Generation Interconnection

Feasibility Study Report

for

Queue Project AF2-109

CHURCH 69 KV

10 MW Capacity / 20 MW Energy

July 2020

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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 DPL.

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 Queen Anne's County, Maryland. The installed facilities will have a total capability of 20 MW with 10 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is October 31, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-109
Project Name	CHURCH 69 KV
State	Maryland
County	Queen Anne's
Transmission Owner	DPL
MFO	20
MWE	20
MWC	10
Fuel	Storage
Basecase Study Year	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

AF2-109 will interconnect with the DPL transmission system at the Church 69 kV substation by expanding and reconfiguring the substation as a breaker and a half station.

5 Cost Summary

The AF2-109 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$26,500,000
Total System Network Upgrade Costs	$ 8,410,000
Total Costs	$34,910,000

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.

5.1 DPL Costs

Cost estimates will further be refined as a part of the Impact Study and Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by DPL in connection with the AF2-109 project. DPL reserves the right to reassess issues presented in this document and, upon appropriate justification, submit additional costs related to the AF2-109 project.

6 Transmission Owner Scope of Work

Expand and reconfigure the Church 69 kV Substation as a breaker and a half substation. Existing substation already contains 8 breaker positions and cannot be expanded within the existing substation footprint. These factors will require major substation modifications at which point the substation will be constructed to our preferred standard of a breaker and a half due to the number of elements present at the substation.

Major Equipment:

- 14 2000A 69 kV circuit breakers
- 28 2000A 69 kV breaker disconnect switches
- Five (5) 2000A 69 kV line disconnect switches
- One (1) new control house
- Associated Bus work and relaying

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

Description	Total Cost
Expand and reconfigure Church 69 kV substation	$29,500,000
Total Physical Interconnection Costs	$29,500,000

Estimate Assumptions:

- Any additional land required will be provided by IC and is not included in the cost estimate
- Site prep to be performed by IC if additional land required

7 Schedule

DPL would take approximately 48-60 months to expand and reconfigure the substation.

8 Transmission Owner Analysis

None

9 Interconnection Customer Requirements

9.1 Required Relaying and Communications

New protection relays are required for the new terminals.

Front line and back-up line protection will be required. A relay panel at the generator terminal will be required for front line and back-up protection.

New protection relays are required for all 69kV positions. Frontline and Backup line protection will be required. A relay panel will be required for each transmission line.

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

9.2 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 DPL'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.

9.3 DPL Interconnection Customer Scope of Direct Connection Work Requirements:

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

9.4 Special Operating Requirements

1. DPL 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 DPL.

2. DPL 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 DPL.

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 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 the DPL's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer and inspected by DPL, while the connections at the metering enclosure will be completed by the DPL. The metering control cable and meter cabinets will be supplied by the DPL 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. The DPL 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. DPL 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 DPL within approximately three feet of the DPL metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and DPL require directly to PJM. The Interconnection Customer will grant permission for PJM to send DPL the following telemetry that the Interconnection Customer sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

DPL'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 AF2-109 was evaluated as a 20.0 MW (Capacity 10.0 MW) injection at the Church 69 kV substation in the DPL area. Project AF2-109 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-109 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)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
101644713	232106	MIDLTNTP	138.0	DP&L	232104	MT PLSNT	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA-A	tower	348.0	98.07	100.74	DC	9.4
101643601	232215	KENT	69.0	DP&L	232812	NMEREDTH	69.0	DP&L	1	DPL_P4-2_DP11	breaker	93.0	97.7	101.19	DC	3.24

11.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
101644707	232100	CHURCH	138.0	DP&L	232107	TOWNSEND	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA-A	tower	348.0	102.18	104.86	DC	9.4
101644697	232107	TOWNSEND	138.0	DP&L	232106	MIDLTNTP	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA-A	tower	348.0	107.38	110.05	DC	9.4

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.

None

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
101643601	2	**KENT 69.0 kV - NMEREDTH 69.0 kV Ckt 1**	**DPL** **dt6704r0001 (1014) : Rebuild 6704-2 Line from Kent to N. Meredith Tap. Upgrade disconnect switch @ N Meredith** **Project Type : FAC** **Cost : $7,600,000** **Time Estimate : 36-48 Months**	$7,600,000
101644713	1	**MIDLTNTP 138.0 kV - MT PLSNT 138.0 kV Ckt 1**	**DPL** **dt13808r0002 (1010) : Partial reconductor of 13808 line between Mt. Pleasant and Middletown Tap** **Project Type : FAC** **Cost : $110,000** **Time Estimate : 9-12 Months**	$110,000
101644707	3	**CHURCH 138.0 kV - TOWNSEND 138.0 kV Ckt 1**	**DPL** **ds13833r0001 (1031) : To mitigate the (DP&L) CHURCH to TOWNSEND 138 kV line (from bus 232100 to bus 232107 ckt 1) overload will require substation reinforcements at Church Substation.** **Project Type : FAC** **Cost : $500,000** **Time Estimate : 24-36 Months**	$500,000
101644697	4	**TOWNSEND 138.0 kV - MIDLTNTP 138.0 kV Ckt 1**	**DPL** **ds13808r0001 (1011) : Upgrade disconnect switch at Middletown Tap** **Project Type : FAC** **Cost : $100,000** **Time Estimate : 12.0 Months** **dt13808r0001 (1035) : To mitigate the (DP&L) TOWNSEND to MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload, it will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by reconductoring a small portion of the line** **Project Type : FAC** **Cost : $100,000** **Time Estimate : 9-12 Months**	$200,000
			TOTAL COST	**$8,410,000**

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".

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
10164471 3	23210 6	MIDLTNT P	DP&L	23210 4	MT PLSN T	DP&L	1	DPL_P7_1_DBL_1NCB_FSA -A	tower	348.0	98.07	100.74	DC	9.4

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232404	W1-003 C	0.5398	50/50	0.5398
232405	W1-003 E	0.9090	50/50	0.9090
232406	W1-004 FULL	0.5398	50/50	0.5398
232407	W1-004 E	0.9090	50/50	0.9090
232408	W1-005 C	0.5398	50/50	0.5398
232409	W1-005 E	0.9090	50/50	0.9090
232410	W1-006 C	0.5398	50/50	0.5398
232411	W1-006 E	0.9090	50/50	0.9090
232412	X1-032 E	0.8192	50/50	0.8192
232417	X3-008 C	0.3307	50/50	0.3307
232418	X3-008 E	3.1277	50/50	3.1277
232422	X3-066 FULL	0.1653	50/50	0.1653
232423	X3-066 E	1.5632	50/50	1.5632
232424	Y1-079 C	0.2436	50/50	0.2436
232425	Y1-079 E	2.3039	50/50	2.3039
232426	Y1-080 FULL	0.0519	50/50	0.0519
232427	Y1-080 E	0.4932	50/50	0.4932
232428	Y3-058 C	0.2078	50/50	0.2078
232429	Y3-058 E	1.9655	50/50	1.9655
232433	Z2-076 E	0.3208	Adder	0.38
232435	Z2-077 E	0.3208	Adder	0.38
232436	AB1-176 C	0.6345	50/50	0.6345
232813	VAUGHN	0.1155	50/50	0.1155
232902	EASTMUNI	3.7067	50/50	3.7067
232907	VN8	5.9640	50/50	5.9640
232910	NRG_G1	1.8200	50/50	1.8200
232911	NRG_G2	1.8200	50/50	1.8200
232919	VN10	0.4079	50/50	0.4079
232922	**MR3 (Deactivation : 01/06/2021)**	**9.0862**	**Adder**	**10.69**
232926	CRISFLD1	0.3545	50/50	0.3545
293670	O-025 C	0.2133	50/50	0.2133
917082	Z2-012 E	2.1263	Adder	2.5
918831	AA1-102	1.3293	50/50	1.3293
919831	**AA2-069 (Suspended)**	**40.1751**	**Adder**	**47.26**
923282	AB1-137 C	0.6591	Adder	0.78
923283	AB1-137 E	0.2825	Adder	0.33
923322	AB1-141 C OP	5.7565	50/50	5.7565
923323	AB1-141 E OP	2.6864	50/50	2.6864
923332	AB1-142 C OP	5.7565	50/50	5.7565
923603	AB1-176 E	1.0463	50/50	1.0463
923921	AB2-032 C	5.7992	50/50	5.7992

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923922	AB2-032 E	2.7290	50/50	2.7290
923951	AB2-036 C	12.6924	50/50	12.6924
923952	AB2-036 E	20.7661	50/50	20.7661
924681	AB2-120 C OP	6.5091	Adder	7.66
924682	AB2-120 E OP	10.6201	Adder	12.49
924781	AB2-130 C OP	5.4762	Adder	6.44
924782	AB2-130 E OP	8.9348	Adder	10.51
924801	AB2-133 C OP	11.5595	50/50	11.5595
924802	AB2-133 E OP	14.6609	50/50	14.6609
924821	AB2-135 C	12.3188	50/50	12.3188
924822	AB2-135 E	14.0492	50/50	14.0492
924831	AB2-136 C	5.9522	50/50	5.9522
924832	AB2-136 E	6.3123	50/50	6.3123
924971	AB2-153 C	3.2407	50/50	3.2407
924972	AB2-153 E	5.2875	50/50	5.2875
925151	AB2-172 C OP	4.7924	50/50	4.7924
925152	AB2-172 E OP	7.8191	50/50	7.8191
925251	AB2-179 C OP	26.8588	50/50	26.8588
925252	AB2-179 E OP	8.8577	50/50	8.8577
925261	AB2-180 C	2.9588	50/50	2.9588
925262	AB2-180 E	1.2680	50/50	1.2680
925271	AB2-185 C OP	5.2023	50/50	5.2023
925272	AB2-185 E OP	2.2295	50/50	2.2295
927031	AC1-190 C	8.7532	50/50	8.7532
927032	AC1-190 E	3.7514	50/50	3.7514
927191	AC1-213 C	0.6596	50/50	0.6596
927192	AC1-213 E	0.4328	50/50	0.4328
930201	AB1-056 C	9.9441	Adder	11.7
930202	AB1-056 E	28.3190	Adder	33.32
930881	AB1-137 C	0.6591	Adder	0.78
930882	AB1-137 E	0.2825	Adder	0.33
930932	AB1-142 E OP	2.6864	50/50	2.6864
932161	AC2-023 C	5.6983	50/50	5.6983
932162	AC2-023 E	4.1501	50/50	4.1501
933641	AC2-186 C	3.1357	Adder	3.69
933642	AC2-186 E	5.1161	Adder	6.02
936611	AD2-076 C O1	8.1874	50/50	8.1874
936612	AD2-076 E O1	13.3584	50/50	13.3584
938651	AE1-087 C	4.0357	50/50	4.0357
938652	AE1-087 E	1.0089	50/50	1.0089
938891	AE1-117 C O1	6.5135	Adder	7.66
938892	AE1-117 E O1	17.3433	Adder	20.4
938901	**AE1-118 C O1 (Withdrawn : 07/10/2020)**	**6.5188**	**Adder**	**7.67**
938902	**AE1-118 E O1 (Withdrawn : 07/10/2020)**	**17.3573**	**Adder**	**20.42**
939151	AE1-145	3.4253	Adder	4.03
939621	AE1-192 C O1	8.0595	Adder	9.48
939622	AE1-192 E O1	3.9440	Adder	4.64
941021	AE2-093 C	5.9738	50/50	5.9738
941022	AE2-093 E	9.4914	50/50	9.4914

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
941181	AE2-112 C	2.8405	50/50	2.8405
941182	AE2-112 E	4.6345	50/50	4.6345
942441	AE2-257 C	5.1662	Adder	6.08
942442	AE2-257 E	13.6201	Adder	16.02
943361	AF1-007 C	0.2934	Adder	0.35
943362	AF1-007 E	0.8338	Adder	0.98
943441	AF1-015 C	1.9104	50/50	1.9104
943442	AF1-015 E	2.6382	50/50	2.6382
943651	AF1-036 C	3.6936	50/50	3.6936
943652	AF1-036 E	5.1006	50/50	5.1006
944921	AF1-157 C O1	2.4567	Adder	2.89
944922	AF1-157 E O1	1.6378	Adder	1.93
945661	AF1-231 C	1.3034	Adder	1.53
945662	AF1-231 E	1.9552	Adder	2.3
945781	AF1-243	0.8574	Adder	1.01
945791	AF1-244	1.6440	50/50	1.6440
945931	AF1-258	0.6763	50/50	0.6763
945941	AF1-259	0.3362	50/50	0.3362
946041	**AF1-269 (Withdrawn : 05/12/2020)**	**2.5836**	**50/50**	**2.5836**
957611	AF2-055 C	3.1809	Adder	7.06
957612	AF2-055 E	1.3633	Adder	3.03
957661	AF2-060	0.8169	Adder	1.81
957671	AF2-061 O1	3.6308	Adder	8.06
958151	AF2-109 C	4.6990	50/50	4.6990
958152	AF2-109 E	4.6990	50/50	4.6990
959021	AF2-193 C O1	9.7387	Adder	21.62
959022	AF2-193 E O1	26.2699	Adder	58.31
959031	AF2-194 C O1	9.7387	Adder	21.62
959032	AF2-194 E O1	26.2699	Adder	58.31
959051	AF2-196 C	0.7468	Adder	1.66
959052	AF2-196 E	1.7424	Adder	3.87
959161	AF2-207 C O1	4.1274	50/50	4.1274
959162	AF2-207 E O1	6.1910	50/50	6.1910
959571	AF2-248 C	0.6978	50/50	0.6978
959572	AF2-248 E	0.7799	50/50	0.7799
959581	AF2-249 C	0.1231	50/50	0.1231
959582	AF2-249 E	0.4926	50/50	0.4926
959591	AF2-250 C	0.2258	50/50	0.2258
959592	AF2-250 E	0.1745	50/50	0.1745
960221	AF2-313 C	5.3367	50/50	5.3367
960222	AF2-313 E	3.0255	50/50	3.0255
960341	AF2-325 C	1.0261	50/50	1.0261
960342	AF2-325 E	1.4170	50/50	1.4170
960671	AF2-358 C O1	13.9800	50/50	13.9800
960672	AF2-358 E O1	9.3200	50/50	9.3200
960871	AF2-378 C	0.2686	50/50	0.2686
960872	AF2-378 E	0.3727	50/50	0.3727
960881	AF2-379 C	0.3393	50/50	0.3393
960882	AF2-379 E	0.4676	50/50	0.4676
960941	AF2-385 C O1	9.8270	50/50	9.8270
960942	AF2-385 E O1	5.5277	50/50	5.5277
960961	AF2-387 C O1	22.1865	50/50	22.1865

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960962	AF2-387 E O1	11.1265	50/50	11.1265
961181	AF2-409 O1	22.5980	50/50	22.5980
NEWTON	NEWTON	0.1870	Confirmed LTF	0.1870
FARMERCITY	FARMERCITY	0.0097	Confirmed LTF	0.0097
CALDERWOOD	CALDERWOOD	0.0870	Confirmed LTF	0.0870
NY	NY	0.0603	Confirmed LTF	0.0603
PRAIRIE	PRAIRIE	0.4494	Confirmed LTF	0.4494
O-066	O-066	0.5309	Confirmed LTF	0.5309
CHEOAH	CHEOAH	0.0876	Confirmed LTF	0.0876
EDWARDS	EDWARDS	0.0609	Confirmed LTF	0.0609
TILTON	TILTON	0.1096	Confirmed LTF	0.1096
G-007	G-007	0.0530	Confirmed LTF	0.0530
GIBSON	GIBSON	0.0950	Confirmed LTF	0.0950
BLUEG	BLUEG	0.3021	Confirmed LTF	0.3021
TRIMBLE	TRIMBLE	0.0968	Confirmed LTF	0.0968
CATAWBA	CATAWBA	0.0619	Confirmed LTF	0.0619

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
101643601	232215	KENT	DP&L	232812	NMEREDTH	DP&L	1	DPL_P4-2_DP11	breaker	93.0	97.7	101.19	DC	3.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232405	W1-003 E	0.2068	Adder	0.24
232407	W1-004 E	0.2068	Adder	0.24
232409	W1-005 E	0.2068	Adder	0.24
232411	W1-006 E	0.2068	Adder	0.24
232412	X1-032 E	0.1823	Adder	0.21
232429	Y3-058 E	0.4017	Adder	0.47
232433	Z2-076 E	0.0983	Adder	0.12
232435	Z2-077 E	0.0983	Adder	0.12
232813	VAUGHN	0.1279	50/50	0.1279
232899	W1-062	0.9333	50/50	0.9333
232900	DEMECSMY	0.9333	50/50	0.9333
232910	NRG_G1	2.3092	50/50	2.3092
232911	NRG_G2	2.3092	50/50	2.3092
917082	Z2-012 E	0.5697	Adder	0.67
923282	AB1-137 C	0.2078	Adder	0.24
923283	AB1-137 E	0.0891	Adder	0.1
923322	AB1-141 C OP	-1.0388	Adder	-1.22
923332	AB1-142 C OP	-1.0388	Adder	-1.22
923921	AB2-032 C	-1.0465	Adder	-1.23
924681	AB2-120 C OP	1.7468	Adder	2.06
924682	AB2-120 E OP	2.8500	Adder	3.35
924781	AB2-130 C OP	1.7505	Adder	2.06
924782	AB2-130 E OP	2.8561	Adder	3.36
924971	AB2-153 C	-0.5848	Adder	-0.69
925251	AB2-179 C OP	-2.0557	Adder	-2.42
925261	AB2-180 C	0.6048	Adder	0.71
925262	AB2-180 E	0.2592	Adder	0.3
926131	AC1-091 C	0.4457	Adder	0.52
926132	AC1-091 E	0.7309	Adder	0.86
926141	AC1-092 C	0.4457	Adder	0.52
926142	AC1-092 E	0.7309	Adder	0.86
926151	AC1-093 C	0.4219	Adder	0.5
926152	AC1-093 E	0.6953	Adder	0.82
926161	AC1-094 C	0.3565	Adder	0.42
926162	AC1-094 E	0.5883	Adder	0.69
927191	AC1-213 C	0.1456	Adder	0.17
927192	AC1-213 E	0.0956	Adder	0.11
930201	AB1-056 C	3.1070	Adder	3.66
930202	AB1-056 E	8.8483	Adder	10.41
930881	AB1-137 C	0.2078	Adder	0.24
930882	AB1-137 E	0.0891	Adder	0.1
933631	AC2-185 C	0.9032	Adder	1.06

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
933632	AC2-185 E	1.4737	Adder	1.73
933641	AC2-186 C	2.7814	50/50	2.7814
933642	AC2-186 E	4.5381	50/50	4.5381
938891	AE1-117 C O1	2.0516	Adder	2.41
938892	AE1-117 E O1	5.4627	Adder	6.43
938901	**AE1-118 C O1 (Withdrawn : 07/10/2020)**	**2.0509**	**Adder**	**2.41**
938902	**AE1-118 E O1 (Withdrawn : 07/10/2020)**	**5.4608**	**Adder**	**6.42**
939151	AE1-145	0.9194	Adder	1.08
939621	AE1-192 C O1	2.1593	Adder	2.54
939622	AE1-192 E O1	1.0567	Adder	1.24
942441	AE2-257 C	1.6289	Adder	1.92
942442	AE2-257 E	4.2943	Adder	5.05
943361	AF1-007 C	0.0917	Adder	0.11
943362	AF1-007 E	0.2605	Adder	0.31
944921	AF1-157 C O1	0.7817	Adder	0.92
944922	AF1-157 E O1	0.5211	Adder	0.61
945661	AF1-231 C	0.3491	Adder	0.41
945662	AF1-231 E	0.5236	Adder	0.62
945781	AF1-243	0.2297	Adder	0.27
945791	AF1-244	0.3641	Adder	0.43
945931	AF1-258	0.1382	Adder	0.16
957611	AF2-055 C	0.8522	Adder	1.89
957612	AF2-055 E	0.3652	Adder	0.81
957661	AF2-060	0.2193	Adder	0.49
957671	AF2-061 O1	0.9745	Adder	2.16
958153	AF2-109 BAT	3.2376	50/50	3.2376
959021	AF2-193 C O1	3.0429	Adder	6.75
959022	AF2-193 E O1	8.2081	Adder	18.22
959031	AF2-194 C O1	3.0429	Adder	6.75
959032	AF2-194 E O1	8.2081	Adder	18.22
959051	AF2-196 C	0.2354	Adder	0.52
959052	AF2-196 E	0.5494	Adder	1.22
959161	AF2-207 C O1	0.5175	Adder	1.15
959162	AF2-207 E O1	0.7762	Adder	1.72
959571	AF2-248 C	0.0853	Adder	0.19
959572	AF2-248 E	0.0954	Adder	0.21
959581	AF2-249 C	0.0151	Adder	0.03
959582	AF2-249 E	0.0602	Adder	0.13
959591	AF2-250 C	0.0276	Adder	0.06
959592	AF2-250 E	0.0213	Adder	0.05
960881	AF2-379 C	0.0394	Adder	0.09
960882	AF2-379 E	0.0543	Adder	0.12
960941	AF2-385 C O1	1.2321	Adder	2.73
960942	AF2-385 E O1	0.6931	Adder	1.54
961181	AF2-409 O1	2.2845	Adder	5.07
NEWTON	NEWTON	0.0666	Confirmed LTF	0.0666
FARMERCITY	FARMERCITY	0.0035	Confirmed LTF	0.0035
CALDERWOOD	CALDERWOOD	0.0308	Confirmed LTF	0.0308
NY	NY	0.0188	Confirmed LTF	0.0188

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
PRAIRIE	PRAIRIE	0.1601	Confirmed LTF	0.1601
O-066	O-066	0.1411	Confirmed LTF	0.1411
CHEOAH	CHEOAH	0.0310	Confirmed LTF	0.0310
EDWARDS	EDWARDS	0.0217	Confirmed LTF	0.0217
TILTON	TILTON	0.0391	Confirmed LTF	0.0391
G-007	G-007	0.0104	Confirmed LTF	0.0104
GIBSON	GIBSON	0.0339	Confirmed LTF	0.0339
BLUEG	BLUEG	0.1076	Confirmed LTF	0.1076
TRIMBLE	TRIMBLE	0.0345	Confirmed LTF	0.0345
CATAWBA	CATAWBA	0.0221	Confirmed LTF	0.0221

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
10164470 7	23210 0	CHURC H	DP&L	23210 7	TOWNSEN D	DP& L	1	DPL_P7_1_DBL_1NCB_FS A-A	towe r	348.0	102.18	104.86	DC	9.4

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232404	W1-003 C	0.5398	50/50	0.5398
232405	W1-003 E	0.9090	50/50	0.9090
232406	W1-004 FULL	0.5398	50/50	0.5398
232407	W1-004 E	0.9090	50/50	0.9090
232408	W1-005 C	0.5398	50/50	0.5398
232409	W1-005 E	0.9090	50/50	0.9090
232410	W1-006 C	0.5398	50/50	0.5398
232411	W1-006 E	0.9090	50/50	0.9090
232412	X1-032 E	0.8192	50/50	0.8192
232417	X3-008 C	0.3307	50/50	0.3307
232418	X3-008 E	3.1277	50/50	3.1277
232422	X3-066 FULL	0.1653	50/50	0.1653
232423	X3-066 E	1.5632	50/50	1.5632
232424	Y1-079 C	0.2436	50/50	0.2436
232425	Y1-079 E	2.3039	50/50	2.3039
232426	Y1-080 FULL	0.0519	50/50	0.0519
232427	Y1-080 E	0.4932	50/50	0.4932
232428	Y3-058 C	0.2078	50/50	0.2078
232429	Y3-058 E	1.9655	50/50	1.9655
232433	Z2-076 E	0.3208	Adder	0.38
232435	Z2-077 E	0.3208	Adder	0.38
232436	AB1-176 C	0.6345	50/50	0.6345
232813	VAUGHN	0.1155	50/50	0.1155
232902	EASTMUNI	3.7067	50/50	3.7067
232907	VN8	5.9640	50/50	5.9640
232910	NRG_G1	1.8200	50/50	1.8200
232911	NRG_G2	1.8200	50/50	1.8200
232919	VN10	0.4079	50/50	0.4079
232922	**MR3 (Deactivation : 01/06/2021)**	**9.0862**	**Adder**	**10.69**
232926	CRISFLD1	0.3545	50/50	0.3545
293670	O-025 C	0.2133	50/50	0.2133
917082	Z2-012 E	2.1263	Adder	2.5
918831	AA1-102	1.3293	50/50	1.3293
919831	**AA2-069 (Suspended)**	**40.1751**	**Adder**	**47.26**
923282	AB1-137 C	0.6591	Adder	0.78
923283	AB1-137 E	0.2825	Adder	0.33
923322	AB1-141 C OP	5.7565	50/50	5.7565
923323	AB1-141 E OP	2.6864	50/50	2.6864
923332	AB1-142 C OP	5.7565	50/50	5.7565
923603	AB1-176 E	1.0463	50/50	1.0463
923921	AB2-032 C	5.7992	50/50	5.7992

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923922	AB2-032 E	2.7290	50/50	2.7290
923951	AB2-036 C	12.6924	50/50	12.6924
923952	AB2-036 E	20.7661	50/50	20.7661
924681	AB2-120 C OP	6.5091	Adder	7.66
924682	AB2-120 E OP	10.6201	Adder	12.49
924781	AB2-130 C OP	5.4762	Adder	6.44
924782	AB2-130 E OP	8.9348	Adder	10.51
924801	AB2-133 C OP	11.5595	50/50	11.5595
924802	AB2-133 E OP	14.6609	50/50	14.6609
924821	AB2-135 C	12.3188	50/50	12.3188
924822	AB2-135 E	14.0492	50/50	14.0492
924831	AB2-136 C	5.9522	50/50	5.9522
924832	AB2-136 E	6.3123	50/50	6.3123
924971	AB2-153 C	3.2407	50/50	3.2407
924972	AB2-153 E	5.2875	50/50	5.2875
925151	AB2-172 C OP	4.7924	50/50	4.7924
925152	AB2-172 E OP	7.8191	50/50	7.8191
925251	AB2-179 C OP	-9.1300	Adder	-10.74
925261	AB2-180 C	2.9588	50/50	2.9588
925262	AB2-180 E	1.2680	50/50	1.2680
925271	AB2-185 C OP	5.2023	50/50	5.2023
925272	AB2-185 E OP	2.2295	50/50	2.2295
926131	AC1-091 C	0.6416	Adder	0.75
926132	AC1-091 E	1.0523	Adder	1.24
926141	AC1-092 C	0.6416	Adder	0.75
926142	AC1-092 E	1.0523	Adder	1.24
926151	AC1-093 C	0.6074	Adder	0.71
926152	AC1-093 E	1.0010	Adder	1.18
926161	AC1-094 C	0.5133	Adder	0.6
926162	AC1-094 E	0.8470	Adder	1.0
927031	AC1-190 C	8.7532	50/50	8.7532
927032	AC1-190 E	3.7514	50/50	3.7514
927191	AC1-213 C	0.6596	50/50	0.6596
927192	AC1-213 E	0.4328	50/50	0.4328
930201	AB1-056 C	9.9441	Adder	11.7
930202	AB1-056 E	28.3190	Adder	33.32
930881	AB1-137 C	0.6591	Adder	0.78
930882	AB1-137 E	0.2825	Adder	0.33
930932	AB1-142 E OP	2.6864	50/50	2.6864
932161	AC2-023 C	5.6983	50/50	5.6983
932162	AC2-023 E	4.1501	50/50	4.1501
933631	AC2-185 C	1.3004	Adder	1.53
933632	AC2-185 E	2.1217	Adder	2.5
933641	AC2-186 C	3.1357	Adder	3.69
933642	AC2-186 E	5.1161	Adder	6.02
936611	AD2-076 C O1	8.1874	50/50	8.1874
936612	AD2-076 E O1	13.3584	50/50	13.3584
938651	AE1-087 C	4.0357	50/50	4.0357
938652	AE1-087 E	1.0089	50/50	1.0089
938891	AE1-117 C O1	6.5135	Adder	7.66
938892	AE1-117 E O1	17.3433	Adder	20.4

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938901	AE1-118 C O1 (Withdrawn : 07/10/2020)	6.5188	Adder	7.67
938902	AE1-118 E O1 (Withdrawn : 07/10/2020)	17.3573	Adder	20.42
939151	AE1-145	3.4253	Adder	4.03
939621	AE1-192 C O1	8.0595	Adder	9.48
939622	AE1-192 E O1	3.9440	Adder	4.64
941021	AE2-093 C	5.9738	50/50	5.9738
941022	AE2-093 E	9.4914	50/50	9.4914
941181	AE2-112 C	2.8405	50/50	2.8405
941182	AE2-112 E	4.6345	50/50	4.6345
942441	AE2-257 C	5.1662	Adder	6.08
942442	AE2-257 E	13.6201	Adder	16.02
943361	AF1-007 C	0.2934	Adder	0.35
943362	AF1-007 E	0.8338	Adder	0.98
943441	AF1-015 C	1.9104	50/50	1.9104
943442	AF1-015 E	2.6382	50/50	2.6382
943651	AF1-036 C	3.6936	50/50	3.6936
943652	AF1-036 E	5.1006	50/50	5.1006
944921	AF1-157 C O1	2.4567	Adder	2.89
944922	AF1-157 E O1	1.6378	Adder	1.93
945661	AF1-231 C	1.3034	Adder	1.53
945662	AF1-231 E	1.9552	Adder	2.3
945781	AF1-243	0.8574	Adder	1.01
945791	AF1-244	1.6440	50/50	1.6440
945931	AF1-258	0.6763	50/50	0.6763
945941	AF1-259	0.3362	50/50	0.3362
946041	AF1-269 (Withdrawn : 05/12/2020)	2.5836	50/50	2.5836
957611	AF2-055 C	3.1809	Adder	7.06
957612	AF2-055 E	1.3633	Adder	3.03
957661	AF2-060	0.8169	Adder	1.81
957671	AF2-061 O1	3.6308	Adder	8.06
958151	AF2-109 C	4.6990	50/50	4.6990
958152	AF2-109 E	4.6990	50/50	4.6990
959021	AF2-193 C O1	9.7387	Adder	21.62
959022	AF2-193 E O1	26.2699	Adder	58.31
959031	AF2-194 C O1	9.7387	Adder	21.62
959032	AF2-194 E O1	26.2699	Adder	58.31
959051	AF2-196 C	0.7468	Adder	1.66
959052	AF2-196 E	1.7424	Adder	3.87
959161	AF2-207 C O1	4.1274	50/50	4.1274
959162	AF2-207 E O1	6.1910	50/50	6.1910
959571	AF2-248 C	0.6978	50/50	0.6978
959572	AF2-248 E	0.7799	50/50	0.7799
959581	AF2-249 C	0.1231	50/50	0.1231
959582	AF2-249 E	0.4926	50/50	0.4926
959591	AF2-250 C	0.2258	50/50	0.2258
959592	AF2-250 E	0.1745	50/50	0.1745
960221	AF2-313 C	5.3367	50/50	5.3367
960222	AF2-313 E	3.0255	50/50	3.0255

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960341	AF2-325 C	1.0261	50/50	1.0261
960342	AF2-325 E	1.4170	50/50	1.4170
960671	AF2-358 C O1	13.9800	50/50	13.9800
960672	AF2-358 E O1	9.3200	50/50	9.3200
960871	AF2-378 C	0.2686	50/50	0.2686
960872	AF2-378 E	0.3727	50/50	0.3727
960881	AF2-379 C	0.3393	50/50	0.3393
960882	AF2-379 E	0.4676	50/50	0.4676
960941	AF2-385 C O1	9.8270	50/50	9.8270
960942	AF2-385 E O1	5.5277	50/50	5.5277
960961	AF2-387 C O1	22.1865	50/50	22.1865
960962	AF2-387 E O1	11.1265	50/50	11.1265
961181	AF2-409 O1	22.5980	50/50	22.5980
NEWTON	NEWTON	0.1870	Confirmed LTF	0.1870
FARMERCITY	FARMERCITY	0.0097	Confirmed LTF	0.0097
CALDERWOOD	CALDERWOOD	0.0870	Confirmed LTF	0.0870
NY	NY	0.0603	Confirmed LTF	0.0603
PRAIRIE	PRAIRIE	0.4494	Confirmed LTF	0.4494
O-066	O-066	0.5309	Confirmed LTF	0.5309
CHEOAH	CHEOAH	0.0876	Confirmed LTF	0.0876
EDWARDS	EDWARDS	0.0609	Confirmed LTF	0.0609
TILTON	TILTON	0.1096	Confirmed LTF	0.1096
G-007	G-007	0.0530	Confirmed LTF	0.0530
GIBSON	GIBSON	0.0950	Confirmed LTF	0.0950
BLUEG	BLUEG	0.3021	Confirmed LTF	0.3021
TRIMBLE	TRIMBLE	0.0968	Confirmed LTF	0.0968
CATAWBA	CATAWBA	0.0619	Confirmed LTF	0.0619

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
10164469 7	23210 7	TOWNSEN D	DP&L	23210 6	MIDLTNT P	DP& L	1	DPL_P7_1_DBL_1NCB_FS A-A	towe r	348.0	107.38	110.05	DC	9.4

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232404	W1-003 C	0.5398	50/50	0.5398
232405	W1-003 E	0.9090	50/50	0.9090
232406	W1-004 FULL	0.5398	50/50	0.5398
232407	W1-004 E	0.9090	50/50	0.9090
232408	W1-005 C	0.5398	50/50	0.5398
232409	W1-005 E	0.9090	50/50	0.9090
232410	W1-006 C	0.5398	50/50	0.5398
232411	W1-006 E	0.9090	50/50	0.9090
232412	X1-032 E	0.8192	50/50	0.8192
232417	X3-008 C	0.3307	50/50	0.3307
232418	X3-008 E	3.1277	50/50	3.1277
232422	X3-066 FULL	0.1653	50/50	0.1653
232423	X3-066 E	1.5632	50/50	1.5632
232424	Y1-079 C	0.2436	50/50	0.2436
232425	Y1-079 E	2.3039	50/50	2.3039
232426	Y1-080 FULL	0.0519	50/50	0.0519
232427	Y1-080 E	0.4932	50/50	0.4932
232428	Y3-058 C	0.2078	50/50	0.2078
232429	Y3-058 E	1.9655	50/50	1.9655
232433	Z2-076 E	0.3208	Adder	0.38
232435	Z2-077 E	0.3208	Adder	0.38
232436	AB1-176 C	0.6345	50/50	0.6345
232813	VAUGHN	0.1155	50/50	0.1155
232902	EASTMUNI	3.7067	50/50	3.7067
232907	VN8	5.9640	50/50	5.9640
232910	NRG_G1	1.8200	50/50	1.8200
232911	NRG_G2	1.8200	50/50	1.8200
232919	VN10	0.4079	50/50	0.4079
232922	**MR3 (Deactivation : 01/06/2021)**	**9.0862**	**Adder**	**10.69**
232926	CRISFLD1	0.3545	50/50	0.3545
293670	O-025 C	0.2133	50/50	0.2133
917082	Z2-012 E	2.1263	Adder	2.5
918831	AA1-102	1.3293	50/50	1.3293
919831	**AA2-069 (Suspended)**	**40.1751**	**Adder**	**47.26**
923282	AB1-137 C	0.6591	Adder	0.78
923283	AB1-137 E	0.2825	Adder	0.33
923322	AB1-141 C OP	5.7565	50/50	5.7565
923323	AB1-141 E OP	2.6864	50/50	2.6864
923332	AB1-142 C OP	5.7565	50/50	5.7565
923603	AB1-176 E	1.0463	50/50	1.0463
923921	AB2-032 C	5.7992	50/50	5.7992

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923922	AB2-032 E	2.7290	50/50	2.7290
923951	AB2-036 C	12.6924	50/50	12.6924
923952	AB2-036 E	20.7661	50/50	20.7661
924681	AB2-120 C OP	6.5091	Adder	7.66
924682	AB2-120 E OP	10.6201	Adder	12.49
924781	AB2-130 C OP	5.4762	Adder	6.44
924782	AB2-130 E OP	8.9348	Adder	10.51
924801	AB2-133 C OP	11.5595	50/50	11.5595
924802	AB2-133 E OP	14.6609	50/50	14.6609
924821	AB2-135 C	12.3188	50/50	12.3188
924822	AB2-135 E	14.0492	50/50	14.0492
924831	AB2-136 C	5.9522	50/50	5.9522
924832	AB2-136 E	6.3123	50/50	6.3123
924971	AB2-153 C	3.2407	50/50	3.2407
924972	AB2-153 E	5.2875	50/50	5.2875
925151	AB2-172 C OP	4.7924	50/50	4.7924
925152	AB2-172 E OP	7.8191	50/50	7.8191
925251	AB2-179 C OP	26.8588	50/50	26.8588
925252	AB2-179 E OP	8.8577	50/50	8.8577
925261	AB2-180 C	2.9588	50/50	2.9588
925262	AB2-180 E	1.2680	50/50	1.2680
925271	AB2-185 C OP	5.2023	50/50	5.2023
925272	AB2-185 E OP	2.2295	50/50	2.2295
927031	AC1-190 C	8.7532	50/50	8.7532
927032	AC1-190 E	3.7514	50/50	3.7514
927191	AC1-213 C	0.6596	50/50	0.6596
927192	AC1-213 E	0.4328	50/50	0.4328
930201	AB1-056 C	9.9441	Adder	11.7
930202	AB1-056 E	28.3190	Adder	33.32
930881	AB1-137 C	0.6591	Adder	0.78
930882	AB1-137 E	0.2825	Adder	0.33
930932	AB1-142 E OP	2.6864	50/50	2.6864
932161	AC2-023 C	5.6983	50/50	5.6983
932162	AC2-023 E	4.1501	50/50	4.1501
933641	AC2-186 C	3.1357	Adder	3.69
933642	AC2-186 E	5.1161	Adder	6.02
936611	AD2-076 C O1	8.1874	50/50	8.1874
936612	AD2-076 E O1	13.3584	50/50	13.3584
938651	AE1-087 C	4.0357	50/50	4.0357
938652	AE1-087 E	1.0089	50/50	1.0089
938891	AE1-117 C O1	6.5135	Adder	7.66
938892	AE1-117 E O1	17.3433	Adder	20.4
938901	**AE1-118 C O1 (Withdrawn : 07/10/2020)**	**6.5188**	**Adder**	**7.67**
938902	**AE1-118 E O1 (Withdrawn : 07/10/2020)**	**17.3573**	**Adder**	**20.42**
939151	AE1-145	3.4253	Adder	4.03
939621	AE1-192 C O1	8.0595	Adder	9.48
939622	AE1-192 E O1	3.9440	Adder	4.64
941021	AE2-093 C	5.9738	50/50	5.9738
941022	AE2-093 E	9.4914	50/50	9.4914

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
941181	AE2-112 C	2.8405	50/50	2.8405
941182	AE2-112 E	4.6345	50/50	4.6345
942441	AE2-257 C	5.1662	Adder	6.08
942442	AE2-257 E	13.6201	Adder	16.02
943361	AF1-007 C	0.2934	Adder	0.35
943362	AF1-007 E	0.8338	Adder	0.98
943441	AF1-015 C	1.9104	50/50	1.9104
943442	AF1-015 E	2.6382	50/50	2.6382
943651	AF1-036 C	3.6936	50/50	3.6936
943652	AF1-036 E	5.1006	50/50	5.1006
944921	AF1-157 C O1	2.4567	Adder	2.89
944922	AF1-157 E O1	1.6378	Adder	1.93
945661	AF1-231 C	1.3034	Adder	1.53
945662	AF1-231 E	1.9552	Adder	2.3
945781	AF1-243	0.8574	Adder	1.01
945791	AF1-244	1.6440	50/50	1.6440
945931	AF1-258	0.6763	50/50	0.6763
945941	AF1-259	0.3362	50/50	0.3362
946041	**AF1-269 (Withdrawn : 05/12/2020)**	**2.5836**	**50/50**	**2.5836**
957611	AF2-055 C	3.1809	Adder	7.06
957612	AF2-055 E	1.3633	Adder	3.03
957661	AF2-060	0.8169	Adder	1.81
957671	AF2-061 O1	3.6308	Adder	8.06
958151	AF2-109 C	4.6990	50/50	4.6990
958152	AF2-109 E	4.6990	50/50	4.6990
959021	AF2-193 C O1	9.7387	Adder	21.62
959022	AF2-193 E O1	26.2699	Adder	58.31
959031	AF2-194 C O1	9.7387	Adder	21.62
959032	AF2-194 E O1	26.2699	Adder	58.31
959051	AF2-196 C	0.7468	Adder	1.66
959052	AF2-196 E	1.7424	Adder	3.87
959161	AF2-207 C O1	4.1274	50/50	4.1274
959162	AF2-207 E O1	6.1910	50/50	6.1910
959571	AF2-248 C	0.6978	50/50	0.6978
959572	AF2-248 E	0.7799	50/50	0.7799
959581	AF2-249 C	0.1231	50/50	0.1231
959582	AF2-249 E	0.4926	50/50	0.4926
959591	AF2-250 C	0.2258	50/50	0.2258
959592	AF2-250 E	0.1745	50/50	0.1745
960221	AF2-313 C	5.3367	50/50	5.3367
960222	AF2-313 E	3.0255	50/50	3.0255
960341	AF2-325 C	1.0261	50/50	1.0261
960342	AF2-325 E	1.4170	50/50	1.4170
960671	AF2-358 C O1	13.9800	50/50	13.9800
960672	AF2-358 E O1	9.3200	50/50	9.3200
960871	AF2-378 C	0.2686	50/50	0.2686
960872	AF2-378 E	0.3727	50/50	0.3727
960881	AF2-379 C	0.3393	50/50	0.3393
960882	AF2-379 E	0.4676	50/50	0.4676
960941	AF2-385 C O1	9.8270	50/50	9.8270
960942	AF2-385 E O1	5.5277	50/50	5.5277
960961	AF2-387 C O1	22.1865	50/50	22.1865

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960962	AF2-387 E O1	11.1265	50/50	11.1265
961181	AF2-409 O1	22.5980	50/50	22.5980
NEWTON	NEWTON	0.1870	Confirmed LTF	0.1870
FARMERCITY	FARMERCITY	0.0097	Confirmed LTF	0.0097
CALDERWOOD	CALDERWOOD	0.0870	Confirmed LTF	0.0870
NY	NY	0.0603	Confirmed LTF	0.0603
PRAIRIE	PRAIRIE	0.4494	Confirmed LTF	0.4494
O-066	O-066	0.5309	Confirmed LTF	0.5309
CHEOAH	CHEOAH	0.0876	Confirmed LTF	0.0876
EDWARDS	EDWARDS	0.0609	Confirmed LTF	0.0609
TILTON	TILTON	0.1096	Confirmed LTF	0.1096
G-007	G-007	0.0530	Confirmed LTF	0.0530
GIBSON	GIBSON	0.0950	Confirmed LTF	0.0950
BLUEG	BLUEG	0.3021	Confirmed LTF	0.3021
TRIMBLE	TRIMBLE	0.0968	Confirmed LTF	0.0968
CATAWBA	CATAWBA	0.0619	Confirmed LTF	0.0619

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
AA1-102	Kings Creek-Loretto 138kV	Partially in Service - Under Construction
AA2-069	Cartanza 230kV	Suspended
AB1-056	Indian River 230kV I	Engineering and Procurement
AB1-137	Frankford 25kV	Engineering and Procurement
AB1-141	Church-Wye Mills 138 kV I	Engineering and Procurement
AB1-142	Church-Wye Mills 138 kV II	Engineering and Procurement
AB1-176	Price 25kV II	Active
AB2-032	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-036	Church-Steele 138kV	Active
AB2-120	Piney Grove-New Church 138kV	Active
AB2-130	Laurel 69kV	Active
AB2-133	Chestertown-Church 69kV	Active
AB2-135	Church-Kent 69kV	Active
AB2-136	West Cambridge-Vienna 69kV	Active
AB2-153	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-172	Todd 69kV	Active
AB2-179	Townsend 138kV	Engineering and Procurement
AB2-180	Rockawalkin 69kV	Active
AB2-185	Wye Mills 25kV	Active
AC1-091	Cedar Creek 138kV I	Active
AC1-092	Cedar Creek 138kV II	Active
AC1-093	Cedar Creek 138kV III	Active
AC1-094	Cedar Creek 138kV IV	Active
AC1-190	East New Market 69kV	Active
AC1-213	North Salisbury 25kV	Active
AC2-023	Hebron 69kV	Active
AC2-185	Cedar Creek 138kV II	Active
AC2-186	Harrington 25kV	Active
AD2-076	Centreville 69 kV	Active
AE1-087	Todd 69 kV	Active
AE1-117	Bethany 138 kV	Active
AE1-118	Bethany-138th Street 138 kV	Withdrawn
AE1-145	Wallops Island 69 kV	Active
AE1-192	Belle Haven-Tasley 69 kV	Active
AE2-093	Easton-Steele 138 kV	Active
AE2-112	Carville 138 kV	Active
AE2-257	Cedar Neck 69 kV	Active
AF1-007	Indian River 230 kV I	Active
AF1-015	Easton-Steele 138 kV	Active

Queue Number	Project Name	Status
AF1-036	Carville 138 kV	Active
AF1-157	Laurel-Sussex 69 kV	Active
AF1-231	New Church 138 kV	Active
AF1-243	Tasley 25 kV	Active
AF1-244	Kingston 25 kV	Active
AF1-258	Rockawalkin 69 kV	Active
AF1-259	Price 25 kV	Active
AF1-269	Airey-Golden Hill 69 kV	Withdrawn
AF2-055	Plantation 69 kV	Active
AF2-060	Wattsville 12 kV	Active
AF2-061	Wattsville 69kV	Active
AF2-109	Church 69 kV	Active
AF2-193	Indian River 230 kV I	Active
AF2-194	Indian River 230 kV II	Active
AF2-196	Cedar Neck 69 kV II	Active
AF2-207	Nelson 69 kV	Active
AF2-248	Edgewood 12 kV I	Active
AF2-249	Edgewood 12 kV II	Active
AF2-250	Edgewood 12 kV III	Active
AF2-313	Price 69 kV	Active
AF2-325	Jacktown 12 kV	Active
AF2-358	Airey-Vienna 69 kV	Active
AF2-378	Cambridge 12 kV	Active
AF2-379	Princess Anne 25 kV	Active
AF2-385	Nelson 69 kV	Active
AF2-387	Hillsboro 138 kV	Active
AF2-409	Vienna 138 kV	Active
W1-003	Oak Hall	In Service
W1-004	Oak Hall	In Service
W1-005	Oak Hall	In Service
W1-006	Oak Hall	In Service
W1-062	Clayton 138kV	In Service
X1-032	Costen 25kV	In Service
X3-008	Todd 69kV	Under Construction
X3-066	Church Hill 69kV	In Service
Y1-079	Wye Mills 69kV	In Service
Y1-080	Dorchester 12kV	In Service
Y3-058	Rockawalkin 69kV	In Service
Z2-012	Weirwood-Eastville 69kV	In Service
Z2-076	Worcester South 25kV	In Service
Z2-077	Worcester North 25kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
DPL_P4-2_DP11	CONTINGENCY 'DPL_P4-2_DP11' /*STEELE BUS BREAKER TO MILFORD DISCONNECT BRANCH FROM BUS 232004 TO BUS 232000 CKT 1 /*MILFORD STEELE 230 230 DISCONNECT BRANCH FROM BUS 232000 TO BUS 232005 CKT 1 /*STEELE VIENNA 230 230 END
DPL_P7_1_DBL_1NCB_FSA-A	CONTINGENCY 'DPL_P7_1_DBL_1NCB_FSA-A' /* #1 & #2 KEENEY-STEELE 230 OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1 OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2 OPEN LINE FROM BUS 232000 TO BUS 923960 CKT 2 DISCONNECT BUS 923961 DISCONNECT BUS 923962 END

12 Short Circuit Analysis

Short circuit will be studied in the System Impact Study phase.

13 Affected Systems

None