



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-280
CLAYSBURG-PUZZLETOWN 46 KV
12 MW Capacity / 20 MW Energy**

January 2021

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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 Mid-Atlantic Interstate Transmission, LLC (MAIT) (PENELEC Zone).

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

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 Solar generating facility located in Blair County, Pennsylvania. The installed facilities will have a total capability of 20 MW with 12 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is March 01, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-280
Project Name	CLAYSBURG-PUZZLETOWN 46 KV
State	Pennsylvania
County	Blair
Transmission Owner	MAIT (PENELEC)
MFO	20
MWE	20
MWC	12
Fuel	Solar
Basecase Study Year	2024

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

The project will interconnect with Allegheny Electric Cooperative (“AEC”) behind the Puzzletown delivery point on the Buckeye Pipeline No. 2 (Claysburg) 46 kV line. AEC will be responsible for providing the interconnection requirements for this Point of Interconnection. FE will upgrade relaying at Claysburg Substation.

5 Cost Summary

The AG1-280 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$485,000
Total System Network Upgrade Costs	\$70,450,000 ¹
Total Costs	\$70,935,000

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 2016-36, 2016-25 I.R.B. (6/20/2016). 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.

¹ This project currently causes and/or contributes to overloads of the Transmission System (see Summer Peak Load Flow Analysis section below) and therefore has potential to have cost allocation for the system reinforcements listed in the report. This will be re-evaluated in the System Impact phase. The results may vary with queue customers withdrawing from the queue and other generators deactivating over time. If a customer is the first to cause the need for a project (causes loading to exceed 100% of rating), then the customer is responsible. If a customer contributes to a facility that is already overloaded by a prior queue, then they may receive cost allocation.

6 Transmission Owner Scope of Work

The project will interconnect with Allegheny Electric Cooperative (“AEC”) behind the Puzzletown delivery point on the Buckeye Pipeline No. 2 (Claysburg) 46 kV line. AEC will be responsible for providing the interconnection requirements for this Point of Interconnection. FE will upgrade relaying at Claysburg Substation.

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

Description	Total Cost
Upgrade relaying at Claysburg Substation.	\$485,000
Total Physical Interconnection Costs	\$485,000

7 Schedule

Based on the scope of work for the interconnection facilities, it is expected to take a minimum of **12 months** after the signing of an Interconnection Construction Service Agreement and construction kickoff call to complete. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined work and that all system outages will be allowed when requested.

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

8 Transmission Owner Analysis

8.1 Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AG1-280 project did not contribute to any overloads on the FE transmission <100 kV system.

9 Interconnection Customer Requirements

9.1 System Protection

An analysis was conducted to assess the impact of the Claysburg-Puzzletown 46 kV (AG1-280) Project on the system protection requirements in the area.

The 46 kV interconnection proposal will require Developer to meet applicable "Technical Requirements" as outlined in First Energy's document titled "Technical Requirements for the Interconnection of Customer-Owned Generation to the FirstEnergy Distribution System". Anti-islanding system shall meet IEEE 1547 and UL 1741. Therefore no Direct Transfer Trip (DTT) will be required.

1.1 General Concerns

It is to be understood, for abnormal operation of the Penelec system, which could cause Developer's generation facility to be electrically isolated from the Penelec system synchronous source via the tripping of an interconnecting primary voltage line or device, Developer will, via Penelec's direction, be required to disconnect the generation from Penelec's system and remain disconnected (**units are required to be OFF LINE**), until the Penelec system normal circuitry is restored. These abnormal conditions will be reviewed by Penelec system operators as to the need for the generation facility to be disconnected.

9.2 Requirements for Owner's/Developer's generation IPP Facility

The proposed interconnection Owner's/Developer's facilities must be designed in accordance with the document titled *FirstEnergy Distribution Engineering Practices Interconnection of Customer-Owned Generation to the FirstEnergy Distribution System* dated 11/17/14 located at the following link:

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

The document is referred to as engineering practice EP(# 02-280) with section 4 part C specifically referencing the "interconnection technical requirements". Certain protection requirements are shown.

Additionally, Owner/Developer is responsible to provide adequate protection (for their equipment) under any distribution system operating condition' - which includes 'Separation from supply' (i.e. tripping of F.E. circuit breakers) and 'Re-synchronizing the generation after electric restoration of the supply' (i.e. reclosing of F.E. circuit breakers).

Owner's/Developer's protection must be designed to coordinate with the reclosing practices of FirstEnergy line protective devices. The generator must cease to energize the FirstEnergy circuit to which it is connected prior to reclosing of any (FE) automatic reclosing devices.

Owners/Developer's electrical protection and control schematics shall be provided to FE for consideration. FE may request modifications, if required, to meet the technical requirements.

9.3 Compliance Issues

The IC will be responsible for meeting a power factor between 0.95 lagging (producing MVARs) to 0.95 leading (absorbing MVARs) and assure that voltage deviation will be less than 1.0 volt as measured at the POI under all Solar Gen operating conditions due to the inherent dynamic reactive power capability of this solar facility.

Generators with no inherent VAR (reactive power) control capability, or those that have a restricted VAR capability less than the defined requirements, must provide dynamic supplementary reactive support located at the generation facility with electrical characteristics equivalent to that provided by a similar sized synchronous generator. A Dynamic Reactive Compensation (either Static VAR Compensator (SVC) or STATCOM) or other method be applied in order to maintain the required specifications at the POI. The IC is responsible for the installation of equipment on its side of the POI in order to adhere to the criteria stated above by FirstEnergy.

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:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter²) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

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/>

11 Summer Peak - Load Flow Analysis

The Queue Project AG1-280 was evaluated as a 20.0 MW (Capacity 12.0 MW) injection tapping the Claysburg to Puzzletown 46 kV line in the PENELEC area. Project AG1-280 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-280 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	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
166590283	200505	26CLYSBURG	115.0	PENELEC	200525	26SUMMIT	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	252.0	103.0	105.33	DC	5.88
166590303	200744	26SOMERS T	115.0	PENELEC	965880	AG1-457 TAP	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	106.58	107.03	DC	1.81
166590282	200751	26HILLCLAY	115.0	PENELEC	200752	26HILLTOP	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	282.0	101.31	102.91	DC	4.51
166590270	965880	AG1-457 TAP	115.0	PENELEC	200746	26ROCKWOOD	115.0	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	106.58	107.03	DC	1.81

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	CON T NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
166204585	200501	26BDFORD N	115.0	PENELE C	960900	AF2-381 TAP	115.0	PENELE C	1	PN-P1-2-PN-115-074-A	operatio n	149.0	100.57	102.43	DC	2.77
166204596	200505	26CLYSBUR G	115.0	PENELE C	200525	26SUMMI T	115.0	PENELE C	1	PN-P1-2-PN-115-082	operatio n	252.0	99.95	102.89	DC	7.39
166204451	202637	26PRIDE	115.0	PENELE C	200744	26SOMER ST	115.0	PENELE C	1	Base Case	operatio n	133.0	138.13	138.61	DC	1.41
166204469	945670	AF1-232 TAP	115.0	PENELE C	964920	AG1-356 TAP	115.0	PENELE C	1	Base Case	operatio n	133.0	143.09	143.57	DC	1.41
166204413	960900	AF2-381 TAP	115.0	PENELE C	200799	26CEN.CT Y	115.0	PENELE C	1	PN-P1-2-PN-115-074-A	operatio n	149.0	159.32	161.19	DC	2.77
166204418	960900	AF2-381 TAP	115.0	PENELE C	200799	26CEN.CT Y	115.0	PENELE C	1	Base Case	operatio n	126.0	110.33	111.96	DC	2.05
166204438	964920	AG1-356 TAP	115.0	PENELE C	202637	26PRIDE	115.0	PENELE C	1	Base Case	operatio n	133.0	141.36	141.84	DC	1.41

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166590303	2	26SOMERST 115.0 kV - AG1-457 TAP 115.0 kV Ckt 1	<u>PENELEC</u> PN-AG1-F-0008 (2180) : Reconductor approximately 8.1 miles of line. Replace line drops at Somerset Substation. Project Type : FAC Cost : \$20,000,000 Time Estimate : 42.0 Months	\$20,000,000
166590283	1	26CLYSBURG 115.0 kV - 26SUMMIT 115.0 kV Ckt 1	<u>PENELEC</u> PN-AG1-F-0006A (2169) : Rebuild approximately 11.85 miles of line. Project Type : FAC Cost : \$29,000,000 Time Estimate : 50.0 Months PN-AG1-F-0006B (2170) : Replace bus conductor at Claysburg substation. Project Type : FAC Cost : \$200,000 Time Estimate : 12.0 Months	\$29,200,000
166590282	3	26HILLCLAY 115.0 kV - 26HILLTOP 115.0 kV Ckt 1	<u>PENELEC</u> PN-AF2-F-0041A (2297) : Reconductor 4.5 miles of line Project Type : FAC Cost : \$13,850,000 Time Estimate : 36.0 Months	\$13,850,000
166590270	4	AG1-457 TAP 115.0 kV - 26ROCKWOOD 115.0 kV Ckt 1	<u>PENELEC</u> PN-AG1-F-0033A (2281) : Rebuild 3 miles of line. Project Type : FAC Cost : \$7,400,000 Time Estimate : 32.0 Months	\$7,400,000
			TOTAL COST	\$70,450,000¹

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
166590283	200505	26CLYSBURG	PENELEC	200525	26SUMMIT	PENELEC	1	PN-P7-1-PN-230-001	tower	252.0	103.0	105.33	DC	5.88

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUUGH	0.1264	50/50	0.1264
200834	26SW_E13_K22	0.0336	50/50	0.0336
200835	26ARN_Z1-066	1.5990	50/50	1.5990
200846	26FORWARD	0.1318	50/50	0.1318
200864	K-013 E	6.0566	50/50	6.0566
200888	26HIGHLAND	0.3683	50/50	0.3683
200889	26STNY CRK	0.4031	50/50	0.4031
200890	26BF_G21_K23	0.1608	50/50	0.1608
200891	26CSLMN_L13	0.1860	50/50	0.1860
200892	26LOOKOUT	0.1987	50/50	0.1987
200925	26R32	0.5775	50/50	0.5775
202225	26SCI_S29B	0.0672	50/50	0.0672
202652	26RGH_Y1-033	0.1217	50/50	0.1217
203915	26BF_Z2-108	3.5977	50/50	3.5977
292350	K-023	6.5757	50/50	6.5757
292542	L-013 1	6.3958	50/50	6.3958
293432	R-040 E	0.3598	50/50	0.3598
293603	O-018 E	14.9880	50/50	14.9880
293902	O-048 E	5.7563	50/50	5.7563
294903	P-060 E	12.6252	50/50	12.6252
296332	R-032 E	17.2938	50/50	17.2938
913142	Y1-033 E OP1	5.2483	50/50	5.2483
938351	AE1-053	1.9987	50/50	1.9987
938881	AE1-116	1.0644	50/50	1.0644
938993	AE1-128 C	27.0670	50/50	27.0670
938994	AE1-128 E	18.0446	50/50	18.0446
941351	AE2-131 C (Suspended)	-0.9094	Adder	-1.07
942361	AE2-249 C	3.0450	50/50	3.0450
942362	AE2-249 E	2.0300	50/50	2.0300
943711	AF1-039 C O1	1.3884	50/50	1.3884
943712	AF1-039 E O1	0.9256	50/50	0.9256
944751	AF1-140 C	4.9027	50/50	4.9027
944752	AF1-140 E	3.2685	50/50	3.2685
944781	AF1-143 C	11.9922	50/50	11.9922
944782	AF1-143 E	6.3958	50/50	6.3958
945671	AF1-232 C (Withdrawn : 01/19/2021)	28.9266	50/50	28.9266
945672	AF1-232 E (Withdrawn : 01/19/2021)	15.5758	50/50	15.5758
946571	AF1-321 C O1	2.8532	50/50	2.8532
946572	AF1-321 E O1	1.9022	50/50	1.9022

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957001	AF2-001 C O1	2.8532	50/50	2.8532
957002	AF2-001 E O1	1.9022	50/50	1.9022
957011	AF2-002 C O1	1.4266	50/50	1.4266
957012	AF2-002 E O1	0.9511	50/50	0.9511
957513	AF2-045 BAT	2.6190	50/50	2.6190
957931	AF2-087 C (Suspended)	-0.2402	Adder	-0.28
957981	AF2-092 C	2.9074	50/50	2.9074
957982	AF2-092 E	1.9383	50/50	1.9383
958101	AF2-104 C (Withdrawn : 12/08/2020)	0.5677	50/50	0.5677
958102	AF2-104 E (Withdrawn : 12/08/2020)	0.3785	50/50	0.3785
958471	AF2-141	1.5990	50/50	1.5990
959792	AF2-270 E	1.3988	50/50	1.3988
959803	AF2-271 BAT	0.1233	Merchant Transmission	0.1233
960451	AF2-336 C	4.8457	50/50	4.8457
960452	AF2-336 E	3.2305	50/50	3.2305
960461	AF2-337 C	4.8457	50/50	4.8457
960462	AF2-337 E	3.2305	50/50	3.2305
960471	AF2-338 C	4.8457	50/50	4.8457
960472	AF2-338 E	3.2305	50/50	3.2305
960481	AF2-339 C	4.8457	50/50	4.8457
960482	AF2-339 E	3.2305	50/50	3.2305
960901	AF2-381 C	24.1081	50/50	24.1081
960902	AF2-381 E	12.6869	50/50	12.6869
961911	AG1-033 C	0.6497	50/50	0.6497
961912	AG1-033 E	0.3655	50/50	0.3655
961981	AG1-041 C	3.0536	50/50	3.0536
961982	AG1-041 E	2.0357	50/50	2.0357
962292	AG1-077 E	1.1411	50/50	1.1411
962641	AG1-113	0.8515	50/50	0.8515
962651	AG1-114	1.9987	50/50	1.9987
963541	AG1-203 C	1.8543	50/50	1.8543
963542	AG1-203 E	0.9984	50/50	0.9984
963561	AG1-205 C	1.2992	50/50	1.2992
963562	AG1-205 E	0.6995	50/50	0.6995
963881	AG1-241 C	1.3198	50/50	1.3198
963882	AG1-241 E	0.7106	50/50	0.7106
964191	AG1-280 C	3.5288	50/50	3.5288
964192	AG1-280 E	2.3526	50/50	2.3526
964201	AG1-281 C	3.4664	50/50	3.4664
964202	AG1-281 E	2.3110	50/50	2.3110
964751	AG1-338 C	2.1353	50/50	2.1353
964752	AG1-338 E	0.2912	50/50	0.2912
964761	AG1-339 C	2.2323	50/50	2.2323
964762	AG1-339 E	0.1941	50/50	0.1941
964771	AG1-340 C	2.1353	50/50	2.1353
964772	AG1-340 E	0.2912	50/50	0.2912
964911	AG1-355 C	7.4465	50/50	7.4465
964912	AG1-355 E	4.9643	50/50	4.9643
964921	AG1-356 C	5.8249	50/50	5.8249
964922	AG1-356 E	3.8832	50/50	3.8832
965303	AG1-395 BAT	0.4050	Merchant Transmission	0.4050

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965881	AG1-457 C	6.8850	50/50	6.8850
965882	AG1-457 E	4.5900	50/50	4.5900
966512	AG1-520 E	0.9511	50/50	0.9511
WEC	WEC	0.0378	Confirmed LTF	0.0378
LGEE	LGEE	0.0785	Confirmed LTF	0.0785
CPL	CPL	0.0935	Confirmed LTF	0.0935
CBM-W2	CBM-W2	1.1290	Confirmed LTF	1.1290
NY	NY	0.2101	Confirmed LTF	0.2101
TVA	TVA	0.1820	Confirmed LTF	0.1820
O-066	O-066	1.4537	Confirmed LTF	1.4537
SIGE	SIGE	0.0357	Confirmed LTF	0.0357
CBM-S2	CBM-S2	1.4198	Confirmed LTF	1.4198
CBM-S1	CBM-S1	0.0490	Confirmed LTF	0.0490
G-007	G-007	0.2195	Confirmed LTF	0.2195
MEC	MEC	0.1939	Confirmed LTF	0.1939
LAGN	LAGN	0.2240	Confirmed LTF	0.2240
CBM-W1	CBM-W1	1.5843	Confirmed LTF	1.5843

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
166590303	200744	26SOMERST	PENELEC	965880	AG1-457 TAP	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	106.58	107.03	DC	1.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.0404	50/50	0.0404
200835	26ARN_Z1-066	-4.1106	Adder	-4.84
200846	26FORWARD	0.1044	50/50	0.1044
200864	K-013 E	4.7966	50/50	4.7966
200888	26HIGHLAND	0.1443	50/50	0.1443
200889	26STNY CRK	0.3137	50/50	0.3137
200925	26R32	0.2262	50/50	0.2262
202225	26SCI_S29B	0.0808	50/50	0.0808
293603	O-018 E	5.8708	50/50	5.8708
294903	P-060 E	9.8259	50/50	9.8259
296332	R-032 E	6.7740	50/50	6.7740
917673	Z2-108 BAT	10.8810	50/50	10.8810
938352	AE1-053 BAT	6.0450	50/50	6.0450
938881	AE1-116	1.2798	50/50	1.2798
938993	AE1-128 C	12.5712	50/50	12.5712
938994	AE1-128 E	8.3808	50/50	8.3808
942361	AE2-249 C	1.4143	50/50	1.4143
942362	AE2-249 E	0.9428	50/50	0.9428
943301	AF1-001 C	-0.8054	Adder	-0.95
944751	AF1-140 C	1.1050	50/50	1.1050
944752	AF1-140 E	0.7367	50/50	0.7367
945671	AF1-232 C (Withdrawn : 01/19/2021)	26.1706	50/50	26.1706
945672	AF1-232 E (Withdrawn : 01/19/2021)	14.0918	50/50	14.0918
946571	AF1-321 C O1	2.5591	50/50	2.5591
946572	AF1-321 E O1	1.7061	50/50	1.7061
957001	AF2-001 C O1	2.5591	50/50	2.5591
957002	AF2-001 E O1	1.7061	50/50	1.7061
957011	AF2-002 C O1	1.2796	50/50	1.2796
957012	AF2-002 E O1	0.8530	50/50	0.8530
957981	AF2-092 C	1.1585	50/50	1.1585
957982	AF2-092 E	0.7723	50/50	0.7723
958101	AF2-104 C (Withdrawn : 12/08/2020)	0.6826	50/50	0.6826
958102	AF2-104 E (Withdrawn : 12/08/2020)	0.4551	50/50	0.4551
958472	AF2-141 BAT	12.0900	50/50	12.0900
959792	AF2-270 E	0.6497	50/50	0.6497
960451	AF2-336 C	1.9308	50/50	1.9308
960452	AF2-336 E	1.2872	50/50	1.2872

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960461	AF2-337 C	1.9308	50/50	1.9308
960462	AF2-337 E	1.2872	50/50	1.2872
960471	AF2-338 C	1.9308	50/50	1.9308
960472	AF2-338 E	1.2872	50/50	1.2872
960481	AF2-339 C	1.9308	50/50	1.9308
960482	AF2-339 E	1.2872	50/50	1.2872
960901	AF2-381 C	16.1695	50/50	16.1695
960902	AF2-381 E	8.5092	50/50	8.5092
961911	AG1-033 C	0.5102	50/50	0.5102
961912	AG1-033 E	0.2870	50/50	0.2870
961981	AG1-041 C	1.0866	50/50	1.0866
961982	AG1-041 E	0.7244	50/50	0.7244
962292	AG1-077 E	0.9841	50/50	0.9841
962641	AG1-113	1.0239	50/50	1.0239
962652	AG1-114 BAT	6.0450	50/50	6.0450
963541	AG1-203 C	1.5991	50/50	1.5991
963542	AG1-203 E	0.8611	50/50	0.8611
963881	AG1-241 C	1.0364	50/50	1.0364
963882	AG1-241 E	0.5581	50/50	0.5581
964191	AG1-280 C	0.4902	Adder	1.09
964192	AG1-280 E	0.3268	Adder	0.73
964201	AG1-281 C	0.4872	Adder	1.08
964202	AG1-281 E	0.3248	Adder	0.72
964751	AG1-338 C	0.5317	50/50	0.5317
964752	AG1-338 E	0.0725	50/50	0.0725
964761	AG1-339 C	0.5559	50/50	0.5559
964762	AG1-339 E	0.0483	50/50	0.0483
964771	AG1-340 C	0.5317	50/50	0.5317
964772	AG1-340 E	0.0725	50/50	0.0725
964911	AG1-355 C	6.5111	50/50	6.5111
964912	AG1-355 E	4.3407	50/50	4.3407
964921	AG1-356 C	5.5797	50/50	5.5797
964922	AG1-356 E	3.7198	50/50	3.7198
966512	AG1-520 E	0.8530	50/50	0.8530
G-007A	G-007A	1.0909	Confirmed LTF	1.0909
VFT	VFT	2.9993	Confirmed LTF	2.9993
CALDERWOOD	CALDERWOOD	0.1605	Confirmed LTF	0.1605
PRAIRIE	PRAIRIE	0.7594	Confirmed LTF	0.7594
CHEOAH	CHEOAH	0.1617	Confirmed LTF	0.1617
CBM-N	CBM-N	0.5844	Confirmed LTF	0.5844
COTTONWOOD	COTTONWOOD	0.6489	Confirmed LTF	0.6489
HAMLET	HAMLET	0.1981	Confirmed LTF	0.1981
GIBSON	GIBSON	0.1583	Confirmed LTF	0.1583
BLUEG	BLUEG	0.5086	Confirmed LTF	0.5086
TRIMBLE	TRIMBLE	0.1631	Confirmed LTF	0.1631
CATAWBA	CATAWBA	0.1186	Confirmed LTF	0.1186

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
166590282	200751	26HILLCLAY	PENELEC	200752	26HILLTOP	PENELEC	1	PN-P7-1-PN-230-001	tower	282.0	101.31	102.91	DC	4.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200813	26YOUUGH	0.2238	50/50	0.2238
200834	26SW_E13_K22	0.0596	50/50	0.0596
200835	26ARN_Z1-066	2.8370	50/50	2.8370
200840	26DEEPCRK1	0.1921	50/50	0.1921
200841	26DEEPCRK2	0.1940	50/50	0.1940
200846	26FORWARD	0.2356	50/50	0.2356
200864	K-013 E	10.8267	50/50	10.8267
200883	Q-053 E	7.3843	50/50	7.3843
200888	26HIGHLAND	0.7062	50/50	0.7062
200889	26STNY CRK	0.5401	50/50	0.5401
200890	26BF_G21_K23	0.2853	50/50	0.2853
200891	26CSLMN_L13	0.3301	50/50	0.3301
200892	26LOOKOUT	0.3525	50/50	0.3525
200915	26CHSTN_FL	0.1553	50/50	0.1553
200925	26R32	1.1072	50/50	1.1072
202225	26SCI_S29B	0.1193	50/50	0.1193
202652	26RGH_Y1-033	0.2157	50/50	0.2157
203915	26BF_Z2-108	6.3832	50/50	6.3832
292350	K-023	11.6670	50/50	11.6670
292542	L-013 1	11.3478	50/50	11.3478
293432	R-040 E	0.6383	50/50	0.6383
293603	O-018 E	28.7352	50/50	28.7352
293902	O-048 E	10.2131	50/50	10.2131
294903	P-060 E	16.9163	50/50	16.9163
296332	R-032 E	33.1560	50/50	33.1560
913142	Y1-033 E OP1	9.3014	50/50	9.3014
938351	AE1-053	3.5462	50/50	3.5462
938881	AE1-116	1.8896	50/50	1.8896
938993	AE1-128 C	27.5472	50/50	27.5472
938994	AE1-128 E	18.3648	50/50	18.3648
942361	AE2-249 C	3.0991	50/50	3.0991
942362	AE2-249 E	2.0660	50/50	2.0660
943711	AF1-039 C O1	2.4607	50/50	2.4607
943712	AF1-039 E O1	1.6405	50/50	1.6405
944751	AF1-140 C	3.0816	50/50	3.0816
944752	AF1-140 E	2.0544	50/50	2.0544
944781	AF1-143 C	21.2772	50/50	21.2772
944782	AF1-143 E	11.3478	50/50	11.3478
945671	AF1-232 C (Withdrawn : 01/19/2021)	42.5131	50/50	42.5131

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945672	AF1-232 E (Withdrawn : 01/19/2021)	22.8917	50/50	22.8917
946571	AF1-321 C O1	5.8045	50/50	5.8045
946572	AF1-321 E O1	3.8697	50/50	3.8697
957001	AF2-001 C O1	5.8045	50/50	5.8045
957002	AF2-001 E O1	3.8697	50/50	3.8697
957011	AF2-002 C O1	2.9023	50/50	2.9023
957012	AF2-002 E O1	1.9348	50/50	1.9348
957981	AF2-092 C	2.6466	50/50	2.6466
957982	AF2-092 E	1.7644	50/50	1.7644
958101	AF2-104 C (Withdrawn : 12/08/2020)	1.0078	50/50	1.0078
958102	AF2-104 E (Withdrawn : 12/08/2020)	0.6719	50/50	0.6719
958471	AF2-141	2.8370	50/50	2.8370
959792	AF2-270 E	1.4237	50/50	1.4237
960451	AF2-336 C	4.4111	50/50	4.4111
960452	AF2-336 E	2.9407	50/50	2.9407
960461	AF2-337 C	4.4111	50/50	4.4111
960462	AF2-337 E	2.9407	50/50	2.9407
960471	AF2-338 C	4.4111	50/50	4.4111
960472	AF2-338 E	2.9407	50/50	2.9407
960481	AF2-339 C	4.4111	50/50	4.4111
960482	AF2-339 E	2.9407	50/50	2.9407
960901	AF2-381 C	36.2244	50/50	36.2244
960902	AF2-381 E	19.0631	50/50	19.0631
961911	AG1-033 C	1.8864	50/50	1.8864
961912	AG1-033 E	1.0611	50/50	1.0611
961981	AG1-041 C	2.5680	50/50	2.5680
961982	AG1-041 E	1.7120	50/50	1.7120
962292	AG1-077 E	1.6275	50/50	1.6275
962641	AG1-113	1.5117	50/50	1.5117
962651	AG1-114	3.5462	50/50	3.5462
963541	AG1-203 C	2.6447	50/50	2.6447
963542	AG1-203 E	1.4240	50/50	1.4240
963561	AG1-205 C	2.3050	50/50	2.3050
963562	AG1-205 E	1.2412	50/50	1.2412
963881	AG1-241 C	3.8318	50/50	3.8318
963882	AG1-241 E	2.0633	50/50	2.0633
964191	AG1-280 C	2.7077	50/50	2.7077
964192	AG1-280 E	1.8051	50/50	1.8051
964201	AG1-281 C	2.6807	50/50	2.6807
964202	AG1-281 E	1.7871	50/50	1.7871
964751	AG1-338 C	1.4243	50/50	1.4243
964752	AG1-338 E	0.1942	50/50	0.1942
964761	AG1-339 C	1.4891	50/50	1.4891
964762	AG1-339 E	0.1295	50/50	0.1295
964771	AG1-340 C	1.4243	50/50	1.4243
964772	AG1-340 E	0.1942	50/50	0.1942
964911	AG1-355 C	16.4560	50/50	16.4560
964912	AG1-355 E	10.9706	50/50	10.9706
964921	AG1-356 C	8.8787	50/50	8.8787
964922	AG1-356 E	5.9191	50/50	5.9191

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
965881	AG1-457 C	12.2184	50/50	12.2184
965882	AG1-457 E	8.1456	50/50	8.1456
966512	AG1-520 E	1.9348	50/50	1.9348
WEC	WEC	0.0296	Confirmed LTF	0.0296
LGEE	LGEE	0.0647	Confirmed LTF	0.0647
CPL	CPL	0.1037	Confirmed LTF	0.1037
CBM-W2	CBM-W2	0.9856	Confirmed LTF	0.9856
NY	NY	0.1919	Confirmed LTF	0.1919
TVA	TVA	0.1666	Confirmed LTF	0.1666
O-066	O-066	1.1306	Confirmed LTF	1.1306
SIGE	SIGE	0.0284	Confirmed LTF	0.0284
CBM-S2	CBM-S2	1.5034	Confirmed LTF	1.5034
CBM-S1	CBM-S1	0.0441	Confirmed LTF	0.0441
G-007	G-007	0.1711	Confirmed LTF	0.1711
MEC	MEC	0.1589	Confirmed LTF	0.1589
LAGN	LAGN	0.2030	Confirmed LTF	0.2030
CBM-W1	CBM-W1	1.1637	Confirmed LTF	1.1637

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
166590270	965880	AG1-457 TAP	PENELEC	200746	26ROCKWOOD	PENELEC	1	PN-P7-1-PN-230-001	tower	179.0	106.58	107.03	DC	1.81

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200834	26SW_E13_K22	0.0404	50/50	0.0404
200835	26ARN_Z1-066	-4.1106	Adder	-4.84
200846	26FORWARD	0.1044	50/50	0.1044
200864	K-013 E	4.7966	50/50	4.7966
200888	26HIGHLAND	0.1443	50/50	0.1443
200889	26STNY CRK	0.3137	50/50	0.3137
200925	26R32	0.2262	50/50	0.2262
202225	26SCI_S29B	0.0808	50/50	0.0808
293603	O-018 E	5.8708	50/50	5.8708
294903	P-060 E	9.8259	50/50	9.8259
296332	R-032 E	6.7740	50/50	6.7740
917673	Z2-108 BAT	10.8810	50/50	10.8810
938352	AE1-053 BAT	6.0450	50/50	6.0450
938881	AE1-116	1.2798	50/50	1.2798
938993	AE1-128 C	12.5712	50/50	12.5712
938994	AE1-128 E	8.3808	50/50	8.3808
942361	AE2-249 C	1.4143	50/50	1.4143
942362	AE2-249 E	0.9428	50/50	0.9428
943301	AF1-001 C	-0.8054	Adder	-0.95
944751	AF1-140 C	1.1050	50/50	1.1050
944752	AF1-140 E	0.7367	50/50	0.7367
945671	AF1-232 C (Withdrawn : 01/19/2021)	26.1706	50/50	26.1706
945672	AF1-232 E (Withdrawn : 01/19/2021)	14.0918	50/50	14.0918
946571	AF1-321 C O1	2.5591	50/50	2.5591
946572	AF1-321 E O1	1.7061	50/50	1.7061
957001	AF2-001 C O1	2.5591	50/50	2.5591
957002	AF2-001 E O1	1.7061	50/50	1.7061
957011	AF2-002 C O1	1.2796	50/50	1.2796
957012	AF2-002 E O1	0.8530	50/50	0.8530
957981	AF2-092 C	1.1585	50/50	1.1585
957982	AF2-092 E	0.7723	50/50	0.7723
958101	AF2-104 C (Withdrawn : 12/08/2020)	0.6826	50/50	0.6826
958102	AF2-104 E (Withdrawn : 12/08/2020)	0.4551	50/50	0.4551
958472	AF2-141 BAT	12.0900	50/50	12.0900
959792	AF2-270 E	0.6497	50/50	0.6497
960451	AF2-336 C	1.9308	50/50	1.9308
960452	AF2-336 E	1.2872	50/50	1.2872

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960461	AF2-337 C	1.9308	50/50	1.9308
960462	AF2-337 E	1.2872	50/50	1.2872
960471	AF2-338 C	1.9308	50/50	1.9308
960472	AF2-338 E	1.2872	50/50	1.2872
960481	AF2-339 C	1.9308	50/50	1.9308
960482	AF2-339 E	1.2872	50/50	1.2872
960901	AF2-381 C	16.1695	50/50	16.1695
960902	AF2-381 E	8.5092	50/50	8.5092
961911	AG1-033 C	0.5102	50/50	0.5102
961912	AG1-033 E	0.2870	50/50	0.2870
961981	AG1-041 C	1.0866	50/50	1.0866
961982	AG1-041 E	0.7244	50/50	0.7244
962292	AG1-077 E	0.9841	50/50	0.9841
962641	AG1-113	1.0239	50/50	1.0239
962652	AG1-114 BAT	6.0450	50/50	6.0450
963541	AG1-203 C	1.5991	50/50	1.5991
963542	AG1-203 E	0.8611	50/50	0.8611
963881	AG1-241 C	1.0364	50/50	1.0364
963882	AG1-241 E	0.5581	50/50	0.5581
964191	AG1-280 C	0.4902	Adder	1.09
964192	AG1-280 E	0.3268	Adder	0.73
964201	AG1-281 C	0.4872	Adder	1.08
964202	AG1-281 E	0.3248	Adder	0.72
964751	AG1-338 C	0.5317	50/50	0.5317
964752	AG1-338 E	0.0725	50/50	0.0725
964761	AG1-339 C	0.5559	50/50	0.5559
964762	AG1-339 E	0.0483	50/50	0.0483
964771	AG1-340 C	0.5317	50/50	0.5317
964772	AG1-340 E	0.0725	50/50	0.0725
964911	AG1-355 C	6.5111	50/50	6.5111
964912	AG1-355 E	4.3407	50/50	4.3407
964921	AG1-356 C	5.5797	50/50	5.5797
964922	AG1-356 E	3.7198	50/50	3.7198
965881	AG1-457 C	11.5746	50/50	11.5746
965882	AG1-457 E	7.7164	50/50	7.7164
966512	AG1-520 E	0.8530	50/50	0.8530
G-007A	G-007A	1.0909	Confirmed LTF	1.0909
VFT	VFT	2.9993	Confirmed LTF	2.9993
CALDERWOOD	CALDERWOOD	0.1605	Confirmed LTF	0.1605
PRAIRIE	PRAIRIE	0.7594	Confirmed LTF	0.7594
CHEOAH	CHEOAH	0.1617	Confirmed LTF	0.1617
CBM-N	CBM-N	0.5844	Confirmed LTF	0.5844
COTTONWOOD	COTTONWOOD	0.6489	Confirmed LTF	0.6489
HAMLET	HAMLET	0.1981	Confirmed LTF	0.1981
GIBSON	GIBSON	0.1583	Confirmed LTF	0.1583
BLUEG	BLUEG	0.5086	Confirmed LTF	0.5086
TRIMBLE	TRIMBLE	0.1631	Confirmed LTF	0.1631
CATAWBA	CATAWBA	0.1186	Confirmed LTF	0.1186

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
AE1-053	Meyersdale North	Active
AE1-116	Somerset Windpower 23 kV	Active
AE1-128	Bedford North-Wills Mountain 115 kV	Active
AE2-131	Philipsburg-Karthus 34.5	Suspended
AE2-249	Bedford North-Pennsylvania Hollow 23 kV	Engineering and Procurement
AF1-001	Thayerville 34.5 kV	Engineering and Procurement
AF1-039	Listonburg-Highpoint 24.9 kV	Active
AF1-140	Claysburg 23 kV	Engineering and Procurement
AF1-143	Lick Run 115 kV	Active
AF1-232	Allegheny-Somerset 115 kV	Withdrawn
AF1-321	Hooversville 115 kV I	Active
AF2-001	Hooversville 115 kV II	Active
AF2-002	Hooversville 115 kV III	Active
AF2-045	Cambria Nug 115 kV	Engineering and Procurement
AF2-087	East Altoona-Pinecroft 12.47 kV	Suspended
AF2-092	Snake Spring-Bedford Area 23 kV	Active
AF2-104	Somerset 23 kV	Withdrawn
AF2-141	Lick Run 115 kV	Active
AF2-270	Bedford South RCB-Bedford Area 23 kV	Engineering and Procurement
AF2-271	Pemberton-Sinking Valley 12.47 kV	Engineering and Procurement
AF2-336	Snake Spring 115 kV I	Active
AF2-337	Snake Spring 115 kV II	Active
AF2-338	Snake Spring 115 kV III	Active
AF2-339	Snake Spring 115 kV IV	Active
AF2-381	Bedford North-Central City West 115 kV	Active
AG1-033	Scalp Level 23 kV	Active
AG1-041	Osterburg-Bedford North 23 kV	Active
AG1-077	Allegheny Tunnel 23 kV	Active
AG1-113	Somerset Windpower 22.86 kV	Active
AG1-114	Meyersdale North 115 kV	Active
AG1-203	Reels Corner 23 kV	Active
AG1-205	Rockwood 23 kV	Active
AG1-241	Scalp Level 23 kV	Active
AG1-280	Claysburg-Puzzletown 46 kV	Active
AG1-281	Claysburg-HCR Tap 46 kV	Active
AG1-338	Curryville-RKB-Yellow Creek 23 kV I	Active
AG1-339	Curryville-RKB-Yellow Creek 23 kV II	Active
AG1-340	Curryville 23 kV	Active
AG1-355	Scalp Level-Hooversville 115 kV	Active
AG1-356	Somerset-Allegheny 115 kV	Active
AG1-395	Philipsburg-Karthus 34.5 kV 2	Active
AG1-457	Somerset-Rockwood 115 kV	Active
AG1-520	Hooversville-Rockingham 23 kV	Active

Queue Number	Project Name	Status
Y1-033	Penn Mar-Rock Wood 115kV	In Service
Z1-066	Arnold 34.5kV	In Service
Z2-108	Meyersdale North 115kV	In Service

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
Base Case	
PN-P7-1-PN-230-001	CONTINGENCY 'PN-P7-1-PN-230-001' /* HOMER CITY - HOOVERSVILLE 230KV & SEWARD - TOWER 51 115KV DISCONNECT BRANCH FROM BUS 200767 TO BUS 200768 CKT 1 /* 26HOMER CT 230 26QUEMAHON 230 DISCONNECT BRANCH FROM BUS 200768 TO BUS 200796 CKT 1 /* 26QUEMAHON 230 26HOOVRSVL 230 DISCONNECT BRANCH FROM BUS 200796 TO BUS 200743 CKT 3 /* 26HOOVRSVL 230 26HOOVERSV 115 DISCONNECT BRANCH FROM BUS 200741 TO BUS 200742 CKT 1 /* 26SEWARD 115 26TOWER 51 115 END
PN-P1-2-PN-115-074-A	CONTINGENCY 'PN-P1-2-PN-115-074-A' /* ALLEGHENY - SOMERSET 115KV DISCONNECT BRANCH FROM BUS 200744 TO BUS 202637 CKT 1 /* 26SOMERST 115 26PRIDE 115 DISCONNECT BRANCH FROM BUS 202637 TO BUS 964920 CKT 1 /* 26PRIDE 115 AG1- 356 TAP 115 END
PN-P1-2-PN-115-082	CONTINGENCY 'PN-P1-2-PN-115-082' /* HILLTOP - KRAYN - RACHEL HILL 115KV DISCONNECT BRANCH FROM BUS 200878 TO BUS 200790 CKT 1 /* 26KRAYN 115 26SALIX 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200751 CKT 1 /* 26SALIX 115 26HILLCLAY 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200752 CKT 1 /* 26HILLCLAY 115 26HILLTOP 115 DISCONNECT BRANCH FROM BUS 200751 TO BUS 200749 CKT 1 /* 26HILLCLAY 115 26RACHEL H 115 DISCONNECT BRANCH FROM BUS 200790 TO BUS 200785 CKT 1 /* 26SALIX 115 26SALIX 23 DISCONNECT BRANCH FROM BUS 200749 TO BUS 200784 CKT 1 /* 26RACHEL H 115 26RACHEL#1 23 DISCONNECT BUS 200790 /* 26SALIX 115 DISCONNECT BUS 200751 /* 26HILLCLAY 115 END

12 Short Circuit Analysis

The following Breakers are overdutied:

None

13 Affected Systems

13.1 NYISO

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

13.2 MISO

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

14 Attachment 1: One Line Diagram