



**Generation Interconnection
Feasibility Study Report
for
Queue Project AG1-328
KIRBY-BLUE JACKET 138 KV
60 MW Capacity / 100 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 ATSI.

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.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

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 Union County, Ohio. The installed facilities will have a total capability of 100 MW with 60 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is September 30, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-328
Project Name	KIRBY-BLUE JACKET 138 KV
State	Ohio
County	Union
Transmission Owner	ATSI
MFO	100
MWE	100
MWC	60
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

4.1 Primary Point of Interconnection

AG1-328 will interconnect with the ATSI 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 Kirby-Blue Jacket 138 kV line into the new station. The new substation will be located approximately 5.1 miles from Kirby 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 Kirby Substation and Blue Jacket Substation.

Attachment 1 shows a one-line diagram of the proposed primary Direct Connection facilities for the AG1-328 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.

4.2 Secondary Point of Interconnection

The interconnection of the project at the Secondary POI will be a direct connection to the Kirby 138 kV substation. The IC will be responsible for acquiring all easements, properties, and permits that may be required to expand the Kirby substation and associated attachment facilities. A full scope of work or estimated cost is not provided for the proposed Secondary POI.

5 Cost Summary

The AG1-328 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$8,630,000
Total System Network Upgrade Costs	\$28,385,600 ¹
Total Costs	\$37,015,600

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

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.

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

AG1-328 will interconnect with the ATSI 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 Kirby-Blue Jacket 138 kV line into the new station. The new substation will be located approximately 5.1 miles from Kirby 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 Kirby Substation and Blue Jacket Substation.

Attachment 1 shows a one-line diagram of the proposed primary Direct Connection Facilities for the AG1-328 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.

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	\$320,000
Construct 138 kV three breaker ring bus interconnection substation	\$5,970,000
Loop the Kirby-Blue Jacket 138 kV Line into interconnection substation	\$820,000
Upgrade relaying at Kirby Substation	\$760,000
Upgrade relaying at Blue Jacket Substation (Dayton)	\$760,000
Total Physical Interconnection Costs	\$8,630,000

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 **24 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 first three months of the engineering design work that is related to the construction of the interconnection substation. 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

8.1 Power Flow Analysis

FE performed an analysis of its underlying transmission <100 kV system. The AG1-328 project did not contribute to any overloads on the FE Transmission System.

9 Interconnection Customer Requirements

9.1 System Protection

The IC must design its 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 AG1-328 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 AG1-328 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 Transmission System.

9.3 Power Factor Requirements

The IC shall design its non-synchronous 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) - (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 - Primary POI

The Queue Project AG1-328 was evaluated as a 100.0 MW (Capacity 60.0 MW) injection tapping the Kirby to Blue Jacket 138 kV line in the ATSI area. Project AG1-328 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-328 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)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
16793832	238861	02KIRBY	138.0	ATSI	238640	02CRIS S	138.0	ATSI	1	DAY_P1_BLUE JACKET_138_BLUE E JACKET_69_BK_7	single	179.0	91.53	110.54	DC	34.02

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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
167938319	238861	02KIRBY	138.0	ATSI	238640	02CRIS S	138.0	ATSI	1	DAY_P1_BLUE JACKET_138_BLUE JACKET_69_BK_7	operation	179.0	137.03	168.71	DC	56.71
167938321	238861	02KIRBY	138.0	ATSI	238640	02CRIS S	138.0	ATSI	1	Base Case	operation	152.0	124.91	155.72	DC	46.82
169689505	938700	AE1-092 TAP	138.0	DAY	253101	09BLU JK	138.0	DAY	1	DAY_P1_13829B_AE1_092_KIRBY (FE)_138KV-B	operation	269.0	103.98	141.15	DC	100.0
164527554	964650	AG1-328 TAP	138.0	DAY	238861	02KIRBY	138.0	ATSI	1	DAY_P1_BLUE JACKET_138_BLUE JACKET_69_BK_7	operation	269.0	116.25	153.42	DC	100.0
164527557	964650	AG1-328 TAP	138.0	DAY	238861	02KIRBY	138.0	ATSI	1	Base Case	operation	218.0	102.4	140.18	DC	82.35

11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
167938322	1	02KIRBY 138.0 kV - 02CRISS 138.0 kV Ckt 1	<u>ATSI</u> OES-005A (932) : Reconductor approx. 11.3 mi from Kirby to Crissinger Project Type : FAC Cost : \$28,385,600 Time Estimate : 48.0 Months	\$28,385,600
			TOTAL COST	\$28,385,600

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".

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
167938322	238861	02KIRBY	ATSI	238640	02CRISS	ATSI	1	DAY_P1_BLUE JACKET_138_BLUE JACKET_69_BK_7	single	179.0	91.53	110.54	DC	34.02

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
240624	02GALON M2	-2.2754	Adder	-2.68
938705	AE1-092 C	54.4378	80/20	54.4378
946051	AF1-270	28.3530	80/20	28.3530
964601	AG1-323 O1	22.6824	80/20	22.6824
964651	AG1-328 C O1	34.0236	80/20	34.0236
WEC	WEC	0.0372	Confirmed LTF	0.0372
LGEE	LGEE	0.1621	Confirmed LTF	0.1621
CPL	CPL	0.0915	Confirmed LTF	0.0915
CBM-W2	CBM-W2	1.5949	Confirmed LTF	1.5949
NY	NY	0.0570	Confirmed LTF	0.0570
TVA	TVA	0.2618	Confirmed LTF	0.2618
SIGE	SIGE	0.0299	Confirmed LTF	0.0299
CBM-S2	CBM-S2	1.6078	Confirmed LTF	1.6078
CBM-S1	CBM-S1	0.0760	Confirmed LTF	0.0760
MEC	MEC	0.2225	Confirmed LTF	0.2225
LAGN	LAGN	0.3063	Confirmed LTF	0.3063

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
AE1-092	Blue Jacket-Kirby 138 kV	Active
AF1-270	Blue Jacket-Kirby 138 kV	Active
AG1-323	Blue Jacket 138 kV	Active
AG1-328	Kirby-Blue Jacket 138 kV	Active

11.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
Base Case	
DAY_P1_13829B_AE1_092_KIRBY (FE)_138KV-B	CONTINGENCY 'DAY_P1_13829B_AE1_092_KIRBY (FE)_138KV-B' /REPLACED BLUE JACKET (253101) WITH AE1-092 (938700)AND AG1-328 (964650) OPEN BRANCH FROM BUS 964650 TO BUS 238861 CKT 1 END
DAY_P1_BLUE JACKET_138_BLUE JACKET_69_BK_7	CONTINGENCY 'DAY_P1_BLUE JACKET_138_BLUE JACKET_69_BK_7' OPEN BRANCH FROM BUS 253009 TO BUS 253101 CKT 1 DECREASE BUS 253009 SHUNT BY 50 PERCENT END

12 Short Circuit Analysis - Primary POI

The following Breakers are overdutied:

None.

12.1 System Reinforcements - Short Circuit

None.

13 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-328 was evaluated as a 100.0 MW (Capacity 60.0 MW) injection at the Kirby 138 kV Substation in the ATSI area. Project AG1-328 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-328 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)

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
174679808	238861	02KIRBY	138.0	ATSI	238640	02CRISS	138.0	ATSI	1	DAY_P1_13829A_BLUEJACKET_AE1_092_138KV	single	179.0	81.04	100.05	DC	34.02

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
167145326	938700	AE1-092 TAP	138.0	DAY	253101	09BLUJK	138.0	DAY	1	ATSI-P2-3-OES-138-035	breaker	269.0	85.16	110.21	DC	67.39

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)

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
173869089	238861	02KIRBY	138.0	ATSI	238640	02CRISS	138.0	ATSI	1	BLUE JACKET_A 138KV	breaker	179.0	126.6	158.28	DC	56.71

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
167938321	238861	02KIRBY	138.0	ATSI	238640	02CRISS	138.0	ATSI	1	Base Case	operation	152.0	122.99	155.82	DC	49.92
174679806	238861	02KIRBY	138.0	ATSI	238640	02CRISS	138.0	ATSI	1	DAY_P1_13829A_BLUEJACKET_AE1_092_138KV	operation	179.0	126.54	158.22	DC	56.71

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
173869089	238861	02KIRBY	ATSI	238640	02CRISS	ATSI	1	BLUE JACKET_A 138KV	breaker	179.0	126.6	158.28	DC	56.71

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
240624	02GALON M2	-2.2754	Adder	-2.68
938705	AE1-092 C	54.4378	50/50	54.4378
938706	AE1-092 E	75.9860	50/50	75.9860
943012	AE2-324 BAT	4.9234	50/50	4.9234
946051	AF1-270	28.3530	50/50	28.3530
964651	AG1-328 C O2	34.0236	50/50	34.0236
964652	AG1-328 E O2	22.6824	50/50	22.6824
966132	AG1-482 BAT	4.1702	50/50	4.1702
WEC	WEC	0.0372	Confirmed LTF	0.0372
LGEE	LGEE	0.1621	Confirmed LTF	0.1621
CPLE	CPLE	0.0915	Confirmed LTF	0.0915
CBM-W2	CBM-W2	1.5949	Confirmed LTF	1.5949
NY	NY	0.0570	Confirmed LTF	0.0570
TVA	TVA	0.2618	Confirmed LTF	0.2618
O-066	O-066	0.4644	Confirmed LTF	0.4644
SIGE	SIGE	0.0299	Confirmed LTF	0.0299
CBM-S2	CBM-S2	1.6078	Confirmed LTF	1.6078
CBM-S1	CBM-S1	0.0760	Confirmed LTF	0.0760
G-007	G-007	0.0714	Confirmed LTF	0.0714
MEC	MEC	0.2225	Confirmed LTF	0.2225
LAGN	LAGN	0.3063	Confirmed LTF	0.3063

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
167145326	938700	AE1-092 TAP	DAY	253101	09BLUJK	DAY	1	ATSI-P2-3-OES-138-035	breaker	269.0	85.16	110.21	DC	67.39

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938705	AE1-092 C	69.4061	50/50	69.4061
938706	AE1-092 E	96.8793	50/50	96.8793
946051	AF1-270	36.1490	50/50	36.1490
964602	AG1-323 BAT	6.3836	50/50	6.3836
964651	AG1-328 C O2	40.4358	50/50	40.4358
964652	AG1-328 E O2	26.9572	50/50	26.9572
G-007A	G-007A	0.0671	Confirmed LTF	0.0671
VFT	VFT	0.1806	Confirmed LTF	0.1806
CALDERWOOD	CALDERWOOD	0.0144	Confirmed LTF	0.0144
PRAIRIE	PRAIRIE	0.1369	Confirmed LTF	0.1369
CHEOAH	CHEOAH	0.0140	Confirmed LTF	0.0140
CBM-N	CBM-N	0.0336	Confirmed LTF	0.0336
COTTONWOOD	COTTONWOOD	0.0840	Confirmed LTF	0.0840
HAMLET	HAMLET	0.0040	Confirmed LTF	0.0040
GIBSON	GIBSON	0.0399	Confirmed LTF	0.0399
BLUEG	BLUEG	0.1371	Confirmed LTF	0.1371
TRIMBLE	TRIMBLE	0.0440	Confirmed LTF	0.0440
CATAWBA	CATAWBA	0.0039	Confirmed LTF	0.0039

13.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
Base Case	
BLUE JACKET_A 138KV	CONTINGENCY 'BLUE JACKET_A 138KV' / 191 OPEN BRANCH FROM BUS 253101 TO BUS 938700 CKT 1 / 253101 09BLUJK 138 938700 AE1-092 TAP 138 1 OPEN BRANCH FROM BUS 253009 TO BUS 253101 CKT 1 / 253009 09BLUJK 69.0 253101 09BLUJK 138 1 DECREASE BUS 253009 SHUNT BY 50.00 PERCENT /* 253009 09BLUJK 69.0 END
DAY_P1_13829A_BLUEJACKET_AE1_092_138KV	CONTINGENCY 'DAY_P1_13829A_BLUEJACKET_AE1_092_138KV' / 180 OPEN BRANCH FROM BUS 253101 TO BUS 938700 CKT 1 / 253101 09BLUJK 138 938700 AE1-092 TAP 138 1 END
ATSI-P2-3-OES-138-035	CONTINGENCY 'ATSI-P2-3-OES-138-035' / 424 OPEN BRANCH FROM BUS 238861 TO BUS 239218 CKT 1 / 238861 02KIRBY 138 239218 02SSCIOT 138 1 OPEN BRANCH FROM BUS 239134 TO BUS 239218 CKT 1 / 239134 02TANGY 138 239218 02SSCIOT 138 1 OPEN BRANCH FROM BUS 238640 TO BUS 238861 CKT 1 / 238640 02CRISS 138 238861 02KIRBY 138 1 END

14 Affected Systems

14.1 MISO

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

14.2 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

15 Attachment 1: One Line Diagram