Generation Interconnection

Feasibility Study Report

for

Queue Project AF2-117

WARFORDSBURG-MCCONNELLSBURG 138 KV

46.67 MW Capacity / 70 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 APS.

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 Fulton County, Pennsylvania. The installed facilities will have a total capability of 70 MW with 46.67 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is September 01, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-117
Project Name	WARFORDSBURG-MCCONNELLSBURG 138 KV
State	Pennsylvania
County	Fulton
Transmission Owner	APS
MFO	70
MWE	70
MWC	46.67
Fuel	Solar
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

AF2-117 will interconnect with the APS transmission system. The interconnection of the project at the Primary POI will be accomplished by constructing a new 138 kV three (3) breaker ring bus substation and looping the McConnellsburg - Warfordsburg 138 kV line into the new station. The new substation will be located approximately 5.1 miles from McConnellsburg Substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated facilities. The IC will also be responsible for the rough grade of the property and an access road to the proposed three-breaker ring bus site. The project will also require Non-Direct Connection upgrades at McConnellsburg Substation and Cherry Run Substation.

Attachment 1 shows a one-line diagram of the proposed primary Direct Connection facilities for the AF2-117 generation project to connect to the FirstEnergy ("FE") Transmission System. The IC will be responsible for constructing the facilities on its side of the POI, including the Attachment Facilities which connect the generator to the FE Transmission System's Direct Connection facilities.

5 Cost Summary

The AF2-117 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$7,640,000
Total System Network Upgrade Costs	$0
Total Costs	$7,640,000

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.

6 Transmission Owner Scope of Work

AF2-117 will interconnect with the APS transmission system. The interconnection of the project at the Primary POI will be accomplished by constructing a new 138 kV three (3) breaker ring bus substation and looping the McConnellsburg - Warfordsburg 138 kV line into the new station. The new substation will be located approximately 5.1 miles from McConnellsburg Substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated facilities.

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

Description	**Total Cost**
Install disconnect switch, dead-end structure, and associated facilities for generator lead line exit at interconnection substation.	$295,000
Construct 138 kV three breaker ring bus interconnection substation.	$5,575,000
Loop the McConnellsburg - Warfordsburg 138 kV line into the new substation.	$850,000
Upgrade relaying at McConnellsburg.	$460,000
Upgrade relaying at Cherry Run.	$460,000
Total Physical Interconnection Costs	$7,640,000

7 Schedule

Based on the scope of work for the interconnection facilities, it is expected to take a minimum of 24 months after the signing of an Interconnection Construction Service Agreement and construction kickoff call to complete the installation. 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

FE performed an analysis of its underlying transmission <100 kV system. The AF2-117 project did not contribute to any overloads on the <100 kV FE Transmission System.

9 Interconnection Customer Requirements

9.1 System Protection

The IC must design it's Customer Facilities in accordance with all applicable standards, including the standards in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx.

Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

9.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated 138 kV circuit breaker to protect the AF2-117 generator lead line. A single circuit breaker must be used to protect this line; if the project has several GSU transformers, the individual GSU transformer breakers cannot be used to protect this line.
2. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.
3. The purchase and installation of supervisory control and data acquisition ("SCADA") equipment to provide information in a compatible format to the FE Transmission System Control Center.

4. Compliance with the FE and PJM generator power factor and voltage control requirements.
5. The execution of a back-up service agreement to serve the customer load supplied from the AF2-117 generation project metering point when the units are out-of-service. This assumes the intent of the IC is to net the generation with the load.

The IC will also be required to meet all PJM, ReliabilityFirst, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

9.3 Power Factor Requirements

The IC shall design its solar Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the FE transmission system.

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)
- Irradiance (Watts/meter^2)
- 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/

The IC will be required to comply with all FE revenue metering requirements for generation interconnection customers which can be found in FE's "Requirements for Transmission Connected Facilities" document located at: http://www.pjm.com/planning/design-engineering/to-tech-standards/private-firstenergy.aspx

11 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AF2-117 was evaluated as a 70.0 MW (Capacity 46.7 MW) injection tapping the Warfordsburg to McConnellsburg 138 kV line in the APS area. Project AF2-117 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-117 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)

None

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	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
10053801 6	23518 9	01GUILFD	138. 0	AP	23518 7	01GRANDP	138. 0	AP	1	AP-P1-2-WP-138-109	operatio n	228.0	113.43	124.88	DC	26.09
10053806 4	23528 5	01TEX E6	138. 0	AP	23518 9	01GUILFD	138. 0	AP	1	AP-P1-2-WP-138-112	operatio n	332.0	88.96	107.78	DC	62.48
10053799 6	23545 3	01CHERY R	138. 0	AP	23551 7	01HARMN Y	138. 0	AP	1	AP-P1-3-WP-138-056	operatio n	229.0	123.72	142.25	DC	42.43
10053809 6	93875 0	AE1-101 TAP	138. 0	AP	23528 5	01TEX E6	138. 0	AP	1	AP-P1-2-WP-138-112	operatio n	343.0	86.11	104.33	DC	62.48

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
			TOTAL COST	**$0**

11.6 Flow Gate Details - Primary POI

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".

None

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.

None

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
AP-P1-3-WP-138-056	CONTINGENCY 'AP-P1-3-WP-138-056' /* GUILFORD #1 138/34.5KV AND #2 138/69KV XFMR DISCONNECT BRANCH FROM BUS 235189 TO BUS 237333 CKT 2 /* 01GUILFD 138 01GUILFORD 69 DISCONNECT BRANCH FROM BUS 235189 TO BUS 237421 CKT 1 /* 01GUILFD 138 01GUILFORD 35 DISCONNECT BRANCH FROM BUS 235189 TO BUS 237010 CKT ZB /* 01GUILFD 138 01GUILFD CAP138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235725 CKT 1 /* 01GUILFD 138 01GLFNUG 138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235285 CKT 1 /* 01GUILFD 138 01TEX E6 138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235136 CKT 1 /* 01GUILFD 138 01ANTRIM 138 REDUCE BUS 237010 SHUNT BY 100 PERCENT /* 01GUILFD CAP138 DISCONNECT BUS 237010 /* 01GUILFD CAP138 DISCONNECT BUS 235723 /* 01GUILF1 14 DISCONNECT BUS 235724 /* 01GUILF2 14 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235187 CKT 1 /* 01GUILFD 138 01GRANDP 138 END
AP-P1-2-WP-138-109	CONTINGENCY 'AP-P1-2-WP-138-109' /* GUILFORD - REID 138KV DISCONNECT BRANCH FROM BUS 235189 TO BUS 235136 CKT 1 /* 01GUILFD 138 01ANTRIM 138 DISCONNECT BRANCH FROM BUS 235136 TO BUS 235503 CKT 1 /* 01ANTRIM 138 01REID 138 REMOVE LOAD 1 FROM BUS 235136 /* 01ANTRIM 138 END
AP-P1-2-WP-138-112	CONTINGENCY 'AP-P1-2-WP-138-112' /* CHERRY RUN - MCCONNELSBURG 138KV DISCONNECT BRANCH FROM BUS 958230 TO BUS 235267 CKT 1 /* 01MCCONL 138 01WARFOR 138 DISCONNECT BRANCH FROM BUS 235267 TO BUS 235453 CKT 1 /* 01WARFOR 138 01CHERYR 138 DISCONNECT BRANCH FROM BUS 235267 TO BUS 236686 CKT 2 /* 01WARFOR 138 01WARFORDS 35 END

12 Short Circuit Analysis - Primary POI

The Short Circuit Analysis will be performed during the System Impact Study phase.

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AF2-117 was evaluated as a 70.0 MW (Capacity 46.7 MW) injection at the McConnellsvurg 138 kV substation in the APS area. Project AF2-117 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-117 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

13.1 Generation Deliverability

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

None

13.2 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
151565961	235285	01TEX E6	138.0	AP	235189	01GUILFD	138.0	AP	1	AP-P2-2-WP-138-072	bus	332.0	89.48	108.61	DC	63.52
151565983	938750	AE1-101 TAP	138.0	AP	235285	01TEX E6	138.0	AP	1	AP-P2-2-WP-138-072	bus	343.0	86.61	105.13	DC	63.52

13.3 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)

None

13.4 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	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
100538016	235189	01GUILFD	138.0	AP	235187	01GRANDP	138.0	AP	1	AP-P1-2-WP-138-109	operation	228.0	113.43	126.32	DC	29.38
100538064	235285	01TEX E6	138.0	AP	235189	01GUILFD	138.0	AP	1	AP-P1-2-WP-138-112	operation	332.0	88.96	107.78	DC	62.48

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONTNAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
100537996	235453	01CHERYR	138.0	AP	235517	01HARMNY	138.0	AP	1	AP-P1-3-WP-138-056	operation	229.0	123.72	141.79	DC	41.38
100538096	938750	AE1-101 TAP	138.0	AP	235285	01TEX E6	138.0	AP	1	AP-P1-2-WP-138-112	operation	343.0	86.11	104.33	DC	62.48

13.5 Flow Gate Details - Secondary POI

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".

13.5.1 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
151565961	235285	01TEX E6	AP	235189	01GUILFD	AP	1	AP-P2-2-WP-138-072	bus	332.0	89.48	108.61	DC	63.52

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
237577	01ROUTE 16	0.6968	50/50	0.6968
934361	AD1-060 C	1.5351	50/50	1.5351
934362	AD1-060 E	1.3197	50/50	1.3197
934371	AD1-061 C	3.7520	50/50	3.7520
934372	AD1-061 E	3.2583	50/50	3.2583
936061	AD2-009 C	43.6503	50/50	43.6503
936062	AD2-009 E	19.8740	50/50	19.8740
938751	AE1-101 C	94.2590	50/50	94.2590
938752	AE1-101 E	46.4261	50/50	46.4261
939031	AE1-132 C O1	46.2820	50/50	46.2820
939032	AE1-132 E O1	30.8547	50/50	30.8547
940671	**AE2-054 C (Suspended)**	**5.7071**	**50/50**	**5.7071**
940672	**AE2-054 E (Suspended)**	**3.8047**	**50/50**	**3.8047**
945601	AF1-225 C O1	1.2957	50/50	1.2957
945602	AF1-225 E O1	1.7893	50/50	1.7893
945891	AF1-254 C O1	1.8079	50/50	1.8079
945892	AF1-254 E O1	1.2053	50/50	1.2053
958221	AF2-116 C	12.0696	50/50	12.0696
958222	AF2-116 E	6.0802	50/50	6.0802
958231	AF2-117 C O2	42.3526	50/50	42.3526
958232	AF2-117 E O2	21.1717	50/50	21.1717
958931	AF2-184	2.8633	50/50	2.8633
958941	AF2-185	1.1850	50/50	1.1850
959241	AF2-215 C	1.0101	50/50	1.0101
959242	AF2-215 E	0.6734	50/50	0.6734
WEC	WEC	0.0028	Confirmed LTF	0.0028
LGEE	LGEE	0.0057	Confirmed LTF	0.0057
CPLE	CPLE	0.0093	Confirmed LTF	0.0093
CBM-W2	CBM-W2	0.0819	Confirmed LTF	0.0819
NY	NY	0.0144	Confirmed LTF	0.0144
CBM-W1	CBM-W1	0.1126	Confirmed LTF	0.1126
TVA	TVA	0.0154	Confirmed LTF	0.0154
O-066	O-066	0.1680	Confirmed LTF	0.1680
CBM-S2	CBM-S2	0.0751	Confirmed LTF	0.0751
CBM-S1	CBM-S1	0.0937	Confirmed LTF	0.0937
G-007	G-007	0.0260	Confirmed LTF	0.0260
MADISON	MADISON	0.0020	Confirmed LTF	0.0020
MEC	MEC	0.0159	Confirmed LTF	0.0159

13.5.2 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
151565983	938750	AE1-101 TAP	AP	235285	01TEX E6	AP	1	AP-P2-2-WP-138-072	bus	343.0	86.61	105.13	DC	63.52

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
237577	01ROUTE 16	0.6968	50/50	0.6968
934361	AD1-060 C	1.5351	50/50	1.5351
934362	AD1-060 E	1.3197	50/50	1.3197
934371	AD1-061 C	3.7520	50/50	3.7520
934372	AD1-061 E	3.2583	50/50	3.2583
936061	AD2-009 C	43.6503	50/50	43.6503
936062	AD2-009 E	19.8740	50/50	19.8740
938751	AE1-101 C	94.2590	50/50	94.2590
938752	AE1-101 E	46.4261	50/50	46.4261
939031	AE1-132 C O1	46.2820	50/50	46.2820
939032	AE1-132 E O1	30.8547	50/50	30.8547
940671	**AE2-054 C (Suspended)**	**5.7071**	**50/50**	**5.7071**
940672	**AE2-054 E (Suspended)**	**3.8047**	**50/50**	**3.8047**
945601	AF1-225 C O1	1.2957	50/50	1.2957
945602	AF1-225 E O1	1.7893	50/50	1.7893
945891	AF1-254 C O1	1.8079	50/50	1.8079
945892	AF1-254 E O1	1.2053	50/50	1.2053
958221	AF2-116 C	12.0696	50/50	12.0696
958222	AF2-116 E	6.0802	50/50	6.0802
958231	AF2-117 C O2	42.3526	50/50	42.3526
958232	AF2-117 E O2	21.1717	50/50	21.1717
958931	AF2-184	2.8633	50/50	2.8633
958941	AF2-185	1.1850	50/50	1.1850
959241	AF2-215 C	1.0101	50/50	1.0101
959242	AF2-215 E	0.6734	50/50	0.6734
WEC	WEC	0.0028	Confirmed LTF	0.0028
LGEE	LGEE	0.0057	Confirmed LTF	0.0057
CPLE	CPLE	0.0093	Confirmed LTF	0.0093
CBM-W2	CBM-W2	0.0819	Confirmed LTF	0.0819
NY	NY	0.0144	Confirmed LTF	0.0144
CBM-W1	CBM-W1	0.1126	Confirmed LTF	0.1126
TVA	TVA	0.0154	Confirmed LTF	0.0154
O-066	O-066	0.1680	Confirmed LTF	0.1680
CBM-S2	CBM-S2	0.0751	Confirmed LTF	0.0751
CBM-S1	CBM-S1	0.0937	Confirmed LTF	0.0937
G-007	G-007	0.0260	Confirmed LTF	0.0260
MADISON	MADISON	0.0020	Confirmed LTF	0.0020
MEC	MEC	0.0159	Confirmed LTF	0.0159

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
AP-P1-3-WP-138-056	CONTINGENCY 'AP-P1-3-WP-138-056' /* GUILFORD #1 138/34.5KV AND #2 138/69KV XFMR DISCONNECT BRANCH FROM BUS 235189 TO BUS 237333 CKT 2 /* 01GUILFD 138 01GUILFORD 69 DISCONNECT BRANCH FROM BUS 235189 TO BUS 237421 CKT 1 /* 01GUILFD 138 01GUILFORD 35 DISCONNECT BRANCH FROM BUS 235189 TO BUS 237010 CKT ZB /* 01GUILFD 138 01GUILFD CAP138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235725 CKT 1 /* 01GUILFD 138 01GLFNUG 138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235285 CKT 1 /* 01GUILFD 138 01TEXE6 138 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235136 CKT 1 /* 01GUILFD 138 01ANTRIM 138 REDUCE BUS 237010 SHUNT BY 100 PERCENT /* 01GUILFD CAP138 DISCONNECT BUS 237010 /* 01GUILFD CAP138 DISCONNECT BUS 235723 /* 01GUILF1 14 DISCONNECT BUS 235724 /* 01GUILF2 14 DISCONNECT BRANCH FROM BUS 235189 TO BUS 235187 CKT 1 /* 01GUILFD 138 01GRANDP 138 END
AP-P1-2-WP-138-109	CONTINGENCY 'AP-P1-2-WP-138-109' /* GUILFORD - REID 138KV DISCONNECT BRANCH FROM BUS 235189 TO BUS 235136 CKT 1 /* 01GUILFD 138 01ANTRIM 138 DISCONNECT BRANCH FROM BUS 235136 TO BUS 235503 CKT 1 /* 01ANTRIM 138 01REID 138 REMOVE LOAD 1 FROM BUS 235136 /* 01ANTRIM 138 END
AP-P2-2-WP-138-072	CONTINGENCY 'AP-P2-2-WP-138-072' /* MCCONNELLSBURG #2 138KV BUS DISCONNECT BRANCH FROM BUS 235217 TO BUS 235267 CKT 1 /* 01MCCONL 138 01WARFOR 138 DISCONNECT BRANCH FROM BUS 235217 TO BUS 236684 CKT 2 /* 01MCCONL 138 01MCCONNEL 35 END
AP-P1-2-WP-138-112	CONTINGENCY 'AP-P1-2-WP-138-112' /* CHERRY RUN - MCCONNELSBURG 138KV DISCONNECT BRANCH FROM BUS 235217 TO BUS 235267 CKT 1 /* 01MCCONL 138 01WARFOR 138 DISCONNECT BRANCH FROM BUS 235267 TO BUS 235453 CKT 1 /* 01WARFOR 138 01CHERYR 138 DISCONNECT BRANCH FROM BUS 235267 TO BUS 236686 CKT 2 /* 01WARFOR 138 01WARFORDS 35 END

14 Affected Systems

14.1 NYISO

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

15 Attachment 1: One Line Diagram