



# **Generation Interconnection**

## **Feasibility Study Report**

**For**

**Queue Project AF2-021**

**CEDAR 69 KV**

**16 MW Capacity / 40 MW Energy**

July 2020

# Table of Contents

1	Introduction.....	4
2	Preface.....	4
3	General.....	4
4	Point of Interconnection.....	5
5	Cost Summary.....	5
6	Transmission Owner Scope of Work.....	5
7	Schedule.....	6
8	Transmission Owner Analysis.....	6
9	Interconnection Customer Requirements.....	6
10	Revenue Metering and SCADA Requirements.....	7
10.1	PJM Requirements.....	7
10.2	Meteorological Data Reporting Requirements.....	7
10.3	Interconnected Transmission Owner Requirements.....	7
11	Summer Peak - Load Flow Analysis.....	8
11.1	Generation Deliverability.....	8
11.2	Multiple Facility Contingency.....	8
11.3	Contribution to Previously Identified Overloads.....	8
11.4	Potential Congestion due to Local Energy Deliverability.....	10
11.5	System Reinforcements - Summer Peak Load Flow - Primary POI.....	12
11.6	Flow Gate Details.....	18
11.6.1	Index 1.....	19
11.6.2	Index 2.....	22
11.6.3	Index 3.....	25
11.6.4	Index 4.....	28
11.6.5	Index 5.....	30
11.6.6	Index 6.....	32
11.6.7	Index 7.....	35
11.6.8	Index 8.....	37
11.6.9	Index 9.....	39
11.6.10	Index 10.....	41
11.6.11	Index 11.....	43

11.6.12	Index 12.....	46
11.6.13	Index 13.....	48
11.6.14	Index 14.....	51
11.7	Queue Dependencies .....	52
11.8	Contingency Descriptions.....	55
12	Short Circuit Analysis.....	60
13	Affected Systems .....	60
14	Attachment 1: One Line Diagram .....	61

## 1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is AEC.

## 2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

## 3 General

The Interconnection Customer (IC), has proposed a Storage generating facility located in Ocean County, New Jersey. The installed facilities will have a total capability of 40 MW with 16 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 01, 2021. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AF2-021</b>
<b>Project Name</b>	<b>CEDAR 69 KV</b>
<b>State</b>	<b>New Jersey</b>
<b>County</b>	<b>Ocean</b>
<b>Transmission Owner</b>	<b>AEC</b>
<b>MFO</b>	<b>40</b>

<b>Queue Number</b>	<b>AF2-021</b>
<b>MWE</b>	40
<b>MWC</b>	16
<b>Fuel</b>	Storage
<b>Basecase Study Year</b>	2023

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

#### 4 Point of Interconnection

AF2-021 will interconnect with the AEC transmission system at the Cedar 69 kV substation.

#### 5 Cost Summary

The AF2-021 project will be responsible for the following costs:

Description	Total Cost
<b>Total Physical Interconnection Costs</b>	\$700,000
<b>Total System Network Upgrade Costs</b>	\$777,848,010
<b>Total Costs</b>	\$778,548,010

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

#### 6 Transmission Owner Scope of Work

##### Substation Interconnection Estimate

Scope: Install 69 kV terminal and bus tie breaker for AF2-021.

Developer responsible for land purchase and site development for substation expansion if required, price is not included.

##### Required Relaying and Communications

Cedar substation:

New protection relays are required for the new terminal and new breaker.

The total physical interconnection costs is given in the table below:

Description	Total Cost
Total Physical Interconnection Costs	\$700,000

## 7 Schedule

Work estimated to take 12-24 months to complete.

## 8 Transmission Owner Analysis

None.

## 9 Interconnection Customer Requirements

### Interconnection Customer Scope of Direct Connection Work

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

### **ACE 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 may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.
3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.IV of Schedule H to the Interconnection Service Agreement.

## **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 Meteorological Data Reporting Requirements**

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Temperature (degrees Fahrenheit)
- Atmospheric pressure (hectopascals)
- Irradiance
- Forced outage data

### **10.3 Interconnected Transmission Owner Requirements**

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/>

A three phase 69 kV revenue metering point will need to be established within the Interconnection Customer Facilities at the Point of Interconnection. The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per ACE's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer and inspected by ACE, while the connections at the metering enclosure will be completed by ACE. The metering control cable and meter cabinets will be supplied by ACE and installed by the Interconnection Customer. The

Interconnection Customer will install conduit for the control cable between the instrument transformers and the metering enclosure. The location of the metering enclosure will be determined during construction. The Interconnection Customer will provide 120V power to the meter cabinet. ACE will provide, program, install, and own the primary & backup solid state multi-function meters for the new metering position.

Each meter will be equipped with load profile, telemetry, and DNP outputs. The Interconnection Customer will be provided with one-meter DNP output for each meter. ACE will supply a wireless modem for MV90 interrogation. In the event that a wireless modem is unable to reliably communicate, the IC will be required to make provisions for a POTS (Plain Old Telephone Service) line or equivalent technology approved by ACE within approximately three feet of the ACE metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and ACE require directly to PJM. The Interconnection Customer will grant permission for PJM to send ACE the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

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

## **11 Summer Peak - Load Flow Analysis**

The Queue Project AF2-021 was evaluated as a 40.0 MW (Capacity 16.0 MW) injection at the Cedar 69 kV substation in the AEC area. Project AF2-021 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-021 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

### **11.1 Generation Deliverability**

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

None

### **11.2 Multiple Facility Contingency**

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

None

### **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	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
99013702	206294	28LARRABE E	230.0	JCP& L	206309	28SMITHBR G	230.0	JCP& L	2	JC-P2-3-JCC-230-15F	breaker	813.0	161.83	162.34	DC	9.11
99013703	206294	28LARRABE E	230.0	JCP& L	206309	28SMITHBR G	230.0	JCP& L	2	JC-P2-3-JCC-230-13A	breaker	813.0	160.56	161.06	DC	8.88
99013707	206294	28LARRABE E	230.0	JCP& L	206309	28SMITHBR G	230.0	JCP& L	1	JC-P2-3-JCC-230-15G	breaker	817.0	161.04	161.55	DC	9.11
99013708	206294	28LARRABE E	230.0	JCP& L	206309	28SMITHBR G	230.0	JCP& L	1	JC-P2-3-JCC-230-15A	breaker	817.0	156.61	157.1	DC	8.88
99015219	206294	28LARRABE E	230.0	JCP& L	206318	28VANHISV L	230.0	JCP& L	1	JC-P7-1-JCC-230-11A	tower	869.0	114.09	115.42	DC	11.51
99015220	206294	28LARRABE E	230.0	JCP& L	206318	28VANHISV L	230.0	JCP& L	1	JC-P7-1-JCC-230-12	tower	869.0	104.32	105.72	DC	12.15
99015084	206297	28MANITO U	230.0	JCP& L	206319	28WHITING S	230.0	JCP& L	1	JC-P7-1-JCC-230-12	tower	817.0	169.73	171.69	DC	16.05
99015085	206297	28MANITO U	230.0	JCP& L	206319	28WHITING S	230.0	JCP& L	1	JC-P7-1-JCC-230-10A	tower	817.0	180.32	180.41	DC	15.11
99013762	206302	28OYSTER C	230.0	JCP& L	227955	CEDAR	230.0	AE	1	AE_P4-2 AE46	breaker	564.0	145.64	149.94	DC	24.22
99013763	206302	28OYSTER C	230.0	JCP& L	227955	CEDAR	230.0	AE	1	JC-P2-3-JCC-230-18A	breaker	564.0	141.11	144.77	DC	20.63
99015118	206302	28OYSTER C	230.0	JCP& L	227955	CEDAR	230.0	AE	1	JC-P7-1-JCC-230-10A	tower	564.0	154.26	157.4	DC	17.79
99015119	206302	28OYSTER C	230.0	JCP& L	227955	CEDAR	230.0	AE	1	JC-P7-1-JCC-230-12	tower	564.0	144.39	147.48	DC	17.43
99015102	206318	28VANHISV L	230.0	JCP& L	206294	28LARRABE E	230.0	JCP& L	1	JC-P7-1-JCC-230-12	tower	869.0	155.95	157.2	DC	12.15
99015103	206318	28VANHISV L	230.0	JCP& L	206294	28LARRABE E	230.0	JCP& L	1	JC-P7-1-JCC-230-10A	tower	869.0	148.53	149.13	DC	11.5
99015115	206319	28WHITING S	230.0	JCP& L	206720	28MANCHS TR	230.0	JCP& L	1	JC-P7-1-JCC-230-10A	tower	869.0	154.77	156.15	DC	15.12
99015116	206319	28WHITING S	230.0	JCP& L	206720	28MANCHS TR	230.0	JCP& L	1	JC-P7-1-JCC-230-12	tower	869.0	146.69	148.44	DC	15.86
99013642	206323	28LAKEWO OD	230.0	JCP& L	206294	28LARRABE E	230.0	JCP& L	2	JC-P2-3-JCC-230-15J	breaker	817.0	193.47	194.99	DC	15.67
99015122	206720	28MANCHS TR	230.0	JCP& L	206318	28VANHISV L	230.0	JCP& L	1	JC-P7-1-JCC-230-10A	tower	869.0	153.21	154.58	DC	15.12
99015123	206720	28MANCHS TR	230.0	JCP& L	206318	28VANHISV L	230.0	JCP& L	1	JC-P7-1-JCC-230-12	tower	869.0	145.12	146.88	DC	15.86
99836739	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE& G	1	AE_P4-2 AE46	breaker	692.0	236.77	237.4	DC	9.92
99836740	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE& G	1	AE_P4-2 AE45	breaker	692.0	216.17	217.48	DC	9.51
99836744	227900	CARDIFF	230.0	AE	227955	CEDAR	230.0	AE	1	AE_P4-2 AE6	breaker	805.0	175.91	177.22	DC	11.26
99836745	227900	CARDIFF	230.0	AE	227955	CEDAR	230.0	AE	1	AE_P4-2 AE7	breaker	805.0	175.92	177.23	DC	11.26
99837799	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE& G	1	AE_P7-1 AE13TOWER	tower	692.0	256.2	257.65	DC	10.23

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
99837823	22790	CARDIFF	230.0	AE	228002	ORCHARD	230.0	AE	1	JC-P7-1-JCC-230-13	tower	805.0	147.73	149.12	DC	11.2
99013617	227955	CEDAR	230.0	AE	206302	28OYSTER C	230.0	JCP&L	1	AE_P4-2AE7	breaker	564.0	244.43	248.55	DC	24.73
99013618	227955	CEDAR	230.0	AE	206302	28OYSTER C	230.0	JCP&L	1	AE_P4-2AE6	breaker	564.0	244.43	248.55	DC	24.73
99837948	227955	CEDAR	230.0	AE	227900	CARDIFF	230.0	AE	1	JC-P7-1-JCC-230-13	tower	805.0	115.27	119.18	DC	31.44

#### 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
99014190	206294	28LARRABE E	230.0	JCP&L	206309	28SMITHBR G	230.0	JCP&L	2	JC-P1-2-JCC-230-017	operation	813.0	159.53	160.04	DC	9.11
99014284	206294	28LARRABE E	230.0	JCP&L	206309	28SMITHBR G	230.0	JCP&L	1	JC-P1-2-JCC-230-018	operation	817.0	145.92	146.38	DC	8.34
99014370	206295	28LEISUR D	230.0	JCP&L	206323	28LAKEWOD	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	869.0	125.77	127.41	DC	14.87
99014268	206296	28LEISUR U	230.0	JCP&L	206323	28LAKEWOD	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	142.45	144.19	DC	14.8
99014184	206297	28MANITO U	230.0	JCP&L	206296	28LEISUR U	230.0	JCP&L	1	JC-P1-2-JCC-230-019	operation	817.0	155.44	157.2	DC	15.02
99014195	206297	28MANITO U	230.0	JCP&L	206295	28LEISUR D	230.0	JCP&L	1	JC-P1-2-JCC-230-020	operation	817.0	154.87	156.63	DC	15.02
99014048	206302	28OYSTER C	230.0	JCP&L	206297	28MANITO U	230.0	JCP&L	1	JC-P1-2-JCC-230-022	operation	817.0	246.58	249.04	DC	20.61
99014049	206302	28OYSTER C	230.0	JCP&L	206297	28MANITO U	230.0	JCP&L	1	Base Case	operation	650.0	160.75	162.47	DC	11.13
99014053	206302	28OYSTER C	230.0	JCP&L	206297	28MANITO U	230.0	JCP&L	2	JC-P1-2-JCC-230-021	operation	869.0	231.87	234.18	DC	20.62
99014055	206302	28OYSTER C	230.0	JCP&L	206297	28MANITO U	230.0	JCP&L	2	Base Case	operation	709.0	147.56	149.13	DC	11.14
99014212	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	Base Case	operation	464.0	153.56	158.42	DC	22.53

ID	FROM BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
99014213	206302	28OYSTER C	230.0	JCP&L	227955	CEDAR	230.0	AE	1	AE_P1-2 ORCHAR DXF	operatio n	564.0	137.47	141.59	DC	23.23
99014088	206323	28LAKEWO OD	230.0	JCP&L	206294	28LARRABE E	230.0	JCP&L	2	JC-P1-2-JCC-230-014	operatio n	817.0	193.14	194.66	DC	15.68
99014089	206323	28LAKEWO OD	230.0	JCP&L	206294	28LARRABE E	230.0	JCP&L	2	Base Case	operatio n	650.0	133.58	134.62	DC	8.57
99014113	206323	28LAKEWO OD	230.0	JCP&L	206294	28LARRABE E	230.0	JCP&L	1	JC-P1-2-JCC-230-013	operatio n	869.0	182.74	184.17	DC	15.68
99014114	206323	28LAKEWO OD	230.0	JCP&L	206294	28LARRABE E	230.0	JCP&L	1	Base Case	operatio n	709.0	122.79	123.75	DC	8.59
99837049	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	JC-P1-2-JCC-230-002T	operatio n	692.0	214.17	216.46	DC	16.78
99837053	227900	CARDIFF	230.0	AE	219100	NEWFRDM	230.0	PSE&G	1	Base Case	operatio n	650.0	180.44	181.48	DC	7.09
99837054	227900	CARDIFF	230.0	AE	227955	CEDAR	230.0	AE	1	PS_P1-2_2310	operatio n	805.0	175.26	176.58	DC	11.29
99837055	227900	CARDIFF	230.0	AE	227955	CEDAR	230.0	AE	1	Base Case	operatio n	650.0	169.22	171.27	DC	13.35
99014043	227955	CEDAR	230.0	AE	206302	28OYSTER C	230.0	JCP&L	1	PS_P1-2_2310	operatio n	564.0	243.87	247.98	DC	24.72
99014044	227955	CEDAR	230.0	AE	206302	28OYSTER C	230.0	JCP&L	1	Base Case	operatio n	464.0	227.89	232.49	DC	22.53
101519718	228503	MNOTLA 2	138.0	AE	228502	MNOTLA 1	138.0	AE	1	JC-P1-2-JCC-230-002T	operatio n	311.0	234.89	236.33	DC	4.47

## 11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
99015118,99015119,99013763,99013762	5	28OYSTER C 230.0 kV - CEDAR 230.0 kV Ckt 1	<p><u>AE</u> at2318r0001 (141) : To mitigate the (ACE) Cedar Oyster Creek 230 kV line (from bus 227955 to bus 206302 ckt 1) overload, it will require increasing the emergency rating of the Cedar to Oyster Creek 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. In addition, various terminal reinforcements are required at Cedar.</p> <p>Project Type : FAC Cost : \$27,000,000 Time Estimate : 36-60 Months</p> <p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0011a (1598): Reconductor the Oyster Creek - Cedar 230 kV line (JCP&amp;L portion only ~0.1 miles. AE portion ~14 miles)</p> <p>Upgrade terminal equipment at Oyster Creek</p> <p>Additionally, AE would need to replace their section of the limiting conductor and provide estimates for their replacement.</p> <p>Project Type : FAC Cost : \$469,866 Time Estimate : 24.0 Months</p>	\$27,469,866
99013703,99013702	1	28LARRABEE 230.0 kV - 28SMITHBRG 230.0 kV Ckt 2	<p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0005 (1591): Replace substation conductor at Larrabee substation</p> <p>Reconductor the Larrabee - Smithburg 230 kV line (~11.8 miles).</p> <p>Replace wave trap and disconnect switch at Larrabee substation and wave trap at Smithburg Substation.</p> <p>Replace wave trap and gas insulated bus at Smithburg substation.</p> <p>Project Type : FAC Cost : \$57,290,121 Time Estimate : 54.0 Months</p>	\$57,290,121
99013708,99013707	2	28LARRABEE 230.0 kV - 28SMITHBRG 230.0 kV Ckt 1	<p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0004 (1590): Replace substation conductor at Larrabee substation</p> <p>Reconductor the Larrabee - Smithburg 230 kV line (~11.9 miles).</p> <p>Replace wave trap and disconnect switch at Larrabee substation.</p> <p>Replace wave trap and gas insulated bus at Smithburg substation.</p> <p>Project Type : FAC Cost : \$57,827,111 Time Estimate : 54.0 Months</p>	\$57,827,111

ID	Idx	Facility	Upgrade Description	Cost
99836739,99837799,99836740	10	CARDIFF 230.0 kV - NEWFRDM 230.0 kV Ckt 1	<p><u>AE</u>  as2310r0001 (58): 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.  Project Type : FAC  Cost : \$400,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  as2310r0002 (59): 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.  Project Type : FAC  Cost : \$600,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  as2310r0003 (60): 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.  Project Type : FAC  Cost : \$600,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  as2310r0004_af1f (61): 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.  Project Type : FAC  Cost : \$600,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  at2310r0001 (133) : 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.  Project Type : FAC  Cost : \$63,200,000  Time Estimate : 36-60 Months</p> <p><u>AE</u>  at2310r0002_af1f (134) : 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.  Project Type : FAC  Cost : \$160,000,000  Time Estimate : 60-72 Months</p> <p><u>PSE&amp;G</u>  r_PS_I004a_NF (1941) : Upgrade New Freedom 230kV terminal equipment to achieve a SER of 1593 MVA  Project Type : FAC  Cost : \$4,851,583  Time Estimate : 13.0 Months</p> <p><u>PSE&amp;G</u>  r_PS_I004b_NF (1942) : Upgrade New Freedom 230kV terminal equipment to achieve a SER of 1992 MVA  Project Type : FAC  Cost : \$35,507,396  Time Estimate : 27.0 Months</p>	\$260,907,396

ID	Idx	Facility	Upgrade Description	Cost
99837948	14	CEDAR 230.0 kV - CARDIFF 230.0 kV Ckt 1	<p><u>AE</u>  at2317r0001 (138) : 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</p>	\$66,000,000
99836744,99836745	11	CARDIFF 230.0 kV - CEDAR 230.0 kV Ckt 1	<p><u>AE</u>  as2317r0001 (67) : To mitigate the (ACE) AE2-020 TAP Cedar 230 kV line (from bus 940360 to bus 227955 ckt 1) overload, various terminal reinforcements are required at Cedar.  Project Type : FAC  Cost : \$300,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  at2317r0001 (138) : 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</p>	\$66,300,000
99015084,99015085	4	28MANITOU 230.0 kV - 28WHITINGS 230.0 kV Ckt 1	<p><u>JCP&amp;L</u>  JCP&amp;L-AF2-F-0007 (1594): Replace substation conductor at Manitou and Whitings substations.  Reconductor the Manitou - Whitings 230 kV line (~8.78 miles).  Replace wave trap, circuit breaker, and disconnect switch at Manitou substation  Replace relaying at Manitou substation  Replace metering at Whitings substation.  Project Type : FAC  Cost : \$43,435,779  Time Estimate : 48.0 Months</p>	\$43,435,779
99015103,99015102	6	28VANHISVL 230.0 kV - 28LARRABEE 230.0 kV Ckt 1	<p><u>JCP&amp;L</u>  JCP&amp;L-AF2-F-0018 (1607): Reconductor the Larrabee - Van Hiseville 230 kV line (~7.5 miles).  Replace wave trap at Larrabee.  Replace relaying, metering, current transformers, and fault switch at Larrabee.  Project Type : FAC  Cost : \$37,018,748  Time Estimate : 42.0 Months</p>	\$37,018,748

ID	Idx	Facility	Upgrade Description	Cost
99015219,9901 5220	3	28LARRABEE 230.0 kV - 28VANHISVL 230.0 kV Ckt 1	<p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0006a (1592): Reconductor the Larrabee - Van Hiseville 230 kV line (~7.5 miles). Project Type : FAC Cost : \$35,239,969 Time Estimate : 42.0 Months</p> <p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0006b (1593): Replace relaying and metering at Larrabee substation. Project Type : FAC Cost : \$536,990 Time Estimate : 12.0 Months</p>	\$35,776,959
99015116,9901 5115	7	28WHITINGS 230.0 kV - 28MANCHSTR 230.0 kV Ckt 1	<p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0019a (1608): Reconductor the Manchester - Whitings 230 kV 1590 line (~12.65 miles).  Replace wave trap at Whitings.  Replace substation conductor at Manchester.  Replace circuit breaker at Whitings.  Replace disconnect switches at Manchester and Whitings.  Replace relaying and metering at Whitings. Project Type : FAC Cost : \$62,324,402 Time Estimate : 54.0 Months</p> <p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0019b (1609): Replace fault switches at Whitings. Project Type : FAC Cost : \$536,990 Time Estimate : 12.0 Months</p>	\$62,861,392
99015123,9901 5122	9	28MANCHSTR 230.0 kV - 28VANHISVL 230.0 kV Ckt 1	<p><u>JCP&amp;L</u> JCP&amp;L-AF2-F-0027 (1618): Reconductor the Van Hiseville Tap - Manchester 230 kV line (~5.55 miles).  Replace substation conductor at Manchester.  Replace disconnect switches at Manchester. Project Type : FAC Cost : \$26,077,577 Time Estimate : 42.0 Months</p>	\$26,077,577

ID	Idx	Facility	Upgrade Description	Cost
99013618,99013617	13	CEDAR 230.0 kV - 28OYSTER C 230.0 kV Ckt 1	<p><u>AE</u>  as2318r0001 (72) : To mitigate the (ACE) Cedar Oyster Creek 230 kV line (from bus 227955 to bus 206302 ckt 1) overload, it will require various terminal reinforcements at Cedar.  Project Type : FAC  Cost : \$700,000  Time Estimate : 24-48 Months</p> <p><u>AE</u>  at2318r0001 (141) : To mitigate the (ACE) Cedar Oyster Creek 230 kV line (from bus 227955 to bus 206302 ckt 1) overload, it will require increasing the emergency rating of the Cedar to Oyster Creek 230 kV line by rebuilding the circuit. The rebuild will include the installation of new poles, foundations, insulators, and conductor. In addition, various terminal reinforcements are required at Cedar.  Project Type : FAC  Cost : \$27,000,000  Time Estimate : 36-60 Months</p> <p><u>JCP&amp;L</u>  JCP&amp;L-AF1-S-0010a (1570): Reconductor the Oyster Creek - Cedar 230 kV line (JCP&amp;L portion only ~0.1 miles. AE portion ~14 miles)</p> <p>Upgrade terminal equipment at Oyster Creek</p> <p>Additionally, AE would need to replace their section of the limiting conductor and provide estimates for their replacement.  Project Type : FAC  Cost : \$469,866  Time Estimate : 12.0 Months</p> <p><u>JCP&amp;L</u>  JCP&amp;L-AF1-S-0010b (1571): Replace disconnect switch at Oyster Creek</p> <p>Additionally, AE would need to replace their section of the limiting conductor and provide estimates for their replacement.  Project Type : FAC  Cost : \$402,742  Time Estimate : 12.0 Months</p>	\$28,572,609
99013642	8	28LAKEWOOD 230.0 kV - 28LARRABEE 230.0 kV Ckt 2	<p><u>JCP&amp;L</u>  JCP&amp;L-AF2-F-0021 (1611): Replace substation conductor at Lakewood Gen. and Larrabee.</p> <p>Reconductor the Lakewood Gen. - Larrabee 230 kV line (~5.24 miles).</p> <p>Replace disconnect switches at Larrabee and Lakewood Gen.</p> <p>Replace wave trap at Larrabee.</p> <p>Replace relaying, metering, and fault switches at Lakewood Gen. and at Larrabee.  Project Type : FAC  Cost : \$26,010,453  Time Estimate : 42.0 Months</p>	\$26,010,453

ID	Idx	Facility	Upgrade Description	Cost
99837823	12	CARDIFF 230.0 kV - ORCHARD 230.0 kV Ckt 1	<p><u>AE</u>  as2321r0001_ae2s (74): To mitigate the (ACE) Orchard Cardiff 230 kV line (from bus 228002 to bus 227900 ckt 1) overload, it will require reinforcement of terminal equipment at Orchard &amp; Cardiff .  Project Type : FAC  Cost : \$200,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  as2321r0002_ae2s (75): To mitigate the (ACE) Orchard Cardiff 230 kV line (from bus 228002 to bus 227900 ckt 1) overload, it will require reinforcement of terminal equipment at Orchard &amp; Cardiff .  Project Type : FAC  Cost : \$800,000  Time Estimate : 24-36 Months</p> <p><u>AE</u>  at2321r0001_ae2s (143) : To mitigate the (ACE) Orchard Cardiff 230 kV line (from bus 228002 to bus 227900 ckt 1) overload, it will require increasing the emergency rating of the Orchard to Cardiff 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 is required at Orchard &amp; Cardiff.  Project Type : FAC  Cost : \$74,000,000  Time Estimate : 48-60 Months</p> <p><u>AE</u>  at2321r0002_ae2s (144) : To mitigate the (ACE) Orchard Cardiff 230 kV line (from bus 228002 to bus 227900 ckt 1) overload, it will require increasing the emergency rating of the Orchard to Cardiff 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 is required at Orchard &amp; Cumberland.  Project Type : FAC  Cost : \$300,000  Time Estimate : 24-36 Months</p>	\$75,300,000
			<b>TOTAL COST</b>	<b>\$777,848,010</b>

## 11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

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### 11.6.1 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
99013702	206294	28LARRABEE	JCP&L	206309	28SMITHBRG	JCP&L	2	JC-P2-3-JCC-230-15F	breaker	813.0	161.83	162.34	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206271	28MCRC/REC	1.0635	Adder	1.25
206280	28LAKEHURS	0.7655	50/50	0.7655
206306	28LKWD G1	5.1218	50/50	5.1218
206308	28LKWD G2	5.1218	50/50	5.1218
206312	28LKWD G3	3.7106	50/50	3.7106
206325	28O C GEN (Deactivation : 17/09/2018)	57.4750	Adder	67.62
206366	28LKWD CT1	10.3235	50/50	10.3235
206367	28LKWD CT2	10.3235	50/50	10.3235
206370	LKWD CT3	71.2060	50/50	71.2060
206412	28R11	31.3375	Adder	36.87
207143	28BYD_X4-031	0.3462	Adder	0.41
207145	28FRN_Y2-051	0.1032	50/50	0.1032
207148	28MDF_W3-079	0.1447	50/50	0.1447
207400	28AA1-060 E	2.3542	Adder	2.77
207419	AB2-139 E	-0.0276	Adder	-0.03
227928	V4-067E	0.1293	Adder	0.15
228102	BLE#2 ST (Deactivation : 30/04/2019)	9.9677	Adder	11.73
901912	W1-112E OP1	0.3069	Adder	0.36
901982	W1-119 E	1.0538	Adder	1.24
901992	W1-120E	1.0538	Adder	1.24
902032	W1-124E	1.7146	Adder	2.02
902082	W1-129E	0.5531	Adder	0.65
902322	W2-019 E	0.6524	Adder	0.77
902432	W2-030 E	0.4583	Adder	0.54
902952	W2-082 E OP1	1.9000	Adder	2.24
903982	W3-079 E	1.3871	50/50	1.3871
905252	W4-025 E	0.7850	Adder	0.92
905502	W4-060 E OP1	0.4647	Adder	0.55
907082	X1-037 E	1.2820	Adder	1.51
907272	X1-085 E	0.3061	Adder	0.36
912102	X4-015 E	0.5564	Adder	0.65
914092	Y2-051 E	0.9757	50/50	0.9757
917612	Z2-102 E	1.5531	Adder	1.83
919662	AA2-048 E	2.2068	50/50	2.2068
920732	AA2-184 E	1.8523	Adder	2.18
923292	AB1-138 C	0.1955	50/50	0.1955
923293	AB1-138 E	1.8886	50/50	1.8886
923463	AB1-163 E	1.2288	Adder	1.45
923791	AB2-014	0.4974	50/50	0.4974

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
924701	AB2-122 C	0.0558	Adder	0.07
924702	AB2-122 E	0.0957	Adder	0.11
930001	AB1-001 C	0.0824	Adder	0.1
930002	AB1-001 E	0.1354	Adder	0.16
933962	AD1-019 E	0.5928	Adder	0.7
934351	AD1-059	0.9151	50/50	0.9151
938781	AE1-104 C O1	8.0457	Adder	9.47
938782	AE1-104 E O1	20.5849	Adder	24.22
939121	AE1-142 C O1	2.6794	50/50	2.6794
939122	AE1-142 E O1	3.8557	50/50	3.8557
939981	AE1-238 C	39.6232	Adder	46.62
939982	AE1-238 E	104.0769	Adder	122.44
940161	AE2-000 C O1	58.6255	Adder	68.97
940162	AE2-000 E O1	150.0025	Adder	176.47
940361	AE2-020 C	8.9814	Adder	10.57
940362	AE2-020 E	42.0514	Adder	49.47
940371	AE2-021 C	8.9814	Adder	10.57
940372	AE2-021 E	42.0514	Adder	49.47
940381	AE2-022 C	5.2391	Adder	6.16
940382	AE2-022 E	24.5300	Adder	28.86
940401	AE2-024 C O1	57.6291	50/50	57.6291
940402	AE2-024 E O1	269.8134	50/50	269.8134
940411	AE2-025 C	29.0912	50/50	29.0912
940412	AE2-025 E	136.1893	50/50	136.1893
940691	AE2-056 C	0.1913	Adder	0.23
940692	AE2-056 E	0.1674	Adder	0.2
940701	AE2-057 C	0.0357	Adder	0.04
940702	AE2-057 E	0.0357	Adder	0.04
940921	AE2-081 C	0.2033	Adder	0.24
940922	AE2-081 E	0.2092	Adder	0.25
942101	AE2-222 C O1	6.7002	Adder	7.88
942102	AE2-222 E O1	16.8312	Adder	19.8
942381	AE2-251 C	28.4528	Adder	33.47
942382	AE2-251 E	72.8026	Adder	85.65
943521	AF1-023	1.3413	Adder	1.58
943561	AF1-027	0.2616	Adder	0.31
943732	AF1-041 E	0.1899	Adder	0.22
944332	AF1-101 E O1	147.0623	Adder	173.01
944611	AF1-126 C O1	8.8617	Adder	10.43
944612	AF1-126 E O1	35.4467	Adder	41.7
945571	AF1-222 C	24.6984	Adder	29.06
945572	AF1-222 E	65.1141	Adder	76.6
945951	AF1-260	0.3153	50/50	0.3153
957221	AF2-016 C	4.8211	Adder	10.7
957222	AF2-016 E	7.2316	Adder	16.05
957271	AF2-021 C	1.6415	Adder	3.64
957272	AF2-021 E	2.4623	Adder	5.47
957311	AF2-025 C	0.3289	Adder	0.73
957312	AF2-025 E	0.4934	Adder	1.1
957772	AF2-071 BAT	4.7080	Merchant Transmission	4.7080
957781	AF2-072 C	9.2813	50/50	9.2813
957782	AF2-072 E	9.2813	50/50	9.2813

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
958761	AF2-167 C O1	0.2790	Adder	0.62
958762	AF2-167 E O1	0.3854	Adder	0.86
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.1616	Adder	0.36
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	19.2277	Adder	42.68
959151	AF2-206 C O1	2.0544	50/50	2.0544
959152	AF2-206 E O1	2.8355	50/50	2.8355
959631	AF2-254 C	0.4093	Adder	0.91
959632	AF2-254 E	0.5652	Adder	1.25
999905	MARINGEN 2	0.3108	Adder	0.37
999906	PVILLEG 2	0.1340	Adder	0.16
NEWTON	NEWTON	0.3417	Confirmed LTF	0.3417
FARMERCITY	FARMERCITY	0.0177	Confirmed LTF	0.0177
G-007A	G-007A	16.1424	Confirmed LTF	16.1424
CALDERWOOD	CALDERWOOD	0.1521	Confirmed LTF	0.1521
NY	NY	0.5591	Confirmed LTF	0.5591
PRAIRIE	PRAIRIE	0.8162	Confirmed LTF	0.8162
O-066	O-066	5.7926	Confirmed LTF	5.7926
CHEOAH	CHEOAH	0.1532	Confirmed LTF	0.1532
EDWARDS	EDWARDS	0.1117	Confirmed LTF	0.1117
TILTON	TILTON	0.2010	Confirmed LTF	0.2010
MADISON	MADISON	0.0060	Confirmed LTF	0.0060
GIBSON	GIBSON	0.1736	Confirmed LTF	0.1736
BLUEG	BLUEG	0.5520	Confirmed LTF	0.5520
TRIMBLE	TRIMBLE	0.1770	Confirmed LTF	0.1770
CATAWBA	CATAWBA	0.1040	Confirmed LTF	0.1040

## 11.6.2 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
99013707	206294	28LARRABEE	JCP&L	206309	28SMITHBRG	JCP&L	1	JC-P2-3-JCC-230-15G	breaker	817.0	161.04	161.55	DC	9.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206271	28MCRC/REC	1.0635	Adder	1.25
206280	28LAKEHURS	0.7655	50/50	0.7655
206306	28LKWD G1	5.1218	50/50	5.1218
206308	28LKWD G2	5.1218	50/50	5.1218
206312	28LKWD G3	3.7106	50/50	3.7106
206325	28O C GEN (Deactivation : 17/09/2018)	57.4750	Adder	67.62
206366	28LKWD CT1	10.3235	50/50	10.3235
206367	28LKWD CT2	10.3235	50/50	10.3235
206370	LKWD CT3	71.2060	50/50	71.2060
206412	28R11	31.3375	Adder	36.87
207143	28BYD_X4-031	0.3462	Adder	0.41
207145	28FRN_Y2-051	0.1032	50/50	0.1032
207148	28MDF_W3-079	0.1447	50/50	0.1447
207400	28AA1-060 E	2.3542	Adder	2.77
207419	AB2-139 E	-0.0276	Adder	-0.03
227928	V4-067E	0.1293	Adder	0.15
228102	BLE#2 ST (Deactivation : 30/04/2019)	9.9677	Adder	11.73
901912	W1-112E OP1	0.3069	Adder	0.36
901982	W1-119 E	1.0538	Adder	1.24
901992	W1-120E	1.0538	Adder	1.24
902032	W1-124E	1.7146	Adder	2.02
902082	W1-129E	0.5531	Adder	0.65
902322	W2-019 E	0.6524	Adder	0.77
902432	W2-030 E	0.4583	Adder	0.54
902952	W2-082 E OP1	1.9000	Adder	2.24
903982	W3-079 E	1.3871	50/50	1.3871
905252	W4-025 E	0.7850	Adder	0.92
905502	W4-060 E OP1	0.4647	Adder	0.55
907082	X1-037 E	1.2820	Adder	1.51
907272	X1-085 E	0.3061	Adder	0.36
912102	X4-015 E	0.5564	Adder	0.65
914092	Y2-051 E	0.9757	50/50	0.9757
917612	Z2-102 E	1.5531	Adder	1.83
919662	AA2-048 E	2.2068	50/50	2.2068
920732	AA2-184 E	1.8523	Adder	2.18
923292	AB1-138 C	0.1955	50/50	0.1955
923293	AB1-138 E	1.8886	50/50	1.8886
923463	AB1-163 E	1.2288	Adder	1.45
923791	AB2-014	0.4974	50/50	0.4974

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
924701	AB2-122 C	0.0558	Adder	0.07
924702	AB2-122 E	0.0957	Adder	0.11
930001	AB1-001 C	0.0824	Adder	0.1
930002	AB1-001 E	0.1354	Adder	0.16
933962	AD1-019 E	0.5928	Adder	0.7
934351	AD1-059	0.9151	50/50	0.9151
938781	AE1-104 C O1	8.0457	Adder	9.47
938782	AE1-104 E O1	20.5849	Adder	24.22
939121	AE1-142 C O1	2.6794	50/50	2.6794
939122	AE1-142 E O1	3.8557	50/50	3.8557
939981	AE1-238 C	39.6232	Adder	46.62
939982	AE1-238 E	104.0769	Adder	122.44
940161	AE2-000 C O1	58.6255	Adder	68.97
940162	AE2-000 E O1	150.0025	Adder	176.47
940361	AE2-020 C	8.9814	Adder	10.57
940362	AE2-020 E	42.0514	Adder	49.47
940371	AE2-021 C	8.9814	Adder	10.57
940372	AE2-021 E	42.0514	Adder	49.47
940381	AE2-022 C	5.2391	Adder	6.16
940382	AE2-022 E	24.5300	Adder	28.86
940401	AE2-024 C O1	57.6291	50/50	57.6291
940402	AE2-024 E O1	269.8134	50/50	269.8134
940411	AE2-025 C	29.0912	50/50	29.0912
940412	AE2-025 E	136.1893	50/50	136.1893
940691	AE2-056 C	0.1913	Adder	0.23
940692	AE2-056 E	0.1674	Adder	0.2
940701	AE2-057 C	0.0357	Adder	0.04
940702	AE2-057 E	0.0357	Adder	0.04
940921	AE2-081 C	0.2033	Adder	0.24
940922	AE2-081 E	0.2092	Adder	0.25
942101	AE2-222 C O1	6.7002	Adder	7.88
942102	AE2-222 E O1	16.8312	Adder	19.8
942381	AE2-251 C	28.4528	Adder	33.47
942382	AE2-251 E	72.8026	Adder	85.65
943521	AF1-023	1.3413	Adder	1.58
943561	AF1-027	0.2616	Adder	0.31
943732	AF1-041 E	0.1899	Adder	0.22
944332	AF1-101 E O1	147.0623	Adder	173.01
944611	AF1-126 C O1	8.8617	Adder	10.43
944612	AF1-126 E O1	35.4467	Adder	41.7
945571	AF1-222 C	24.6984	Adder	29.06
945572	AF1-222 E	65.1141	Adder	76.6
945951	AF1-260	0.3153	50/50	0.3153
957221	AF2-016 C	4.8211	Adder	10.7
957222	AF2-016 E	7.2316	Adder	16.05
957271	AF2-021 C	1.6415	Adder	3.64
957272	AF2-021 E	2.4623	Adder	5.47
957311	AF2-025 C	0.3289	Adder	0.73
957312	AF2-025 E	0.4934	Adder	1.1
957772	AF2-071 BAT	4.7080	Merchant Transmission	4.7080
957781	AF2-072 C	9.2813	50/50	9.2813
957782	AF2-072 E	9.2813	50/50	9.2813

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
958761	AF2-167 C O1	0.2790	Adder	0.62
958762	AF2-167 E O1	0.3854	Adder	0.86
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.1616	Adder	0.36
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	19.2277	Adder	42.68
959151	AF2-206 C O1	2.0544	50/50	2.0544
959152	AF2-206 E O1	2.8355	50/50	2.8355
959631	AF2-254 C	0.4093	Adder	0.91
959632	AF2-254 E	0.5652	Adder	1.25
999905	MARINGEN 2	0.3108	Adder	0.37
999906	PVILLEG 2	0.1340	Adder	0.16
NEWTON	NEWTON	0.3417	Confirmed LTF	0.3417
FARMERCITY	FARMERCITY	0.0177	Confirmed LTF	0.0177
G-007A	G-007A	16.1424	Confirmed LTF	16.1424
CALDERWOOD	CALDERWOOD	0.1521	Confirmed LTF	0.1521
NY	NY	0.5591	Confirmed LTF	0.5591
PRAIRIE	PRAIRIE	0.8162	Confirmed LTF	0.8162
O-066	O-066	5.7926	Confirmed LTF	5.7926
CHEOAH	CHEOAH	0.1532	Confirmed LTF	0.1532
EDWARDS	EDWARDS	0.1117	Confirmed LTF	0.1117
TILTON	TILTON	0.2010	Confirmed LTF	0.2010
MADISON	MADISON	0.0060	Confirmed LTF	0.0060
GIBSON	GIBSON	0.1736	Confirmed LTF	0.1736
BLUEG	BLUEG	0.5520	Confirmed LTF	0.5520
TRIMBLE	TRIMBLE	0.1770	Confirmed LTF	0.1770
CATAWBA	CATAWBA	0.1040	Confirmed LTF	0.1040

### 11.6.3 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
99015219	206294	28LARRABEE	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-11A	tower	869.0	114.09	115.42	DC	11.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206201	28JERSVGEN	0.0424	50/50	0.0424
206271	28MCRC/REC	0.9145	50/50	0.9145
206306	28LKWD G1	2.8690	50/50	2.8690
206308	28LKWD G2	2.8690	50/50	2.8690
206312	28LKWD G3	2.0785	50/50	2.0785
206366	28LKWD CT1	5.7827	50/50	5.7827
206367	28LKWD CT2	5.7827	50/50	5.7827
206368	28MDLSEXCO	0.3733	50/50	0.3733
206370	LKWD CT3	39.8860	50/50	39.8860
206412	28R11	37.7403	Adder	44.4
206414	28X4-005E	1.5766	Adder	1.85
206416	28MLH_W1-032	0.0224	50/50	0.0224
207143	28BYD_X4-031	0.2666	50/50	0.2666
207144	28HOW_X1-037	0.1404	50/50	0.1404
207145	28FRN_Y2-051	0.0344	50/50	0.0344
207148	28MDF_W3-079	0.0555	50/50	0.0555
207169	28W4-060COL	0.0756	50/50	0.0756
207204	28HOL_W1-112	0.0350	50/50	0.0350
207205	28MAN_W1-024	0.0295	50/50	0.0295
207206	28TIN_W1-124	0.1583	50/50	0.1583
207401	AA1-060 BAT	4.8934	50/50	4.8934
207419	AB2-139 E	0.0342	Adder	0.04
207420	AC1-207 C	0.4235	Adder	0.5
218629	LAKENESP1_E	0.0211	Adder	0.02
227928	V4-067E	-0.1852	Adder	-0.22
228261	V4-054E	-0.4079	Adder	-0.48
901032	W1-024E OP1	0.2812	50/50	0.2812
901112	W1-032 E OP1	0.2194	50/50	0.2194
901422	W1-113 E	0.3600	Adder	0.42
901912	W1-112E OP1	0.3311	50/50	0.3311
902032	W1-124E	1.5054	50/50	1.5054
902322	W2-019 E	-1.0038	Adder	-1.18
902912	W2-078 E	0.4030	Adder	0.47
903982	W3-079 E	0.5325	50/50	0.5325
905502	W4-060 E OP1	0.7149	50/50	0.7149
907082	X1-037 E	1.3280	50/50	1.3280
914092	Y2-051 E	0.3255	50/50	0.3255
919662	AA2-048 E	0.8471	50/50	0.8471
920732	AA2-184 E	1.6518	50/50	1.6518
923791	AB2-014	0.2786	50/50	0.2786
924701	AB2-122 C	-0.0800	Adder	-0.09

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
927132	AC1-207 E	0.7087	Adder	0.83
934351	AD1-059	0.5126	50/50	0.5126
934841	AD1-113 (Suspended)	5.9122	Adder	6.96
938423	AE1-061 BAT	0.4923	Merchant Transmission	0.4923
939121	AE1-142 C O1	-2.7297	Adder	-3.21
939303	AE1-161 BAT	3.9475	Merchant Transmission	3.9475
939981	AE1-238 C	35.1225	50/50	35.1225
939982	AE1-238 E	92.2551	50/50	92.2551
940401	AE2-024 C O1	30.9622	50/50	30.9622
940402	AE2-024 E O1	144.9615	50/50	144.9615
940411	AE2-025 C	15.6297	50/50	15.6297
940412	AE2-025 E	73.1699	50/50	73.1699
940691	AE2-056 C	0.2011	50/50	0.2011
940692	AE2-056 E	0.1760	50/50	0.1760
940701	AE2-057 C	0.0614	50/50	0.0614
940702	AE2-057 E	0.0614	50/50	0.0614
940921	AE2-081 C	0.2137	50/50	0.2137
940922	AE2-081 E	0.2200	50/50	0.2200
940931	AE2-082 C	0.2988	Adder	0.35
940932	AE2-082 E	0.3163	Adder	0.37
943521	AF1-023	1.1962	50/50	1.1962
944613	AF1-126 BAT	99.8850	50/50	99.8850
945201	AF1-185 1	0.3547	Adder	0.42
945211	AF1-185 2	0.0788	Adder	0.09
945571	AF1-222 C	21.8930	50/50	21.8930
945572	AF1-222 E	57.7180	50/50	57.7180
945733	AF1-238 BAT	10.5812	Merchant Transmission	10.5812
945743	AF1-239 BAT	2.4897	Merchant Transmission	2.4897
945951	AF1-260	0.1210	50/50	0.1210
957223	AF2-016 BAT	38.7300	50/50	38.7300
957253	AF2-019 BAT	2.1919	Merchant Transmission	2.1919
957263	AF2-020 BAT	0.8196	Merchant Transmission	0.8196
957273	AF2-021 BAT	11.5068	50/50	11.5068
957283	AF2-022 BAT	2.3503	Merchant Transmission	2.3503
957313	AF2-025 BAT	2.6296	50/50	2.6296
957323	AF2-026 BAT	1.3776	Merchant Transmission	1.3776
957781	AF2-072 C	4.9865	50/50	4.9865
957782	AF2-072 E	4.9865	50/50	4.9865
958761	AF2-167 C O1	0.4801	50/50	0.4801
958762	AF2-167 E O1	0.6630	50/50	0.6630
959151	AF2-206 C O1	0.7283	50/50	0.7283
959152	AF2-206 E O1	1.0052	50/50	1.0052
961221	AF2-413 O1	10.4448	Adder	23.18
999905	MARINGEN 2	-0.4475	Adder	-0.53
999906	PVILLEG 2	-0.1924	Adder	-0.23
NEWTON	NEWTON	0.0580	Confirmed LTF	0.0580
FARMERCITY	FARMERCITY	0.0032	Confirmed LTF	0.0032
G-007A	G-007A	22.2344	Confirmed LTF	22.2344
VFT	VFT	23.2845	Confirmed LTF	23.2845
CALDERWOOD	CALDERWOOD	0.0403	Confirmed LTF	0.0403
PRAIRIE	PRAIRIE	0.1498	Confirmed LTF	0.1498
CHEOAH	CHEOAH	0.0410	Confirmed LTF	0.0410

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>EDWARDS</b>	EDWARDS	0.0175	Confirmed LTF	0.0175
<b>TILTON</b>	TILTON	0.0315	Confirmed LTF	0.0315
<b>GIBSON</b>	GIBSON	0.0289	Confirmed LTF	0.0289
<b>BLUEG</b>	BLUEG	0.0920	Confirmed LTF	0.0920
<b>TRIMBLE</b>	TRIMBLE	0.0295	Confirmed LTF	0.0295
<b>CATAWBA</b>	CATAWBA	0.0367	Confirmed LTF	0.0367

#### 11.6.4 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
99015085	206297	28MANITOU	JCP&L	206319	28WHITINGS	JCP&L	1	JC-P7-1-JCC-230-10A	tower	817.0	180.32	180.41	DC	15.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206306	28LKWD G1	7.9934	50/50	7.9934
206308	28LKWD G2	7.9934	50/50	7.9934
206312	28LKWD G3	5.7910	50/50	5.7910
206325	28O C GEN (Deactivation : 17/09/2018)	114.1085	50/50	114.1085
206360	28O CRK C1	2.9770	50/50	2.9770
206361	28O CRK C2	1.9688	50/50	1.9688
206366	28LKWD CT1	16.1114	50/50	16.1114
206367	28LKWD CT2	16.1114	50/50	16.1114
206370	LKWD CT3	111.1280	50/50	111.1280
227928	V4-067E	0.1924	Adder	0.23
228102	BLE#2 ST (Deactivation : 30/04/2019)	14.3961	Adder	16.94
902432	W2-030 E	0.6773	Adder	0.8
923293	AB1-138 E	0.7359	Adder	0.87
923791	AB2-014	0.7763	50/50	0.7763
924701	AB2-122 C	0.0831	Adder	0.1
924702	AB2-122 E	0.1425	Adder	0.17
930001	AB1-001 C	0.1263	Adder	0.15
930002	AB1-001 E	0.2076	Adder	0.24
933962	AD1-019 E	0.8784	Adder	1.03
934351	AD1-059	1.4281	50/50	1.4281
938781	AE1-104 C O1	11.6202	Adder	13.67
938782	AE1-104 E O1	29.7302	Adder	34.98
939121	AE1-142 C O1	3.9315	50/50	3.9315
939122	AE1-142 E O1	5.6575	50/50	5.6575
940161	AE2-000 C O1	116.3927	50/50	116.3927
940162	AE2-000 E O1	297.8089	50/50	297.8089
940361	AE2-020 C	13.4951	Adder	15.88
940362	AE2-020 E	63.1851	Adder	74.34
940371	AE2-021 C	13.4951	Adder	15.88
940372	AE2-021 E	63.1851	Adder	74.34
940381	AE2-022 C	7.8721	Adder	9.26
940382	AE2-022 E	36.8580	Adder	43.36
942101	AE2-222 C O1	9.9334	Adder	11.69
942102	AE2-222 E O1	24.9532	Adder	29.36
942381	AE2-251 C	42.7522	Adder	50.3
942382	AE2-251 E	109.3910	Adder	128.7
943732	AF1-041 E	0.2819	Adder	0.33
944332	AF1-101 E O1	291.9715	50/50	291.9715
957221	AF2-016 C	7.1013	Adder	15.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957222	AF2-016 E	10.6520	Adder	23.64
957251	AF2-019 C	0.6836	Adder	1.52
957252	AF2-019 E	1.0254	Adder	2.28
957271	AF2-021 C	2.7222	Adder	6.04
957272	AF2-021 E	9.0641	50/50	9.0641
957311	AF2-025 C	0.4870	Adder	1.08
957312	AF2-025 E	0.7305	Adder	1.62
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2334	Adder	0.52
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	27.7700	Adder	61.64
999905	MARINGEN 2	0.4602	Adder	0.54
999906	PVILLEG 2	0.1987	Adder	0.23
NEWTON	NEWTON	0.2149	Confirmed LTF	0.2149
FARMERCITY	FARMERCITY	0.0111	Confirmed LTF	0.0111
CALDERWOOD	CALDERWOOD	0.0949	Confirmed LTF	0.0949
NY	NY	0.5663	Confirmed LTF	0.5663
PRAIRIE	PRAIRIE	0.5140	Confirmed LTF	0.5140
O-066	O-066	9.5491	Confirmed LTF	9.5491
CHEOAH	CHEOAH	0.0951	Confirmed LTF	0.0951
EDWARDS	EDWARDS	0.0707	Confirmed LTF	0.0707
TILTON	TILTON	0.1273	Confirmed LTF	0.1273
G-007	G-007	3.0846	Confirmed LTF	3.0846
MADISON	MADISON	0.0060	Confirmed LTF	0.0060
GIBSON	GIBSON	0.1097	Confirmed LTF	0.1097
BLUEG	BLUEG	0.3489	Confirmed LTF	0.3489
TRIMBLE	TRIMBLE	0.1119	Confirmed LTF	0.1119
CATAWBA	CATAWBA	0.0637	Confirmed LTF	0.0637

11.6.5 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
99015118	206302	28OYSTER C	JCP&L	227955	CEDAR	AE	1	JC-P7-1-JCC-230-10A	tower	564.0	154.26	157.4	DC	17.79

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206306	28LKWD G1	4.9410	50/50	4.9410
206308	28LKWD G2	4.9410	50/50	4.9410
206312	28LKWD G3	3.5796	50/50	3.5796
206325	280 C GEN (Deactivation : 17/09/2018)	90.7630	50/50	90.7630
206360	280 CRK C1	2.3679	50/50	2.3679
206361	280 CRK C2	1.5660	50/50	1.5660
206366	28LKWD CT1	9.9590	50/50	9.9590
206367	28LKWD CT2	9.9590	50/50	9.9590
206370	LKWD CT3	68.6920	50/50	68.6920
207143	28BYD_X4-031	0.1135	Adder	0.13
207400	28AA1-060 E	1.1359	Adder	1.34
227928	V4-067E	-0.2305	Adder	-0.27
228261	V4-054E	-0.3469	Adder	-0.41
901982	W1-119 E	0.5531	Adder	0.65
901992	W1-120E	0.5531	Adder	0.65
902082	W1-129E	0.2366	Adder	0.28
902322	W2-019 E	0.2691	Adder	0.32
902952	W2-082 E OP1	0.8470	Adder	1.0
903982	W3-079 E	0.3400	Adder	0.4
905252	W4-025 E	0.3359	Adder	0.4
907082	X1-037 E	0.5839	Adder	0.69
907272	X1-085 E	0.1769	Adder	0.21
912102	X4-015 E	0.2422	Adder	0.28
914092	Y2-051 E	0.2863	Adder	0.34
917612	Z2-102 E	0.8120	Adder	0.96
919662	AA2-048 E	0.5410	Adder	0.64
923293	AB1-138 E	1.2025	Adder	1.41
923463	AB1-163 E	0.6335	Adder	0.75
923791	AB2-014	0.4799	50/50	0.4799
924701	AB2-122 C	-0.0996	Adder	-0.12
934351	AD1-059	0.8827	50/50	0.8827
938423	AE1-061 BAT	0.4548	Merchant Transmission	0.4548
939121	AE1-142 C O1	2.7178	50/50	2.7178
939122	AE1-142 E O1	3.9110	50/50	3.9110
940161	AE2-000 C O1	92.5799	50/50	92.5799
940162	AE2-000 E O1	236.8801	50/50	236.8801
940401	AE2-024 C O1	8.9208	Adder	10.5
940402	AE2-024 E O1	41.7664	Adder	49.14
940411	AE2-025 C	4.5032	Adder	5.3
940412	AE2-025 E	21.0817	Adder	24.8
940691	AE2-056 C	0.0886	Adder	0.1

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940692	AE2-056 E	0.0775	Adder	0.09
940921	AE2-081 C	0.0941	Adder	0.11
940922	AE2-081 E	0.0969	Adder	0.11
943561	AF1-027	0.1262	Adder	0.15
944332	AF1-101 E O1	232.2370	50/50	232.2370
944611	AF1-126 C O1	2.8271	Adder	3.33
944612	AF1-126 E O1	11.3084	Adder	13.3
945733	AF1-238 BAT	9.6683	Merchant Transmission	9.6683
945743	AF1-239 BAT	2.2749	Merchant Transmission	2.2749
945951	AF1-260	0.0773	Adder	0.09
957223	AF2-016 BAT	25.0632	Merchant Transmission	25.0632
957253	AF2-019 BAT	2.4382	Merchant Transmission	2.4382
957263	AF2-020 BAT	0.6965	Merchant Transmission	0.6965
957273	AF2-021 BAT	17.7912	50/50	17.7912
957283	AF2-022 BAT	2.3813	Merchant Transmission	2.3813
957313	AF2-025 BAT	1.7175	Merchant Transmission	1.7175
957323	AF2-026 BAT	1.3474	Merchant Transmission	1.3474
957781	AF2-072 C	0.7615	Adder	1.69
957782	AF2-072 E	0.7615	Adder	1.69
959151	AF2-206 C O1	0.2807	Adder	0.62
959152	AF2-206 E O1	0.3875	Adder	0.86
959631	AF2-254 C	0.1906	Adder	0.42
959632	AF2-254 E	0.2632	Adder	0.58
999905	MARINGEN 2	-0.5518	Adder	-0.65
999906	PVILLEG 2	-0.2382	Adder	-0.28
NEWTON	NEWTON	0.1322	Confirmed LTF	0.1322
FARMERCITY	FARMERCITY	0.0069	Confirmed LTF	0.0069
G-007A	G-007A	7.9933	Confirmed LTF	7.9933
VFT	VFT	8.7655	Confirmed LTF	8.7655
CALDERWOOD	CALDERWOOD	0.0671	Confirmed LTF	0.0671
PRAIRIE	PRAIRIE	0.3229	Confirmed LTF	0.3229
CHEOAH	CHEOAH	0.0676	Confirmed LTF	0.0676
EDWARDS	EDWARDS	0.0424	Confirmed LTF	0.0424
TILTON	TILTON	0.0762	Confirmed LTF	0.0762
GIBSON	GIBSON	0.0666	Confirmed LTF	0.0666
BLUEG	BLUEG	0.2135	Confirmed LTF	0.2135
TRIMBLE	TRIMBLE	0.0679	Confirmed LTF	0.0679
CATAWBA	CATAWBA	0.0507	Confirmed LTF	0.0507

11.6.6 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
99015102	206318	28VANHISVL	JCP&L	206294	28LARRABEE	JCP&L	1	JC-P7-1-JCC-230-12	tower	869.0	155.95	157.2	DC	12.15

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206280	28LAKEHURS	0.4830	50/50	0.4830
206325	280 C GEN (Deactivation : 17/09/2018)	88.2925	50/50	88.2925
206360	280 CRK C1	2.3035	50/50	2.3035
206361	280 CRK C2	1.5234	50/50	1.5234
206414	28X4-005E	-1.6118	Adder	-1.9
207149	28UPF_X1-085	0.0619	50/50	0.0619
207150	28HAN_X4-015	0.1045	50/50	0.1045
207157	28PEM_W1-119	0.1924	50/50	0.1924
207158	28PEM_W1-120	0.1924	50/50	0.1924
207160	28EGP_W2-019	0.1252	50/50	0.1252
207164	28NHV_W2-082	0.3595	50/50	0.3595
207171	28DIX_Z2-102	0.2843	50/50	0.2843
207207	28JCB_W1-129	0.1042	50/50	0.1042
207208	28JCB_W4-025	0.1425	50/50	0.1425
207400	28AA1-060 E	4.3434	50/50	4.3434
207419	AB2-139 E	-0.0351	Adder	-0.04
207420	AC1-207 C	-0.4347	Adder	-0.51
218661	EHAMPSOLAR E	0.1854	Adder	0.22
219273	CLEANLIGHT E	0.1592	Adder	0.19
219287	REEVES ST C	0.1035	50/50	0.1035
219288	REEVES ST E	0.9792	50/50	0.9792
219292	REEVESSO E	0.0625	Adder	0.07
219582	COXSCOSP1_E	0.0074	Adder	0.01
219614	COXSCOSP2_E	0.0074	Adder	0.01
219628	LUMB23SP1_C	0.0032	50/50	0.0032
219652	LUMB23SP1_E	0.0299	50/50	0.0299
219653	LUMB23SP2_C	0.0032	50/50	0.0032
219656	LUMB23SP2_E	0.0299	50/50	0.0299
219686	LUMSOLAR_N C	0.0322	50/50	0.0322
219687	LUMSOLAR_N E	0.3015	50/50	0.3015
219689	LUMSOLAR_S E	0.1836	Adder	0.22
227842	MARINGEN	0.0903	50/50	0.0903
227927	V4-067C	0.0238	50/50	0.0238
227928	V4-067E	0.2280	50/50	0.2280
228014	PVILLEG	0.0312	50/50	0.0312
228102	BLE#2 ST (Deactivation : 30/04/2019)	15.4699	Adder	18.2
228712	V2-041E	0.1928	Adder	0.23
228729	W2-030 C	0.0855	50/50	0.0855
228731	V3-036	0.1311	50/50	0.1311
901982	W1-119 E	1.8235	50/50	1.8235

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
901992	W1-120E	1.8235	50/50	1.8235
902082	W1-129E	0.9851	50/50	0.9851
902092	W1-130E	0.4495	Adder	0.53
902322	W2-019 E	1.1672	50/50	1.1672
902432	W2-030 E	0.8149	50/50	0.8149
902952	W2-082 E OP1	3.3663	50/50	3.3663
905252	W4-025 E	1.3983	50/50	1.3983
907272	X1-085 E	0.5854	50/50	0.5854
912102	X4-015 E	0.9888	50/50	0.9888
917612	Z2-102 E	2.6889	50/50	2.6889
919663	AA2-048 BAT	1.0046	50/50	1.0046
923292	AB1-138 C	0.1233	50/50	0.1233
923293	AB1-138 E	1.1915	50/50	1.1915
923463	AB1-163 E	0.4827	Adder	0.57
923532	AB1-169AC	43.5804	Adder	51.27
924531	AB2-102 C	17.3139	Adder	20.37
924532	AB2-102 E	0.3848	Adder	0.45
924701	AB2-122 C	0.0985	50/50	0.0985
924702	AB2-122 E	0.1689	50/50	0.1689
930001	AB1-001 C	0.1410	50/50	0.1410
930002	AB1-001 E	0.2318	50/50	0.2318
932361	AC2-050 C O1	0.3452	Adder	0.41
932362	AC2-050 E O1	0.5632	Adder	0.66
933962	AD1-019 E	1.0502	50/50	1.0502
938421	AE1-061 C	0.2168	Adder	0.26
938422	AE1-061 E	0.2168	Adder	0.26
938781	AE1-104 C O1	12.4870	Adder	14.69
938782	AE1-104 E O1	31.9479	Adder	37.59
939121	AE1-142 C O1	3.2823	50/50	3.2823
939122	AE1-142 E O1	4.7233	50/50	4.7233
939501	AE1-179 C O1	2.5151	Adder	2.96
939502	AE1-179 E O1	1.7749	Adder	2.09
940001	AE1-240 C O1	2.0842	Adder	2.45
940002	AE1-240 E O1	1.4877	Adder	1.75
940161	AE2-000 C O1	90.0599	50/50	90.0599
940162	AE2-000 E O1	230.4323	50/50	230.4323
940361	AE2-020 C	15.6946	50/50	15.6946
940362	AE2-020 E	73.4832	50/50	73.4832
940371	AE2-021 C	15.6946	50/50	15.6946
940372	AE2-021 E	73.4832	50/50	73.4832
940381	AE2-022 C	9.1552	50/50	9.1552
940382	AE2-022 E	42.8652	50/50	42.8652
940691	AE2-056 C	-0.1907	Adder	-0.22
940701	AE2-057 C	-0.0568	Adder	-0.07
940921	AE2-081 C	-0.2026	Adder	-0.24
942101	AE2-222 C O1	11.8580	50/50	11.8580
942102	AE2-222 E O1	29.7880	50/50	29.7880
942381	AE2-251 C	49.7201	50/50	49.7201
942382	AE2-251 E	127.2199	50/50	127.2199
943561	AF1-027	0.4826	50/50	0.4826
943732	AF1-041 E	0.3355	50/50	0.3355
944332	AF1-101 E O1	225.9156	50/50	225.9156

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
944611	AF1-126 C O1	20.0270	50/50	20.0270
944612	AF1-126 E O1	80.1080	50/50	80.1080
945201	AF1-185 1	-0.3626	Adder	-0.43
945211	AF1-185 2	-0.0806	Adder	-0.09
945731	AF1-238 C	3.7281	Adder	4.39
945732	AF1-238 E	5.5922	Adder	6.58
945741	AF1-239 C	0.8772	Adder	1.03
945742	AF1-239 E	1.3158	Adder	1.55
957221	AF2-016 C	7.2997	Adder	16.2
957222	AF2-016 E	24.3054	50/50	24.3054
957251	AF2-019 C	0.7769	Adder	1.72
957252	AF2-019 E	1.1653	Adder	2.59
957271	AF2-021 C	4.8613	50/50	4.8613
957272	AF2-021 E	7.2919	50/50	7.2919
957281	AF2-022 C	0.8305	Adder	1.84
957282	AF2-022 E	1.2458	Adder	2.77
957311	AF2-025 C	1.1005	50/50	1.1005
957312	AF2-025 E	1.6507	50/50	1.6507
957321	AF2-026 C	0.4863	Adder	1.08
957322	AF2-026 E	0.7294	Adder	1.62
957783	AF2-072 BAT	10.1220	50/50	10.1220
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2508	Adder	0.56
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	29.8415	Adder	66.24
958831	AF2-174 C	0.2224	Adder	0.49
958832	AF2-174 E	0.3072	Adder	0.68
959631	AF2-254 C	1.3600	50/50	1.3600
959632	AF2-254 E	1.8782	50/50	1.8782
961222	AF2-413 BAT	12.5623	Merchant Transmission	12.5623
999905	MARINGEN 2	0.5509	50/50	0.5509
999906	PVILLEG 2	0.2369	50/50	0.2369
WEC	WEC	0.0161	Confirmed LTF	0.0161
LGEE	LGEE	0.0314	Confirmed LTF	0.0314
CPL	CPL	0.0840	Confirmed LTF	0.0840
CBM-W2	CBM-W2	0.5324	Confirmed LTF	0.5324
NY	NY	1.3720	Confirmed LTF	1.3720
CBM-W1	CBM-W1	0.5755	Confirmed LTF	0.5755
TVA	TVA	0.1050	Confirmed LTF	0.1050
O-066	O-066	25.2269	Confirmed LTF	25.2269
CBM-S2	CBM-S2	0.6416	Confirmed LTF	0.6416
CBM-S1	CBM-S1	0.6134	Confirmed LTF	0.6134
G-007	G-007	9.8602	Confirmed LTF	9.8602
MADISON	MADISON	0.0141	Confirmed LTF	0.0141
MEC	MEC	0.0890	Confirmed LTF	0.0890

## 11.6.7 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
99015115	206319	28WHITINGS	JCP&L	206720	28MANCHSTR	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	154.77	156.15	DC	15.12

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206306	28LKWD G1	7.9331	50/50	7.9331
206308	28LKWD G2	7.9331	50/50	7.9331
206312	28LKWD G3	5.7473	50/50	5.7473
206325	28O C GEN (Deactivation : 17/09/2018)	114.1647	50/50	114.1647
206360	28O CRK C1	2.9784	50/50	2.9784
206361	28O CRK C2	1.9698	50/50	1.9698
206366	28LKWD CT1	15.9899	50/50	15.9899
206367	28LKWD CT2	15.9899	50/50	15.9899
206370	LKWD CT3	110.2900	50/50	110.2900
227928	V4-067E	0.1927	Adder	0.23
228102	BLE#2 ST (Deactivation : 30/04/2019)	14.4191	Adder	16.96
901982	W1-119 E	0.4652	Adder	0.55
901992	W1-120E	0.4652	Adder	0.55
902432	W2-030 E	0.6782	Adder	0.8
917612	Z2-102 E	0.6734	Adder	0.79
923293	AB1-138 E	1.9035	Adder	2.24
923463	AB1-163 E	0.6617	Adder	0.78
923791	AB2-014	0.7705	50/50	0.7705
924701	AB2-122 C	0.0833	Adder	0.1
924702	AB2-122 E	0.1427	Adder	0.17
930001	AB1-001 C	0.1264	Adder	0.15
930002	AB1-001 E	0.2078	Adder	0.24
933962	AD1-019 E	0.8796	Adder	1.03
934351	AD1-059	1.4173	50/50	1.4173
938781	AE1-104 C O1	11.6388	Adder	13.69
938782	AE1-104 E O1	29.7777	Adder	35.03
939121	AE1-142 C O1	4.4401	50/50	4.4401
939122	AE1-142 E O1	6.3895	50/50	6.3895
940161	AE2-000 C O1	116.4500	50/50	116.4500
940162	AE2-000 E O1	297.9556	50/50	297.9556
940361	AE2-020 C	13.5123	Adder	15.9
940362	AE2-020 E	63.2656	Adder	74.43
940371	AE2-021 C	13.5123	Adder	15.9
940372	AE2-021 E	63.2656	Adder	74.43
940381	AE2-022 C	7.8822	Adder	9.27
940382	AE2-022 E	36.9049	Adder	43.42
942101	AE2-222 C O1	9.9472	Adder	11.7
942102	AE2-222 E O1	24.9878	Adder	29.4
942381	AE2-251 C	42.8067	Adder	50.36

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942382	AE2-251 E	109.5303	Adder	128.86
943732	AF1-041 E	0.2824	Adder	0.33
944332	AF1-101 E O1	292.1153	50/50	292.1153
957221	AF2-016 C	7.1116	Adder	15.79
957222	AF2-016 E	10.6674	Adder	23.68
957251	AF2-019 C	0.6848	Adder	1.52
957252	AF2-019 E	1.0272	Adder	2.28
957271	AF2-021 C	2.7239	Adder	6.05
957272	AF2-021 E	9.0696	50/50	9.0696
957311	AF2-025 C	0.4877	Adder	1.08
957312	AF2-025 E	0.7315	Adder	1.62
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2337	Adder	0.52
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	27.8144	Adder	61.74
999905	MARINGEN 2	0.4608	Adder	0.54
999906	PVILLEG 2	0.1990	Adder	0.23
NEWTON	NEWTON	0.2181	Confirmed LTF	0.2181
FARMERCITY	FARMERCITY	0.0113	Confirmed LTF	0.0113
CALDERWOOD	CALDERWOOD	0.0964	Confirmed LTF	0.0964
NY	NY	0.5724	Confirmed LTF	0.5724
PRAIRIE	PRAIRIE	0.5218	Confirmed LTF	0.5218
O-066	O-066	9.6634	Confirmed LTF	9.6634
CHEOAH	CHEOAH	0.0966	Confirmed LTF	0.0966
EDWARDS	EDWARDS	0.0718	Confirmed LTF	0.0718
TILTON	TILTON	0.1292	Confirmed LTF	0.1292
G-007	G-007	3.1179	Confirmed LTF	3.1179
MADISON	MADISON	0.0060	Confirmed LTF	0.0060
GIBSON	GIBSON	0.1114	Confirmed LTF	0.1114
BLUEG	BLUEG	0.3541	Confirmed LTF	0.3541
TRIMBLE	TRIMBLE	0.1135	Confirmed LTF	0.1135
CATAWBA	CATAWBA	0.0648	Confirmed LTF	0.0648

11.6.8 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
99013642	206323	28LAKEWOOD	JCP&L	206294	28LARRABEE	JCP&L	2	JC-P2-3-JCC-230-15J	breaker	817.0	193.47	194.99	DC	15.67

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206306	28LKWD G1	10.4154	50/50	10.4154
206308	28LKWD G2	10.4154	50/50	10.4154
206312	28LKWD G3	7.5457	50/50	7.5457
206325	28O C GEN (Deactivation : 17/09/2018)	117.5704	50/50	117.5704
206360	28O CRK C1	3.0673	50/50	3.0673
206361	28O CRK C2	2.0285	50/50	2.0285
206366	28LKWD CT1	20.9932	50/50	20.9932
206367	28LKWD CT2	20.9932	50/50	20.9932
206370	LKWD CT3	144.8000	50/50	144.8000
227928	V4-067E	0.2083	Adder	0.25
228102	BLE#2 ST (Deactivation : 30/04/2019)	15.7959	Adder	18.58
901982	W1-119 E	0.5766	Adder	0.68
901992	W1-120E	0.5766	Adder	0.68
902432	W2-030 E	0.7355	Adder	0.87
917612	Z2-102 E	0.8431	Adder	0.99
923293	AB1-138 E	1.6937	Adder	1.99
923463	AB1-163 E	0.6140	Adder	0.72
923791	AB2-014	1.0116	50/50	1.0116
924701	AB2-122 C	0.0900	Adder	0.11
924702	AB2-122 E	0.1543	Adder	0.18
930001	AB1-001 C	0.1351	Adder	0.16
930002	AB1-001 E	0.2220	Adder	0.26
933962	AD1-019 E	0.9526	Adder	1.12
934351	AD1-059	1.8608	50/50	1.8608
938781	AE1-104 C O1	12.7502	Adder	15.0
938782	AE1-104 E O1	32.6211	Adder	38.38
939121	AE1-142 C O1	4.4378	50/50	4.4378
939122	AE1-142 E O1	6.3862	50/50	6.3862
940161	AE2-000 C O1	119.9239	50/50	119.9239
940162	AE2-000 E O1	306.8441	50/50	306.8441
940361	AE2-020 C	14.5518	Adder	17.12
940362	AE2-020 E	68.1328	Adder	80.16
940371	AE2-021 C	14.5518	Adder	17.12
940372	AE2-021 E	68.1328	Adder	80.16
940381	AE2-022 C	8.4886	Adder	9.99
940382	AE2-022 E	39.7441	Adder	46.76
942101	AE2-222 C O1	10.7691	Adder	12.67
942102	AE2-222 E O1	27.0525	Adder	31.83
942381	AE2-251 C	46.1000	Adder	54.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942382	AE2-251 E	117.9568	Adder	138.77
943732	AF1-041 E	0.3055	Adder	0.36
944332	AF1-101 E O1	300.8296	50/50	300.8296
957221	AF2-016 C	7.7198	Adder	17.14
957222	AF2-016 E	11.5797	Adder	25.7
957251	AF2-019 C	0.7594	Adder	1.69
957252	AF2-019 E	1.1390	Adder	2.53
957271	AF2-021 C	2.8235	Adder	6.27
957272	AF2-021 E	9.4013	50/50	9.4013
957311	AF2-025 C	0.5283	Adder	1.17
957312	AF2-025 E	0.7925	Adder	1.76
957783	AF2-072 BAT	2.7072	Merchant Transmission	2.7072
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2561	Adder	0.57
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	30.4704	Adder	67.64
999905	MARINGEN 2	0.4992	Adder	0.59
999906	PVILLEG 2	0.2154	Adder	0.25
NEWTON	NEWTON	0.2740	Confirmed LTF	0.2740
FARMERCITY	FARMERCITY	0.0142	Confirmed LTF	0.0142
CALDERWOOD	CALDERWOOD	0.1198	Confirmed LTF	0.1198
NY	NY	0.8693	Confirmed LTF	0.8693
PRAIRIE	PRAIRIE	0.6535	Confirmed LTF	0.6535
O-066	O-066	14.9050	Confirmed LTF	14.9050
CHEOAH	CHEOAH	0.1201	Confirmed LTF	0.1201
EDWARDS	EDWARDS	0.0903	Confirmed LTF	0.0903
TILTON	TILTON	0.1625	Confirmed LTF	0.1625
G-007	G-007	5.1106	Confirmed LTF	5.1106
MADISON	MADISON	0.0081	Confirmed LTF	0.0081
GIBSON	GIBSON	0.1398	Confirmed LTF	0.1398
BLUEG	BLUEG	0.4444	Confirmed LTF	0.4444
TRIMBLE	TRIMBLE	0.1425	Confirmed LTF	0.1425
CATAWBA	CATAWBA	0.0795	Confirmed LTF	0.0795

11.6.9 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
99015122	206720	28MANCHSTR	JCP&L	206318	28VANHISVL	JCP&L	1	JC-P7-1-JCC-230-10A	tower	869.0	153.21	154.58	DC	15.12

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206306	28LKWD G1	7.9331	50/50	7.9331
206308	28LKWD G2	7.9331	50/50	7.9331
206312	28LKWD G3	5.7473	50/50	5.7473
206325	28O C GEN (Deactivation : 17/09/2018)	114.1647	50/50	114.1647
206360	28O CRK C1	2.9784	50/50	2.9784
206361	28O CRK C2	1.9698	50/50	1.9698
206366	28LKWD CT1	15.9899	50/50	15.9899
206367	28LKWD CT2	15.9899	50/50	15.9899
206370	LKWD CT3	110.2900	50/50	110.2900
227928	V4-067E	0.1927	Adder	0.23
228102	BLE#2 ST (Deactivation : 30/04/2019)	14.4191	Adder	16.96
901982	W1-119 E	0.4652	Adder	0.55
901992	W1-120E	0.4652	Adder	0.55
902432	W2-030 E	0.6782	Adder	0.8
917612	Z2-102 E	0.6734	Adder	0.79
923293	AB1-138 E	1.9035	Adder	2.24
923463	AB1-163 E	0.6617	Adder	0.78
923791	AB2-014	0.7705	50/50	0.7705
924701	AB2-122 C	0.0833	Adder	0.1
924702	AB2-122 E	0.1427	Adder	0.17
930001	AB1-001 C	0.1264	Adder	0.15
930002	AB1-001 E	0.2078	Adder	0.24
933962	AD1-019 E	0.8796	Adder	1.03
934351	AD1-059	1.4173	50/50	1.4173
938781	AE1-104 C O1	11.6388	Adder	13.69
938782	AE1-104 E O1	29.7777	Adder	35.03
939121	AE1-142 C O1	4.4401	50/50	4.4401
939122	AE1-142 E O1	6.3895	50/50	6.3895
940161	AE2-000 C O1	116.4500	50/50	116.4500
940162	AE2-000 E O1	297.9556	50/50	297.9556
940361	AE2-020 C	13.5123	Adder	15.9
940362	AE2-020 E	63.2656	Adder	74.43
940371	AE2-021 C	13.5123	Adder	15.9
940372	AE2-021 E	63.2656	Adder	74.43
940381	AE2-022 C	7.8822	Adder	9.27
940382	AE2-022 E	36.9049	Adder	43.42
942101	AE2-222 C O1	9.9472	Adder	11.7
942102	AE2-222 E O1	24.9878	Adder	29.4
942381	AE2-251 C	42.8067	Adder	50.36

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942382	AE2-251 E	109.5303	Adder	128.86
943732	AF1-041 E	0.2824	Adder	0.33
944332	AF1-101 E O1	292.1153	50/50	292.1153
957221	AF2-016 C	7.1116	Adder	15.79
957222	AF2-016 E	10.6674	Adder	23.68
957251	AF2-019 C	0.6848	Adder	1.52
957252	AF2-019 E	1.0272	Adder	2.28
957271	AF2-021 C	2.7239	Adder	6.05
957272	AF2-021 E	9.0696	50/50	9.0696
957311	AF2-025 C	0.4877	Adder	1.08
957312	AF2-025 E	0.7315	Adder	1.62
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.2337	Adder	0.52
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	27.8144	Adder	61.74
999905	MARINGEN 2	0.4608	Adder	0.54
999906	PVILLEG 2	0.1990	Adder	0.23
NEWTON	NEWTON	0.2181	Confirmed LTF	0.2181
FARMERCITY	FARMERCITY	0.0113	Confirmed LTF	0.0113
CALDERWOOD	CALDERWOOD	0.0964	Confirmed LTF	0.0964
NY	NY	0.5724	Confirmed LTF	0.5724
PRAIRIE	PRAIRIE	0.5218	Confirmed LTF	0.5218
O-066	O-066	9.6634	Confirmed LTF	9.6634
CHEOAH	CHEOAH	0.0966	Confirmed LTF	0.0966
EDWARDS	EDWARDS	0.0718	Confirmed LTF	0.0718
TILTON	TILTON	0.1292	Confirmed LTF	0.1292
G-007	G-007	3.1179	Confirmed LTF	3.1179
MADISON	MADISON	0.0060	Confirmed LTF	0.0060
GIBSON	GIBSON	0.1114	Confirmed LTF	0.1114
BLUEG	BLUEG	0.3541	Confirmed LTF	0.3541
TRIMBLE	TRIMBLE	0.1135	Confirmed LTF	0.1135
CATAWBA	CATAWBA	0.0648	Confirmed LTF	0.0648

## 11.6.10 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
99837799	227900	CARDIFF	AE	219100	NEWFRDM	PSE&G	1	AE_P7-1 AE13TOWER	tower	692.0	256.2	257.65	DC	10.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
<b>206325</b>	<b>280 C GEN (Deactivation : 17/09/2018)</b>	<b>32.6567</b>	<b>50/50</b>	<b>32.6567</b>
206360	280 CRK C1	0.8520	50/50	0.8520
206361	280 CRK C2	0.5634	50/50	0.5634
227842	MARINGEN	0.2545	50/50	0.2545
227927	V4-067C	0.0716	50/50	0.0716
227928	V4-067E	0.6858	50/50	0.6858
228014	PVILLEG	0.0874	50/50	0.0874
<b>228102</b>	<b>BLE#2 ST (Deactivation : 30/04/2019)</b>	<b>46.9037</b>	<b>50/50</b>	<b>46.9037</b>
228712	V2-041E	0.2825	Adder	0.33
228728	W1-130C	0.2412	50/50	0.2412
228729	W2-030 C	0.2436	50/50	0.2436
228731	V3-036	0.3687	50/50	0.3687
228732	V1-021 C	0.0793	50/50	0.0793
902092	W1-130E	2.2769	50/50	2.2769
902432	W2-030 E	2.3218	50/50	2.3218
923532	AB1-169AC	219.6975	50/50	219.6975
924531	AB2-102 C	24.4647	Adder	28.78
924532	AB2-102 E	0.5437	Adder	0.64
924701	AB2-122 C	0.2963	50/50	0.2963
924702	AB2-122 E	0.5079	50/50	0.5079
930001	AB1-001 C	0.3230	50/50	0.3230
930002	AB1-001 E	0.5309	50/50	0.5309
933962	AD1-019 E	2.9538	50/50	2.9538
938421	AE1-061 C	1.0985	50/50	1.0985
938422	AE1-061 E	1.0985	50/50	1.0985
938781	AE1-104 C O1	37.8598	50/50	37.8598
938782	AE1-104 E O1	96.8637	50/50	96.8637
939121	AE1-142 C O1	0.6819	Adder	0.8
939122	AE1-142 E O1	0.9812	Adder	1.15
939501	AE1-179 C O1	2.8251	Adder	3.32
939502	AE1-179 E O1	1.9937	Adder	2.35
940001	AE1-240 C O1	2.3528	Adder	2.77
940002	AE1-240 E O1	1.6794	Adder	1.98
940161	AE2-000 C O1	33.3104	50/50	33.3104
940162	AE2-000 E O1	85.2299	50/50	85.2299
940361	AE2-020 C	50.6537	50/50	50.6537
940362	AE2-020 E	237.1645	50/50	237.1645
940371	AE2-021 C	50.6537	50/50	50.6537
940372	AE2-021 E	237.1645	50/50	237.1645
940381	AE2-022 C	29.5480	50/50	29.5480

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940382	AE2-022 E	138.3460	50/50	138.3460
942101	AE2-222 C O1	33.2378	50/50	33.2378
942102	AE2-222 E O1	83.4952	50/50	83.4952
942381	AE2-251 C	160.4701	50/50	160.4701
942382	AE2-251 E	410.5979	50/50	410.5979
943732	AF1-041 E	0.9497	50/50	0.9497
944332	AF1-101 E O1	83.5593	50/50	83.5593
945731	AF1-238 C	4.3849	Adder	5.16
945732	AF1-238 E	6.5773	Adder	7.74
945741	AF1-239 C	1.0317	Adder	1.21
945742	AF1-239 E	1.5476	Adder	1.82
957221	AF2-016 C	47.9364	50/50	47.9364
957222	AF2-016 E	71.9046	50/50	71.9046
957251	AF2-019 C	3.7059	50/50	3.7059
957252	AF2-019 E	5.5589	50/50	5.5589
957271	AF2-021 C	4.0931	50/50	4.0931
957272	AF2-021 E	6.1397	50/50	6.1397
957281	AF2-022 C	1.2445	Adder	2.76
957282	AF2-022 E	1.8667	Adder	4.14
957311	AF2-025 C	3.1057	50/50	3.1057
957312	AF2-025 E	4.6585	50/50	4.6585
957321	AF2-026 C	0.6763	Adder	1.5
957322	AF2-026 E	1.0145	Adder	2.25
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	1.4346	50/50	1.4346
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	170.7122	50/50	170.7122
958811	AF2-172 C	0.1455	Adder	0.32
958812	AF2-172 E	0.2375	Adder	0.53
999905	MARINGEN 2	1.5533	50/50	1.5533
999906	PVILLEG 2	0.6623	50/50	0.6623
NEWTON	NEWTON	0.0946	Confirmed LTF	0.0946
FARMERCITY	FARMERCITY	0.0050	Confirmed LTF	0.0050
G-007A	G-007A	6.3126	Confirmed LTF	6.3126
VFT	VFT	6.3533	Confirmed LTF	6.3533
CALDERWOOD	CALDERWOOD	0.0477	Confirmed LTF	0.0477
PRAIRIE	PRAIRIE	0.2299	Confirmed LTF	0.2299
CHEOAH	CHEOAH	0.0480	Confirmed LTF	0.0480
EDWARDS	EDWARDS	0.0304	Confirmed LTF	0.0304
TILTON	TILTON	0.0548	Confirmed LTF	0.0548
GIBSON	GIBSON	0.0475	Confirmed LTF	0.0475
BLUEG	BLUEG	0.1510	Confirmed LTF	0.1510
TRIMBLE	TRIMBLE	0.0484	Confirmed LTF	0.0484
CATAWBA	CATAWBA	0.0361	Confirmed LTF	0.0361

## 11.6.11 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
99836745	227900	CARDIFF	AE	227955	CEDAR	AE	1	AE_P4-2 AE7	breaker	805.0	175.92	177.23	DC	11.26

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
227842	MARINGEN	0.1443	50/50	0.1443
227927	V4-067C	0.0417	50/50	0.0417
227928	V4-067E	0.3995	50/50	0.3995
228014	PVILLEG	0.0484	50/50	0.0484
228102	BLE#2 ST (Deactivation : 30/04/2019)	30.0514	50/50	30.0514
228202	CUMB CT	1.4271	50/50	1.4271
228203	P06	1.5204	50/50	1.5204
228261	V4-054E	0.4922	Adder	0.58
228334	MANNMILG	0.4439	Adder	0.52
228343	QUINTN#1 (Deactivation : 26/04/2020)	0.1092	Adder	0.13
228357	V2-046E	0.6780	Adder	0.8
228711	V2-041C	0.0337	50/50	0.0337
228712	V2-041E	0.3191	50/50	0.3191
228721	V2-035E	0.0838	Adder	0.1
228729	W2-030 C	0.1417	50/50	0.1417
228731	V3-036	0.2077	50/50	0.2077
228732	V1-021 C	0.0582	50/50	0.0582
902092	W1-130E	0.5586	Adder	0.66
902432	W2-030 E	1.3503	50/50	1.3503
919663	AA2-048 BAT	0.5223	Merchant Transmission	0.5223
923532	AB1-169AC	54.4871	Adder	64.1
924531	AB2-102 C	29.4953	50/50	29.4953
924532	AB2-102 E	0.6555	50/50	0.6555
924701	AB2-122 C	0.1727	50/50	0.1727
924702	AB2-122 E	0.2960	50/50	0.2960
930001	AB1-001 C	0.1281	50/50	0.1281
930002	AB1-001 E	0.2106	50/50	0.2106
933962	AD1-019 E	1.6639	50/50	1.6639
938421	AE1-061 C	0.2695	Adder	0.32
938422	AE1-061 E	0.2695	Adder	0.32
938781	AE1-104 C O1	24.2569	50/50	24.2569
938782	AE1-104 E O1	62.0610	50/50	62.0610
938871	AE1-115 C	0.5397	Adder	0.63
938872	AE1-115 E	0.5397	Adder	0.63
939121	AE1-142 C O1	-0.9053	Adder	-1.07
939301	AE1-161 C	1.4277	Adder	1.68
939302	AE1-161 E	2.1415	Adder	2.52
939501	AE1-179 C O1	3.1392	Adder	3.69
939502	AE1-179 E O1	2.2154	Adder	2.61
939931	AE1-229 C O1	5.7033	Adder	6.71

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939932	AE1-229 E O1	3.8641	Adder	4.55
940001	AE1-240 C O1	2.6117	Adder	3.07
940002	AE1-240 E O1	1.8642	Adder	2.19
940361	AE2-020 C	33.2572	50/50	33.2572
940362	AE2-020 E	155.7126	50/50	155.7126
940371	AE2-021 C	33.2572	50/50	33.2572
940372	AE2-021 E	155.7126	50/50	155.7126
940381	AE2-022 C	19.4000	50/50	19.4000
940382	AE2-022 E	90.8323	50/50	90.8323
940691	AE2-056 C	-0.0828	Adder	-0.1
940701	AE2-057 C	-0.0241	Adder	-0.03
940921	AE2-081 C	-0.0879	Adder	-0.1
942101	AE2-222 C O1	18.5626	50/50	18.5626
942102	AE2-222 E O1	46.6304	50/50	46.6304
942381	AE2-251 C	105.3581	50/50	105.3581
942382	AE2-251 E	269.5819	50/50	269.5819
943732	AF1-041 E	0.5305	50/50	0.5305
945431	AF1-208 C O1	1.9629	Adder	2.31
945432	AF1-208 E O1	1.3086	Adder	1.54
945731	AF1-238 C	4.7074	Adder	5.54
945732	AF1-238 E	7.0611	Adder	8.31
945741	AF1-239 C	1.1076	Adder	1.3
945742	AF1-239 E	1.6614	Adder	1.95
945971	AF1-262	0.0608	Adder	0.07
957221	AF2-016 C	27.9408	50/50	27.9408
957222	AF2-016 E	41.9112	50/50	41.9112
957251	AF2-019 C	2.7083	50/50	2.7083
957252	AF2-019 E	4.0625	50/50	4.0625
957261	AF2-020 C	0.3361	Adder	0.75
957262	AF2-020 E	0.5042	Adder	1.12
957273	AF2-021 BAT	11.2644	50/50	11.2644
957281	AF2-022 C	2.6434	50/50	2.6434
957282	AF2-022 E	3.9651	50/50	3.9651
957291	AF2-023 C O1	0.5723	Adder	1.27
957292	AF2-023 E O1	0.8585	Adder	1.91
957311	AF2-025 C	1.7643	50/50	1.7643
957312	AF2-025 E	2.6465	50/50	2.6465
957321	AF2-026 C	0.6679	Adder	1.48
957322	AF2-026 E	2.2237	50/50	2.2237
957641	AF2-058	0.1052	Adder	0.23
957783	AF2-072 BAT	2.0386	Merchant Transmission	2.0386
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.9191	50/50	0.9191
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	109.3760	50/50	109.3760
958811	AF2-172 C	0.1712	Adder	0.38
958812	AF2-172 E	0.2794	Adder	0.62
959111	AF2-202 C	0.0480	Adder	0.11
959112	AF2-202 E	0.0656	Adder	0.15
999905	MARINGEN 2	0.8805	50/50	0.8805
999906	PVILLEG 2	0.3672	50/50	0.3672
WEC	WEC	0.0063	Confirmed LTF	0.0063

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>LGEE</b>	LGEE	0.0126	Confirmed LTF	0.0126
<b>CPL</b>	CPL	0.0370	Confirmed LTF	0.0370
<b>CBM-W2</b>	CBM-W2	0.2211	Confirmed LTF	0.2211
<b>NY</b>	NY	0.6100	Confirmed LTF	0.6100
<b>CBM-W1</b>	CBM-W1	0.2127	Confirmed LTF	0.2127
<b>TVA</b>	TVA	0.0434	Confirmed LTF	0.0434
<b>O-066</b>	O-066	11.1014	Confirmed LTF	11.1014
<b>CBM-S2</b>	CBM-S2	0.2774	Confirmed LTF	0.2774
<b>CBM-S1</b>	CBM-S1	0.2471	Confirmed LTF	0.2471
<b>G-007</b>	G-007	3.9499	Confirmed LTF	3.9499
<b>MADISON</b>	MADISON	0.0060	Confirmed LTF	0.0060
<b>MEC</b>	MEC	0.0350	Confirmed LTF	0.0350

## 11.6.12 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
99837823	227900	CARDIFF	AE	228002	ORCHARD	AE	1	JC-P7-1-JCC-230-13	tower	805.0	147.73	149.12	DC	11.2

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206360	280 CRK C1	1.6370	50/50	1.6370
206361	280 CRK C2	1.0826	50/50	1.0826
227842	MARINGEN	0.1455	50/50	0.1455
227927	V4-067C	0.0429	50/50	0.0429
227928	V4-067E	0.4110	50/50	0.4110
228014	PVILLEG	0.0502	50/50	0.0502
228102	BLE#2 ST (Deactivation : 30/04/2019)	22.5389	50/50	22.5389
228729	W2-030 C	0.1382	50/50	0.1382
228731	V3-036	0.2111	50/50	0.2111
902092	W1-130E	0.4173	Adder	0.49
902432	W2-030 E	1.3174	50/50	1.3174
923532	AB1-169AC	40.9530	Adder	48.18
924701	AB2-122 C	0.1776	50/50	0.1776
924702	AB2-122 E	0.3044	50/50	0.3044
930001	AB1-001 C	0.2018	50/50	0.2018
930002	AB1-001 E	0.3317	50/50	0.3317
933962	AD1-019 E	1.6914	50/50	1.6914
938421	AE1-061 C	0.2013	Adder	0.24
938422	AE1-061 E	0.2013	Adder	0.24
938781	AE1-104 C O1	18.1930	50/50	18.1930
938782	AE1-104 E O1	46.5465	50/50	46.5465
940161	AE2-000 C O1	64.0022	50/50	64.0022
940162	AE2-000 E O1	163.7597	50/50	163.7597
940361	AE2-020 C	32.2343	50/50	32.2343
940362	AE2-020 E	150.9233	50/50	150.9233
940371	AE2-021 C	32.2343	50/50	32.2343
940372	AE2-021 E	150.9233	50/50	150.9233
940381	AE2-022 C	18.8033	50/50	18.8033
940382	AE2-022 E	88.0386	50/50	88.0386
942101	AE2-222 C O1	19.0768	50/50	19.0768
942102	AE2-222 E O1	47.9222	50/50	47.9222
942381	AE2-251 C	102.1176	50/50	102.1176
942382	AE2-251 E	261.2904	50/50	261.2904
943732	AF1-041 E	0.5510	50/50	0.5510
944332	AF1-101 E O1	160.5498	50/50	160.5498
957221	AF2-016 C	26.7348	50/50	26.7348
957222	AF2-016 E	40.1022	50/50	40.1022
957251	AF2-019 C	0.5872	Adder	1.3
957252	AF2-019 E	0.8807	Adder	1.95
957271	AF2-021 C	4.4816	50/50	4.4816
957272	AF2-021 E	6.7224	50/50	6.7224

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957311	AF2-025 C	1.7742	50/50	1.7742
957312	AF2-025 E	2.6614	50/50	2.6614
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	0.6894	50/50	0.6894
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	82.0334	50/50	82.0334
999905	MARINGEN 2	0.8879	50/50	0.8879
999906	PVILLEG 2	0.3809	50/50	0.3809
NEWTON	NEWTON	0.0161	Confirmed LTF	0.0161
FARMERCITY	FARMERCITY	0.0008	Confirmed LTF	0.0008
G-007A	G-007A	1.0597	Confirmed LTF	1.0597
VFT	VFT	1.9544	Confirmed LTF	1.9544
CALDERWOOD	CALDERWOOD	0.0089	Confirmed LTF	0.0089
PRAIRIE	PRAIRIE	0.0387	Confirmed LTF	0.0387
CHEOAH	CHEOAH	0.0090	Confirmed LTF	0.0090
EDWARDS	EDWARDS	0.0049	Confirmed LTF	0.0049
TILTON	TILTON	0.0088	Confirmed LTF	0.0088
GIBSON	GIBSON	0.0076	Confirmed LTF	0.0076
BLUEG	BLUEG	0.0243	Confirmed LTF	0.0243
TRIMBLE	TRIMBLE	0.0078	Confirmed LTF	0.0078
CATAWBA	CATAWBA	0.0070	Confirmed LTF	0.0070

11.6.13 Index 13

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
99013618	227955	CEDAR	AE	206302	28OYSTER C	JCP&L	1	AE_P4-2 AE6	breaker	564.0	244.43	248.55	DC	24.73

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
227842	MARINGEN	0.1858	50/50	0.1858
227927	V4-067C	0.0496	50/50	0.0496
227928	V4-067E	0.4754	50/50	0.4754
228014	PVILLEG	0.0644	50/50	0.0644
228102	BLE#2 ST (Deactivation : 30/04/2019)	35.9501	50/50	35.9501
228202	CUMB CT	1.6611	50/50	1.6611
228203	P06	1.7600	50/50	1.7600
228261	V4-054E	0.5700	Adder	0.67
228334	MANNMILG	0.5062	Adder	0.6
228343	QUINTN#1 (Deactivation : 26/04/2020)	0.1250	Adder	0.15
228357	V2-046E	0.7749	Adder	0.91
228712	V2-041E	0.3160	Adder	0.37
228721	V2-035E	0.0979	Adder	0.12
228729	W2-030 C	0.1758	50/50	0.1758
228731	V3-036	0.2699	50/50	0.2699
228732	V1-021 C	0.0689	50/50	0.0689
902092	W1-130E	0.6657	Adder	0.78
902432	W2-030 E	1.6754	50/50	1.6754
919663	AA2-048 BAT	0.5909	Merchant Transmission	0.5909
923532	AB1-169AC	64.9451	Adder	76.41
924531	AB2-102 C	34.1437	50/50	34.1437
924532	AB2-102 E	0.6449	Adder	0.76
924701	AB2-122 C	0.2053	50/50	0.2053
924702	AB2-122 E	0.3520	50/50	0.3520
930001	AB1-001 C	0.2897	50/50	0.2897
930002	AB1-001 E	0.4761	50/50	0.4761
933962	AD1-019 E	2.1622	50/50	2.1622
938421	AE1-061 C	0.3212	Adder	0.38
938422	AE1-061 E	0.3212	Adder	0.38
938781	AE1-104 C O1	29.0182	50/50	29.0182
938782	AE1-104 E O1	74.2427	50/50	74.2427
938871	AE1-115 C	0.6100	Adder	0.72
938872	AE1-115 E	0.6100	Adder	0.72
939121	AE1-142 C O1	-1.0248	Adder	-1.21
939301	AE1-161 C	1.6883	Adder	1.99
939302	AE1-161 E	2.5324	Adder	2.98
939501	AE1-179 C O1	3.6491	Adder	4.29
939502	AE1-179 E O1	2.5752	Adder	3.03
939931	AE1-229 C O1	6.5740	Adder	7.73
939932	AE1-229 E O1	4.4541	Adder	5.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940001	AE1-240 C O1	3.0354	Adder	3.57
940002	AE1-240 E O1	2.1666	Adder	2.55
940361	AE2-020 C	35.3583	50/50	35.3583
940362	AE2-020 E	165.5502	50/50	165.5502
940371	AE2-021 C	35.3583	50/50	35.3583
940372	AE2-021 E	165.5502	50/50	165.5502
940381	AE2-022 C	20.6257	50/50	20.6257
940382	AE2-022 E	96.5710	50/50	96.5710
940691	AE2-056 C	-0.0936	Adder	-0.11
940921	AE2-081 C	-0.0995	Adder	-0.12
942101	AE2-222 C O1	24.4216	50/50	24.4216
942102	AE2-222 E O1	61.3484	50/50	61.3484
942381	AE2-251 C	112.0145	50/50	112.0145
942382	AE2-251 E	286.6136	50/50	286.6136
943732	AF1-041 E	0.6928	50/50	0.6928
945431	AF1-208 C O1	2.2640	Adder	2.66
945432	AF1-208 E O1	1.5093	Adder	1.78
945731	AF1-238 C	5.4812	Adder	6.45
945732	AF1-238 E	8.2218	Adder	9.67
945741	AF1-239 C	1.2897	Adder	1.52
945742	AF1-239 E	1.9345	Adder	2.28
945971	AF1-262	0.0711	Adder	0.08
957221	AF2-016 C	33.6444	50/50	33.6444
957222	AF2-016 E	50.4666	50/50	50.4666
957251	AF2-019 C	3.2080	50/50	3.2080
957252	AF2-019 E	4.8120	50/50	4.8120
957261	AF2-020 C	0.3892	Adder	0.86
957262	AF2-020 E	0.5837	Adder	1.3
957271	AF2-021 C	9.8923	50/50	9.8923
957272	AF2-021 E	14.8385	50/50	14.8385
957281	AF2-022 C	3.0768	50/50	3.0768
957282	AF2-022 E	4.6152	50/50	4.6152
957291	AF2-023 C O1	0.6469	Adder	1.44
957292	AF2-023 E O1	0.9704	Adder	2.15
957311	AF2-025 C	2.2648	50/50	2.2648
957312	AF2-025 E	3.3972	50/50	3.3972
957321	AF2-026 C	0.7777	Adder	1.73
957322	AF2-026 E	1.1665	Adder	2.59
957641	AF2-058	0.1218	Adder	0.27
957783	AF2-072 BAT	2.3068	Merchant Transmission	2.3068
958781	AF2-169 C O1 (Withdrawn : 06/09/2020)	1.0995	50/50	1.0995
958782	AF2-169 E O1 (Withdrawn : 06/09/2020)	130.8450	50/50	130.8450
958811	AF2-172 C	0.1987	Adder	0.44
958812	AF2-172 E	0.3243	Adder	0.72
959111	AF2-202 C	0.0555	Adder	0.12
959112	AF2-202 E	0.0760	Adder	0.17
999905	MARINGEN 2	1.1338	50/50	1.1338
999906	PVILLEG 2	0.4881	50/50	0.4881
WEC	WEC	0.0063	Confirmed LTF	0.0063
LGEE	LGEE	0.0126	Confirmed LTF	0.0126

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>CPLE</b>	CPLE	0.0404	Confirmed LTF	0.0404
<b>CBM-W2</b>	CBM-W2	0.2293	Confirmed LTF	0.2293
<b>NY</b>	NY	0.6896	Confirmed LTF	0.6896
<b>CBM-W1</b>	CBM-W1	0.2127	Confirmed LTF	0.2127
<b>TVA</b>	TVA	0.0462	Confirmed LTF	0.0462
<b>O-066</b>	O-066	12.5530	Confirmed LTF	12.5530
<b>CBM-S2</b>	CBM-S2	0.3006	Confirmed LTF	0.3006
<b>CBM-S1</b>	CBM-S1	0.2641	Confirmed LTF	0.2641
<b>G-007</b>	G-007	4.4689	Confirmed LTF	4.4689
<b>MADISON</b>	MADISON	0.0081	Confirmed LTF	0.0081
<b>MEC</b>	MEC	0.0365	Confirmed LTF	0.0365

11.6.14 Index 14

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
99837948	227955	CEDAR	AE	227900	CARDIFF	AE	1	JC-P7-1-JCC-230-13	tower	805.0	115.27	119.18	DC	31.44

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
206360	280 CRK C1	4.8370	50/50	4.8370
206361	280 CRK C2	3.1989	50/50	3.1989
930001	AB1-001 C	0.1116	50/50	0.1116
930002	AB1-001 E	0.1834	50/50	0.1834
940161	AE2-000 C O1	189.1152	50/50	189.1152
940162	AE2-000 E O1	483.8808	50/50	483.8808
944332	AF1-101 E O1	474.3962	50/50	474.3962
957271	AF2-021 C	12.5742	50/50	12.5742
957272	AF2-021 E	18.8614	50/50	18.8614
NEWTON	NEWTON	0.0365	Confirmed LTF	0.0365
FARMERCITY	FARMERCITY	0.0019	Confirmed LTF	0.0019
G-007A	G-007A	0.9111	Confirmed LTF	0.9111
VFT	VFT	0.9223	Confirmed LTF	0.9223
CALDERWOOD	CALDERWOOD	0.0174	Confirmed LTF	0.0174
PRAIRIE	PRAIRIE	0.0878	Confirmed LTF	0.0878
CHEOAH	CHEOAH	0.0175	Confirmed LTF	0.0175
EDWARDS	EDWARDS	0.0119	Confirmed LTF	0.0119
TILTON	TILTON	0.0214	Confirmed LTF	0.0214
GIBSON	GIBSON	0.0186	Confirmed LTF	0.0186
BLUEG	BLUEG	0.0590	Confirmed LTF	0.0590
TRIMBLE	TRIMBLE	0.0189	Confirmed LTF	0.0189
CATAWBA	CATAWBA	0.0129	Confirmed LTF	0.0129

## 11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA1-060	Great Adventure 34.5kV	In Service
AA2-048	Allenwood-Larrabee 34kV	Engineering and Procurement
AA2-184	Atlantic-Red Bank 34kV	In Service
AB1-001	Absecon 12 kV	Engineering and Procurement
AB1-138	Navy 34.5kV	In Service
AB1-163	Glidden-Van Hiseville 34.5 kV	Engineering and Procurement
AB1-169A	Minotola 138 kV	Withdrawn
AB2-014	Lakewood 230kV	Partially in Service - Under Construction
AB2-102	Cumberland 230kV	Active
AB2-122	Egg Harbor 12kV	Engineering and Procurement
AB2-139	Raceway Mall 34.5kV	In Service
AC1-207	Monroe 34.5kV	In Service
AC2-050	Tabernacle 12kV	Active
AD1-019	Ontario 23 kV	Active
AD1-059	Lakewood 230 kV	In Service
AD1-113	Raritan River 230 kV	Suspended
AE1-061	Minotola 12 kV	Active
AE1-104	BL England 138 kV	Active
AE1-115	Churchtown 69 kV	Active
AE1-142	Manitou-Pleasant Plains 34.5 kV	Under Construction
AE1-161	Landis 138 kV	Active
AE1-179	South Millville-Newport 69 kV	Active
AE1-229	Deepwater-Upper Pittsgrove 138 kV	Active
AE1-238	Oceanview Wind 230 kV	Active
AE1-240	Carlls Corner-Sherman Avenue 69 kV	Active
AE2-000	N/A	N/A
AE2-020	Cardiff 230 kV I	Active
AE2-021	Cardiff 230 kV II	Active
AE2-022	Cardiff 230 kV III	Active
AE2-024	Larrabee 230 kV I	Active
AE2-025	Larrabee 230 kV II	Active
AE2-056	Howell 12.47 kV Solar I	Engineering and Procurement
AE2-057	Jerseyville 12.47 kV Solar	Engineering and Procurement
AE2-081	Howell 12.47 kV Solar II	Engineering and Procurement
AE2-082	Englishtown-Wyckoff 34.5 kV Solar	Active
AE2-222	Higbee 69 kV	Active
AE2-251	Cardiff 230 kV	Active
AF1-023	Atlantic-Red Bank 34 kV II	Active
AF1-027	Plumsted 537 Energy Storage (CIRs)	Active

Queue Number	Project Name	Status
AF1-041	Absecon 12.47 kV	In Service
AF1-101	Oyster Creek 230 kV III	Active
AF1-126	Cookstown 230 kV	Active
AF1-185	Sayreville 1-2-3 230 kV	In Service
AF1-208	Quinton-Roadstown 69 kV	Active
AF1-222	Oceanview Wind 2 230 kV	Active
AF1-238	Sherman Ave. 69 kV	Active
AF1-239	Sherman Ave-Vineland 69 kV	Active
AF1-260	Allenwood-Larrabee 2 34.5 kV	Active
AF1-262	Upper Pittsgrove 12 kV	Active
AF2-016	Lewis 138 kV	Active
AF2-019	Rio Grande 69 kV	Active
AF2-020	Carll's Corner 69 kV	Active
AF2-021	Cedar 69 kV	Active
AF2-022	Cumberland 138 kV	Active
AF2-023	Churchtown 69 kV	Active
AF2-025	Missouri Ave 69 kV	Active
AF2-026	Sherman Ave 138 kV	Active
AF2-058	Fairton 12 kV	Active
AF2-071	Windsor 230 kV	Active
AF2-072	Larrabee 230 kV	Active
AF2-167	Eaton Crest-Red Bank 34.5 kV	Active
AF2-169	BL England 138 kV	Withdrawn
AF2-172	Whibco 12 kV	Active
AF2-174	Tabernacle 12 kV	Active
AF2-202	Landis 12 V	Active
AF2-206	Larrabee-Point Pleasant 34.5 kV	Active
AF2-254	Cookstown-New Lisbon 34.5 kV	Active
AF2-413	Raritan River 230 kV	Active
V1-021	Cape May County 12kV	In Service
V2-035	Pittsgrove	In Service
V2-041	Clayville 12kV	In Service
V2-046	Pilesgrove Township 12kV	In Service
V3-036	Ontario 23kV	In Service
V4-054	Fairfield Township 12kV	In Service
V4-067	Cates Road Egg Harbor Township 12kV	In Service
W1-024	Manalapan 12.5kV	In Service
W1-032	Millhurst 12.5kV	In Service
W1-112	Holmdel	In Service
W1-113	Millstone 2	In Service
W1-119	Pemberton Township 1 34.5 kV	In Service
W1-120	Pemberton Township 2 34.5 kV	In Service
W1-124	Tinton Falls 34.5kV	In Service
W1-129	Cookstown 34.5kV	In Service
W1-130	Vine Road 12kV	In Service
W2-019	Wrightstown 34.5kV	In Service
W2-030	Egg Harbor Township	In Service
W2-078	Applegarth 12.5kV	In Service
W2-082	Fort Dix-McGuire 34.5kV	In Service
W3-079	Allenwood-Larabee 34.5kV	In Service
W4-025	Cookstown-Fort Dix 34.5kV	In Service
W4-060	Midland-Werner 34.5kV	In Service

<b>Queue Number</b>	<b>Project Name</b>	<b>Status</b>
<b>X1-037</b>	Howell	In Service
<b>X1-085</b>	Hornerstown-Windsor 34kV	In Service
<b>X4-005</b>	Raritan River 230kV	In Service
<b>X4-015</b>	Cookstown-Fort Dix 34kV	In Service
<b>X4-031</b>	Bennett-Farmingdale 34kV	In Service
<b>Y2-051</b>	Brick-Lane Mill 34.5kV	In Service
<b>Z2-102</b>	Argonne-New Lisbon 34.5kV	In Service

## 11.8 Contingency Descriptions

Contingency Name	Contingency Definition
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
JC-P1-2-JCC-230-002T	CONTINGENCY 'JC-P1-2-JCC-230-002T' /** OYSTER CREEK - CEDAR (S2045) 230 KV DISCONNECT BRANCH FROM BUS 206302 TO BUS 227955 CKT 1 /* 28OYSTER C 230 CEDAR 230 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-230-013	CONTINGENCY 'JC-P1-2-JCC-230-013' /* LAKEWOOD - LARRABEE (K2011) 230 KV DISCONNECT BRANCH FROM BUS 206323 TO BUS 206294 CKT 2 END

Contingency Name	Contingency Definition
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
JC-P2-3-JCC-230-13A	CONTINGENCY 'JC-P2-3-JCC-230-13A' /* LARRABEE - SMITHBURG (D2004) & LAKEWOOD (Z2026) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 1 /* LARRABEE-SMITHBURG (D2004) DISCONNECT BRANCH FROM BUS 206294 TO BUS 206323 CKT 2 /* LARRABEE-LAKEWOOD (Z2026) SET BUS 206294 LOAD TO 0 MW /* LARRABEE BK8 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 12 /* LARRABEE BK12 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
AE_P1-2 ORCHARD XF	CONTINGENCY 'AE_P1-2 ORCHARD XF' OPEN LINE FROM BUS 200063 TO BUS 228002 CIRCUIT 1 / END
JC-P2-3-JCC-230-15J	CONTINGENCY 'JC-P2-3-JCC-230-15J' /* LAKEWOOD-LARRABEE (K2011) & LARRABEE SE BUS 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206323 CKT 1 /* LARRABEE - LAKEWOOD (K2011) DISCONNECT BRANCH FROM BUS 206294 TO BUS 206274 CKT 4 /* LARRABEE BK4 REDUCE BUS 206294 SHUNT BY 100 PERCENT /* LARRABEE 2X 130MVAR CAPS END
JC-P2-3-JCC-230-15G	CONTINGENCY 'JC-P2-3-JCC-230-15G' /* LARRABEE-SMITHBURG (H2008) 230 KV & LARRABEE NW BUS 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 2 /* LARRABEE-SMITHBURG (H2008) REMOVE LOAD 7 FROM BUS 206294 /* LARRABEE BK7 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 9 /* LARRABEE BK9 END

Contingency Name	Contingency Definition
JC-P2-3-JCC-230-15F	CONTINGENCY 'JC-P2-3-JCC-230-15F' /* LARRABEE - SMITHBURG (D2004) & LARRABEE NW BUS 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 1 /* LARRABEE-SMITHBURG (D2004) REMOVE LOAD 7 FROM BUS 206294 /* LARRABEE BK7 DISCONNECT BRANCH FROM BUS 206294 TO BUS 206275 CKT 9 /* LARRABEE BK9 END
JC-P2-3-JCC-230-15A	CONTINGENCY 'JC-P2-3-JCC-230-15A' /* LAKEWOOD-LARRABEE (K2011) & LARRABEE-SMITHBURG (H2008) 230 KV DISCONNECT BRANCH FROM BUS 206294 TO BUS 206323 CKT 1 /* LARRABEE - LAKEWOOD (K2011) DISCONNECT BRANCH FROM BUS 206294 TO BUS 206309 CKT 2 /* LARRABEE-SMITHBURG (H2008) END
PS_P1-2_2310	CONTINGENCY 'PS_P1-2_2310' /* NEW FREEDOM TO CARDIFF TIELINE TRIP LINE FROM BUS 219100 TO BUS 227900 CKT 1 /* NEW FREEDOM TO CARDIFF 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-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

Contingency Name	Contingency Definition
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	
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
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
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

Contingency Name	Contingency Definition
<b>AE_P4-2 AE45</b>	CONTINGENCY 'AE_P4-2 AE45' /*ORCHARD 230 BUS BREAKER E DISCONNECT BRANCH FROM BUS 228002 TO BUS 227900 CKT 1 /* ORCHARD TO CARDIFF 230 230 DISCONNECT BRANCH FROM BUS 200063 TO BUS 228002 CKT 1 /*ORCHARD ORCHARD 500 230 T1 END
<b>JC-P2-3-JCC-230-18A</b>	CONTINGENCY 'JC-P2-3-JCC-230-18A' /* OYSTER CRK-MANITOU & MANITOU-WHITINGS 230 KV DISCONNECT BRANCH FROM BUS 206297 TO BUS 206302 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206319 CKT 1 DISCONNECT BRANCH FROM BUS 206297 TO BUS 206277 CKT 7 DISCONNECT BRANCH FROM BUS 206319 TO BUS 206281 CKT 4 END

## 12 Short Circuit Analysis

The following Breakers are overdutied

None

## 13 Affected Systems

None

## 14 Attachment 1: One Line Diagram