



# **Generation Interconnection**

## **Feasibility Study Report**

**for**

## **Queue Project AG1-338**

**CURRYVILLE-RKB-YELLOW CREEK 23 KV I**

**4.4 MW Capacity / 5 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; Storage generating facility located in Bedford County, Pennsylvania. The installed facilities will have a total capability of 5 MW with 4.4 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is June 30, 2023. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AG1-338</b>
<b>Project Name</b>	CURRYVILLE-RKB-YELLOW CREEK 23 KV I
<b>State</b>	Pennsylvania
<b>County</b>	Bedford
<b>Transmission Owner</b>	PENELEC (MAIT)
<b>MFO</b>	5
<b>MWE</b>	5
<b>MWC</b>	4.4
<b>Fuel</b>	Solar; Storage
<b>Basecase Study Year</b>	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

### 4.1 Primary Point of Interconnection

AG1-338 (Curryville-RKB-Yellow Creek 23kV I) will interconnect with the PENELEC distribution system at POI pole 3-3896371, which is located on the 22.86kV Yellow Creek feeder at the Curryville substation.

Attachment 1 shows a one-line diagram of the proposed primary direct connection facilities for the AG1-338 generation project to connect to the Penelec distribution system. IC will be responsible for constructing all of the facilities on its side of the POI, including the attachment facilities which connect the generator to the Penelec distribution system's direct connection facilities.

### 4.2 Secondary Point of Interconnection

There is no secondary point of interconnection specified for AG1-338.

## 5 Cost Summary

The AG1-338 project will be responsible for the following costs:

Description	Total Cost
<b>Total Physical Interconnection Costs</b>	\$142,100
<b>Total System Network Upgrade Costs</b>	\$5,100,000 <sup>1</sup>
<b>Total Costs</b>	\$5,242,100

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.

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<sup>1</sup> 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 total physical interconnection costs is given in the table below:

Description	Total Cost
Tap the existing 22.86kV Yellow Creek ckt#00633-71 @ Curryville at POI pole 3-3896371 and install a SCADA controlled 22.86kV recloser to interconnect queue project AG1-338. Install 22.86kV metering in customer's facilities. The customer is responsible to build their own line from their site to Penelec's existing facilities	\$102,500.00
NPs & Cust Dwg Review @ AG1-338	\$ 25,200.00
Curryville 22.86kV SS. Adjust Remote Relay and Metering Settings.	\$ 14,400.00
<b>Total Physical Interconnection Costs</b>	<b>\$142,100.00</b>

## 7 Schedule

Based on the scope of work for the Attachment Facilities and the Direct and/or Non-Direct Connection facilities, it is expected to take a minimum of **18 months** after the signing of an Interconnection Construction Service Agreement to complete the installation. This includes the requirement for the IC to make a preliminary payment that compensates FE for the engineering design work that is related to the construction. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined direct connection and network upgrades, and that all transmission system outages will be allowed when requested.

If the customer is ultimately responsible for network upgrades, then the schedule for those upgrades will be refined in future study phases. The customer would need to wait for those upgrades to be completed prior to commercial operation unless determined deliverable by an interim deliverability study. The elapsed time to complete any network upgrades is provided in the System Reinforcements table of this report.

## 8 Transmission Owner Analysis

Penelec performed an analysis of its distribution system. The AG1-338 project did not contribute to any overloads on the distribution system.

## 9 Interconnection Customer Requirements

### 9.1 System Protection

Proposed single line diagrams show the developer constructing a generation facility (Curryville-RKB-Yellow Creek 23kV I AG1-338) tapping Penelec's 22.86kV Yellow Creek ckt#00633-71 @ Curryville at pole 3-3896371.

The 22.86kV 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.

### 9.2 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 a 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.

### 9.3 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 'resynchronizing 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.

### 9.4 Compliance Issues

The Developer 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/storage 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 Developer 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/meter<sup>2</sup>) - (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 AG1-338 was evaluated as a 5.0 MW (Capacity 4.4 MW) injection at the Curryville 23 kV substation in the PENELEC area. Project AG1-338 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-338 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	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
165994085	202637	26PRIDE	115.0	PENELEC	200744	26SOMERS T	115.0	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	151.72	152.92	DC	1.92
165994107	945670	AF1-232 TAP	115.0	PENELEC	964920	AG1-356 TAP	115.0	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	154.47	155.67	DC	1.92
165994075	964920	AG1-356 TAP	115.0	PENELEC	202637	26PRIDE	115.0	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	154.47	155.67	DC	1.92

### 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 IMPACT
166228108	200501	26BDFORD N	115.0	PENELEC	200523	26SNAKE SP	115.0	PENELEC	1	PN-P1-2-PN-115-080	operation	152.0	99.62	100.28	DC	1.0

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 IMPACT
166228060	200505	26CLYSBURG	115.0	PENELEC	200525	26SUMMIT	115.0	PENELEC	1	PN-P1-2-PN-115-082	operation	252.0	105.77	106.91	DC	2.88

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

ID	Idx	Facility	Upgrade Description	Cost
165994085	1	26PRIDE 115.0 kV - 26SOMERST 115.0 kV Ckt 1	<p><u>PENELEC</u> No violation, incorrect contingency.</p> <p>Note: It should be noted that some of the contingencies taken in the analysis may not be valid due to system condition changes that were not captured in the model. This will be re-evaluated for validity in the System Impact phase.</p>	\$0
165994075	3	AG1-356 TAP 115.0 kV - 26PRIDE 115.0 kV Ckt 1	<p><u>PENELEC</u> PN-AG1-F-0036B : Reconductor 2.1 miles of line. Project Type : Cost : \$5,100,000 Time Estimate : 30 Months</p>	\$5,100,000
165994107	2	AF1-232 TAP 115.0 kV - AG1-356 TAP 115.0 kV Ckt 1	<p><u>PENELEC</u> No violation, incorrect contingency.</p> <p>Note: It should be noted that some of the contingencies taken in the analysis may not be valid due to system condition changes that were not captured in the model. This will be re-evaluated for validity in the System Impact phase.</p>	\$0
			<b>TOTAL COST</b>	<b>\$5,100,000</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
165994085	202637	26PRIDE	PENELEC	200744	26SOMERST	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	151.72	152.92	DC	1.92

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200835	26ARN_Z1-066	-0.5118	Adder	-0.6
200864	K-013 E	1.4859	Adder	1.75
200889	26STNY CRK	0.8974	50/50	0.8974
294903	P-060 E	28.1064	50/50	28.1064
917673	Z2-108 BAT	1.3547	Merchant Transmission	1.3547
938352	AE1-053 BAT	0.7526	Merchant Transmission	0.7526
938993	AE1-128 C	27.7142	50/50	27.7142
938994	AE1-128 E	18.4762	50/50	18.4762
942361	AE2-249 C	3.1179	50/50	3.1179
942362	AE2-249 E	2.0786	50/50	2.0786
945671	AF1-232 C (Withdrawn : 01/19/2021)	78.4108	50/50	78.4108
945672	AF1-232 E (Withdrawn : 01/19/2021)	42.2212	50/50	42.2212
957981	AF2-092 C	2.7714	50/50	2.7714
957982	AF2-092 E	1.8476	50/50	1.8476
958472	AF2-141 BAT	1.5052	Merchant Transmission	1.5052
959792	AF2-270 E	1.4323	50/50	1.4323
960451	AF2-336 C	4.6190	50/50	4.6190
960452	AF2-336 E	3.0794	50/50	3.0794
960461	AF2-337 C	4.6190	50/50	4.6190
960462	AF2-337 E	3.0794	50/50	3.0794
960471	AF2-338 C	4.6190	50/50	4.6190
960472	AF2-338 E	3.0794	50/50	3.0794
960481	AF2-339 C	4.6190	50/50	4.6190
960482	AF2-339 E	3.0794	50/50	3.0794
960901	AF2-381 C	13.5225	50/50	13.5225
960902	AF2-381 E	7.1162	50/50	7.1162
962292	AG1-077 E	2.9082	50/50	2.9082
962642	AG1-113 BAT	0.4249	Merchant Transmission	0.4249
962652	AG1-114 BAT	0.3989	Merchant Transmission	0.3989
963541	AG1-203 C	4.7258	50/50	4.7258
963542	AG1-203 E	2.5446	50/50	2.5446
964751	AG1-338 C	1.6936	50/50	1.6936
964752	AG1-338 E	0.2310	50/50	0.2310
964761	AG1-339 C	1.7706	50/50	1.7706
964762	AG1-339 E	0.1540	50/50	0.1540
964771	AG1-340 C	1.6936	50/50	1.6936
964772	AG1-340 E	0.2310	50/50	0.2310
964921	AG1-356 C	16.9759	50/50	16.9759
964922	AG1-356 E	11.3172	50/50	11.3172

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>G-007A</b>	G-007A	0.1151	Confirmed LTF	0.1151
<b>VFT</b>	VFT	0.3161	Confirmed LTF	0.3161
<b>CALDERWOOD</b>	CALDERWOOD	0.0204	Confirmed LTF	0.0204
<b>PRAIRIE</b>	PRAIRIE	0.0956	Confirmed LTF	0.0956
<b>CHEOAH</b>	CHEOAH	0.0205	Confirmed LTF	0.0205
<b>CBM-N</b>	CBM-N	0.0624	Confirmed LTF	0.0624
<b>COTTONWOOD</b>	COTTONWOOD	0.0819	Confirmed LTF	0.0819
<b>HAMLET</b>	HAMLET	0.0254	Confirmed LTF	0.0254
<b>GIBSON</b>	GIBSON	0.0202	Confirmed LTF	0.0202
<b>BLUEG</b>	BLUEG	0.0642	Confirmed LTF	0.0642
<b>TRIMBLE</b>	TRIMBLE	0.0206	Confirmed LTF	0.0206
<b>CATAWBA</b>	CATAWBA	0.0154	Confirmed LTF	0.0154

## 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
165994107	945670	AF1-232 TAP	PENELEC	964920	AG1-356 TAP	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	154.47	155.67	DC	1.92

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200835	26ARN_Z1-066	-0.5118	Adder	-0.6
200864	K-013 E	1.4859	Adder	1.75
200889	26STNY CRK	0.8974	50/50	0.8974
294903	P-060 E	28.1064	50/50	28.1064
917673	Z2-108 BAT	1.3547	Merchant Transmission	1.3547
938352	AE1-053 BAT	0.7526	Merchant Transmission	0.7526
938993	AE1-128 C	27.7142	50/50	27.7142
938994	AE1-128 E	18.4762	50/50	18.4762
942361	AE2-249 C	3.1179	50/50	3.1179
942362	AE2-249 E	2.0786	50/50	2.0786
945671	AF1-232 C (Withdrawn : 01/19/2021)	78.4108	50/50	78.4108
945672	AF1-232 E (Withdrawn : 01/19/2021)	42.2212	50/50	42.2212
957981	AF2-092 C	2.7714	50/50	2.7714
957982	AF2-092 E	1.8476	50/50	1.8476
958472	AF2-141 BAT	1.5052	Merchant Transmission	1.5052
959792	AF2-270 E	1.4323	50/50	1.4323
960451	AF2-336 C	4.6190	50/50	4.6190
960452	AF2-336 E	3.0794	50/50	3.0794
960461	AF2-337 C	4.6190	50/50	4.6190
960462	AF2-337 E	3.0794	50/50	3.0794
960471	AF2-338 C	4.6190	50/50	4.6190
960472	AF2-338 E	3.0794	50/50	3.0794
960481	AF2-339 C	4.6190	50/50	4.6190
960482	AF2-339 E	3.0794	50/50	3.0794
960901	AF2-381 C	13.5225	50/50	13.5225
960902	AF2-381 E	7.1162	50/50	7.1162
962292	AG1-077 E	2.9082	50/50	2.9082
962642	AG1-113 BAT	0.4249	Merchant Transmission	0.4249
962652	AG1-114 BAT	0.3989	Merchant Transmission	0.3989
963541	AG1-203 C	4.7258	50/50	4.7258
963542	AG1-203 E	2.5446	50/50	2.5446
964751	AG1-338 C	1.6936	50/50	1.6936
964752	AG1-338 E	0.2310	50/50	0.2310
964761	AG1-339 C	1.7706	50/50	1.7706
964762	AG1-339 E	0.1540	50/50	0.1540
964771	AG1-340 C	1.6936	50/50	1.6936
964772	AG1-340 E	0.2310	50/50	0.2310
G-007A	G-007A	0.1151	Confirmed LTF	0.1151
VFT	VFT	0.3161	Confirmed LTF	0.3161
CALDERWOOD	CALDERWOOD	0.0204	Confirmed LTF	0.0204

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>PRAIRIE</b>	PRAIRIE	0.0956	Confirmed LTF	0.0956
<b>CHEOAH</b>	CHEOAH	0.0205	Confirmed LTF	0.0205
<b>CBM-N</b>	CBM-N	0.0624	Confirmed LTF	0.0624
<b>COTTONWOOD</b>	COTTONWOOD	0.0819	Confirmed LTF	0.0819
<b>HAMLET</b>	HAMLET	0.0254	Confirmed LTF	0.0254
<b>GIBSON</b>	GIBSON	0.0202	Confirmed LTF	0.0202
<b>BLUEG</b>	BLUEG	0.0642	Confirmed LTF	0.0642
<b>TRIMBLE</b>	TRIMBLE	0.0206	Confirmed LTF	0.0206
<b>CATAWBA</b>	CATAWBA	0.0154	Confirmed LTF	0.0154

### 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
165994075	964920	AG1-356 TAP	PENELEC	202637	26PRIDE	PENELEC	1	PN-P2-3-PN-115-11A	breaker	160.0	154.47	155.67	DC	1.92

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
200835	26ARN_Z1-066	-0.5118	Adder	-0.6
200864	K-013 E	1.4859	Adder	1.75
200889	26STNY CRK	0.8974	50/50	0.8974
294903	P-060 E	28.1064	50/50	28.1064
917673	Z2-108 BAT	1.3547	Merchant Transmission	1.3547
938352	AE1-053 BAT	0.7526	Merchant Transmission	0.7526
938993	AE1-128 C	27.7142	50/50	27.7142
938994	AE1-128 E	18.4762	50/50	18.4762
942361	AE2-249 C	3.1179	50/50	3.1179
942362	AE2-249 E	2.0786	50/50	2.0786
945671	AF1-232 C (Withdrawn : 01/19/2021)	78.4108	50/50	78.4108
945672	AF1-232 E (Withdrawn : 01/19/2021)	42.2212	50/50	42.2212
957981	AF2-092 C	2.7714	50/50	2.7714
957982	AF2-092 E	1.8476	50/50	1.8476
958472	AF2-141 BAT	1.5052	Merchant Transmission	1.5052
959792	AF2-270 E	1.4323	50/50	1.4323
960451	AF2-336 C	4.6190	50/50	4.6190
960452	AF2-336 E	3.0794	50/50	3.0794
960461	AF2-337 C	4.6190	50/50	4.6190
960462	AF2-337 E	3.0794	50/50	3.0794
960471	AF2-338 C	4.6190	50/50	4.6190
960472	AF2-338 E	3.0794	50/50	3.0794
960481	AF2-339 C	4.6190	50/50	4.6190
960482	AF2-339 E	3.0794	50/50	3.0794
960901	AF2-381 C	13.5225	50/50	13.5225
960902	AF2-381 E	7.1162	50/50	7.1162
962292	AG1-077 E	2.9082	50/50	2.9082
962642	AG1-113 BAT	0.4249	Merchant Transmission	0.4249
962652	AG1-114 BAT	0.3989	Merchant Transmission	0.3989
963541	AG1-203 C	4.7258	50/50	4.7258
963542	AG1-203 E	2.5446	50/50	2.5446
964751	AG1-338 C	1.6936	50/50	1.6936
964752	AG1-338 E	0.2310	50/50	0.2310
964761	AG1-339 C	1.7706	50/50	1.7706
964762	AG1-339 E	0.1540	50/50	0.1540
964771	AG1-340 C	1.6936	50/50	1.6936
964772	AG1-340 E	0.2310	50/50	0.2310
964921	AG1-356 C	16.9759	50/50	16.9759
964922	AG1-356 E	11.3172	50/50	11.3172
G-007A	G-007A	0.1151	Confirmed LTF	0.1151

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>VFT</b>	VFT	0.3161	Confirmed LTF	0.3161
<b>CALDERWOOD</b>	CALDERWOOD	0.0204	Confirmed LTF	0.0204
<b>PRAIRIE</b>	PRAIRIE	0.0956	Confirmed LTF	0.0956
<b>CHEOAH</b>	CHEOAH	0.0205	Confirmed LTF	0.0205
<b>CBM-N</b>	CBM-N	0.0624	Confirmed LTF	0.0624
<b>COTTONWOOD</b>	COTTONWOOD	0.0819	Confirmed LTF	0.0819
<b>HAMLET</b>	HAMLET	0.0254	Confirmed LTF	0.0254
<b>GIBSON</b>	GIBSON	0.0202	Confirmed LTF	0.0202
<b>BLUEG</b>	BLUEG	0.0642	Confirmed LTF	0.0642
<b>TRIMBLE</b>	TRIMBLE	0.0206	Confirmed LTF	0.0206
<b>CATAWBA</b>	CATAWBA	0.0154	Confirmed LTF	0.0154

## 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
AE1-128	Bedford North-Wills Mounain 115 kV	Active
AE2-249	Bedford North-Pennsylvania Hollow 23 kV	Engineering and Procurement
AF1-232	Allegheny-Somerset 115 kV	Withdrawn
AF2-092	Snake Spring-Bedford Area 23 kV	Active
AF2-141	Lick Run 115 kV	Active
AF2-270	Bedford South RCB-Bedford Area 23 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
AG1-077	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
AG1-338	Curryville-RKB-Yellow Creek 23 kV I	Active
AG1-339	Curryville-RKB-Yellow Creek 23 kV II	Active
AG1-340	Curryville 23 kV	Active
AG1-356	Somerset-Allegheny 115 kV	Active
Z1-066	Arnold 34.5kV	In Service
Z2-108	Meyersdale North 115kV	In Service

## 11.8 Contingency Descriptions

Contingency Name	Contingency Definition
<p><b>PN-P1-2-PN-115-082</b></p>	<p>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</p>
<p><b>PN-P2-3-PN-115-11A</b></p>	<p>CONTINGENCY 'PN-P2-3-PN-115-11A' /* CLAYSBURG 115KV SB            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200525 CKT 1 /* 26CLYSBURG 115            26SUMMIT 115            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200878 CKT 1 /* 26CLYSBURG 115            26KRAYN 115            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200516 CKT 1 /* 26CLYSBURG 115            26OSTRBURG 115            DISCONNECT BRANCH FROM BUS 200516 TO BUS 200564 CKT 1 /* 26OSTRBURG 115            26OSTRE SB 23            DISCONNECT BRANCH FROM BUS 200501 TO BUS 200516 CKT 1 /* 26BDFORD N 115            26OSTRBURG 115            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200506 CKT 1 /* 26CLYSBURG 115            26CURYVILE 115            DISCONNECT BRANCH FROM BUS 200506 TO BUS 200521 CKT 1 /* 26CURYVILE 115            26SAXTON 115            DISCONNECT BRANCH FROM BUS 200506 TO BUS 200552 CKT 1 /* 26CURYVILE 115            26CURY SUB 23            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200541 CKT 2 /* 26CLYSBURG 115            26CLAYSBRG 46            DISCONNECT BRANCH FROM BUS 200505 TO BUS 200551 CKT 1 /* 26CLYSBURG 115            26CLAY SUB 23            END</p>

Contingency Name	Contingency Definition
<b>PN-P1-2-PN-115-080</b>	CONTINGENCY 'PN-P1-2-PN-115-080' /* BEDFORD NORTH - CLAYSBURG 115KV DISCONNECT BRANCH FROM BUS 200505 TO BUS 200516 CKT 1 /* 26CLYSBURG 115 26OSTRBURG 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200501 CKT 1 /* 26OSTRBURG 115 26BDFORD N 115 DISCONNECT BRANCH FROM BUS 200516 TO BUS 200564 CKT 1 /* 26OSTRBURG 115 26OSTRE SB 23 DISCONNECT BUS 200516 /* 26OSTRBURG 115 END

## **12 Short Circuit Analysis**

The following Breakers are overdutied:

None.

### **12.1 System Reinforcements - Short Circuit**

None.

## 13 Affected Systems

### 13.1 NYISO

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

## 14 Attachment 1: One Line Diagram