Generation Interconnection Feasibility Study Report

For

PJM Generation Interconnection Request Queue Position AE1-165

Cambria Slope - Johnstown 115kV

March 2019

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. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The Interconnection Customer (IC), has proposed a solar generating facility located in Cambria County, PA. 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 December 30, 2021. **This study does not imply a Penelec commitment to this in-service date.**

Point of Interconnection

AE1-165 will interconnect with the Penelec transmission system along one of the following points of interconnection:

1. Cambria Slope - Johnstown 115 kV Line
2. Cambria Slope 115 kV Substation

Cost Summary

The AE1-165 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 100,000
Direct Connection Network Upgrades	$ 7,194,300
Non Direct Connection Network Upgrades	$ 2,648,600
Total Costs	**$ 9,942,900**

The transmission and substation costs given above exclude the Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross up charge. If at a future date Federal CIAC taxes are deemed

necessary by the IRS for this project, Penelec shall be reimbursed by the Interconnection Customer for such taxes. ATSI estimates the tax, if applicable, would be approximately **$2,024,700**.

In addition, the AE1-165 project may be responsible for a contribution to the following costs:

Description	Total Cost
New System Upgrades	$ 0
Total Costs	**$ 0**

Cost allocations for these upgrades will be provided in the System Impact Study Report.

General Information

Interconnected Transmission Owner ("TO"): Mid-Atlantic Interstate Transmission, LLC ("MAIT")

Impacted TO(s) (if applicable): Mid-Atlantic Interstate Transmission, LLC ("MAIT")

PJM Zone: Pennsylvania Electric Company

FE Operating Company or Planning Region: Pennsylvania Electric Company

Customer Connection Request

Requested Backfeed Date: 9/30/2021

Requested Commercial Operation Date: 12/30/2021

This study does not imply a FirstEnergy commitment to these dates.

New Facilities		Existing Facilities	
Capacity:	12 MW	Capacity:	0 MW
Energy:	20 MW	Energy:	0 MW
MFO[1]:	20 MW	MFO:	0 MW
Fuel:	Solar	Prior Queue Position(s):	n/a

Point of Interconnection

Primary Point of Interconnection: Cambria Slope - Johnstown 115 kV Line

Secondary Point of Interconnection: Cambria Slope 115 kV Bus

[1] Maximum Facility Output

Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install attachment facility line and associated hardware to accept the Interconnection Customer generator lead line terminating at the AE1-165 Interconnection substation & install metering.	$ 100,000
Total Attachment Facility Costs	**$ 100,000**

Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
New three breaker 115kV ring bus	$ 7,194,300
Total Direct Connection Facility Costs	**$ 7,194,300**

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Provide interconnection facilities for AE1-165. Cambria Slope-Johnstown 115kV Line Tap	$ 2,248,600
Adjust remote, relaying, and metering settings and add anti-islanding transmitters @ Johnstown SS	$ 200,000
Adjust remote, relaying, and metering settings and add anti-islanding transmitters @ Cambria Slope SS	$ 200,000
Total Non-Direct Connection Facility Costs	**$ 2,648,600**

Transmission Owner Scope of Work

Primary POI

The interconnection of the project at the Primary POI will be accomplished by constructing a new 115 kV three (3) breaker ring bus and looping the Cambria Slope - Johnstown 115 kV line into the new station. The new substation will be located approximately 10.3 miles from Johnstown 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 attachment 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 Cambria Slope and Johnstown substations.

A summary of the connection facilities that will be required for the Primary POI and their estimated costs are shown in the following table. Based on this scope of work, it is expected to take a minimum of 22 months after the signing of an Interconnection Construction Service Agreement. This include preliminary payment that compensates FE for the first three months of the engineering design work that is related to the construction of the AE1-165 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 PJM will allow all transmission system outages when requested.

Secondary POI

The interconnection of the project at the Secondary POI will be accomplished by constructing a new 115 kV breaker string and terminal position at Cambria Slope substation. A full scope of work or estimated cost is not provided for the Secondary POI.

Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 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.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

3. The Interconnection Customer seeking to interconnect a wind generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per item 5.iv. of Schedule H to the Interconnection Service Agreement.

4. 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:

5. The purchase and installation of a fully rated 115 kV circuit breaker to protect the AE1-165 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.

6. 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.

7. 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.

8. Compliance with the FE and PJM generator power factor and voltage control requirements.

9. The execution of a back-up service agreement to serve the customer load supplied from the AE1-165 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.

10. 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.

11. 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.

Revenue Metering and SCADA Requirements

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 Sections 24.1 and 24.2.

Metering

The IC will be require 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.

FE Requirements

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

http://www.firstenergycorp.com/feconnect
http://www.pjm.com/planning/design-engineering/to-tech-standards.aspx

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.

Network Impacts

Option 1

The Queue Project AE1-165 was evaluated as a 20 MW (Capacity 12 MW) injection tapping the Mariner REC to Johnstown 115 kV line in the PENELEC area. Project AE1-165 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-165 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis – 2022

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Contingency Definition
PN-P2-3-PN-500-001F	CONTINGENCY 'PN-P2-3-PN-500-001F' /* KEYSTONE 500KV BKR 6 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200005 CKT 1 /* KEYSTONE 500 CONEM-GH 500 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 TO BUS 200907 CKT 4/* KEYSTONE 500 26KEYSTONE 230 26KEYSTN#4 20.00 REDUCE BUS 200011 SHUNT BY 100 PERCENT /* KEYSTONE 500 END
AP-P2-2-WP-500-004	CONTINGENCY 'AP-P2-2-WP-500-004' /* YUKON #2 500KV BUS DISCONNECT BRANCH FROM BUS 235277 TO BUS 235116 CKT 2 /* 01YUKON 138 01YUKON 500 DISCONNECT BRANCH FROM BUS 235277 TO BUS 235116 CKT 3 /* 01YUKON 138 01YUKON 500 END
AP-P2-2-WP-500-003	CONTINGENCY 'AP-P2-2-WP-500-003' /* YUKON #1 500KV BUS DISCONNECT BRANCH FROM BUS 235116 TO BUS 235277 CKT 1 /* 01YUKON 500 01YUKON 138 DISCONNECT BRANCH FROM BUS 235116 TO BUS 235277 CKT 3 /* 01YUKON 500 01YUKON 138 END

Generator Deliverability

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

None

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	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
765454	200810	26KEYSTONE	PENELEC	999428	STAR569	PENELEC	3	PN-P2-3-PN-500-001F	breaker	612.0	99.8	100.46	DC	3.96

Note: Please see Attachment 3 for projects providing impacts to flowgate violations. The values in the Reference column correspond to the proper table in the Attachment.

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

Short Circuit

(Summary of impacted circuit breakers)

None

NYISO

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

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	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
766259	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-003	operation	192.0	99.95	105.47	DC	1.03
766260	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-004	operation	192.0	99.95	105.47	DC	1.03

System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

ID	Index	Facility	Upgrade Description	Cost
765454	1	**26KEYSTONE 230.0 kV - STAR569 1.0 kV Ckt 3**	Description : Supplemental upgrade s1736: Replace the existing Keystone 351 MVA 500/230 kV transformer and Install a 500 kV high side breaker. The supplemental project has an projected in-service date of 12/31/2019.	$0
			TOTAL COST	**$0**

Network Impacts

Option 2

The Queue Project AE1-165 was evaluated as a 20 MW (Capacity 12 MW) injection at the Cambria Slope 115 kV substation in the PENELEC area. Project AE1-165 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-165 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Analysis – 2022

Contingency Descriptions

The following contingencies resulted in overloads:

Contingency Name	Contingency Definition
PN-P2-3-PN-500-001F	CONTINGENCY 'PN-P2-3-PN-500-001F' /* KEYSTONE 500KV BKR 6 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200005 CKT 1 /* KEYSTONE 500 CONEM-GH 500 DISCONNECT BRANCH FROM BUS 200011 TO BUS 200810 TO BUS 200907 CKT 4/* KEYSTONE 500 26KEYSTONE 230 26KEYSTN#4 20.00 REDUCE BUS 200011 SHUNT BY 100 PERCENT /* KEYSTONE 500 END
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Generator Deliverability

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

None

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	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
748857	200810	26KEYSTONE	PENELEC	999428	STAR569	PENELEC	3	PN-P2-3-PN-500-001F	breaker	612.0	99.82	100.12	DC	3.91

Note: Please see Attachment 4 for projects providing impacts to flowgate violations. The values in the Reference column correspond to the proper table in the Attachment.

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

Short Circuit

(Summary of impacted circuit breakers)

None

NYISO

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

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	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
749584	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-003	operation	192.0	99.91	105.47	DC	1.04
749585	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-004	operation	192.0	99.91	105.47	DC	1.04

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

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
749584	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-003	operation	192.0	99.91	105.47	DC	1.04
749585	235173	01EDGEWT	AP	235618	01LOYALH3	AP	1	AP-P2-2-WP-500-004	operation	192.0	99.91	105.47	DC	1.04

Attachment 1. Flowgate Details

Appendices

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.

It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

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
765454	200810	26KEYSTONE	PENELEC	999428	STAR569	PENELEC	3	PN-P2-3-PN-500-001F	breaker	612.0	99.8	100.46	DC	3.96

Bus #	Bus	MW Impact
200636	26IUP CO-G	0.49
200805	26COLVER13	21.44
200809	26SITHE	1.46
200823	26MHP_X3-003	4.5
200833	26SEWRDB34	16.72
200834	26SW_E13_K22	0.65
200835	26DSGENWIN	1.57
200837	26HOMER C1	25.14
200838	26HOMER C2	20.98
200839	26HOMER C3	22.21
200846	26FORWARD	0.18
200864	K-013 E	4.66
200883	Q-053 E	8.77
200888	26HIGHLAND	0.39
200894	26K02	5.48
200925	26R32	0.46
202158	26CON.GEN1	0.12
203999	P-047 E	9.63
236828	01GRAYMONT	0.39
290086	Q-036 E	6.2
292350	K-023	4.83
292542	L-013 1	4.83

Bus #	Bus	MW Impact
293301	N-039 E	12.09
293393	V3-030E	5.33
293432	R-040 E	0.27
293603	O-018 E	10.29
293802	O-038 E	7.56
293902	O-048 E	4.35
294515	P-022 E	3.02
294573	P-028 E	9.11
294903	P-060 E	7.81
296332	R-032 E	11.88
903643	W3-099 C OP1	1.12
903644	W3-099 E OP1	7.46
913142	Y1-033 E OP1	3.89
914101	Y2-055	3.07
916051	Z1-038	1.5
916202	Z1-069 E	7.57
916351	Z1-091	1.82
917672	Z2-108 E	3.02
918682	AA1-082 E	5.28
918701	AA1-085 C	1.09
918702	AA1-085 E	7.29
918871	AA1-106	2.05
919201	AA1-144 O1	15.05
919491	AA2-000	47.78
920341	AA2-132	1.99
925512	AC1-025 E	0.15
930411	AB1-082	2.73
930511	AB1-092	1.75
931092	AB1-160 E	2.16
932571	AC2-077	2.67
932981	AC2-122 C	2.87
932982	AC2-122 E	4.68
935191	AD1-154	2.93
936421	AD2-055	3.61
936991	AD2-133 C	2.79
936992	AD2-133 E	12.75
938351	AE1-053	0.8
938881	AE1-116	0.81
938951	AE1-123	1.97
938991	AE1-128 C	13.9
938992	AE1-128 E	9.27
939171	AE1-147 C	1.19
939172	AE1-147 E	0.79
939291	AE1-160 C	1.22
939292	AE1-160 E	0.7
939341	AE1-165 C	2.38
939342	AE1-165 E	1.59
939381	AE1-169 C O1	4.97
939382	AE1-169 E O1	3.31
AA2-500	AA2-500	132.94
BAYOU	BAYOU	1.67
BIG_CAJUN1	BIG_CAJUN1	2.56

Bus #	Bus	MW Impact
BIG_CAJUN2	BIG_CAJUN2	5.16
BLUEG	BLUEG	8.5
CALDERWOOD	CALDERWOOD	0.85
CANNELTON	CANNELTON	0.51
CATAWBA	CATAWBA	0.5
CBM-N	CBM-N	3.79
CHEOAH	CHEOAH	0.78
CHILHOWEE	CHILHOWEE	0.28
CHOCTAW	CHOCTAW	1.71
COFFEEN	COFFEEN	0.88
COTTONWOOD	COTTONWOOD	6.64
DEARBORN	DEARBORN	1.29
DUCKCREEK	DUCKCREEK	1.92
EDWARDS	EDWARDS	0.87
ELMERSMITH	ELMERSMITH	0.88
FARMERCITY	FARMERCITY	0.58
G-007A	G-007A	4.12
GIBSON	GIBSON	0.35
HAMLET	HAMLET	1.58
NEWTON	NEWTON	2.3
NYISO	NYISO	16.47
O-066A	O-066A	1.99
PRAIRIE	PRAIRIE	4.25
SANTEETLA	SANTEETLA	0.23
SMITHLAND	SMITHLAND	0.34
TATANKA	TATANKA	1.04
TILTON	TILTON	1.06
TRIMBLE	TRIMBLE	0.94
TVA	TVA	2.79
UNIONPOWER	UNIONPOWER	1.22
VFT	VFT	11.35

Attachment 2. Flowgate Details – Option 2

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
748857	200810	26KEYSTONE	PENELEC	999428	STAR569	PENELEC	3	PN-P2-3-PN-500-001F	breaker	612.0	99.82	100.12	DC	3.91

Bus #	Bus	MW Impact
200636	26IUP CO-G	0.49
200805	26COLVER13	21.44
200809	26SITHE	1.46
200823	26MHP_X3-003	4.5
200833	26SEWRDB34	16.72
200834	26SW_E13_K22	0.65
200835	26DSGENWIN	1.57
200837	26HOMER C1	25.14
200838	26HOMER C2	20.98
200839	26HOMER C3	22.21
200846	26FORWARD	0.18
200864	K-013 E	4.66
200883	Q-053 E	8.77
200888	26HIGHLAND	0.39
200894	26K02	5.48
200925	26R32	0.46
202158	26CON.GEN1	0.12
203999	P-047 E	9.63
236828	01GRAYMONT	0.39
290086	Q-036 E	6.2
292350	K-023	4.83
292542	L-013 1	4.83
293301	N-039 E	12.09
293393	V3-030E	5.33
293432	R-040 E	0.27
293603	O-018 E	10.29
293802	O-038 E	7.56
293902	O-048 E	4.35
294515	P-022 E	3.02
294573	P-028 E	9.11
294903	P-060 E	7.81
296332	R-032 E	11.88
903643	W3-099 C OP1	1.12
903644	W3-099 E OP1	7.46
913142	Y1-033 E OP1	3.89

Bus #	Bus	MW Impact
914101	Y2-055	3.07
916051	Z1-038	1.5
916202	Z1-069 E	7.57
916351	Z1-091	1.82
917672	Z2-108 E	3.02
918682	AA1-082 E	5.28
918701	AA1-085 C	1.09
918702	AA1-085 E	7.29
918871	AA1-106	2.05
919201	AA1-144 O1	15.05
919491	AA2-000	47.78
920341	AA2-132	1.99
925512	AC1-025 E	0.15
930411	AB1-082	2.73
930511	AB1-092	1.75
931092	AB1-160 E	2.16
932571	AC2-077	2.67
932981	AC2-122 C	2.87
932982	AC2-122 E	4.68
935191	AD1-154	2.93
936421	AD2-055	3.61
936991	AD2-133 C	2.79
936992	AD2-133 E	12.75
938351	AE1-053	0.8
938881	AE1-116	0.81
938951	AE1-123	1.97
938991	AE1-128 C	13.9
938992	AE1-128 E	9.27
939171	AE1-147 C	1.19
939172	AE1-147 E	0.79
939291	AE1-160 C	1.22
939292	AE1-160 E	0.7
939341	AE1-165 C O2	2.35
939342	AE1-165 E O2	1.57
939381	AE1-169 C O2	4.82
939382	AE1-169 E O2	3.21
AA2-500	AA2-500	132.94
BAYOU	BAYOU	1.67
BIG_CAJUN1	BIG_CAJUN1	2.56
BIG_CAJUN2	BIG_CAJUN2	5.16
BLUEG	BLUEG	8.5
CALDERWOOD	CALDERWOOD	0.85
CANNELTON	CANNELTON	0.51
CATAWBA	CATAWBA	0.5
CBM-N	CBM-N	3.79
CHEOAH	CHEOAH	0.78
CHILHOWEE	CHILHOWEE	0.28
CHOCTAW	CHOCTAW	1.71
COFFEEN	COFFEEN	0.88
COTTONWOOD	COTTONWOOD	6.64
DEARBORN	DEARBORN	1.29
DUCKCREEK	DUCKCREEK	1.92

Bus #	Bus	MW Impact
EDWARDS	EDWARDS	0.87
ELMERSMITH	ELMERSMITH	0.88
FARMERCITY	FARMERCITY	0.58
G-007A	G-007A	4.12
GIBSON	GIBSON	0.35
HAMLET	HAMLET	1.58
NEWTON	NEWTON	2.3
NYISO	NYISO	16.47
O-066A	O-066A	1.99
PRAIRIE	PRAIRIE	4.25
SANTEETLA	SANTEETLA	0.23
SMITHLAND	SMITHLAND	0.34
TATANKA	TATANKA	1.04
TILTON	TILTON	1.06
TRIMBLE	TRIMBLE	0.94
TVA	TVA	2.79
UNIONPOWER	UNIONPOWER	1.22
VFT	VFT	11.35