1	22.09
940362	AE2-020 E O1	103.41
940371	AE2-021 C O1	22.09
940372	AE2-021 E O1	103.41
940381	AE2-022 C O1	12.88
940382	AE2-022 E O1	60.33
940391	AE2-023 C O1	8.92
940392	AE2-023 E O1	41.75
940951	AE2-085 C	0.23
940952	AE2-085 E	0.22
941091	AE2-103 C	0.32
941092	AE2-103 E	0.45
941441	AE2-141 C	0.13
941442	AE2-141 E	0.2
942101	AE2-222 C O1	11.15
942102	AE2-222 E O1	28.02
942201	AE2-232 C O1	41.7
942202	AE2-232 E O1	106.7
942941	AE2-314 C	6.02
942942	AE2-314 E	4.01
BLUEG	BLUEG	0.91
CALDERWOOD	CALDERWOOD	0.08
CANNELTON	CANNELTON	0.05
CARR	CARR	0.96
CATAWBA	CATAWBA	0.04
CHEOAH	CHEOAH	0.08
CHILHOWEE	CHILHOWEE	0.03
COFFEEN	COFFEEN	0.1
COTTONWOOD	COTTONWOOD	0.34
DUCKCREEK	DUCKCREEK	0.21
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.09
FARMERCITY	FARMERCITY	0.06
G-007	G-007	9.97
GIBSON	GIBSON	0.04
HAMLET	HAMLET	0.07
NEWTON	NEWTON	0.25
O-066	O-066	25.98
PRAIRIE	PRAIRIE	0.45
RENSSELAER	RENSSELAER	0.76
SANTEETLA	SANTEETLA	0.02
SMITHLAND	SMITHLAND	0.04
TATANKA	TATANKA	0.11
TILTON	TILTON	0.12
TRIMBLE	TRIMBLE	0.1
TVA	TVA	0.28
UNIONPOWER	UNIONPOWER	0.12

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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
8277260	206319	28WHITINGS	JCP&L	206720	28MANCHSTR	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	84.85	102.62	DC	154.33

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.64
206306	28LKWD G1	5.61
206308	28LKWD G2	5.61
206312	28LKWD G3	3.45
206325	28O C GEN	312.99
206360	28O CRK C1	2.11
206361	28O CRK C2	1.18
206366	28LKWD CT1	10.63
206367	28LKWD CT2	10.63
227801	ONTC&DCT	5.26
227842	MARINGEN	0.06
227843	MARINGEN E	0.55
227927	V4-067C	0.02
227928	V4-067E	0.23
228014	PVILLEG	0.07
292063	V1-021 E	0.03
293404	V3-036	0.75
902432	W2-030 E	0.83
915022	Y3-012 E	1.02
917612	Z2-102 E	0.76
924701	AB2-122 C	0.1
924702	AB2-122 E	0.17
930001	AB1-001 C	0.01
930002	AB1-001 E	0.2
930891	AB1-138 C	1.34
930892	AB1-138 E	2.24
931122	AB1-163 E	0.78
933962	AD1-019 E	1.04
934351	AD1-059	1.0
938781	AE1-104 C O1	15.65
938782	AE1-104 E O1	40.02
939121	AE1-142 C O1	4.44
939122	AE1-142 E O1	6.39
940161	AE2-000 C O1	116.56
940162	AE2-000 E O1	298.25
940361	AE2-020 C O1	27.16
940362	AE2-020 E O1	127.17
940371	AE2-021 C O1	27.16
940372	AE2-021 E O1	127.17
940381	AE2-022 C O1	15.84
940382	AE2-022 E O1	74.18
940391	AE2-023 C O1	8.8
940392	AE2-023 E O1	41.17
942101	AE2-222 C O1	11.65
942102	AE2-222 E O1	29.26

Bus #	Bus	MW Impact
942201	AE2-232 C O1	57.14
942202	AE2-232 E O1	146.2
942941	AE2-314 C	6.46
942942	AE2-314 E	4.31
BLUEG	BLUEG	1.21
CALDERWOOD	CALDERWOOD	0.13
CANNELTON	CANNELTON	0.07
CARR	CARR	0.39
CATAWBA	CATAWBA	0.08
CHEOAH	CHEOAH	0.12
CHILHOWEE	CHILHOWEE	0.04
COFFEEN	COFFEEN	0.13
COTTONWOOD	COTTONWOOD	0.49
DUCKCREEK	DUCKCREEK	0.28
EDWARDS	EDWARDS	0.13
ELMERSMITH	ELMERSMITH	0.13
FARMERCITY	FARMERCITY	0.08
G-007	G-007	3.17
GIBSON	GIBSON	0.05
HAMLET	HAMLET	0.13
NEWTON	NEWTON	0.33
O-066	O-066	9.77
PRAIRIE	PRAIRIE	0.62
RENSSELAER	RENSSELAER	0.31
SANTEETLA	SANTEETLA	0.03
SMITHLAND	SMITHLAND	0.05
TATANKA	TATANKA	0.15
TILTON	TILTON	0.15
TRIMBLE	TRIMBLE	0.13
TVA	TVA	0.41
UNIONPOWER	UNIONPOWER	0.18

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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
8277273	206720	28MANCHSTR	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	83.11	100.88	DC	154.33

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.64
206306	28LKWD G1	5.61
206308	28LKWD G2	5.61
206312	28LKWD G3	3.45
206325	28O C GEN	312.99
206360	28O CRK C1	2.11
206361	28O CRK C2	1.18
206366	28LKWD CT1	10.63
206367	28LKWD CT2	10.63

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.26
227842	MARINGEN	0.06
227843	MARINGEN E	0.55
227927	V4-067C	0.02
227928	V4-067E	0.23
228014	PVILLEG	0.07
292063	V1-021 E	0.03
293404	V3-036	0.75
902432	W2-030 E	0.83
915022	Y3-012 E	1.02
917612	Z2-102 E	0.76
924701	AB2-122 C	0.1
924702	AB2-122 E	0.17
930001	AB1-001 C	0.01
930002	AB1-001 E	0.2
930891	AB1-138 C	1.34
930892	AB1-138 E	2.24
931122	AB1-163 E	0.78
933962	AD1-019 E	1.04
934351	AD1-059	1.0
938781	AE1-104 C O1	15.65
938782	AE1-104 E O1	40.02
939121	AE1-142 C O1	4.44
939122	AE1-142 E O1	6.39
940161	AE2-000 C O1	116.56
940162	AE2-000 E O1	298.25
940361	AE2-020 C O1	27.16
940362	AE2-020 E O1	127.17
940371	AE2-021 C O1	27.16
940372	AE2-021 E O1	127.17
940381	AE2-022 C O1	15.84
940382	AE2-022 E O1	74.18
940391	AE2-023 C O1	8.8
940392	AE2-023 E O1	41.17
942101	AE2-222 C O1	11.65
942102	AE2-222 E O1	29.26
942201	AE2-232 C O1	57.14
942202	AE2-232 E O1	146.2
942941	AE2-314 C	6.46
942942	AE2-314 E	4.31
BLUEG	BLUEG	1.21
CALDERWOOD	CALDERWOOD	0.13
CANNELTON	CANNELTON	0.07
CARR	CARR	0.39
CATAWBA	CATAWBA	0.08
CHEOAH	CHEOAH	0.12
CHILHOWEE	CHILHOWEE	0.04
COFFEEN	COFFEEN	0.13
COTTONWOOD	COTTONWOOD	0.49
DUCKCREEK	DUCKCREEK	0.28
EDWARDS	EDWARDS	0.13
ELMERSMITH	ELMERSMITH	0.13

Bus #	Bus	MW Impact
FARMERCITY	FARMERCITY	0.08
G-007	G-007	3.17
GIBSON	GIBSON	0.05
HAMLET	HAMLET	0.13
NEWTON	NEWTON	0.33
O-066	O-066	9.77
PRAIRIE	PRAIRIE	0.62
RENSSELAER	RENSSELAER	0.31
SANTEETLA	SANTEETLA	0.03
SMITHLAND	SMITHLAND	0.05
TATANKA	TATANKA	0.15
TILTON	TILTON	0.15
TRIMBLE	TRIMBLE	0.13
TVA	TVA	0.41
UNIONPOWER	UNIONPOWER	0.18

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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
8277181	940360	AE2-020 TAP	AE	227900	CARDIFF	AE	1	JC-P7-1-JCC-230-13	tower	805.0	96.25	152.34	DC	553.39

Bus #	Bus	MW Impact
206360	28O CRK C1	3.43
206361	28O CRK C2	1.93
940161	AE2-000 C O1	189.65
940162	AE2-000 E O1	485.25
940361	AE2-020 C O1	97.39
940362	AE2-020 E O1	455.99
940371	AE2-021 C O1	97.39
940372	AE2-021 E O1	455.99
940381	AE2-022 C O1	56.81
940382	AE2-022 E O1	266.0
942201	AE2-232 C O1	92.96
942202	AE2-232 E O1	237.87
BLUEG	BLUEG	0.18
CALDERWOOD	CALDERWOOD	0.02
CANNELTON	CANNELTON	0.01
CATAWBA	CATAWBA	0.01
CBM-N	CBM-N	0.06
CHEOAH	CHEOAH	0.02
CHILHOWEE	CHILHOWEE	0.01
COFFEEN	COFFEEN	0.02
COTTONWOOD	COTTONWOOD	0.08
DUCKCREEK	DUCKCREEK	0.04
EDWARDS	EDWARDS	0.02
ELMERSMITH	ELMERSMITH	0.02

Bus #	Bus	MW Impact
FARMERCITY	FARMERCITY	0.01
G-007A	G-007A	0.91
GIBSON	GIBSON	0.01
HAMLET	HAMLET	0.02
NEWTON	NEWTON	0.05
NYISO	NYISO	0.27
PRAIRIE	PRAIRIE	0.09
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.01
TATANKA	TATANKA	0.02
TILTON	TILTON	0.02
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.06
UNIONPOWER	UNIONPOWER	0.03
VFT	VFT	0.9

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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
8276540	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P2-3-JCC-230-13D	breaker	817.0	110.48	130.29	DC	161.75

Bus #	Bus	MW Impact
206280	28LAKEHURS	0.57
206306	28LKWD G1	7.36
206308	28LKWD G2	7.36
206312	28LKWD G3	4.53
206325	28O C GEN	321.99
206360	28O CRK C1	2.17
206361	28O CRK C2	1.22
206366	28LKWD CT1	13.94
206367	28LKWD CT2	13.94
227801	ONTC&DCT	5.69
227842	MARINGEN	0.07
227843	MARINGEN E	0.59
227927	V4-067C	0.02
227928	V4-067E	0.24
228014	PVILLEG	0.07
292063	V1-021 E	0.03
293404	V3-036	0.81
901982	W1-119 E	1.2

Bus #	Bus	MW Impact
901991	W1-120C	0.82
901992	W1-120E	1.33
902432	W2-030 E	0.9
915022	Y3-012 E	1.11
917612	Z2-102 E	0.97
924701	AB2-122 C	0.11
924702	AB2-122 E	0.18
930001	AB1-001 C	0.02
930002	AB1-001 E	0.21
930891	AB1-138 C	1.19
930892	AB1-138 E	1.99
931122	AB1-163 E	0.72
933962	AD1-019 E	1.12
934351	AD1-059	1.31
938781	AE1-104 C O1	17.12
938782	AE1-104 E O1	43.8
939121	AE1-142 C O1	4.44
939122	AE1-142 E O1	6.38
940161	AE2-000 C O1	119.91
940162	AE2-000 E O1	306.82
940361	AE2-020 C O1	28.47
940362	AE2-020 E O1	133.28
940371	AE2-021 C O1	28.47
940372	AE2-021 E O1	133.28
940381	AE2-022 C O1	16.61
940382	AE2-022 E O1	77.75
940391	AE2-023 C O1	9.63
940392	AE2-023 E O1	45.06
942101	AE2-222 C O1	12.6
942102	AE2-222 E O1	31.65
942201	AE2-232 C O1	58.78
942202	AE2-232 E O1	150.4
942941	AE2-314 C	6.95
942942	AE2-314 E	4.63
BLUEG	BLUEG	1.5
CALDERWOOD	CALDERWOOD	0.15
CANNELTON	CANNELTON	0.09
CARR	CARR	0.58
CATAWBA	CATAWBA	0.09
CHEOAH	CHEOAH	0.14
CHILHOWEE	CHILHOWEE	0.05
COFFEEN	COFFEEN	0.16
COTTONWOOD	COTTONWOOD	0.61
DUCKCREEK	DUCKCREEK	0.35
EDWARDS	EDWARDS	0.16
ELMERSMITH	ELMERSMITH	0.16
FARMERCITY	FARMERCITY	0.1
G-007	G-007	5.18
GIBSON	GIBSON	0.06
HAMLET	HAMLET	0.15
NEWTON	NEWTON	0.41
O-066	O-066	14.98

Bus #	Bus	MW Impact
PRAIRIE	PRAIRIE	0.76
RENSSELAER	RENSSELAER	0.46
SANTEETLA	SANTEETLA	0.04
SMITHLAND	SMITHLAND	0.06
TATANKA	TATANKA	0.19
TILTON	TILTON	0.19
TRIMBLE	TRIMBLE	0.17
TVA	TVA	0.5
UNIONPOWER	UNIONPOWER	0.22

Contingency Name	Contingency Definition
AE_P1-2 OY CK-CEDAR	CONTINGENCY 'AE_P1-2 OY CK-CEDAR' OPEN LINE FROM BUS 206302 TO BUS 227955 CIRCUIT 1 / END
PS_P7-1_V2274+P2242_LT	CONTINGENCY 'PS_P7-1_V2274+P2242_LT' /* EAGEL POINT - GLOUCESTER & DEPTFORD - GLOUCESTER DISCONNECT BUS 219757 /* DEPTFORD SECTION 2 DISCONNECT BUS 219760 /* EAGLE POINT SECTION 4 TRIP LINE FROM BUS 219110 TO BUS 219128 CKT 1 /* DISCONNECT TRANSFORMER 26KV CKT 1 CLOSE LINE FROM BUS 219255 TO BUS 219256 CKT Z /* DEPTFORD CLOSE LINE FROM BUS 219180 TO BUS 219181 CKT Z /* DEPTFORD MOVE 8 MW LOAD FROM BUS 219180 TO BUS 219162 /* INTERSTATION TIE TRANSFER LOAD FROM DEPTFORD TO BEAVERBK T1 MOVE 8 MW LOAD FROM BUS 219181 TO BUS 219163 /* INTERSTATION TIE TRANSFER LOAD FROM DEPTFORD TO BEAVERBK T2 MOVE 8 MW LOAD FROM BUS 219255 TO BUS 219162 /* INTERSTATION TIE TRANSFER LOAD FROM DEPTFORD TO BEAVERBK T1 MOVE 8 MW LOAD FROM BUS 219256 TO BUS 219163 /* INTERSTATION TIE TRANSFER LOAD FROM DEPTFORD TO BEAVERBK T2 END
Base Case	
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
AE_P7-1 AE6TOWER	CONTINGENCY 'AE_P7-1 AE6TOWER' DISCONNECT BRANCH FROM BUS 228197 TO BUS 228106 CKT 1 /* MERION TO CORSON 138 KV DISCONNECT BUS 228111 /* BLE TO CORSON 138 KV END

Contingency Name	Contingency Definition
AE_P7-1 W2275_O2241	CONTINGENCY 'AE_P7-1 W2275_O2241' /* DOUBLE CIRCUIT TOWER W-2275(MICKLETON - DEPTFORD) AND O-2241(MICKLETON - THOROFARE) TRIP BRANCH FROM BUS 219762 TO BUS 228401 CKT 1 /* TRIP O-2241(MICKLETON - THOROFARE) 230KV TRIP BRANCH FROM BUS 219121 TO BUS 228401 CKT 1 /* TRIP (MICKLETON - THOROFARE #2) 230KV 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-230-022	CONTINGENCY 'JC-P1-2-JCC-230-022' /* MANITOU - OYSTER CREEK (O1019) 230 KV DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 2 END
JC-P7-1-JCC-230-10A	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

Secondary POI Flow Gate Details

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
1976901	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	JC-P2-3-JCC-500-002D	breaker	564.0	86.33	111.41	DC	141.42

Bus #	Bus	MW Impact
227801	ONTC&DCT	8.28
227842	MARINGEN	0.1
227843	MARINGEN E	0.86
227927	V4-067C	0.03

Bus #	Bus	MW Impact
227928	V4-067E	0.36
228014	PVILLEG	0.11
228202	CUMB CT	0.82
228261	V4-054E	0.59
228357	V2-046E	0.89
228712	V2-041E	0.31
228721	V2-035E	0.1
292062	V1-021 C	0.04
292063	V1-021 E	0.05
293404	V3-036	1.18
902092	W1-130E	0.73
902431	W2-030 C	0.1
902432	W2-030 E	1.31
913341	Y1-077	9.82
915022	Y3-012 E	1.61
918452	AA1-060 E	1.43
919662	AA2-048 E	0.78
919672	AA2-049 E	0.28
924531	AB2-102 C	27.97
924532	AB2-102 E	0.62
924701	AB2-122 C	0.15
924702	AB2-122 E	0.26
930001	AB1-001 C	0.02
930002	AB1-001 E	0.31
931191	AB1-169A	65.66
933962	AD1-019 E	1.63
936411	AD2-052 C	0.52
936412	AD2-052 E	0.26
938311	AE1-046 C	0.24
938312	AE1-046 E	0.12
938421	AE1-061 C	0.31
938422	AE1-061 E	0.31
938781	AE1-104 C O1	25.13
938782	AE1-104 E O1	64.28
938871	AE1-115 C	0.36
938872	AE1-115 E	0.36
939301	AE1-161 C	0.94
939302	AE1-161 E	1.41
939501	AE1-179 C O1	3.69
939502	AE1-179 E O1	2.61
939931	AE1-229 C O1	7.03
939932	AE1-229 E O1	4.77
940001	AE1-240 C O1	3.07
940002	AE1-240 E O1	2.19
940361	AE2-020 C O2	24.89
940362	AE2-020 E O2	116.53
940371	AE2-021 C O2	24.89
940372	AE2-021 E O2	116.53
940381	AE2-022 C O2	14.52
940382	AE2-022 E O2	67.98
940391	AE2-023 C O2	16.3
940392	AE2-023 E O2	76.32

Bus #	Bus	MW Impact
940411	AE2-025 C O2	45.79
940412	AE2-025 E O2	214.38
940961	AE2-087 C	0.14
940962	AE2-087 E	0.19
940963	AE2-087 BAT	0.05
940971	AE2-088 C	0.06
940972	AE2-088 E	0.08
940973	AE2-088 BAT	0.03
941001	AE2-091 C O2	2.3
941002	AE2-091 E O2	1.2
941121	AE2-106 C	0.16
941122	AE2-106 E	0.21
941123	AE2-106 BAT	0.05
941931	AE2-205 C O2	5.96
941932	AE2-205 E O2	3.97
942101	AE2-222 C O2	18.33
942102	AE2-222 E O2	46.06
942201	AE2-232 C O2	26.28
942202	AE2-232 E O2	67.25
942381	AE2-251 C O2	78.85
942382	AE2-251 E O2	201.75
942571	AE2-272	0.1
942941	AE2-314 C	10.1
942942	AE2-314 E	6.73
943081	AE2-335 C O2	3.22
943082	AE2-335 E O2	1.44
BLUEG	BLUEG	0.03
CANNELTON	CANNELTON	0.0
CARR	CARR	0.73
CBM-S1	CBM-S1	0.03
CBM-S2	CBM-S2	0.07
CBM-W2	CBM-W2	0.07
COFFEEN	COFFEEN	0.0
CPLE	CPLE	0.04
DUCKCREEK	DUCKCREEK	0.01
EDWARDS	EDWARDS	0.0
ELMERSMITH	ELMERSMITH	0.0
FARMERCITY	FARMERCITY	0.0
G-007	G-007	6.33
GIBSON	GIBSON	0.0
NEWTON	NEWTON	0.01
O-066	O-066	19.64
PRAIRIE	PRAIRIE	0.0
RENSSELAER	RENSSELAER	0.58
TATANKA	TATANKA	0.0
TILTON	TILTON	0.01
TRIMBLE	TRIMBLE	0.0

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

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
1977458	228503	MNOTLA 2	AE	228502	MNOTLA 1	AE	1	AE_P7-1 AE6TOWER	tower	311.0	126.18	133.61	DC	51.18

Bus #	Bus	MW Impact
227801	ONTC&DCT	5.51
227842	MARINGEN	0.07
227843	MARINGEN E	0.57
227928	V4-067E	0.18
228014	PVILLEG	0.07
293404	V3-036	0.79
902432	W2-030 E	0.83
913341	Y1-077	8.38
915022	Y3-012 E	1.07
924701	AB2-122 C	0.08
924702	AB2-122 E	0.14
930001	AB1-001 C	0.02
930002	AB1-001 E	0.21
931191	AB1-169A	349.68
933962	AD1-019 E	1.09
938311	AE1-046 C	1.27
938312	AE1-046 E	0.64
938421	AE1-061 C	1.8
938422	AE1-061 E	1.8
938781	AE1-104 C O1	21.46
938782	AE1-104 E O1	54.89
939301	AE1-161 C	3.99
939302	AE1-161 E	5.98
940361	AE2-020 C O2	9.01
940362	AE2-020 E O2	42.18
940371	AE2-021 C O2	9.01
940372	AE2-021 E O2	42.18
940381	AE2-022 C O2	5.25
940382	AE2-022 E O2	24.6
940391	AE2-023 C O2	12.63
940392	AE2-023 E O2	59.11
940973	AE2-088 BAT	0.12
942101	AE2-222 C O2	12.2
942102	AE2-222 E O2	30.64
942201	AE2-232 C O2	9.51
942202	AE2-232 E O2	24.34
942381	AE2-251 C O2	28.54
942382	AE2-251 E O2	73.02
942941	AE2-314 C	3.66
942942	AE2-314 E	2.44
BLUEG	BLUEG	0.2
CALDERWOOD	CALDERWOOD	0.02
CANNELTON	CANNELTON	0.01
CATAWBA	CATAWBA	0.01
CBM-N	CBM-N	0.07
CHEOAH	CHEOAH	0.02
CHILHOWEE	CHILHOWEE	0.01

Bus #	Bus	MW Impact
COFFEEN	COFFEEN	0.02
COTTONWOOD	COTTONWOOD	0.09
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.02
ELMERSMITH	ELMERSMITH	0.02
FARMERCITY	FARMERCITY	0.01
G-007A	G-007A	1.2
GIBSON	GIBSON	0.01
HAMLET	HAMLET	0.02
NEWTON	NEWTON	0.06
NYISO	NYISO	0.32
PRAIRIE	PRAIRIE	0.1
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.01
TATANKA	TATANKA	0.03
TILTON	TILTON	0.03
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.07
UNIONPOWER	UNIONPOWER	0.03
VFT	VFT	1.07

Contingency Name	Contingency Definition
AE_P1-2 OY CK-CEDAR	CONTINGENCY 'AE_P1-2 OY CK-CEDAR' OPEN LINE FROM BUS 206302 TO BUS 227955 CIRCUIT 1 / END
AE_P7-1 AE6TOWER	CONTINGENCY 'AE_P7-1 AE6TOWER' DISCONNECT BRANCH FROM BUS 228197 TO BUS 228106 CKT 1 /* MERION TO CORSON 138 KV DISCONNECT BUS 228111 /* BLE TO CORSON 138 KV END
PECO_P4_PEACH205/* $ CHESCO $ PECO_P4_PEACH205 $ STBK	CONTINGENCY 'PECO_P4_PEACH205/* $ CHESCO $ PECO_P4_PEACH205 $ STBK' TRIP BRANCH FROM BUS 200065 TO BUS 200066 CKT 1 /* PCHBTM2S 500.00 PCHBTM1N 500.00 $ CHESCO $ PECO_P4_PEACH205 $ STBK TRIP BRANCH FROM BUS 200064 TO BUS 200065 CKT Z1 /* PCHBTM1S 500.00 PCHBTM2S 500.00 $ CHESCO $ PECO_P4_PEACH205 $ STBK TRIP BRANCH FROM BUS 200013 TO BUS 200066 CKT Z1 /* PCHBTM2N 500.00 PCHBTM1N 500.00 $ CHESCO $ PECO_P4_PEACH205 $ STBK TRIP BRANCH FROM BUS 200065 TO BUS 200051 CKT 1 /* PCHBTM2S 500.00 ROCKSPGS 500.00 $ CHESCO $ PECO_P4_PEACH205 $ STBK 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

Contingency Name	Contingency Definition
Base Case	
JC-P2-3-JCC-500-002B	CONTINGENCY 'JC-P2-3-JCC-500-002B' /* E.WINDSOR CB10 DISCONNECT BRANCH FROM BUS 200012 TO BUS 200028 CKT 1 /* NEWFRDM - WINDSOR 500.00 LINE DISCONNECT BRANCH FROM BUS 200028 TO BUS 206326 CKT 2 /* WINDSOR 500.00 - 28E WINDSR 230.00 XFMR END
PECO_P4_PEACH215/* $ CHESCO $ PECO_P4_PEACH215 $ STBK	CONTINGENCY 'PECO_P4_PEACH215/* $ CHESCO $ PECO_P4_PEACH215 $ STBK' TRIP BRANCH FROM BUS 200065 TO BUS 200051 CKT 1 /* PCHBTM2S 500.00 ROCKSPGS 500.00 $ CHESCO $ PECO_P4_PEACH215 $ STBK REMOVE MACHINE 1 FROM BUS 200034 /* PCHBTM 2 22.00 $ CHESCO $ PECO_P4_PEACH215 $ STBK END
AE_P1-2 CARD-CEDAR	CONTINGENCY 'AE_P1-2 CARD-CEDAR' OPEN LINE FROM BUS 227900 TO BUS 227955 CIRCUIT 1 / END
JC-P2-3-JCC-500-002D	CONTINGENCY 'JC-P2-3-JCC-500-002D' /* E.WINDSOR CB16 DISCONNECT BRANCH FROM BUS 200006 TO BUS 200028 CKT 1 /* DEANS - WINDSOR 500.00 LINE DISCONNECT BRANCH FROM BUS 200012 TO BUS 200028 CKT 1 /* NEWFRDM - WINDSOR 500.00 LINE END