



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF2-396
STINGER 138 KV
200 MW Capacity / 200 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 AEP.

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.

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; Storage generating facility located in Cass County, Michigan. The installed facilities will have a total capability of 200 MW with 200 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-396
Project Name	STINGER 138 KV
State	Michigan
County	Cass
Transmission Owner	AEP
MFO	200
MWE	200
MWC	200
Fuel	Solar; Storage
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

AF2-396 will interconnect with the AEP transmission system along one of the following Points of Interconnection:

Primary POI: Stinger 138 kV

To accommodate the interconnection of the AEP-owned Stinger 138 kV substation, the substation will have to be expanded requiring the installation of one (1) 138 kV circuit breaker (see Attachment 1). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

Installation of the generator lead first span exiting the POI station, including the first structure outside the AEP fence, will also be included in AEP's scope. In the case where the generator lead is a single span, the structure in the customer station will be the customer's responsibility.

Secondary POI: Brody 138 kV

To accommodate the interconnection on the AEP-owned Brody 138 kV circuit, the station will need to be expanded by one (1) new circuit breaker 138 kV bus will be constructed (see Attachment 2). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

Installation of the generator lead first span exiting the POI station, including the first structure outside the AEP fence, will also be included in AEP's scope. In the case where the generator lead is a single span, the structure in the customer station will be the customer's responsibility.

5 Cost Summary

The AF2-396 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$1,509,000
Total System Network Upgrade Costs	\$75,344,101
Total Costs	\$76,853.101

The estimates provided in this report are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

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

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

6.1 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
138kV Revenue Metering	\$ 388,000
Generator lead first span exiting the POI station, including the first structure outside the fence	\$ 400,000
Total Attachment Facility Costs	\$ 788,000

6.2 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
Expand the Stinger 138 kV substation: Install one (1) additional 138 kV circuit breaker (see Attachment 1). Installation of associated protection and control equipment, 138 kV line risers and SCADA will also be required.	\$631,000
Total Direct Connection Facility Costs	\$631,000

6.3 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
Upgrade line protection and controls at the Valley 138 kV substation	\$45,000
Upgrade line protection and controls at the Brody 138 kV substation	\$45,000
Total Non-Direct Connection Facility Costs	\$90,000

7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

8 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

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.

9 Revenue Metering and SCADA Requirements

9.1 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.

9.2 Meteorological Data Reporting Requirements

Solar generation facilities shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit)
- Irradiance (Watts/meter²)
- Ambient air temperature (Fahrenheit) – (Accepted, not required)
- Wind speed (meters/second) – (Accepted, not required)

- Wind direction (decimal degrees from true north) – (Accepted, not required)

9.3 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/>

10 Summer Peak - Load Flow Analysis – Primary POI

The Queue Project AF2-396 was evaluated as a 200.0 MW (Capacity 200.0 MW) injection at the Stinger 138 kV substation in the AEP area. Project AF2-396 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-396 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

10.1 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
95535275	243412	05STURGI	69.0	AEP	255331	17HOWE	69.0	NIPS	1	AEP_P1-2_#5577	single	47.0	87.01	129.05	DC	19.76

10.2 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
95968168	243265	05COREY	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	bus	185.0	83.83	125.39	DC	76.87
95968363	243265	05COREY	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_SUBT_P4_#1342_05 VALLEY 69.0_A	breaker	185.0	84.32	125.87	DC	76.87
95968364	243265	05COREY	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_SUBT_P4_#1247_05 MOORE PK 69.0_B	breaker	185.0	99.53	123.47	DC	44.29
95968476	243294	05FLWRF D8 SS	138.0	AEP	243345	05MOORP K	138.0	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	64.43	108.82	DC	111.42
95968183	243346	05MOTT V	138.0	AEP	243287	05E.ELKH ART	138.0	AEP	1	AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	bus	185.0	76.25	122.06	DC	84.75
95968410	243346	05MOTT V	138.0	AEP	243287	05E.ELKH ART	138.0	AEP	1	AEP_SUBT_P4_#1342_05 VALLEY 69.0_A	breaker	185.0	76.84	122.65	DC	84.75
95968469	247330	05BROD Y	138.0	AEP	243294	05FLWRF D8 SS	138.0	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	65.35	109.74	DC	111.42

10.3 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
95535034	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P4_#7443_05DUM ONT 765_A	breaker	1409.0	135.64	137.15	DC	21.88
95535035	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P4_#8621_05COOK 345_K	breaker	1409.0	131.16	131.73	DC	17.37
95535344	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P1-2_#358	single	1409.0	115.5	117.17	DC	23.53
95968167	243265	05COREY	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_P2-2_#9208_05KENZIE 138_2	bus	185.0	114.59	143.4	DC	53.29
95968362	243265	05COREY	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_SUBT_P4_#1145_05COREY 69.0_D	breaker	185.0	108.28	132.66	DC	45.1
95968214	243287	05E.ELKH ART	138.0	AEP	243346	05MOTT	138.0	AEP	1	AEP_P2-2_#9208_05KENZIE 138_2	bus	185.0	112.49	125.09	DC	23.32

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 PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC DC	MW IMPACT
95968182	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_P2-2_#9208_05KENZIE138_2	bus	185.0	106.48	138.0	DC	58.31
98936948	256583	18MOROCCO	345.0	MET C	238530	02ALLEN	345.0	ATS I	1	ATSI-P7-1-TE-345-022T	tower	1793.0	136.22	136.23	DC	21.43
98936311	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATS I	1	ATSI-P2-3-TE-345-016T	breaker	1244.0	123.71	124.23	DC	14.27
98936312	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATS I	1	ATSI-P2-3-TE-345-015T	breaker	1244.0	121.91	122.43	DC	14.19
98936570	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATS I	1	ATSI-P1-2-TE-345-605T	single	1244.0	141.43	141.44	DC	17.01
98936576	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATS I	1	ATSI-P1-2-TE-345-604T-A	single	1244.0	101.93	103.07	DC	14.18
98936956	955620	J1046 TAP	345.0	ITCT	238889	02LEMOYN	345.0	ATS I	1	ATSI-P7-1-TE-138-027T-A	tower	953.0	126.09	126.67	DC	12.22

10.4 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 PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC DC	MW IMPACT
95535343	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P1-2_#358	operation	1409.0	127.46	129.11	DC	23.53
95968762	243250	05BENTON	138.0	AEP	243396	05WESTST	138.0	AEP	1	Base Case	operation	167.0	89.91	100.19	DC	17.17
95968653	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_P1-2_#5574-B	operation	185.0	96.48	122.53	DC	48.19
95968658	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	Base Case	operation	185.0	82.3	104.5	DC	41.07
95968723	243294	05FLWRFD8SS	138.0	AEP	243345	05MOORPK	138.0	AEP	1	AEP_P1-2_#5574-B	operation	251.0	64.37	108.6	DC	111.03
95968683	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_P1-2_#5574-B	operation	185.0	88.6	117.54	DC	53.54
95535274	243412	05STURGI	69.0	AEP	255331	17HOWE	69.0	NIPS	1	AEP_P1-2_#5577	operation	47.0	134.13	153.07	DC	19.76
95968718	247330	05BRODY	138.0	AEP	243294	05FLWRFD8SS	138.0	AEP	1	AEP_P1-2_#5574-B	operation	251.0	65.28	109.52	DC	111.03

ID	FROM BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS ARE A	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
9893657 1	26461 2	19MON12	345. 0	ITCT	24190 1	02LALLEND RF	345. 0	ATSI	1	ATSI-P1- 2-TE- 345- 604T-A	operatio n	1244. 0	121.77	122.29	DC	14.18
9893657 5	26461 2	19MON12	345. 0	ITCT	24190 1	02LALLEND RF	345. 0	ATSI	1	Base Case	operatio n	1099. 0	110.37	110.88	DC	12.38

10.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
95968362,95968364,95968167,95968168,95968363	2	05COREY 138.0 kV - 05MOTTV 138.0 kV Ckt 1	<u>AEP</u> AEPI0030a (332) : A Sag Study will be required on the 8.5 mile section of ACSR 477 26/7 HAWK line to mitigate the overload . New Rating after the Sag Study: S/N: 185 MVA S/E: 257 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$34,000 (No remediations required just sag study) and \$12.75 million (complete line re-conductor/rebuild required). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. Project Type : FAC Cost : \$34,000 Time Estimate : 6-12 Months AEPI0030b (333) : Replace 800A Wavetrap at Mottville Project Type : FAC Cost : \$50,000 Time Estimate : 12-18 Months	\$84,000
95968469	5	05BRODY 138.0 kV - 05FLWRFD8 SS 138.0 kV Ckt 1	<u>AEP</u> AEPI0029a (331) : A Sag Study will be required on the 8.5 mile section of ACSR ~ 795 ~ 45/7 ~ TERN line to mitigate the overload . New Rating after the Sag Study: S/N: 251 MVA S/E: 335 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$34,000 (No remediations required just sag study) and \$12.75 million (complete line re-conductor/rebuild required). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. Project Type : FAC Cost : \$34,000 Time Estimate : 6-12 Months	\$34,000

ID	Idx	Facility	Upgrade Description	Cost
98936311,98936576,98936312,98936570	9	19MON12 345.0 kV - 02LALLENDORF 345.0 kV Ckt 1	<u>ATSI</u> TE-014A (816) : Re-conductor the Lallendorf-Monroe 345 kV line and the line drop at Lallendorf with 1272 ACSS 45/7 bundled (2 conductor per phase) with OPGW. Replace the wave trap with a new 4500 Amp unit. ITC would need to replace their section of limiting conductor and provide estimates for their replacement. Project Type : FAC Cost : \$17,631,000 Time Estimate : 30.0 Months NonPJMArea (1526) : The external (i.e. Non-PJM) Transmission Owner, ITCT, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$17,631,000
95535034,95535035,95535344	6	05COOK 345.0 kV - 05OLIVE 345.0 kV Ckt 1	<u>AEP</u> AEP10020a (304) : Rebuild / re-conductor 23.6 miles of ACSR ~ 954 ~ 45/7 ~ RAIL - Conductor section 1 Project Type : FAC Cost : \$47,200,000 Time Estimate : 24- 36 Months AEP10020b (305) : Replace 2 Cook circuit breakers (3000A) Project Type : FAC Cost : \$2,000,000 Time Estimate : 12-18 Months AEP10020c (306) : Replace 2 Olive circuit breakers (3000A) Project Type : FAC Cost : \$2,000,001 Time Estimate : 12-18 Months AEP10020J (313) : A Sag Study will be required on the 23.6 miles section of ACSR ~ 954 ~ 45/7 ~ RAIL line to mitigate the overload. New ratings after the sag study: S/N: 1409 MVA, S/E: 1887 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$93,600 (no remediations required just sag study) and \$47.2million (complete line rec-onductor/rebuild required) Project Type : FAC Cost : \$93,600 Time Estimate : 6-12 Months	\$51,200,001
98936956	10	J1046 TAP 345.0 kV - 02LEMOYN 345.0 kV Ckt 1	<u>ITCT</u> NonPJMArea (1526) : The external (i.e. Non-PJM) Transmission Owner, ITCT, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$0

ID	Idx	Facility	Upgrade Description	Cost
98936948	8	18MOROCCO 345.0 kV - 02ALLEN 345.0 kV Ckt 1	<u>ATSI</u> TE-007A (807) : Build new Line exit at Allen Junction 345kV substation for the new (2nd) Allen Junction-Morocco 345kV line. Install new 345kV Breaker, Metering, Disconnect Switches and Protection Relaying. New Line will be built and owned by ITC. ITC has indicated that the new line rating will be 2036 MVA SN / 2298 MVA SE and plans to use the same size conductor as the existing Allen Junction-Morocco 345kV line. Project Type : FAC Cost : \$3,343,900 Time Estimate : 9.0 Months <u>METC</u> NonPJMArea (1630) : The external (i.e. Non-PJM) Transmission Owner, METC, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$3,343,900
95968476	3	05FLWRFD8 SS 138.0 kV - 05MOORPK 138.0 kV Ckt 1	<u>AEP</u> AEPI0033a (336) : A Sag Study will be required on the 0.7 mile section of ACSR 954 45/7 RAIL line to mitigate the overload . New Rating after the Sag Study: S/N: 1410 MVA S/E: 1888 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$20,000 (No remediations required just sag study) and \$1.05 million (complete line re-conductor/rebuild required). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. Project Type : FAC Cost : \$20,000 Time Estimate : 6-12 Months	\$20,000
95535275	1	05STURGI 69.0 kV - 17HOWE 69.0 kV Ckt 1	<u>AEP</u> AEPI0034a (337) : Re-conductor/Re-conductor ~3 miles of ACSR 211.6 Penguin (4/0) Project Type : FAC Cost : \$3,000,000 Time Estimate : 24-36 Months <u>NIPS</u> NonPJMArea (1661) : The external (i.e. Non-PJM) Transmission Owner, NIPS, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$3,000,000
95968410,9596 8182,95968183	4	05MOTTV 138.0 kV - 05E.ELKHART 138.0 kV Ckt 1	<u>AEP</u> AEPI0031a (334) : A Sag Study will be required on the 7.8 mile section of ACSR 477 26/7 HAWK line to mitigate the overload . New Rating after the	\$31,200

ID	Idx	Facility	Upgrade Description	Cost
95968214	7	05E.ELKHART 138.0 kV - 05MOTTV 138.0 kV Ckt 1	Sag Study: S/N: 185 MVA S/E: 257 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$31,200 (No remediations required just sag study) and \$23.4 million (complete line re-conductor/rebuild required). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. Project Type : FAC Cost : \$31,200 Time Estimate : 6-12 Months	
			TOTAL COST	\$75,344,101

10.6 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".

10.6.1 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
95535275	243412	05STURGI	AEP	255331	17HOWE	NIPS	1	AEP_P1-2_#5577	single	47.0	87.01	129.05	DC	19.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
246536	05MOTTVILL	0.0576	80/20	0.0576
936141	AD2-020 C O1	3.8799	80/20	3.8799
943021	AE2-325 C	1.9650	80/20	1.9650
944161	AF1-084 C	3.0269	80/20	3.0269
944961	AF1-161 C	1.5670	80/20	1.5670
945111	AF1-176 C O1	22.6187	80/20	22.6187
957891	AF2-083 C O1	6.7260	80/20	6.7260
960981	AF2-389 C	2.3511	80/20	2.3511
961051	AF2-396 O1	19.7580	80/20	19.7580
WEC	WEC	0.0507	Confirmed LTF	0.0507
CBM-W2	CBM-W2	0.3276	Confirmed LTF	0.3276
NY	NY	0.0243	Confirmed LTF	0.0243
CBM-W1	CBM-W1	0.9633	Confirmed LTF	0.9633
TVA	TVA	0.0238	Confirmed LTF	0.0238
CBM-S1	CBM-S1	0.1108	Confirmed LTF	0.1108
MADISON	MADISON	0.3044	Confirmed LTF	0.3044
MEC	MEC	0.1811	Confirmed LTF	0.1811
BLUEG	BLUEG	0.0052	Confirmed LTF	0.0052
TRIMBLE	TRIMBLE	0.0017	Confirmed LTF	0.0017
CATAWBA	CATAWBA	0.0042	Confirmed LTF	0.0042

10.6.2 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
95968167	243265	05COREY	AEP	243346	05MOTTV	AEP	1	AEP_P2-2_#9208_05KENZIE 138_2	bus	185.0	114.59	143.4	DC	53.29

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247966	05WTRV SLR E	0.1344	Adder	0.16
936141	AD2-020 C O1	8.9811	50/50	8.9811
936142	AD2-020 E O1	5.5279	50/50	5.5279
943021	AE2-325 C	4.5486	50/50	4.5486
943022	AE2-325 E	3.0251	50/50	3.0251
944161	AF1-084 C	6.6348	50/50	6.6348
944162	AF1-084 E	3.7896	50/50	3.7896
944961	AF1-161 C	3.6272	50/50	3.6272
944962	AF1-161 E	3.6272	50/50	3.6272
945111	AF1-176 C O1	75.7804	50/50	75.7804
945112	AF1-176 E O1	70.2507	50/50	70.2507
957891	AF2-083 C O1	58.4124	50/50	58.4124
957892	AF2-083 E O1	14.6031	50/50	14.6031
960981	AF2-389 C	4.4694	50/50	4.4694
960982	AF2-389 E	2.9796	50/50	2.9796
961051	AF2-396 O1	53.2940	50/50	53.2940
WEC	WEC	0.0035	Confirmed LTF	0.0035
NEWTON	NEWTON	0.0247	Confirmed LTF	0.0247
FARMERCITY	FARMERCITY	0.0002	Confirmed LTF	0.0002
CALDERWOOD	CALDERWOOD	0.0094	Confirmed LTF	0.0094
NY	NY	0.0028	Confirmed LTF	0.0028
CBM-W1	CBM-W1	0.9883	Confirmed LTF	0.9883
PRAIRIE	PRAIRIE	0.0413	Confirmed LTF	0.0413
O-066	O-066	0.0336	Confirmed LTF	0.0336
CHEOAH	CHEOAH	0.0090	Confirmed LTF	0.0090
TILTON	TILTON	0.0176	Confirmed LTF	0.0176
G-007	G-007	0.0062	Confirmed LTF	0.0062
MADISON	MADISON	0.0645	Confirmed LTF	0.0645
GIBSON	GIBSON	0.0191	Confirmed LTF	0.0191
BLUEG	BLUEG	0.0538	Confirmed LTF	0.0538
TRIMBLE	TRIMBLE	0.0173	Confirmed LTF	0.0173
CATAWBA	CATAWBA	0.0056	Confirmed LTF	0.0056

10.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95968476	243294	05FLWRFD8 SS	AEP	243345	05MOORPK	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	64.43	108.82	DC	111.42

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244412	05WTRV SLR C	0.0578	50/50	0.0578
247966	05WTRV SLR E	0.3348	50/50	0.3348
936141	AD2-020 C O1	21.3289	50/50	21.3289
936142	AD2-020 E O1	13.1281	50/50	13.1281
938261	AE1-039	0.0599	Adder	0.07
939391	AE1-170 C O1	20.9859	50/50	20.9859
939392	AE1-170 E O1	28.9806	50/50	28.9806
943021	AE2-325 C	10.8023	50/50	10.8023
943022	AE2-325 E	7.1843	50/50	7.1843
944161	AF1-084 C	11.8771	50/50	11.8771
944162	AF1-084 E	6.7838	50/50	6.7838
944961	AF1-161 C	8.6143	50/50	8.6143
944962	AF1-161 E	8.6143	50/50	8.6143
945113	AF1-176 BAT	16.2540	50/50	16.2540
961051	AF2-396 O1	111.4180	50/50	111.4180
WEC	WEC	0.0060	Confirmed LTF	0.0060
NEWTON	NEWTON	0.0204	Confirmed LTF	0.0204
CALDERWOOD	CALDERWOOD	0.0099	Confirmed LTF	0.0099
NY	NY	0.0039	Confirmed LTF	0.0039
CBM-W1	CBM-W1	1.3636	Confirmed LTF	1.3636
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
O-066	O-066	0.0538	Confirmed LTF	0.0538
CHEOAH	CHEOAH	0.0100	Confirmed LTF	0.0100
TILTON	TILTON	0.0132	Confirmed LTF	0.0132
G-007	G-007	0.0094	Confirmed LTF	0.0094
MADISON	MADISON	0.0867	Confirmed LTF	0.0867
MEC	MEC	0.0079	Confirmed LTF	0.0079
GIBSON	GIBSON	0.0186	Confirmed LTF	0.0186
BLUEG	BLUEG	0.0573	Confirmed LTF	0.0573
TRIMBLE	TRIMBLE	0.0184	Confirmed LTF	0.0184
CATAWBA	CATAWBA	0.0063	Confirmed LTF	0.0063

10.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95968182	243346	05MOTTV	AEP	243287	05E.ELKHART	AEP	1	AEP_P2-2_#9208_05KENZIE 138_2	bus	185.0	106.48	138.0	DC	58.31

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
246536	05MOTTVILL	0.1632	50/50	0.1632
247966	05WTRV SLR E	0.1488	Adder	0.18
936141	AD2-020 C O1	9.9195	50/50	9.9195
936142	AD2-020 E O1	6.1055	50/50	6.1055
943021	AE2-325 C	5.0238	50/50	5.0238
943022	AE2-325 E	3.3412	50/50	3.3412
944161	AF1-084 C	7.4355	50/50	7.4355
944162	AF1-084 E	4.2469	50/50	4.2469
944961	AF1-161 C	4.0062	50/50	4.0062
944962	AF1-161 E	4.0062	50/50	4.0062
945111	AF1-176 C O1	80.2297	50/50	80.2297
945112	AF1-176 E O1	74.3753	50/50	74.3753
957891	AF2-083 C O1	61.8420	50/50	61.8420
957892	AF2-083 E O1	15.4605	50/50	15.4605
960981	AF2-389 C	5.4108	50/50	5.4108
960982	AF2-389 E	3.6072	50/50	3.6072
961051	AF2-396 O1	58.3080	50/50	58.3080
NEWTON	NEWTON	0.0408	Confirmed LTF	0.0408
FARMERCITY	FARMERCITY	0.0013	Confirmed LTF	0.0013
CALDERWOOD	CALDERWOOD	0.0119	Confirmed LTF	0.0119
CBM-W1	CBM-W1	1.0258	Confirmed LTF	1.0258
PRAIRIE	PRAIRIE	0.0801	Confirmed LTF	0.0801
CHEOAH	CHEOAH	0.0120	Confirmed LTF	0.0120
EDWARDS	EDWARDS	0.0063	Confirmed LTF	0.0063
TILTON	TILTON	0.0283	Confirmed LTF	0.0283
MADISON	MADISON	0.0302	Confirmed LTF	0.0302
GIBSON	GIBSON	0.0251	Confirmed LTF	0.0251
BLUEG	BLUEG	0.0677	Confirmed LTF	0.0677
TRIMBLE	TRIMBLE	0.0217	Confirmed LTF	0.0217
CATAWBA	CATAWBA	0.0063	Confirmed LTF	0.0063

10.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95968469	247330	05BRODY	AEP	243294	05FLWRFD8 SS	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	65.35	109.74	DC	111.42

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244412	05WTRV SLR C	0.0578	50/50	0.0578
247966	05WTRV SLR E	0.3348	50/50	0.3348
936141	AD2-020 C O1	21.3289	50/50	21.3289
936142	AD2-020 E O1	13.1281	50/50	13.1281
938261	AE1-039	0.0599	Adder	0.07
939391	AE1-170 C O1	20.9859	50/50	20.9859
939392	AE1-170 E O1	28.9806	50/50	28.9806
943021	AE2-325 C	10.8023	50/50	10.8023
943022	AE2-325 E	7.1843	50/50	7.1843
944161	AF1-084 C	11.8771	50/50	11.8771
944162	AF1-084 E	6.7838	50/50	6.7838
944961	AF1-161 C	8.6143	50/50	8.6143
944962	AF1-161 E	8.6143	50/50	8.6143
945113	AF1-176 BAT	16.2540	50/50	16.2540
961051	AF2-396 O1	111.4180	50/50	111.4180
WEC	WEC	0.0060	Confirmed LTF	0.0060
NEWTON	NEWTON	0.0204	Confirmed LTF	0.0204
CALDERWOOD	CALDERWOOD	0.0099	Confirmed LTF	0.0099
NY	NY	0.0039	Confirmed LTF	0.0039
CBM-W1	CBM-W1	1.3636	Confirmed LTF	1.3636
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
O-066	O-066	0.0538	Confirmed LTF	0.0538
CHEOAH	CHEOAH	0.0100	Confirmed LTF	0.0100
TILTON	TILTON	0.0132	Confirmed LTF	0.0132
G-007	G-007	0.0094	Confirmed LTF	0.0094
MADISON	MADISON	0.0867	Confirmed LTF	0.0867
MEC	MEC	0.0079	Confirmed LTF	0.0079
GIBSON	GIBSON	0.0186	Confirmed LTF	0.0186
BLUEG	BLUEG	0.0573	Confirmed LTF	0.0573
TRIMBLE	TRIMBLE	0.0184	Confirmed LTF	0.0184
CATAWBA	CATAWBA	0.0063	Confirmed LTF	0.0063

10.6.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95535034	243215	05COOK	AEP	243229	05OLIVE	AEP	1	AEP_P4_#7443_05DUMONT 765_A	breaker	1409.0	135.64	137.15	DC	21.88

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243440	05CKG1	50.8080	50/50	50.8080
243441	05CKG2	57.3454	50/50	57.3454
244412	05WTRV SLR C	0.0541	50/50	0.0541
247528	05COVRT1	7.6224	50/50	7.6224
247529	05COVRT2	7.6224	50/50	7.6224
247530	05COVRT3	7.6224	50/50	7.6224
247531	05COVRT4	4.5748	50/50	4.5748
247532	05COVRT5	4.5748	50/50	4.5748
247533	05COVRT6	4.5748	50/50	4.5748
247604	X1-042	0.0740	50/50	0.0740
247651	AA2-116	29.7892	50/50	29.7892
247966	05WTRV SLR E	0.3139	50/50	0.3139
276165	Z1-106 BAT2	0.6846	Merchant Transmission	0.6846
276166	Z1-106 BAT1	0.6845	Merchant Transmission	0.6845
276171	Z1-107 BAT	1.4258	Merchant Transmission	1.4258
276172	Z1-108 BAT	1.3592	Merchant Transmission	1.3592
918052	AA1-018 E OP	-7.8291	Adder	-9.21
920273	AA2-123 BAT	1.3432	Merchant Transmission	1.3432
925961	AC1-072	0.7071	50/50	0.7071
926581	AC1-141	2.7272	50/50	2.7272
927201	AC1-214 C O1	-1.0199	Adder	-1.2
932931	AC2-117	-3.6007	Adder	-4.24
933281	AC2-140 C	11.0044	50/50	11.0044
933282	AC2-140 E	0.5792	50/50	0.5792
936141	AD2-020 C O1	7.2770	50/50	7.2770
936142	AD2-020 E O1	4.4790	50/50	4.4790
936601	AD2-075	29.7192	50/50	29.7192
938261	AE1-039	0.1144	50/50	0.1144
939391	AE1-170 C O1	7.1644	50/50	7.1644
939392	AE1-170 E O1	9.8936	50/50	9.8936
939683	AE1-198 BAT	7.2250	Merchant Transmission	7.2250
943021	AE2-325 C	3.6855	50/50	3.6855
943022	AE2-325 E	2.4511	50/50	2.4511
943383	AF1-009 BAT	1.6535	Merchant Transmission	1.6535
943403	AF1-011 BAT	1.9044	Merchant Transmission	1.9044
943803	AF1-048 BAT	3.5026	Merchant Transmission	3.5026
943922	AF1-060 BAT	0.6760	Merchant Transmission	0.6760
944161	AF1-084 C	6.6997	50/50	6.6997
944162	AF1-084 E	3.8267	50/50	3.8267
944961	AF1-161 C	2.9390	50/50	2.9390
944962	AF1-161 E	2.9390	50/50	2.9390
945111	AF1-176 C O1	12.8160	Adder	15.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945112	AF1-176 E O1	11.8808	Adder	13.98
945352	AF1-200 NFTW	142.4430	Merchant Transmission	142.4430
946163	AF1-281 BAT	1.2840	Merchant Transmission	1.2840
946533	AF1-317 BAT	3.2175	Merchant Transmission	3.2175
950311	G934 C	4.3641	PJM External (MISO)	4.3641
950312	G934 E	17.4564	PJM External (MISO)	17.4564
950351	J466	3.4986	PJM External (MISO)	3.4986
950791	J201 C	0.4959	PJM External (MISO)	0.4959
950792	J201 E	1.9835	PJM External (MISO)	1.9835
950871	J246 C	0.1974	PJM External (MISO)	0.1974
950872	J246 E	0.7897	PJM External (MISO)	0.7897
950942	J325 E	0.4570	PJM External (MISO)	0.4570
951531	J533 C	5.6404	PJM External (MISO)	5.6404
951532	J533 E	22.5616	PJM External (MISO)	22.5616
951571	J538 C	3.2043	PJM External (MISO)	3.2043
951572	J538 E	12.8172	PJM External (MISO)	12.8172
951941	J602 C	3.9627	PJM External (MISO)	3.9627
951942	J602 E	21.4393	PJM External (MISO)	21.4393
952161	J571	0.8893	PJM External (MISO)	0.8893
952201	J589 C	4.2747	PJM External (MISO)	4.2747
952202	J589 E	23.1273	PJM External (MISO)	23.1273
952312	J646 E	0.1723	PJM External (MISO)	0.1723
952401	J752 C	1.8439	PJM External (MISO)	1.8439
952402	J752 E	9.9761	PJM External (MISO)	9.9761
952611	J717 C	4.0864	PJM External (MISO)	4.0864
952612	J717 E	22.1087	PJM External (MISO)	22.1087
952761	J728 C	3.8003	PJM External (MISO)	3.8003
952762	J728 E	20.5882	PJM External (MISO)	20.5882
952881	J758	26.1700	PJM External (MISO)	26.1700
952971	J793	142.6174	PJM External (MISO)	142.6174
953071	J794 C	0.2618	PJM External (MISO)	0.2618
953072	J794 E	1.4162	PJM External (MISO)	1.4162
953271	J701 C	0.9071	PJM External (MISO)	0.9071
953272	J701 E	4.9077	PJM External (MISO)	4.9077
953291	J796	30.7593	PJM External (MISO)	30.7593
953321	J799	17.9399	PJM External (MISO)	17.9399
953361	J806	18.5594	PJM External (MISO)	18.5594
953771	J832	13.9050	PJM External (MISO)	13.9050
953781	J833	9.4160	PJM External (MISO)	9.4160
953811	J839	11.0170	PJM External (MISO)	11.0170
953941	J857	15.9286	PJM External (MISO)	15.9286
954111	J875	15.4290	PJM External (MISO)	15.4290
954591	J937	78.9553	PJM External (MISO)	78.9553
955071	J984 C	4.5387	PJM External (MISO)	4.5387
955072	J984 E	24.5553	PJM External (MISO)	24.5553
955121	J989	9.5592	PJM External (MISO)	9.5592
955181	J996	7.4832	PJM External (MISO)	7.4832
955261	J1005	25.7420	PJM External (MISO)	25.7420
955591	J1043 C	3.0932	PJM External (MISO)	3.0932
955592	J1043 E	54.8115	PJM External (MISO)	54.8115
955781	J1062	12.5580	PJM External (MISO)	12.5580
955861	J1071	15.5140	PJM External (MISO)	15.5140

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
956011	J1088	19.0800	PJM External (MISO)	19.0800
956021	J1089	21.5526	PJM External (MISO)	21.5526
956031	J1090	10.5030	PJM External (MISO)	10.5030
956161	J1103	2.3734	PJM External (MISO)	2.3734
956741	J1172	6.1320	PJM External (MISO)	6.1320
956751	J1173	8.0560	PJM External (MISO)	8.0560
956801	J1178	7.8897	PJM External (MISO)	7.8897
957333	AF2-027 BAT	1.8105	Merchant Transmission	1.8105
957373	AF2-031 BAT	0.7567	Merchant Transmission	0.7567
957843	AF2-078 BAT	0.7713	Merchant Transmission	0.7713
957891	AF2-083 C O1	13.1832	50/50	13.1832
957892	AF2-083 E O1	3.2958	50/50	3.2958
958013	AF2-095 BAT	1.5281	Merchant Transmission	1.5281
958023	AF2-096 BAT	2.7248	Merchant Transmission	2.7248
958923	AF2-183 BAT	2.7221	Merchant Transmission	2.7221
959353	AF2-226 BAT	1.8399	Merchant Transmission	1.8399
960283	AF2-319 BAT	1.8399	Merchant Transmission	1.8399
960382	AF2-329 BAT	1.8863	Merchant Transmission	1.8863
960603	AF2-351 BAT	0.7640	Merchant Transmission	0.7640
960981	AF2-389 C	1.2257	Adder	2.72
960982	AF2-389 E	0.8171	Adder	1.81
961022	AF2-393 BAT	2.0320	Merchant Transmission	2.0320
961032	AF2-394 BAT	1.3547	Merchant Transmission	1.3547
961051	AF2-396 O1	21.8760	50/50	21.8760
NEWTON	NEWTON	4.1486	Confirmed LTF	4.1486
FARMERCITY	FARMERCITY	0.2704	Confirmed LTF	0.2704
G-007A	G-007A	1.8892	Confirmed LTF	1.8892
VFT	VFT	5.1020	Confirmed LTF	5.1020
CALDERWOOD	CALDERWOOD	0.6645	Confirmed LTF	0.6645
PRAIRIE	PRAIRIE	9.9730	Confirmed LTF	9.9730
CHEOAH	CHEOAH	0.6587	Confirmed LTF	0.6587
EDWARDS	EDWARDS	2.1865	Confirmed LTF	2.1865
TILTON	TILTON	2.8514	Confirmed LTF	2.8514
GIBSON	GIBSON	1.4305	Confirmed LTF	1.4305
BLUEG	BLUEG	3.0588	Confirmed LTF	3.0588
TRIMBLE	TRIMBLE	0.9639	Confirmed LTF	0.9639
CATAWBA	CATAWBA	0.2411	Confirmed LTF	0.2411

10.6.7 Index 7

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
95968214	243287	05E.ELKHART	AEP	243346	05MOTTV	AEP	1	AEP_P2-2_#9208_05KENZIE 138_2	bus	185.0	112.49	125.09	DC	23.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943023	AE2-325 BAT	8.3650	50/50	8.3650
944963	AF1-161 BAT	8.0125	50/50	8.0125
945113	AF1-176 BAT	62.6563	50/50	62.6563
957893	AF2-083 BAT	38.6512	50/50	38.6512
961052	AF2-396 BAT	23.3232	50/50	23.3232
WEC	WEC	0.0044	Confirmed LTF	0.0044
LGEE	LGEE	0.0217	Confirmed LTF	0.0217
CPL	CPL	0.0106	Confirmed LTF	0.0106
CBM-W2	CBM-W2	0.2539	Confirmed LTF	0.2539
NY	NY	0.0011	Confirmed LTF	0.0011
TVA	TVA	0.0378	Confirmed LTF	0.0378
CBM-S2	CBM-S2	0.1040	Confirmed LTF	0.1040
CBM-S1	CBM-S1	0.2471	Confirmed LTF	0.2471
MEC	MEC	0.0334	Confirmed LTF	0.0334

10.6.8 Index 8

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
98936948	256583	18MOROCCO	METC	238530	02ALLEN	ATSI	1	ATSI-P7-1-TE-345-022T	tower	1793.0	136.22	136.23	DC	21.43

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243071	05BERRINSP G	0.1151	50/50	0.1151
243440	05CKG1	19.0289	50/50	19.0289
244357	05GRANGER EL	-0.2468	Adder	-0.29
244412	05WTRV SLR C	0.0475	50/50	0.0475
246422	05MAYFLWER	0.0832	50/50	0.0832
246431	05BUCHANAN	0.0157	50/50	0.0157
246536	05MOTTVILL	0.0279	50/50	0.0279
247528	05COVRT1	6.0314	50/50	6.0314
247529	05COVRT2	6.0314	50/50	6.0314
247530	05COVRT3	6.0314	50/50	6.0314
247531	05COVRT4	3.6200	50/50	3.6200
247532	05COVRT5	3.6200	50/50	3.6200
247533	05COVRT6	3.6200	50/50	3.6200
247604	X1-042	0.0636	50/50	0.0636
247651	AA2-116	17.5557	50/50	17.5557
247966	05WTRV SLR E	0.2753	50/50	0.2753
247967	05OLIV SLR E	0.1951	Adder	0.23
247969	Z2-116 E	0.1046	Adder	0.12
274788	SE CHICAG;5U (Deactivation : 01/06/2020)	2.4036	Adder	2.83
274789	SE CHICAG;6U (Deactivation : 01/06/2020)	2.4099	Adder	2.84
274790	SE CHICAG;7U (Deactivation : 01/06/2020)	2.4416	Adder	2.87
274791	SE CHICAG;8U (Deactivation : 01/06/2020)	2.4416	Adder	2.87
274792	SE CHICAG;9U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274793	SE CHICAG;0U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274794	SE CHICAG;1U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274795	SE CHICAG;2U (Deactivation : 01/06/2020)	2.4468	Adder	2.88

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
925961	AC1-072	0.5595	50/50	0.5595
926581	AC1-141	1.6072	50/50	1.6072
931951	AB1-107 1	-41.9666	Adder	-49.37
931961	AB1-107 2	-73.8919	Adder	-86.93
932931	AC2-117	2.9008	Adder	3.41
933281	AC2-140 C	2.7132	Adder	3.19
933282	AC2-140 E	0.1428	Adder	0.17
934252	AD1-052 E1	-0.7196	Adder	-0.85
934262	AD1-052 E2	-0.7196	Adder	-0.85
936141	AD2-020 C O1	6.7972	50/50	6.7972
936142	AD2-020 E O1	4.1838	50/50	4.1838
936601	AD2-075	23.5161	50/50	23.5161
936631	AD2-079 C O1	0.9643	Adder	1.13
936632	AD2-079 E O1	0.6429	Adder	0.76
938261	AE1-039	0.0984	50/50	0.0984
939391	AE1-170 C O1	6.5690	50/50	6.5690
939392	AE1-170 E O1	9.0715	50/50	9.0715
939631	AE1-193 C	4.1703	Adder	4.91
939632	AE1-193 E	27.9087	Adder	32.83
939641	AE1-194 C	4.1703	Adder	4.91
939642	AE1-194 E	27.9087	Adder	32.83
939651	AE1-195 C	4.1703	Adder	4.91
939652	AE1-195 E	27.9087	Adder	32.83
939681	AE1-198 C	12.3825	Adder	14.57
939682	AE1-198 E	10.5219	Adder	12.38
943001	AE2-323 C	4.3620	Adder	5.13
943002	AE2-323 E	2.1388	Adder	2.52
943021	AE2-325 C	3.4425	50/50	3.4425
943022	AE2-325 E	2.2895	50/50	2.2895
943781	AF1-046 C	2.0361	Adder	2.4
943782	AF1-046 E	1.3574	Adder	1.6
944161	AF1-084 C	6.1495	50/50	6.1495
944162	AF1-084 E	3.5124	50/50	3.5124
944931	AF1-158 C O1	7.0678	Adder	8.32
944932	AF1-158 E O1	4.7119	Adder	5.54
944961	AF1-161 C	2.7453	50/50	2.7453
944962	AF1-161 E	2.7453	50/50	2.7453
945111	AF1-176 C O1	15.9883	50/50	15.9883
945112	AF1-176 E O1	14.8217	50/50	14.8217
945501	AF1-215 C O1	11.8529	Adder	13.94
945502	AF1-215 E O1	7.9019	Adder	9.3
950311	G934 C	3.4658	PJM External (MISO)	3.4658
950312	G934 E	13.8632	PJM External (MISO)	13.8632
950351	J466	7.4874	PJM External (MISO)	7.4874
950791	J201 C	0.9044	PJM External (MISO)	0.9044
950792	J201 E	3.6178	PJM External (MISO)	3.6178
950871	J246 C	0.2453	PJM External (MISO)	0.2453
950872	J246 E	0.9811	PJM External (MISO)	0.9811
950942	J325 E	1.0278	PJM External (MISO)	1.0278
951531	J533 C	7.0080	PJM External (MISO)	7.0080
951532	J533 E	28.0320	PJM External (MISO)	28.0320
951571	J538 C	8.5020	PJM External (MISO)	8.5020

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
951572	J538 E	34.0080	PJM External (MISO)	34.0080
951941	J602 C	6.7545	PJM External (MISO)	6.7545
951942	J602 E	36.5435	PJM External (MISO)	36.5435
952201	J589 C	5.7786	PJM External (MISO)	5.7786
952202	J589 E	31.2634	PJM External (MISO)	31.2634
952312	J646 E	0.4444	PJM External (MISO)	0.4444
952401	J752 C	3.8161	PJM External (MISO)	3.8161
952402	J752 E	20.6459	PJM External (MISO)	20.6459
952611	J717 C	6.3780	PJM External (MISO)	6.3780
952612	J717 E	34.5065	PJM External (MISO)	34.5065
952761	J728 C	5.9314	PJM External (MISO)	5.9314
952762	J728 E	32.1334	PJM External (MISO)	32.1334
952971	J793	366.2865	PJM External (MISO)	366.2865
953071	J794 C	0.3783	PJM External (MISO)	0.3783
953072	J794 E	2.0466	PJM External (MISO)	2.0466
953271	J701 C	1.8586	PJM External (MISO)	1.8586
953272	J701 E	10.0553	PJM External (MISO)	10.0553
953291	J796	50.6823	PJM External (MISO)	50.6823
953321	J799	65.8117	PJM External (MISO)	65.8117
953361	J806	28.5514	PJM External (MISO)	28.5514
953771	J832	17.7220	PJM External (MISO)	17.7220
953781	J833	36.0170	PJM External (MISO)	36.0170
953811	J839	26.9670	PJM External (MISO)	26.9670
953941	J857	21.9999	PJM External (MISO)	21.9999
954111	J875	49.3725	PJM External (MISO)	49.3725
955071	J984 C	5.0497	PJM External (MISO)	5.0497
955072	J984 E	27.3203	PJM External (MISO)	27.3203
955121	J989	19.1528	PJM External (MISO)	19.1528
955181	J996	32.3832	PJM External (MISO)	32.3832
955261	J1005	42.3960	PJM External (MISO)	42.3960
955781	J1062	43.8135	PJM External (MISO)	43.8135
956011	J1088	32.0565	PJM External (MISO)	32.0565
956021	J1089	36.6333	PJM External (MISO)	36.6333
956031	J1090	21.2733	PJM External (MISO)	21.2733
956161	J1103	4.8628	PJM External (MISO)	4.8628
956741	J1172	11.5105	PJM External (MISO)	11.5105
956751	J1173	27.5488	PJM External (MISO)	27.5488
956801	J1178	13.6890	PJM External (MISO)	13.6890
957371	AF2-031 C O1	0.2685	Adder	0.6
957372	AF2-031 E O1	0.4028	Adder	0.89
957891	AF2-083 C O1	12.4632	50/50	12.4632
957892	AF2-083 E O1	3.1158	50/50	3.1158
958381	AF2-132 C	6.0688	Adder	13.47
958382	AF2-132 E	4.0459	Adder	8.98
958401	AF2-134 C	2.0940	Adder	4.65
958402	AF2-134 E	1.3960	Adder	3.1
958991	AF2-190 C	5.2329	Adder	11.62
958992	AF2-190 E	3.4886	Adder	7.74
959001	AF2-191 C	2.7316	Adder	6.06
959002	AF2-191 E	1.8210	Adder	4.04
960681	AF2-359 C	2.9341	Adder	6.51
960682	AF2-359 E	1.9561	Adder	4.34

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960981	AF2-389 C	3.0819	50/50	3.0819
960982	AF2-389 E	2.0546	50/50	2.0546
961051	AF2-396 O1	21.4320	50/50	21.4320
961501	AF2-441 C O1	2.6608	Adder	5.91
961502	AF2-441 E O1	3.9912	Adder	8.86
WEC	WEC	2.1300	Confirmed LTF	2.1300
LGEE	LGEE	1.6100	Confirmed LTF	1.6100
CPL	CPL	0.2798	Confirmed LTF	0.2798
CBM-W2	CBM-W2	30.9091	Confirmed LTF	30.9091
NY	NY	1.1851	Confirmed LTF	1.1851
CBM-W1	CBM-W1	195.2436	Confirmed LTF	195.2436
TVA	TVA	3.5840	Confirmed LTF	3.5840
O-066	O-066	12.6941	Confirmed LTF	12.6941
CBM-S2	CBM-S2	4.7801	Confirmed LTF	4.7801
CBM-S1	CBM-S1	22.2287	Confirmed LTF	22.2287
G-007	G-007	1.9531	Confirmed LTF	1.9531
MADISON	MADISON	7.8140	Confirmed LTF	7.8140
MEC	MEC	8.9270	Confirmed LTF	8.9270

10.6.9 Index 9

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
98936570	264612	19MON12	ITCT	241901	02LALLENDORF	ATSI	1	ATSI-P1-2-TE-345-605T	single	1244.0	141.43	141.44	DC	17.01

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243071	05BERRINSP G	0.0914	80/20	0.0914
243440	05CKG1	15.1055	80/20	15.1055
243441	05CKG2	13.2913	80/20	13.2913
244130	05ST.JOE CTR	8.1410	80/20	8.1410
244412	05WTRV SLR C	0.0376	80/20	0.0376
244415	05OLIV SLR C	0.0316	80/20	0.0316
246397	05ELKHART HY	0.0337	80/20	0.0337
246416	05TWIN BRCH1	0.0546	80/20	0.0546
246422	05MAYFLWER	0.0661	80/20	0.0661
246431	05BUCHANAN	0.0124	80/20	0.0124
246536	05MOTTVILL	0.0221	80/20	0.0221
247528	05COVRT1	4.7532	80/20	4.7532
247529	05COVRT2	4.7532	80/20	4.7532
247530	05COVRT3	4.7532	80/20	4.7532
247531	05COVRT4	2.8528	80/20	2.8528
247532	05COVRT5	2.8528	80/20	2.8528
247533	05COVRT6	2.8528	80/20	2.8528
247604	X1-042	0.0504	80/20	0.0504
247620	Y3-023	0.0604	80/20	0.0604
247643	Z2-116 C	0.0169	80/20	0.0169
247651	AA2-116	13.9585	80/20	13.9585
274723	RIVER EC ;12	1.7026	80/20	1.7026
274751	CRETE EC ;1U	0.7844	80/20	0.7844
274752	CRETE EC ;2U	0.7844	80/20	0.7844
274753	CRETE EC ;3U	0.7844	80/20	0.7844
274754	CRETE EC ;4U	0.7844	80/20	0.7844
274788	SE CHICAG;5U (Deactivation : 01/06/2020)	1.9258	Adder	2.27
274789	SE CHICAG;6U (Deactivation : 01/06/2020)	1.9309	Adder	2.27
274790	SE CHICAG;7U (Deactivation : 01/06/2020)	1.9563	Adder	2.3
274791	SE CHICAG;8U (Deactivation : 01/06/2020)	2.3015	80/20	2.3015
274792	SE CHICAG;9U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274793	SE CHICAG;0U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
274794	SE CHICAG;1U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
274795	SE CHICAG;2U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
922912	AB1-080	0.4824	80/20	0.4824
925961	AC1-072	0.4409	80/20	0.4409
926581	AC1-141	1.2779	80/20	1.2779
927451	AC1-142A 1	1.5561	Adder	1.83
927461	AC1-142A 2	1.5561	Adder	1.83
930501	AB1-091 O1	27.0729	Adder	31.85
931951	AB1-107 1	-34.4746	Adder	-40.56
931961	AB1-107 2	-112.3235	Adder	-132.15
932601	AC2-080 C O1	1.2637	Adder	1.49
932931	AC2-117	2.3241	Adder	2.73
933281	AC2-140 C	2.5506	80/20	2.5506
933411	AC2-154 C	0.9346	Adder	1.1
934721	AD1-100 C	7.2624	Adder	8.54
936141	AD2-020 C O1	5.3921	80/20	5.3921
936371	AD2-047 C O1	1.6724	Adder	1.97
936461	AD2-060	0.9838	Adder	1.16
936601	AD2-075	18.5325	80/20	18.5325
936631	AD2-079 C O1	0.9048	80/20	0.9048
937041	AD2-138 C	1.7108	Adder	2.01
937401	AD2-194 1	2.9029	Adder	3.42
937411	AD2-194 2	2.9029	Adder	3.42
938261	AE1-039	0.0779	80/20	0.0779
938511	AE1-070 1	3.4109	Adder	4.01
938521	AE1-070 2	3.1206	Adder	3.67
939351	AE1-166 C O1	3.7963	Adder	4.47
939391	AE1-170 C O1	5.2196	80/20	5.2196
939631	AE1-193 C	3.9305	80/20	3.9305
939641	AE1-194 C	3.9305	80/20	3.9305
939651	AE1-195 C	3.9305	80/20	3.9305
939681	AE1-198 C	11.6707	80/20	11.6707
940581	AE2-045 C O1	5.7352	Adder	6.75
941551	AE2-152 C O1	4.3804	Adder	5.15
941561	AE2-153 C O1	1.7261	Adder	2.03
943001	AE2-323 C	4.1864	80/20	4.1864
943021	AE2-325 C	2.7309	80/20	2.7309
943781	AF1-046 C	1.9541	80/20	1.9541
944161	AF1-084 C	4.8750	80/20	4.8750
944911	AF1-156 C	4.4133	Adder	5.19
944931	AF1-158 C O1	6.6276	80/20	6.6276
944961	AF1-161 C	2.1777	80/20	2.1777
945111	AF1-176 C O1	12.6957	80/20	12.6957
945351	AF1-200 FTIR	115.7304	Merchant Transmission	115.7304
945501	AF1-215 C O1	11.1636	80/20	11.1636
950351	J466	6.4410	PJM External (MISO)	6.4410

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
950791	J201 C	0.7628	PJM External (MISO)	0.7628
951941	J602 C	5.6160	PJM External (MISO)	5.6160
952401	J752 C	3.2738	PJM External (MISO)	3.2738
952971	J793	321.0741	PJM External (MISO)	321.0741
953271	J701 C	1.5931	PJM External (MISO)	1.5931
953291	J796	42.4010	PJM External (MISO)	42.4010
953321	J799	48.3424	PJM External (MISO)	48.3424
953781	J833	24.9220	PJM External (MISO)	24.9220
953811	J839	23.5040	PJM External (MISO)	23.5040
954111	J875	29.9235	PJM External (MISO)	29.9235
955121	J989	15.8048	PJM External (MISO)	15.8048
955181	J996	17.2944	PJM External (MISO)	17.2944
955261	J1005	35.6320	PJM External (MISO)	35.6320
956021	J1089	11.4294	PJM External (MISO)	11.4294
956161	J1103	4.1682	PJM External (MISO)	4.1682
956741	J1172	9.6605	PJM External (MISO)	9.6605
956751	J1173	16.5016	PJM External (MISO)	16.5016
957371	AF2-031 C O1	0.2152	Adder	0.48
957891	AF2-083 C O1	9.9012	80/20	9.9012
958011	AF2-095 C O1	3.5456	Adder	7.87
958021	AF2-096 C O1	6.6031	Adder	14.66
958381	AF2-132 C	10.7946	80/20	10.7946
958391	AF2-133 C	4.7770	Adder	10.6
958401	AF2-134 C	3.7212	80/20	3.7212
958991	AF2-190 C	4.1942	Adder	9.31
959001	AF2-191 C	4.8332	80/20	4.8332
959141	AF2-205 C	3.1436	Adder	6.98
960591	AF2-350 C O1	1.5642	Adder	3.47
960601	AF2-351 C O1	0.2086	Adder	0.46
960681	AF2-359 C	5.1975	80/20	5.1975
960981	AF2-389 C	2.4483	80/20	2.4483
961051	AF2-396 O1	17.0060	80/20	17.0060
961501	AF2-441 C O1	2.1325	Adder	4.73
WEC	WEC	1.7101	Confirmed LTF	1.7101
LGEE	LGEE	1.3378	Confirmed LTF	1.3378
CPL	CPL	0.2547	Confirmed LTF	0.2547
CBM-W2	CBM-W2	25.1843	Confirmed LTF	25.1843
NY	NY	0.9589	Confirmed LTF	0.9589
CBM-W1	CBM-W1	167.6340	Confirmed LTF	167.6340
TVA	TVA	2.9526	Confirmed LTF	2.9526
CBM-S2	CBM-S2	4.1269	Confirmed LTF	4.1269
CBM-S1	CBM-S1	18.3436	Confirmed LTF	18.3436
MADISON	MADISON	6.0702	Confirmed LTF	6.0702
MEC	MEC	7.1950	Confirmed LTF	7.1950

10.6.10 Index 10

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
98936956	955620	J1046 TAP	ITCT	238889	02LEMOYN	ATSI	1	ATSI-P7-1-TE-138-027T-A	tower	953.0	126.09	126.67	DC	12.22

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244357	05GRANGER EL	-0.1404	Adder	-0.17
247966	05WTRV SLR E	0.1340	Adder	0.16
247967	05OLIV SLR E	0.1119	Adder	0.13
247969	Z2-116 E	0.0600	Adder	0.07
931951	AB1-107 1	-18.6084	Adder	-21.89
931961	AB1-107 2	-39.8116	Adder	-46.84
934252	AD1-052 E1	-0.3783	Adder	-0.45
934262	AD1-052 E2	-0.3783	Adder	-0.45
936141	AD2-020 C O1	3.3021	Adder	3.88
936142	AD2-020 E O1	2.0325	Adder	2.39
936601	AD2-075	11.4721	Adder	13.5
936631	AD2-079 C O1	0.5527	Adder	0.65
936632	AD2-079 E O1	0.3685	Adder	0.43
938261	AE1-039	0.0479	Adder	0.06
939391	AE1-170 C O1	3.1975	Adder	3.76
939392	AE1-170 E O1	4.4156	Adder	5.19
943021	AE2-325 C	1.6724	Adder	1.97
943022	AE2-325 E	1.1123	Adder	1.31
944161	AF1-084 C	2.9890	Adder	3.52
944162	AF1-084 E	1.7072	Adder	2.01
944931	AF1-158 C O1	4.0545	Adder	4.77
944932	AF1-158 E O1	2.7030	Adder	3.18
944961	AF1-161 C	1.3337	Adder	1.57
944962	AF1-161 E	1.3337	Adder	1.57
945111	AF1-176 C O1	7.7266	Adder	9.09
945112	AF1-176 E O1	7.1628	Adder	8.43
950311	G934 C	2.8833	PJM External (MISO)	2.8833
950312	G934 E	11.5332	PJM External (MISO)	11.5332
950351	J466	4.4844	PJM External (MISO)	4.4844
950791	J201 C	0.5400	PJM External (MISO)	0.5400
950792	J201 E	2.1600	PJM External (MISO)	2.1600
950871	J246 C	0.1459	PJM External (MISO)	0.1459
950872	J246 E	0.5834	PJM External (MISO)	0.5834
950942	J325 E	0.6162	PJM External (MISO)	0.6162
951531	J533 C	4.1672	PJM External (MISO)	4.1672
951532	J533 E	16.6688	PJM External (MISO)	16.6688
951941	J602 C	4.0270	PJM External (MISO)	4.0270
951942	J602 E	21.7870	PJM External (MISO)	21.7870
952161	J571	0.3855	PJM External (MISO)	0.3855
952201	J589 C	3.4361	PJM External (MISO)	3.4361
952202	J589 E	18.5899	PJM External (MISO)	18.5899

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
952312	J646 E	0.2644	PJM External (MISO)	0.2644
952401	J752 C	2.2838	PJM External (MISO)	2.2838
952402	J752 E	12.3562	PJM External (MISO)	12.3562
952611	J717 C	3.8024	PJM External (MISO)	3.8024
952612	J717 E	20.5718	PJM External (MISO)	20.5718
952761	J728 C	3.5361	PJM External (MISO)	3.5361
952762	J728 E	19.1571	PJM External (MISO)	19.1571
952881	J758	15.8600	PJM External (MISO)	15.8600
952971	J793	218.9629	PJM External (MISO)	218.9629
953071	J794 C	0.2252	PJM External (MISO)	0.2252
953072	J794 E	1.2183	PJM External (MISO)	1.2183
953271	J701 C	1.1120	PJM External (MISO)	1.1120
953272	J701 E	6.0165	PJM External (MISO)	6.0165
953291	J796	30.2192	PJM External (MISO)	30.2192
953321	J799	35.3090	PJM External (MISO)	35.3090
953361	J806	13.8645	PJM External (MISO)	13.8645
953771	J832	10.5410	PJM External (MISO)	10.5410
953781	J833	18.9430	PJM External (MISO)	18.9430
953811	J839	16.1310	PJM External (MISO)	16.1310
953941	J857	10.0697	PJM External (MISO)	10.0697
954111	J875	8.6430	PJM External (MISO)	8.6430
954591	J937	27.4508	PJM External (MISO)	27.4508
955071	J984 C	2.9986	PJM External (MISO)	2.9986
955072	J984 E	16.2234	PJM External (MISO)	16.2234
955121	J989	11.5528	PJM External (MISO)	11.5528
955261	J1005	25.2920	PJM External (MISO)	25.2920
955591	J1043 C	1.6336	PJM External (MISO)	1.6336
955592	J1043 E	28.9474	PJM External (MISO)	28.9474
955781	J1062	76.7670	PJM External (MISO)	76.7670
955861	J1071	7.3330	PJM External (MISO)	7.3330
956011	J1088	19.0275	PJM External (MISO)	19.0275
956021	J1089	21.7702	PJM External (MISO)	21.7702
956031	J1090	11.4507	PJM External (MISO)	11.4507
956161	J1103	2.9096	PJM External (MISO)	2.9096
956741	J1172	6.8890	PJM External (MISO)	6.8890
956801	J1178	8.3551	PJM External (MISO)	8.3551
957891	AF2-083 C O1	3.2101	Adder	7.13
957892	AF2-083 E O1	0.8025	Adder	1.78
959001	AF2-191 C	1.5669	Adder	3.48
959002	AF2-191 E	1.0446	Adder	2.32
960981	AF2-389 C	0.7922	Adder	1.76
960982	AF2-389 E	0.5282	Adder	1.17
961051	AF2-396 O1	5.5051	Adder	12.22
WEC	WEC	1.2225	Confirmed LTF	1.2225
LGEE	LGEE	0.9231	Confirmed LTF	0.9231
CPLE	CPLE	0.1561	Confirmed LTF	0.1561
CBM-W2	CBM-W2	17.7313	Confirmed LTF	17.7313
NY	NY	0.6863	Confirmed LTF	0.6863
CBM-W1	CBM-W1	110.1005	Confirmed LTF	110.1005
TVA	TVA	2.0524	Confirmed LTF	2.0524
O-066	O-066	7.3517	Confirmed LTF	7.3517
CBM-S2	CBM-S2	2.7108	Confirmed LTF	2.7108

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-S1	CBM-S1	12.7289	Confirmed LTF	12.7289
G-007	G-007	1.1315	Confirmed LTF	1.1315
MADISON	MADISON	4.4876	Confirmed LTF	4.4876
MEC	MEC	5.1229	Confirmed LTF	5.1229

10.7 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
AA1-018	Powerton-Goodings Grove	In Service
AA2-116	Cook-East Elkhart 345kV	Under Construction
AA2-123	Marengo 34kV	In Service
AB1-080	Dumont-Olive 345kV	In Service
AB1-091	Davis Creek 345kV	Active
AB1-107	Bayshore-GM Powertrain 138 kV & Lallendorf 345kV	Engineering and Procurement
AC1-072	Segreto (Covert) 345kV	In Service
AC1-141	Cook-East Elkhart 345kV	Under Construction
AC1-142A	Joliet	Active
AC1-214	Crescent Ridge	Engineering and Procurement
AC2-080	Olive-Reynolds 345kV	Active
AC2-117	University Park North	Engineering and Procurement
AC2-140	DC Cook Unit 2	Engineering and Procurement
AC2-154	Davis Creek 138kV	Active
AD1-052	Freemont Energy Center	Under Construction
AD1-100	Loretto-Wilton & Braidwood-Davis Creek	Active
AD2-020	Valley 138 kV	Active
AD2-047	Davis Creek 138 kV	Active
AD2-060	Davis Creek 138kV	Active
AD2-075	Segreto 345kV	Active
AD2-079	Capitol Ave 34.5kV	Active
AD2-138	Olive-Reynolds 345kV	Active
AD2-194	Elwood	Active
AE1-039	West Street (Orchard Hills) 12.47 kV	Engineering and Procurement
AE1-070	Elwood 345 kV	Active
AE1-166	Loretto-Wilton & Braidwood-Davis Creek	Active
AE1-170	Kenzie Creek-Colby 138 kV	Active
AE1-193	Crete 345 kV	Active
AE1-194	Crete 345 kV	Active
AE1-195	Crete 345 kV	Active
AE1-198	Crete 345 kV	Active
AE2-045	Olive-Reynolds 345 kV	Active
AE2-152	Loretto-Wilton & Braidwood-Davis Creek	Active
AE2-153	Braidwood-Davis Creek	Active
AE2-323	Twin Branch-Guardian 138 kV	Active
AE2-325	Valley 138 kV	Active
AF1-009	Dixon-McGirr	Active
AF1-011	Schauff Road	Active
AF1-046	Twin Branch-Guardian 138 kV	Active

Queue Number	Project Name	Status
AF1-048	Belvidere-Marengo	Active
AF1-060	Lena 138 kV	Active
AF1-084	East Hartford-Murch 69 kV	Active
AF1-156	Braidwood-Davis Creek	Active
AF1-158	Edison-Gravel Pit 138 kV	Active
AF1-161	Valley 138 kV	Active
AF1-176	Corey 138 kV	Active
AF1-200	Plano 345 kV	Active
AF1-215	Reynolds-Olive 345 kV	Active
AF1-281	Nelson-Lee County	Active
AF1-317	Electric Jct-Nelson	Active
AF2-027	Zion Energy Center 345 kV	Active
AF2-031	River E.C.	Active
AF2-078	Reynolds-Olive #1 345 kV	Active
AF2-083	Ed Lowe-Kenzie Creek 138 kV	Active
AF2-095	Wilmington-Davis Creek	Active
AF2-096	Braidwood-East Frankfort 345 kV	Active
AF2-132	Reynolds-Olive #1 345 kV	Active
AF2-133	Reynolds-Olive #2 345 kV	Active
AF2-134	Reynolds-Olive #2 345 kV	Active
AF2-183	Nelson-Lee County 345 kV	Active
AF2-190	Olive-Reynolds #2 345 kV	Active
AF2-191	New Carlisle 138 kV	Active
AF2-205	Olive-Reynolds #2 345 kV	Active
AF2-226	Katydid Road 345 kV	Active
AF2-319	Katydid Road 345 kV	Active
AF2-329	Sandwich-Plano 138 kV	Active
AF2-350	Kensington 138 kV	Active
AF2-351	Kensington 138 kV	Active
AF2-359	Olive-University Park 345 kV	Active
AF2-389	Pokagon-Corey 69 kV	Active
AF2-393	Nelson-Dixon 138 kV	Active
AF2-394	Nelson-Dixon 138 kV	Active
AF2-396	Stinger 138 kV	Active
AF2-441	Burnham 138kV	Active
X1-042	Watervliet	In Service
Y3-023	Country Side 12kV	In Service
Z1-106	West Chicago 34kV	In Service
Z1-107	Joliet 34kV	In Service
Z1-108	McHenry 34kV	In Service
Z2-116	Twin Branch 12.47kV	In Service
J1005	MISO	MISO
J1043	MISO	MISO
J1062	MISO	MISO
J1071	MISO	MISO
J1088	MISO	MISO
J1089	MISO	MISO
J1090	MISO	MISO
J1103	MISO	MISO
J1172	MISO	MISO
J1173	MISO	MISO
J1178	MISO	MISO

Queue Number	Project Name	Status
J201	MISO	MISO
J246	MISO	MISO
J325	MISO	MISO
J466	MISO	MISO
J533	MISO	MISO
J538	MISO	MISO
J571	MISO	MISO
J589	MISO	MISO
J602	MISO	MISO
J646	MISO	MISO
J701	MISO	MISO
J717	MISO	MISO
J728	MISO	MISO
J752	MISO	MISO
J758	MISO	MISO
J793	MISO	MISO
J794	MISO	MISO
J796	MISO	MISO
J799	MISO	MISO
J806	MISO	MISO
J832	MISO	MISO
J833	MISO	MISO
J839	MISO	MISO
J857	MISO	MISO
J875	MISO	MISO
J937	MISO	MISO
J984	MISO	MISO
J989	MISO	MISO
J996	MISO	MISO

10.8 Contingency Descriptions – Primary POI

Contingency Name	Contingency Definition
AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	CONTINGENCY 'AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1' OPEN BRANCH FROM BUS 243204 TO BUS 243386 CKT 1 / 243204 05VALLEYEQ 999 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243204 TO BUS 246551 CKT 1 / 243204 05VALLEYEQ 999 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 243204 TO BUS 246550 CKT 1 / 243204 05VALLEYEQ 999 246550 05VALLEY 34.5 1 OPEN BRANCH FROM BUS 243261 TO BUS 243386 CKT 1 / 243261 05COLBYTAPSS 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243307 TO BUS 243386 CKT 1 / 243307 05HARTFO 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 247329 TO BUS 243386 CKT 1 / 247329 05STINGER 138 243386 05VALLY 138 1 REMOVE SWSHUNT FROM BUS 243386 / 243386 05VALLY 138 OPEN BRANCH FROM BUS 246509 TO BUS 246551 CKT 1 / 246509 05CAMERON 69.0 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 247174 TO BUS 246550 CKT 1 / 247174 05ROTHDEW 34.5 246550 05VALLEY 34.5 1 END
ATSI-P2-3-TE-345-015T	CONTINGENCY 'ATSI-P2-3-TE-345-015T' /* LEMOYNE BK-34505 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 238890 CKT 1 /* 02LEMOYN 345 02LEMOYN 138 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 J1046 TAP 345 END
AEP_P1-2_#358	CONTINGENCY 'AEP_P1-2_#358' OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1 END
AEP_P1-2_#5577	CONTINGENCY 'AEP_P1-2_#5577' OPEN BRANCH FROM BUS 243287 TO BUS 243346 CKT 1 / 243287 05E.ELKHART 138 243346 05MOTTV 138 1 END
AEP_P4_#9218_05KENZIE 138_G	CONTINGENCY 'AEP_P4_#9218_05KENZIE 138_G' OPEN BRANCH FROM BUS 939390 TO BUS 243322 CKT 1 / 939390 AE1-170 TAP 138 243322 05KENZIE 138 1 OPEN BRANCH FROM BUS 243322 TO BUS 244510 CKT 1 / 243322 05KENZIE 138 244510 05BLOSSOM TR 138 1 OPEN BRANCH FROM BUS 244510 TO BUS 243365 CKT 1 / 244510 05BLOSSOM TR 138 243365 05RIVRS 138 1 END

Contingency Name	Contingency Definition
ATSI-P1-2-TE-345-604T-A	CONTINGENCY 'ATSI-P1-2-TE-345-604T-A' /*LINE OUTAGE: LEMOYNE TO ITC MAJESTIC DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 END
AEP_SUBT_P4_#1145_05COREY 69.0_D	CONTINGENCY 'AEP_SUBT_P4_#1145_05COREY 69.0_D' OPEN BRANCH FROM BUS 243201 TO BUS 243265 CKT 1 / 243201 05COREY EQ 999 243265 05COREY 138 1 OPEN BRANCH FROM BUS 247782 TO BUS 243265 CKT 2 / 247782 05COREY EQ2 999 243265 05COREY 138 2 OPEN BRANCH FROM BUS 243201 TO BUS 246515 CKT 1 / 243201 05COREY EQ 999 246515 05COREY 69.0 1 OPEN BRANCH FROM BUS 247782 TO BUS 246515 CKT 2 / 247782 05COREY EQ2 999 246515 05COREY 69.0 2 OPEN BRANCH FROM BUS 246515 TO BUS 246520 CKT 1 / 246515 05COREY 69.0 246520 05FLORENCE 69.0 1 OPEN BRANCH FROM BUS 246515 TO BUS 246525 CKT 1 / 246515 05COREY 69.0 246525 05JONES 8 69.0 1 OPEN BRANCH FROM BUS 246515 TO BUS 246547 CKT 1 / 246515 05COREY 69.0 246547 05MOOREPKZ 69.0 1 OPEN BRANCH FROM BUS 246515 TO BUS 244519 CKT 1 / 246515 05COREY 69.0 244519 05RIPPLE 69.0 1 REMOVE SWSHUNT FROM BUS 246515 / 246515 05COREY 69.0 END
AEP_SUBT_P4_#1247_05MOORE PK 69.0_B	CONTINGENCY 'AEP_SUBT_P4_#1247_05MOORE PK 69.0_B' OPEN BRANCH FROM BUS 243345 TO BUS 246535 CKT 1 / 243345 05MOORPK 138 246535 05MOORE PK 69.0 1 OPEN BRANCH FROM BUS 246515 TO BUS 246547 CKT 1 / 246515 05COREY 69.0 246547 05MOOREPKZ 69.0 1 OPEN BRANCH FROM BUS 246517 TO BUS 244519 CKT 1 / 246517 05DOCKFNDR 69.0 244519 05RIPPLE 69.0 1 OPEN BRANCH FROM BUS 246517 TO BUS 246553 CKT 1 / 246517 05DOCKFNDR 69.0 246553 05WHEELR S 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246547 CKT 1 / 246535 05MOORE PK 69.0 246547 05MOOREPKZ 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246542 CKT 1 / 246535 05MOORE PK 69.0 246542 05SCHLCFR8 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246553 CKT 1 / 246535 05MOORE PK 69.0 246553 05WHEELR S 69.0 1 OPEN BRANCH FROM BUS 246547 TO BUS 243401 CKT 1 / 246547 05MOOREPKZ 69.0 243401 05STURGIS IP69.0 1 REMOVE SWSHUNT FROM BUS 246535 / 246535 05MOORE PK 69.0 END
AEP_P1-2_#5574-B	CONTINGENCY 'AEP_P1-2_#5574-B' OPEN BRANCH FROM BUS 939390 TO BUS 243322 CKT 1 / 939390 AE1-170 TAP 138 243322 05KENZIE 138 1 END

Contingency Name	Contingency Definition
ATSI-P7-1-TE-345-022T	CONTINGENCY 'ATSI-P7-1-TE-345-022T' /* Y1-069-MONROE/LEMOYNE-MAJ 345 DISCONNECT BRANCH FROM BUS 241901 TO BUS 264612 CKT 1 /* 02_Y1-069 345 19MON12 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 19MAJTC 345 END
AEP_P2-2_#9208_05KENZIE 138_2	CONTINGENCY 'AEP_P2-2_#9208_05KENZIE 138_2' OPEN BRANCH FROM BUS 957890 TO BUS 243322 CKT 1 / 957890 AF2-083 TAP 138 243322 05KENZIE 138 1 END
ATSI-P2-3-TE-345-016T	CONTINGENCY 'ATSI-P2-3-TE-345-016T' /* LEMOYNE BK-34506 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 J1046 TAP 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 242936 CKT 1 /* 02LEMOYN 345 05FOSTOR 345 END
Base Case	
AEP_P4_#7443_05DUMONT 765_A	CONTINGENCY 'AEP_P4_#7443_05DUMONT 765_A' OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1 OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1 / 243206 05DUMONT 765 246999 05SORENS 765 1 END
AEP_SUBT_P4_#1342_05VALLEY 69.0_A	CONTINGENCY 'AEP_SUBT_P4_#1342_05VALLEY 69.0_A' OPEN BRANCH FROM BUS 243204 TO BUS 243386 CKT 1 / 243204 05VALLEYEQ 999 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243204 TO BUS 246551 CKT 1 / 243204 05VALLEYEQ 999 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 243204 TO BUS 246550 CKT 1 / 243204 05VALLEYEQ 999 246550 05VALLEY 34.5 1 OPEN BRANCH FROM BUS 243261 TO BUS 243386 CKT 1 / 243261 05COLBYTAPSS 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243307 TO BUS 243386 CKT 1 / 243307 05HARTFO 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 247329 TO BUS 243386 CKT 1 / 247329 05STINGER 138 243386 05VALLY 138 1 REMOVE SWSHUNT FROM BUS 243386 / 243386 05VALLY 138 OPEN BRANCH FROM BUS 246502 TO BUS 246509 CKT 1 / 246502 05ALMENA 69.0 246509 05CAMERON 69.0 1 OPEN BRANCH FROM BUS 246509 TO BUS 246551 CKT 1 / 246509 05CAMERON 69.0 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 247174 TO BUS 246550 CKT 1 / 247174 05ROTHDEW 34.5 246550 05VALLEY 34.5 1 END

Contingency Name	Contingency Definition
AEP_P4_#8621_05COOK 345_K	CONTINGENCY 'AEP_P4_#8621_05COOK 345_K' OPEN BRANCH FROM BUS 243205 TO BUS 243215 CKT 4 / 243205 05COOK 765 243215 05COOK 345 4 OPEN BRANCH FROM BUS 243215 TO BUS 920210 CKT 1 / 243215 05COOK 345 920210 AA2-116 TAPK 345 1 OPEN BRANCH FROM BUS 243224 TO BUS 920210 CKT 1 / 243224 05KENZIE 345 920210 AA2-116 TAPK 345 1 END
ATSI-P1-2-TE-345-605T	CONTINGENCY 'ATSI-P1-2-TE-345-605T' /*LINE OUTAGE: AJ TO ITC MOROCCO DISCONNECT BRANCH FROM BUS 238530 TO BUS 256583 CKT 1 END
ATSI-P7-1-TE-138-027T-A	CONTINGENCY 'ATSI-P7-1-TE-138-027T-A' /* ALLEN-MIL-MONRO & BAYSH- MONRO 345KV DISCONNECT BRANCH FROM BUS 264594 TO BUS 256583 CKT 1 /* 19LULU 345 18LENAAWEE 345 DISCONNECT BRANCH FROM BUS 264594 TO BUS 264839 CKT 1 /* 19LULU 345 19MILAN 345 DISCONNECT BRANCH FROM BUS 264594 TO BUS 955720 CKT 1 /* 19LULU 345 J1056 TAP 345 DISCONNECT BRANCH FROM BUS 241901 TO BUS 264612 CKT 1 /* 02_Y1-069 345 19MON12 345 END

11 Light Load Analysis

Light Load Studies (As applicable)

To be determined during later study phases.

12 Short Circuit Analysis – Primary POI

The following Breakers are overdutied:

To be determined during later study phases.

13 Stability and Reactive Power Assessment

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined during later study phases.

14 Affected Systems

None

15 Summer Peak – Load Flow Analysis – Secondary POI

The Queue Project AF2-396 was evaluated as a 200.0 MW (Capacity 200.0 MW) injection at the Brody 138 kV substation in the AEP area. Project AF2-396 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-396 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

15.1 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
95535275	243412	05STURGI	69.0	AEP	255331	17HOWE	69.0	NIPS	1	AEP_P1-2_#5577	single	47.0	89.6	133.54	DC	20.65

15.2 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
95968168	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	bus	185.0	82.33	123.89	DC	76.87
95968363	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_SUBT_P4_#1342_05 VALLEY 69.0_A	breaker	185.0	82.82	124.37	DC	76.87
95968364	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_SUBT_P4_#1247_05 MOORE PK 69.0_B	breaker	185.0	98.24	123.46	DC	46.65
95968476	243294	05FLWRFD8 SS	138.0	AEP	243345	05MOORPK	138.0	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	64.43	110.92	DC	116.69
95968183	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	bus	185.0	76.03	121.84	DC	84.75
95968410	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_SUBT_P4_#1342_05 VALLEY 69.0_A	breaker	185.0	76.62	122.43	DC	84.75
95968469	247330	05BRODY	138.0	AEP	243294	05FLWRFD8 SS	138.0	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	65.35	111.84	DC	116.69

15.3 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
95535034	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P4_#7443_05DUMONT 765_A	breaker	1409.0	134.92	136.43	DC	21.67
95535035	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P4_#8621_05COOK 345_K	breaker	1409.0	130.86	131.41	DC	17.22
95535344	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P1-2_#358	single	1409.0	115.33	116.99	DC	23.32
145199099	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_SUBT_P2-2_#1279_05POKAGON 69.0_1	bus	185.0	102.35	126.74	DC	45.11
95968186	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_SUBT_P2-2_#1279_05POKAGON 69.0_1	bus	185.0	100.51	127.67	DC	50.24

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 PROJE CT LOADING %	POST PROJE CT LOADING %	AC DC	MW IMPACT
145199409	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_SUBT_P4_#1281_05P OKAGON 69.0_H	breaker	185.0	100.62	127.77	DC	50.24
145199410	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_SUBT_P4_#1282_05P OKAGON 69.0_E	breaker	185.0	100.51	127.67	DC	50.24
98936948	256583	18MOROCCO	345.0	METC	238530	02ALLEN	345.0	ATSI	1	ATSI-P7-1-TE-345-022T	tower	1793.0	136.22	136.23	DC	21.37
98936311	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATSI	1	ATSI-P2-3-TE-345-016T	breaker	1244.0	124.23	124.75	DC	14.22
98936312	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATSI	1	ATSI-P2-3-TE-345-015T	breaker	1244.0	121.92	122.44	DC	14.14
98936570	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATSI	1	ATSI-P1-2-TE-345-605T	single	1244.0	141.43	141.44	DC	16.95
98936576	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATSI	1	ATSI-P1-2-TE-345-604T-A	single	1244.0	102.3	103.43	DC	14.14
98936956	955620	J1046 TAP	345.0	ITCT	238889	02LEMOYN	345.0	ATSI	1	ATSI-P7-1-TE-138-027T-A	tower	953.0	126.08	126.66	DC	12.18

15.4 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 PROJE CT LOADING %	POST PROJE CT LOADING %	AC DC	MW IMPACT
95535343	243215	05COOK	345.0	AEP	243229	05OLIVE	345.0	AEP	1	AEP_P1-2_#358	operation	1409.0	126.69	128.33	DC	23.32
95968653	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	AEP_P1-2_#5574-B	operation	185.0	95.25	122.18	DC	49.83
95968658	243265	05COREY	138.0	AEP	243346	05MOTTV	138.0	AEP	1	Base Case	operation	185.0	80.66	103.95	DC	43.09
95968723	243294	05FLWRFD8SS	138.0	AEP	243345	05MOORPK	138.0	AEP	1	AEP_P1-2_#5574-B	operation	251.0	64.37	110.72	DC	116.35
95968683	243346	05MOTTV	138.0	AEP	243287	05E.ELKHART	138.0	AEP	1	AEP_P1-2_#5574-B	operation	185.0	88.69	118.58	DC	55.31
95535274	243412	05STURGI	69.0	AEP	255331	17HOWE	69.0	NIPS	1	AEP_P1-2_#5577	operation	47.0	135.58	179.53	DC	20.65
95968718	247330	05BRODY	138.0	AEP	243294	05FLWRFD8SS	138.0	AEP	1	AEP_P1-2_#5574-B	operation	251.0	65.28	111.64	DC	116.35
98936571	264612	19MON12	345.0	ITCT	241901	02LALLENDORF	345.0	ATSI	1	ATSI-P1-2-TE-345-604T-A	operation	1244.0	121.79	122.31	DC	14.14

ID	FROM BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS ARE A	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJEC T LOADIN G %	POST PROJEC T LOADIN G %	AC D C	MW IMPAC T
9893657 5	26461 2	19MON12	345. 0	ITCT	24190 1	02LALLEND RF	345. 0	ATSI	1	Base Case	operatio n	1099. 0	110.37	110.88	DC	12.35

15.5 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".

15.5.1 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
95535275	243412	05STURGI	AEP	255331	17HOWE	NIPS	1	AEP_P1-2_#5577	single	47.0	89.6	133.54	DC	20.65

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
246536	05MOTTVILL	0.0576	80/20	0.0576
936141	AD2-020 C O1	3.8799	80/20	3.8799
943021	AE2-325 C	1.9650	80/20	1.9650
944161	AF1-084 C	3.0269	80/20	3.0269
944961	AF1-161 C	1.5670	80/20	1.5670
945111	AF1-176 C O1	22.6187	80/20	22.6187
957891	AF2-083 C O2	7.9416	80/20	7.9416
960981	AF2-389 C	2.3511	80/20	2.3511
961051	AF2-396 O2	20.6540	80/20	20.6540
WEC	WEC	0.0507	Confirmed LTF	0.0507
CBM-W2	CBM-W2	0.3276	Confirmed LTF	0.3276
NY	NY	0.0243	Confirmed LTF	0.0243
CBM-W1	CBM-W1	0.9633	Confirmed LTF	0.9633
TVA	TVA	0.0238	Confirmed LTF	0.0238
CBM-S1	CBM-S1	0.1108	Confirmed LTF	0.1108
MADISON	MADISON	0.3044	Confirmed LTF	0.3044
MEC	MEC	0.1811	Confirmed LTF	0.1811
BLUEG	BLUEG	0.0052	Confirmed LTF	0.0052
TRIMBLE	TRIMBLE	0.0017	Confirmed LTF	0.0017
CATAWBA	CATAWBA	0.0042	Confirmed LTF	0.0042

15.5.2 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
145199099	243265	05COREY	AEP	243346	05MOTTV	AEP	1	AEP_SUBT_P2-2_#1279_05POKAGON 69.0_1	bus	185.0	102.35	126.74	DC	45.11

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247966	05WTRV SLR E	0.1269	Adder	0.15
936141	AD2-020 C O1	7.9634	50/50	7.9634
936142	AD2-020 E O1	4.9016	50/50	4.9016
939391	AE1-170 C O1	3.0909	Adder	3.64
939392	AE1-170 E O1	4.2684	Adder	5.02
943021	AE2-325 C	4.0332	50/50	4.0332
943022	AE2-325 E	2.6824	50/50	2.6824
944161	AF1-084 C	5.8704	50/50	5.8704
944162	AF1-084 E	3.3530	50/50	3.3530
944961	AF1-161 C	3.2162	50/50	3.2162
944962	AF1-161 E	3.2162	50/50	3.2162
945111	AF1-176 C O1	57.9114	50/50	57.9114
945112	AF1-176 E O1	53.6856	50/50	53.6856
957891	AF2-083 C O2	35.1696	50/50	35.1696
957892	AF2-083 E O2	8.7924	50/50	8.7924
960981	AF2-389 C	8.7924	50/50	8.7924
960982	AF2-389 E	5.8616	50/50	5.8616
961051	AF2-396 O2	45.1100	50/50	45.1100
WEC	WEC	0.0126	Confirmed LTF	0.0126
NEWTON	NEWTON	0.0193	Confirmed LTF	0.0193
CALDERWOOD	CALDERWOOD	0.0109	Confirmed LTF	0.0109
NY	NY	0.0077	Confirmed LTF	0.0077
CBM-W1	CBM-W1	1.2385	Confirmed LTF	1.2385
PRAIRIE	PRAIRIE	0.0207	Confirmed LTF	0.0207
O-066	O-066	0.0941	Confirmed LTF	0.0941
CHEOAH	CHEOAH	0.0105	Confirmed LTF	0.0105
TILTON	TILTON	0.0145	Confirmed LTF	0.0145
G-007	G-007	0.0146	Confirmed LTF	0.0146
MADISON	MADISON	0.1290	Confirmed LTF	0.1290
MEC	MEC	0.0286	Confirmed LTF	0.0286
GIBSON	GIBSON	0.0213	Confirmed LTF	0.0213
BLUEG	BLUEG	0.0642	Confirmed LTF	0.0642
TRIMBLE	TRIMBLE	0.0206	Confirmed LTF	0.0206
CATAWBA	CATAWBA	0.0073	Confirmed LTF	0.0073

15.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95968476	243294	05FLWRFD8 SS	AEP	243345	05MOORPK	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	64.43	110.92	DC	116.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244412	05WTRV SLR C	0.0578	50/50	0.0578
247966	05WTRV SLR E	0.3348	50/50	0.3348
936141	AD2-020 C O1	21.3289	50/50	21.3289
936142	AD2-020 E O1	13.1281	50/50	13.1281
938261	AE1-039	0.0599	Adder	0.07
939391	AE1-170 C O1	20.9859	50/50	20.9859
939392	AE1-170 E O1	28.9806	50/50	28.9806
943021	AE2-325 C	10.8023	50/50	10.8023
943022	AE2-325 E	7.1843	50/50	7.1843
944161	AF1-084 C	11.8771	50/50	11.8771
944162	AF1-084 E	6.7838	50/50	6.7838
944961	AF1-161 C	8.6143	50/50	8.6143
944962	AF1-161 E	8.6143	50/50	8.6143
945113	AF1-176 BAT	16.2540	50/50	16.2540
961051	AF2-396 O2	116.6900	50/50	116.6900
WEC	WEC	0.0060	Confirmed LTF	0.0060
NEWTON	NEWTON	0.0204	Confirmed LTF	0.0204
CALDERWOOD	CALDERWOOD	0.0099	Confirmed LTF	0.0099
NY	NY	0.0039	Confirmed LTF	0.0039
CBM-W1	CBM-W1	1.3636	Confirmed LTF	1.3636
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
O-066	O-066	0.0538	Confirmed LTF	0.0538
CHEOAH	CHEOAH	0.0100	Confirmed LTF	0.0100
TILTON	TILTON	0.0132	Confirmed LTF	0.0132
G-007	G-007	0.0094	Confirmed LTF	0.0094
MADISON	MADISON	0.0867	Confirmed LTF	0.0867
MEC	MEC	0.0079	Confirmed LTF	0.0079
GIBSON	GIBSON	0.0186	Confirmed LTF	0.0186
BLUEG	BLUEG	0.0573	Confirmed LTF	0.0573
TRIMBLE	TRIMBLE	0.0184	Confirmed LTF	0.0184
CATAWBA	CATAWBA	0.0063	Confirmed LTF	0.0063

15.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
145199410	243346	05MOTT V	AEP	243287	05E.ELKHA RT	AEP	1	AEP_SUBT_P4_#1282_05POKA GON 69.0_E	breaker	185.0	100.51	127.67	DC	50.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
246536	05MOTTVILL	0.1451	50/50	0.1451
247966	05WTRV SLR E	0.1415	Adder	0.17
936141	AD2-020 C O1	8.9086	50/50	8.9086
936142	AD2-020 E O1	5.4834	50/50	5.4834
939391	AE1-170 C O1	3.3217	Adder	3.91
939392	AE1-170 E O1	4.5871	Adder	5.4
943021	AE2-325 C	4.5119	50/50	4.5119
943022	AE2-325 E	3.0007	50/50	3.0007
944161	AF1-084 C	6.6786	50/50	6.6786
944162	AF1-084 E	3.8146	50/50	3.8146
944961	AF1-161 C	3.5980	50/50	3.5980
944962	AF1-161 E	3.5980	50/50	3.5980
945111	AF1-176 C O1	61.9824	50/50	61.9824
945112	AF1-176 E O1	57.4596	50/50	57.4596
957891	AF2-083 C O2	45.5772	50/50	45.5772
957892	AF2-083 E O2	11.3943	50/50	11.3943
960981	AF2-389 C	11.3943	50/50	11.3943
960982	AF2-389 E	7.5962	50/50	7.5962
961051	AF2-396 O2	50.2420	50/50	50.2420
WEC	WEC	0.0041	Confirmed LTF	0.0041
NEWTON	NEWTON	0.0376	Confirmed LTF	0.0376
FARMERCITY	FARMERCITY	0.0004	Confirmed LTF	0.0004
CALDERWOOD	CALDERWOOD	0.0139	Confirmed LTF	0.0139
NY	NY	0.0044	Confirmed LTF	0.0044
CBM-W1	CBM-W1	1.2760	Confirmed LTF	1.2760
PRAIRIE	PRAIRIE	0.0620	Confirmed LTF	0.0620
O-066	O-066	0.0672	Confirmed LTF	0.0672
CHEOAH	CHEOAH	0.0135	Confirmed LTF	0.0135
TILTON	TILTON	0.0265	Confirmed LTF	0.0265
G-007	G-007	0.0104	Confirmed LTF	0.0104
MADISON	MADISON	0.0907	Confirmed LTF	0.0907
GIBSON	GIBSON	0.0278	Confirmed LTF	0.0278
BLUEG	BLUEG	0.0781	Confirmed LTF	0.0781
TRIMBLE	TRIMBLE	0.0250	Confirmed LTF	0.0250
CATAWBA	CATAWBA	0.0084	Confirmed LTF	0.0084

15.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95968469	247330	05BRODY	AEP	243294	05FLWRFD8 SS	AEP	1	AEP_P4_#9218_05KENZIE 138_G	breaker	251.0	65.35	111.84	DC	116.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244412	05WTRV SLR C	0.0578	50/50	0.0578
247966	05WTRV SLR E	0.3348	50/50	0.3348
936141	AD2-020 C O1	21.3289	50/50	21.3289
936142	AD2-020 E O1	13.1281	50/50	13.1281
938261	AE1-039	0.0599	Adder	0.07
939391	AE1-170 C O1	20.9859	50/50	20.9859
939392	AE1-170 E O1	28.9806	50/50	28.9806
943021	AE2-325 C	10.8023	50/50	10.8023
943022	AE2-325 E	7.1843	50/50	7.1843
944161	AF1-084 C	11.8771	50/50	11.8771
944162	AF1-084 E	6.7838	50/50	6.7838
944961	AF1-161 C	8.6143	50/50	8.6143
944962	AF1-161 E	8.6143	50/50	8.6143
945113	AF1-176 BAT	16.2540	50/50	16.2540
961051	AF2-396 O2	116.6900	50/50	116.6900
WEC	WEC	0.0060	Confirmed LTF	0.0060
NEWTON	NEWTON	0.0204	Confirmed LTF	0.0204
CALDERWOOD	CALDERWOOD	0.0099	Confirmed LTF	0.0099
NY	NY	0.0039	Confirmed LTF	0.0039
CBM-W1	CBM-W1	1.3636	Confirmed LTF	1.3636
PRAIRIE	PRAIRIE	0.0310	Confirmed LTF	0.0310
O-066	O-066	0.0538	Confirmed LTF	0.0538
CHEOAH	CHEOAH	0.0100	Confirmed LTF	0.0100
TILTON	TILTON	0.0132	Confirmed LTF	0.0132
G-007	G-007	0.0094	Confirmed LTF	0.0094
MADISON	MADISON	0.0867	Confirmed LTF	0.0867
MEC	MEC	0.0079	Confirmed LTF	0.0079
GIBSON	GIBSON	0.0186	Confirmed LTF	0.0186
BLUEG	BLUEG	0.0573	Confirmed LTF	0.0573
TRIMBLE	TRIMBLE	0.0184	Confirmed LTF	0.0184
CATAWBA	CATAWBA	0.0063	Confirmed LTF	0.0063

15.5.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
95535034	243215	05COOK	AEP	243229	05OLIVE	AEP	1	AEP_P4_#7443_05DUMONT 765_A	breaker	1409.0	134.92	136.43	DC	21.67

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243440	05CKG1	50.8080	50/50	50.8080
243441	05CKG2	57.3454	50/50	57.3454
244412	05WTRV SLR C	0.0541	50/50	0.0541
247528	05COVRT1	7.6224	50/50	7.6224
247529	05COVRT2	7.6224	50/50	7.6224
247530	05COVRT3	7.6224	50/50	7.6224
247531	05COVRT4	4.5748	50/50	4.5748
247532	05COVRT5	4.5748	50/50	4.5748
247533	05COVRT6	4.5748	50/50	4.5748
247604	X1-042	0.0740	50/50	0.0740
247651	AA2-116	29.7892	50/50	29.7892
247966	05WTRV SLR E	0.3139	50/50	0.3139
276165	Z1-106 BAT2	0.6846	Merchant Transmission	0.6846
276166	Z1-106 BAT1	0.6845	Merchant Transmission	0.6845
276171	Z1-107 BAT	1.4258	Merchant Transmission	1.4258
276172	Z1-108 BAT	1.3592	Merchant Transmission	1.3592
918052	AA1-018 E OP	-7.8291	Adder	-9.21
920273	AA2-123 BAT	1.3432	Merchant Transmission	1.3432
925961	AC1-072	0.7071	50/50	0.7071
926581	AC1-141	2.7272	50/50	2.7272
927201	AC1-214 C O1	-1.0199	Adder	-1.2
932931	AC2-117	-3.6007	Adder	-4.24
933281	AC2-140 C	11.0044	50/50	11.0044
933282	AC2-140 E	0.5792	50/50	0.5792
936141	AD2-020 C O1	7.2770	50/50	7.2770
936142	AD2-020 E O1	4.4790	50/50	4.4790
936601	AD2-075	29.7192	50/50	29.7192
938261	AE1-039	0.1144	50/50	0.1144
939391	AE1-170 C O1	7.1644	50/50	7.1644
939392	AE1-170 E O1	9.8936	50/50	9.8936
939683	AE1-198 BAT	7.2250	Merchant Transmission	7.2250
943021	AE2-325 C	3.6855	50/50	3.6855
943022	AE2-325 E	2.4511	50/50	2.4511
943383	AF1-009 BAT	1.6535	Merchant Transmission	1.6535
943403	AF1-011 BAT	1.9044	Merchant Transmission	1.9044
943803	AF1-048 BAT	3.5026	Merchant Transmission	3.5026
943922	AF1-060 BAT	0.6760	Merchant Transmission	0.6760
944161	AF1-084 C	6.6997	50/50	6.6997
944162	AF1-084 E	3.8267	50/50	3.8267
944961	AF1-161 C	2.9390	50/50	2.9390
944962	AF1-161 E	2.9390	50/50	2.9390
945111	AF1-176 C O1	12.8160	Adder	15.08

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945112	AF1-176 E O1	11.8808	Adder	13.98
945352	AF1-200 NFTW	142.4430	Merchant Transmission	142.4430
946163	AF1-281 BAT	1.2840	Merchant Transmission	1.2840
946533	AF1-317 BAT	3.2175	Merchant Transmission	3.2175
950311	G934 C	4.3641	PJM External (MISO)	4.3641
950312	G934 E	17.4564	PJM External (MISO)	17.4564
950351	J466	3.4986	PJM External (MISO)	3.4986
950791	J201 C	0.4959	PJM External (MISO)	0.4959
950792	J201 E	1.9835	PJM External (MISO)	1.9835
950871	J246 C	0.1974	PJM External (MISO)	0.1974
950872	J246 E	0.7897	PJM External (MISO)	0.7897
950942	J325 E	0.4570	PJM External (MISO)	0.4570
951531	J533 C	5.6404	PJM External (MISO)	5.6404
951532	J533 E	22.5616	PJM External (MISO)	22.5616
951571	J538 C	3.2043	PJM External (MISO)	3.2043
951572	J538 E	12.8172	PJM External (MISO)	12.8172
951941	J602 C	3.9627	PJM External (MISO)	3.9627
951942	J602 E	21.4393	PJM External (MISO)	21.4393
952161	J571	0.8893	PJM External (MISO)	0.8893
952201	J589 C	4.2747	PJM External (MISO)	4.2747
952202	J589 E	23.1273	PJM External (MISO)	23.1273
952312	J646 E	0.1723	PJM External (MISO)	0.1723
952401	J752 C	1.8439	PJM External (MISO)	1.8439
952402	J752 E	9.9761	PJM External (MISO)	9.9761
952611	J717 C	4.0864	PJM External (MISO)	4.0864
952612	J717 E	22.1087	PJM External (MISO)	22.1087
952761	J728 C	3.8003	PJM External (MISO)	3.8003
952762	J728 E	20.5882	PJM External (MISO)	20.5882
952881	J758	26.1700	PJM External (MISO)	26.1700
952971	J793	142.6174	PJM External (MISO)	142.6174
953071	J794 C	0.2618	PJM External (MISO)	0.2618
953072	J794 E	1.4162	PJM External (MISO)	1.4162
953271	J701 C	0.9071	PJM External (MISO)	0.9071
953272	J701 E	4.9077	PJM External (MISO)	4.9077
953291	J796	30.7593	PJM External (MISO)	30.7593
953321	J799	17.9399	PJM External (MISO)	17.9399
953361	J806	18.5594	PJM External (MISO)	18.5594
953771	J832	13.9050	PJM External (MISO)	13.9050
953781	J833	9.4160	PJM External (MISO)	9.4160
953811	J839	11.0170	PJM External (MISO)	11.0170
953941	J857	15.9286	PJM External (MISO)	15.9286
954111	J875	15.4290	PJM External (MISO)	15.4290
954591	J937	78.9553	PJM External (MISO)	78.9553
955071	J984 C	4.5387	PJM External (MISO)	4.5387
955072	J984 E	24.5553	PJM External (MISO)	24.5553
955121	J989	9.5592	PJM External (MISO)	9.5592
955181	J996	7.4832	PJM External (MISO)	7.4832
955261	J1005	25.7420	PJM External (MISO)	25.7420
955591	J1043 C	3.0932	PJM External (MISO)	3.0932
955592	J1043 E	54.8115	PJM External (MISO)	54.8115
955781	J1062	12.5580	PJM External (MISO)	12.5580
955861	J1071	15.5140	PJM External (MISO)	15.5140

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
956011	J1088	19.0800	PJM External (MISO)	19.0800
956021	J1089	21.5526	PJM External (MISO)	21.5526
956031	J1090	10.5030	PJM External (MISO)	10.5030
956161	J1103	2.3734	PJM External (MISO)	2.3734
956741	J1172	6.1320	PJM External (MISO)	6.1320
956751	J1173	8.0560	PJM External (MISO)	8.0560
956801	J1178	7.8897	PJM External (MISO)	7.8897
957333	AF2-027 BAT	1.8105	Merchant Transmission	1.8105
957373	AF2-031 BAT	0.7605	Merchant Transmission	0.7605
957843	AF2-078 BAT	0.7596	Merchant Transmission	0.7596
957891	AF2-083 C O2	4.8740	Adder	10.82
957892	AF2-083 E O2	1.2185	Adder	2.7
958013	AF2-095 BAT	1.5213	Merchant Transmission	1.5213
958023	AF2-096 BAT	2.7349	Merchant Transmission	2.7349
958923	AF2-183 BAT	2.7221	Merchant Transmission	2.7221
959353	AF2-226 BAT	1.8399	Merchant Transmission	1.8399
960283	AF2-319 BAT	1.8399	Merchant Transmission	1.8399
960382	AF2-329 BAT	1.8863	Merchant Transmission	1.8863
960603	AF2-351 BAT	0.7640	Merchant Transmission	0.7640
960981	AF2-389 C	1.2257	Adder	2.72
960982	AF2-389 E	0.8171	Adder	1.81
961022	AF2-393 BAT	2.0307	Merchant Transmission	2.0307
961032	AF2-394 BAT	1.3538	Merchant Transmission	1.3538
961051	AF2-396 O2	21.6740	50/50	21.6740
NEWTON	NEWTON	4.1486	Confirmed LTF	4.1486
FARMERCITY	FARMERCITY	0.2704	Confirmed LTF	0.2704
G-007A	G-007A	1.8892	Confirmed LTF	1.8892
VFT	VFT	5.1020	Confirmed LTF	5.1020
CALDERWOOD	CALDERWOOD	0.6645	Confirmed LTF	0.6645
PRAIRIE	PRAIRIE	9.9730	Confirmed LTF	9.9730
CHEOAH	CHEOAH	0.6587	Confirmed LTF	0.6587
EDWARDS	EDWARDS	2.1865	Confirmed LTF	2.1865
TILTON	TILTON	2.8514	Confirmed LTF	2.8514
GIBSON	GIBSON	1.4305	Confirmed LTF	1.4305
BLUEG	BLUEG	3.0588	Confirmed LTF	3.0588
TRIMBLE	TRIMBLE	0.9639	Confirmed LTF	0.9639
CATAWBA	CATAWBA	0.2411	Confirmed LTF	0.2411

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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
98936948	256583	18MOROCCO	METC	238530	02ALLEN	ATSI	1	ATSI-P7-1-TE-345-022T	tower	1793.0	136.22	136.23	DC	21.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243071	05BERRINSP G	0.1151	50/50	0.1151
243440	05CKG1	19.0289	50/50	19.0289
244357	05GRANGER EL	-0.2468	Adder	-0.29
244412	05WTRV SLR C	0.0475	50/50	0.0475
246422	05MAYFLWER	0.0832	50/50	0.0832
246431	05BUCHANAN	0.0157	50/50	0.0157
246536	05MOTTVILL	0.0279	50/50	0.0279
247528	05COVRT1	6.0314	50/50	6.0314
247529	05COVRT2	6.0314	50/50	6.0314
247530	05COVRT3	6.0314	50/50	6.0314
247531	05COVRT4	3.6200	50/50	3.6200
247532	05COVRT5	3.6200	50/50	3.6200
247533	05COVRT6	3.6200	50/50	3.6200
247604	X1-042	0.0636	50/50	0.0636
247651	AA2-116	17.5557	50/50	17.5557
247966	05WTRV SLR E	0.2753	50/50	0.2753
247967	05OLIV SLR E	0.1951	Adder	0.23
247969	Z2-116 E	0.1046	Adder	0.12
274788	SE CHICAG;5U (Deactivation : 01/06/2020)	2.4036	Adder	2.83
274789	SE CHICAG;6U (Deactivation : 01/06/2020)	2.4099	Adder	2.84
274790	SE CHICAG;7U (Deactivation : 01/06/2020)	2.4416	Adder	2.87
274791	SE CHICAG;8U (Deactivation : 01/06/2020)	2.4416	Adder	2.87
274792	SE CHICAG;9U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274793	SE CHICAG;0U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274794	SE CHICAG;1U (Deactivation : 01/06/2020)	2.4468	Adder	2.88
274795	SE CHICAG;2U (Deactivation : 01/06/2020)	2.4468	Adder	2.88

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
925961	AC1-072	0.5595	50/50	0.5595
926581	AC1-141	1.6072	50/50	1.6072
931951	AB1-107 1	-41.9666	Adder	-49.37
931961	AB1-107 2	-73.8919	Adder	-86.93
932931	AC2-117	2.9008	Adder	3.41
933281	AC2-140 C	2.7132	Adder	3.19
933282	AC2-140 E	0.1428	Adder	0.17
934252	AD1-052 E1	-0.7196	Adder	-0.85
934262	AD1-052 E2	-0.7196	Adder	-0.85
936141	AD2-020 C O1	6.7972	50/50	6.7972
936142	AD2-020 E O1	4.1838	50/50	4.1838
936601	AD2-075	23.5161	50/50	23.5161
936631	AD2-079 C O1	0.9643	Adder	1.13
936632	AD2-079 E O1	0.6429	Adder	0.76
938261	AE1-039	0.0984	50/50	0.0984
939391	AE1-170 C O1	6.5690	50/50	6.5690
939392	AE1-170 E O1	9.0715	50/50	9.0715
939631	AE1-193 C	4.1703	Adder	4.91
939632	AE1-193 E	27.9087	Adder	32.83
939641	AE1-194 C	4.1703	Adder	4.91
939642	AE1-194 E	27.9087	Adder	32.83
939651	AE1-195 C	4.1703	Adder	4.91
939652	AE1-195 E	27.9087	Adder	32.83
939681	AE1-198 C	12.3825	Adder	14.57
939682	AE1-198 E	10.5219	Adder	12.38
943001	AE2-323 C	4.3620	Adder	5.13
943002	AE2-323 E	2.1388	Adder	2.52
943021	AE2-325 C	3.4425	50/50	3.4425
943022	AE2-325 E	2.2895	50/50	2.2895
943781	AF1-046 C	2.0361	Adder	2.4
943782	AF1-046 E	1.3574	Adder	1.6
944161	AF1-084 C	6.1495	50/50	6.1495
944162	AF1-084 E	3.5124	50/50	3.5124
944931	AF1-158 C O1	7.0678	Adder	8.32
944932	AF1-158 E O1	4.7119	Adder	5.54
944961	AF1-161 C	2.7453	50/50	2.7453
944962	AF1-161 E	2.7453	50/50	2.7453
945111	AF1-176 C O1	15.9883	50/50	15.9883
945112	AF1-176 E O1	14.8217	50/50	14.8217
945501	AF1-215 C O1	11.8529	Adder	13.94
945502	AF1-215 E O1	7.9019	Adder	9.3
950311	G934 C	3.4658	PJM External (MISO)	3.4658
950312	G934 E	13.8632	PJM External (MISO)	13.8632
950351	J466	7.4874	PJM External (MISO)	7.4874
950791	J201 C	0.9044	PJM External (MISO)	0.9044
950792	J201 E	3.6178	PJM External (MISO)	3.6178
950871	J246 C	0.2453	PJM External (MISO)	0.2453
950872	J246 E	0.9811	PJM External (MISO)	0.9811
950942	J325 E	1.0278	PJM External (MISO)	1.0278
951531	J533 C	7.0080	PJM External (MISO)	7.0080
951532	J533 E	28.0320	PJM External (MISO)	28.0320
951571	J538 C	8.5020	PJM External (MISO)	8.5020

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
951572	J538 E	34.0080	PJM External (MISO)	34.0080
951941	J602 C	6.7545	PJM External (MISO)	6.7545
951942	J602 E	36.5435	PJM External (MISO)	36.5435
952201	J589 C	5.7786	PJM External (MISO)	5.7786
952202	J589 E	31.2634	PJM External (MISO)	31.2634
952312	J646 E	0.4444	PJM External (MISO)	0.4444
952401	J752 C	3.8161	PJM External (MISO)	3.8161
952402	J752 E	20.6459	PJM External (MISO)	20.6459
952611	J717 C	6.3780	PJM External (MISO)	6.3780
952612	J717 E	34.5065	PJM External (MISO)	34.5065
952761	J728 C	5.9314	PJM External (MISO)	5.9314
952762	J728 E	32.1334	PJM External (MISO)	32.1334
952971	J793	366.2865	PJM External (MISO)	366.2865
953071	J794 C	0.3783	PJM External (MISO)	0.3783
953072	J794 E	2.0466	PJM External (MISO)	2.0466
953271	J701 C	1.8586	PJM External (MISO)	1.8586
953272	J701 E	10.0553	PJM External (MISO)	10.0553
953291	J796	50.6823	PJM External (MISO)	50.6823
953321	J799	65.8117	PJM External (MISO)	65.8117
953361	J806	28.5514	PJM External (MISO)	28.5514
953771	J832	17.7220	PJM External (MISO)	17.7220
953781	J833	36.0170	PJM External (MISO)	36.0170
953811	J839	26.9670	PJM External (MISO)	26.9670
953941	J857	21.9999	PJM External (MISO)	21.9999
954111	J875	49.3725	PJM External (MISO)	49.3725
955071	J984 C	5.0497	PJM External (MISO)	5.0497
955072	J984 E	27.3203	PJM External (MISO)	27.3203
955121	J989	19.1528	PJM External (MISO)	19.1528
955181	J996	32.3832	PJM External (MISO)	32.3832
955261	J1005	42.3960	PJM External (MISO)	42.3960
955781	J1062	43.8135	PJM External (MISO)	43.8135
956011	J1088	32.0565	PJM External (MISO)	32.0565
956021	J1089	36.6333	PJM External (MISO)	36.6333
956031	J1090	21.2733	PJM External (MISO)	21.2733
956161	J1103	4.8628	PJM External (MISO)	4.8628
956741	J1172	11.5105	PJM External (MISO)	11.5105
956751	J1173	27.5488	PJM External (MISO)	27.5488
956801	J1178	13.6890	PJM External (MISO)	13.6890
957371	AF2-031 C O2	0.2691	Adder	0.6
957372	AF2-031 E O2	0.4036	Adder	0.9
957891	AF2-083 C O2	12.3192	50/50	12.3192
957892	AF2-083 E O2	3.0798	50/50	3.0798
958381	AF2-132 C O2	6.0769	Adder	13.49
958382	AF2-132 E O2	4.0513	Adder	8.99
958401	AF2-134 C O2	2.0902	Adder	4.64
958402	AF2-134 E O2	1.3935	Adder	3.09
958991	AF2-190 C O2	5.3798	Adder	11.94
958992	AF2-190 E O2	3.5865	Adder	7.96
959001	AF2-191 C O2	2.7450	Adder	6.09
959002	AF2-191 E O2	1.8300	Adder	4.06
960681	AF2-359 C O2	2.9165	Adder	6.47
960682	AF2-359 E O2	1.9444	Adder	4.32

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
960981	AF2-389 C	3.0819	50/50	3.0819
960982	AF2-389 E	2.0546	50/50	2.0546
961051	AF2-396 O2	21.3660	50/50	21.3660
961501	AF2-441 C O2	2.6569	Adder	5.9
961502	AF2-441 E O2	3.9853	Adder	8.85
WEC	WEC	2.1300	Confirmed LTF	2.1300
LGEE	LGEE	1.6100	Confirmed LTF	1.6100
CPL	CPL	0.2798	Confirmed LTF	0.2798
CBM-W2	CBM-W2	30.9091	Confirmed LTF	30.9091
NY	NY	1.1851	Confirmed LTF	1.1851
CBM-W1	CBM-W1	195.2436	Confirmed LTF	195.2436
TVA	TVA	3.5840	Confirmed LTF	3.5840
O-066	O-066	12.6941	Confirmed LTF	12.6941
CBM-S2	CBM-S2	4.7801	Confirmed LTF	4.7801
CBM-S1	CBM-S1	22.2287	Confirmed LTF	22.2287
G-007	G-007	1.9531	Confirmed LTF	1.9531
MADISON	MADISON	7.8140	Confirmed LTF	7.8140
MEC	MEC	8.9270	Confirmed LTF	8.9270

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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
98936570	264612	19MON12	ITCT	241901	02LALLENDORF	ATSI	1	ATSI-P1-2-TE-345-605T	single	1244.0	141.43	141.44	DC	16.95

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243071	05BERRINSP G	0.0914	80/20	0.0914
243440	05CKG1	15.1055	80/20	15.1055
243441	05CKG2	13.2913	80/20	13.2913
244130	05ST.JOE CTR	8.1410	80/20	8.1410
244412	05WTRV SLR C	0.0376	80/20	0.0376
244415	05OLIV SLR C	0.0316	80/20	0.0316
246397	05ELKHART HY	0.0337	80/20	0.0337
246416	05TWIN BRCH1	0.0546	80/20	0.0546
246422	05MAYFLWER	0.0661	80/20	0.0661
246431	05BUCHANAN	0.0124	80/20	0.0124
246536	05MOTTVILL	0.0221	80/20	0.0221
247528	05COVRT1	4.7532	80/20	4.7532
247529	05COVRT2	4.7532	80/20	4.7532
247530	05COVRT3	4.7532	80/20	4.7532
247531	05COVRT4	2.8528	80/20	2.8528
247532	05COVRT5	2.8528	80/20	2.8528
247533	05COVRT6	2.8528	80/20	2.8528
247604	X1-042	0.0504	80/20	0.0504
247620	Y3-023	0.0604	80/20	0.0604
247643	Z2-116 C	0.0169	80/20	0.0169
247651	AA2-116	13.9585	80/20	13.9585
274723	RIVER EC ;12	1.7026	80/20	1.7026
274751	CRETE EC ;1U	0.7844	80/20	0.7844
274752	CRETE EC ;2U	0.7844	80/20	0.7844
274753	CRETE EC ;3U	0.7844	80/20	0.7844
274754	CRETE EC ;4U	0.7844	80/20	0.7844
274788	SE CHICAG;5U (Deactivation : 01/06/2020)	1.9258	Adder	2.27
274789	SE CHICAG;6U (Deactivation : 01/06/2020)	1.9309	Adder	2.27
274790	SE CHICAG;7U (Deactivation : 01/06/2020)	1.9563	Adder	2.3
274791	SE CHICAG;8U (Deactivation : 01/06/2020)	2.3015	80/20	2.3015
274792	SE CHICAG;9U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
274793	SE CHICAG;0U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
274794	SE CHICAG;1U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
274795	SE CHICAG;2U (Deactivation : 01/06/2020)	2.3065	80/20	2.3065
922912	AB1-080	0.4824	80/20	0.4824
925961	AC1-072	0.4409	80/20	0.4409
926581	AC1-141	1.2779	80/20	1.2779
927451	AC1-142A 1	1.5561	Adder	1.83
927461	AC1-142A 2	1.5561	Adder	1.83
930501	AB1-091 O1	27.0729	Adder	31.85
931951	AB1-107 1	-34.4746	Adder	-40.56
931961	AB1-107 2	-112.3235	Adder	-132.15
932601	AC2-080 C O1	1.2637	Adder	1.49
932931	AC2-117	2.3241	Adder	2.73
933281	AC2-140 C	2.5506	80/20	2.5506
933411	AC2-154 C	0.9346	Adder	1.1
934721	AD1-100 C	7.2624	Adder	8.54
936141	AD2-020 C O1	5.3921	80/20	5.3921
936371	AD2-047 C O1	1.6724	Adder	1.97
936461	AD2-060	0.9838	Adder	1.16
936601	AD2-075	18.5325	80/20	18.5325
936631	AD2-079 C O1	0.9048	80/20	0.9048
937041	AD2-138 C	1.7108	Adder	2.01
937401	AD2-194 1	2.9029	Adder	3.42
937411	AD2-194 2	2.9029	Adder	3.42
938261	AE1-039	0.0779	80/20	0.0779
938511	AE1-070 1	3.4109	Adder	4.01
938521	AE1-070 2	3.1206	Adder	3.67
939351	AE1-166 C O1	3.7963	Adder	4.47
939391	AE1-170 C O1	5.2196	80/20	5.2196
939631	AE1-193 C	3.9305	80/20	3.9305
939641	AE1-194 C	3.9305	80/20	3.9305
939651	AE1-195 C	3.9305	80/20	3.9305
939681	AE1-198 C	11.6707	80/20	11.6707
940581	AE2-045 C O1	5.7352	Adder	6.75
941551	AE2-152 C O1	4.3804	Adder	5.15
941561	AE2-153 C O1	1.7261	Adder	2.03
943001	AE2-323 C	4.1864	80/20	4.1864
943021	AE2-325 C	2.7309	80/20	2.7309
943781	AF1-046 C	1.9541	80/20	1.9541
944161	AF1-084 C	4.8750	80/20	4.8750
944911	AF1-156 C	4.4133	Adder	5.19
944931	AF1-158 C O1	6.6276	80/20	6.6276
944961	AF1-161 C	2.1777	80/20	2.1777
945111	AF1-176 C O1	12.6957	80/20	12.6957
945351	AF1-200 FTIR	115.7304	Merchant Transmission	115.7304
945501	AF1-215 C O1	11.1636	80/20	11.1636
950351	J466	6.4410	PJM External (MISO)	6.4410

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
950791	J201 C	0.7628	PJM External (MISO)	0.7628
951941	J602 C	5.6160	PJM External (MISO)	5.6160
952401	J752 C	3.2738	PJM External (MISO)	3.2738
952971	J793	321.0741	PJM External (MISO)	321.0741
953271	J701 C	1.5931	PJM External (MISO)	1.5931
953291	J796	37.9231	PJM External (MISO)	37.9231
953321	J799	48.3424	PJM External (MISO)	48.3424
953781	J833	24.9220	PJM External (MISO)	24.9220
953811	J839	23.5040	PJM External (MISO)	23.5040
954111	J875	29.9235	PJM External (MISO)	29.9235
955121	J989	15.8048	PJM External (MISO)	15.8048
955181	J996	17.2944	PJM External (MISO)	17.2944
955261	J1005	35.6320	PJM External (MISO)	35.6320
956161	J1103	4.1682	PJM External (MISO)	4.1682
956741	J1172	9.6605	PJM External (MISO)	9.6605
956751	J1173	16.5016	PJM External (MISO)	16.5016
957371	AF2-031 C O2	0.4786	80/20	0.4786
957891	AF2-083 C O2	9.7872	80/20	9.7872
958011	AF2-095 C O2	3.5315	Adder	7.84
958021	AF2-096 C O2	6.6146	Adder	14.68
958381	AF2-132 C O2	10.8090	80/20	10.8090
958391	AF2-133 C O2	4.7721	Adder	10.59
958401	AF2-134 C O2	3.7146	80/20	3.7146
958991	AF2-190 C O2	9.5644	80/20	9.5644
959001	AF2-191 C O2	4.8563	80/20	4.8563
959141	AF2-205 C	3.1436	Adder	6.98
960591	AF2-350 C O2	1.5642	Adder	3.47
960601	AF2-351 C O2	0.2086	Adder	0.46
960681	AF2-359 C O2	5.1675	80/20	5.1675
960981	AF2-389 C	2.4483	80/20	2.4483
961051	AF2-396 O2	16.9540	80/20	16.9540
961501	AF2-441 C O2	2.1292	Adder	4.73
WEC	WEC	1.7101	Confirmed LTF	1.7101
LGEE	LGEE	1.3378	Confirmed LTF	1.3378
CPL	CPL	0.2547	Confirmed LTF	0.2547
CBM-W2	CBM-W2	25.1843	Confirmed LTF	25.1843
NY	NY	0.9589	Confirmed LTF	0.9589
CBM-W1	CBM-W1	167.6340	Confirmed LTF	167.6340
TVA	TVA	2.9526	Confirmed LTF	2.9526
CBM-S2	CBM-S2	4.1269	Confirmed LTF	4.1269
CBM-S1	CBM-S1	18.3436	Confirmed LTF	18.3436
MADISON	MADISON	6.0702	Confirmed LTF	6.0702
MEC	MEC	7.1950	Confirmed LTF	7.1950

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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
98936956	955620	J1046 TAP	ITCT	238889	02LEMOYN	ATSI	1	ATSI-P7-1-TE-138-027T-A	tower	953.0	126.08	126.66	DC	12.18

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
244357	05GRANGER EL	-0.1404	Adder	-0.17
247966	05WTRV SLR E	0.1340	Adder	0.16
247967	05OLIV SLR E	0.1119	Adder	0.13
247969	Z2-116 E	0.0600	Adder	0.07
931951	AB1-107 1	-18.6084	Adder	-21.89
931961	AB1-107 2	-39.8116	Adder	-46.84
934252	AD1-052 E1	-0.3783	Adder	-0.45
934262	AD1-052 E2	-0.3783	Adder	-0.45
936141	AD2-020 C O1	3.3021	Adder	3.88
936142	AD2-020 E O1	2.0325	Adder	2.39
936601	AD2-075	11.4721	Adder	13.5
936631	AD2-079 C O1	0.5527	Adder	0.65
936632	AD2-079 E O1	0.3685	Adder	0.43
938261	AE1-039	0.0479	Adder	0.06
939391	AE1-170 C O1	3.1975	Adder	3.76
939392	AE1-170 E O1	4.4156	Adder	5.19
943021	AE2-325 C	1.6724	Adder	1.97
943022	AE2-325 E	1.1123	Adder	1.31
944161	AF1-084 C	2.9890	Adder	3.52
944162	AF1-084 E	1.7072	Adder	2.01
944931	AF1-158 C O1	4.0545	Adder	4.77
944932	AF1-158 E O1	2.7030	Adder	3.18
944961	AF1-161 C	1.3337	Adder	1.57
944962	AF1-161 E	1.3337	Adder	1.57
945111	AF1-176 C O1	7.7266	Adder	9.09
945112	AF1-176 E O1	7.1628	Adder	8.43
950311	G934 C	2.8833	PJM External (MISO)	2.8833
950312	G934 E	11.5332	PJM External (MISO)	11.5332
950351	J466	4.4844	PJM External (MISO)	4.4844
950791	J201 C	0.5400	PJM External (MISO)	0.5400
950792	J201 E	2.1600	PJM External (MISO)	2.1600
950871	J246 C	0.1459	PJM External (MISO)	0.1459
950872	J246 E	0.5834	PJM External (MISO)	0.5834
950942	J325 E	0.6162	PJM External (MISO)	0.6162
951531	J533 C	4.1672	PJM External (MISO)	4.1672
951532	J533 E	16.6688	PJM External (MISO)	16.6688
951941	J602 C	4.0270	PJM External (MISO)	4.0270
951942	J602 E	21.7870	PJM External (MISO)	21.7870
952161	J571	0.3855	PJM External (MISO)	0.3855
952201	J589 C	3.4361	PJM External (MISO)	3.4361
952202	J589 E	18.5899	PJM External (MISO)	18.5899

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
952312	J646 E	0.2644	PJM External (MISO)	0.2644
952401	J752 C	2.2838	PJM External (MISO)	2.2838
952402	J752 E	12.3562	PJM External (MISO)	12.3562
952611	J717 C	3.8024	PJM External (MISO)	3.8024
952612	J717 E	20.5718	PJM External (MISO)	20.5718
952761	J728 C	3.5361	PJM External (MISO)	3.5361
952762	J728 E	19.1571	PJM External (MISO)	19.1571
952881	J758	15.8600	PJM External (MISO)	15.8600
952971	J793	218.9629	PJM External (MISO)	218.9629
953071	J794 C	0.2252	PJM External (MISO)	0.2252
953072	J794 E	1.2183	PJM External (MISO)	1.2183
953271	J701 C	1.1120	PJM External (MISO)	1.1120
953272	J701 E	6.0165	PJM External (MISO)	6.0165
953291	J796	30.2192	PJM External (MISO)	30.2192
953321	J799	35.3090	PJM External (MISO)	35.3090
953361	J806	13.8645	PJM External (MISO)	13.8645
953771	J832	10.5410	PJM External (MISO)	10.5410
953781	J833	18.9430	PJM External (MISO)	18.9430
953811	J839	16.1310	PJM External (MISO)	16.1310
953941	J857	10.0697	PJM External (MISO)	10.0697
954111	J875	8.6430	PJM External (MISO)	8.6430
954591	J937	27.4508	PJM External (MISO)	27.4508
955071	J984 C	2.9986	PJM External (MISO)	2.9986
955072	J984 E	16.2234	PJM External (MISO)	16.2234
955121	J989	11.5528	PJM External (MISO)	11.5528
955261	J1005	25.2920	PJM External (MISO)	25.2920
955591	J1043 C	1.6336	PJM External (MISO)	1.6336
955592	J1043 E	28.9474	PJM External (MISO)	28.9474
955781	J1062	76.7670	PJM External (MISO)	76.7670
955861	J1071	7.3330	PJM External (MISO)	7.3330
956011	J1088	19.0275	PJM External (MISO)	19.0275
956021	J1089	21.7702	PJM External (MISO)	21.7702
956031	J1090	11.4507	PJM External (MISO)	11.4507
956161	J1103	2.9096	PJM External (MISO)	2.9096
956741	J1172	6.8890	PJM External (MISO)	6.8890
956801	J1178	8.3551	PJM External (MISO)	8.3551
957891	AF2-083 C O2	3.1695	Adder	7.04
957892	AF2-083 E O2	0.7924	Adder	1.76
959001	AF2-191 C O2	1.5747	Adder	3.5
959002	AF2-191 E O2	1.0498	Adder	2.33
960981	AF2-389 C	0.7922	Adder	1.76
960982	AF2-389 E	0.5282	Adder	1.17
961051	AF2-396 O2	5.4862	Adder	12.18
WEC	WEC	1.2225	Confirmed LTF	1.2225
LGEE	LGEE	0.9231	Confirmed LTF	0.9231
CPL	CPL	0.1561	Confirmed LTF	0.1561
CBM-W2	CBM-W2	17.7313	Confirmed LTF	17.7313
NY	NY	0.6863	Confirmed LTF	0.6863
CBM-W1	CBM-W1	110.1005	Confirmed LTF	110.1005
TVA	TVA	2.0524	Confirmed LTF	2.0524
O-066	O-066	7.3517	Confirmed LTF	7.3517
CBM-S2	CBM-S2	2.7108	Confirmed LTF	2.7108

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-S1	CBM-S1	12.7289	Confirmed LTF	12.7289
G-007	G-007	1.1315	Confirmed LTF	1.1315
MADISON	MADISON	4.4876	Confirmed LTF	4.4876
MEC	MEC	5.1229	Confirmed LTF	5.1229

15.6 Contingency Descriptions – Secondary POI

Contingency Name	Contingency Definition
AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1	CONTINGENCY 'AEP_SUBT_P2-2_#1012_05VALLEY 69.0_1' OPEN BRANCH FROM BUS 243204 TO BUS 243386 CKT 1 / 243204 05VALLEYEQ 999 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243204 TO BUS 246551 CKT 1 / 243204 05VALLEYEQ 999 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 243204 TO BUS 246550 CKT 1 / 243204 05VALLEYEQ 999 246550 05VALLEY 34.5 1 OPEN BRANCH FROM BUS 243261 TO BUS 243386 CKT 1 / 243261 05COLBYTAPSS 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243307 TO BUS 243386 CKT 1 / 243307 05HARTFO 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 247329 TO BUS 243386 CKT 1 / 247329 05STINGER 138 243386 05VALLY 138 1 REMOVE SWSHUNT FROM BUS 243386 / 243386 05VALLY 138 OPEN BRANCH FROM BUS 246509 TO BUS 246551 CKT 1 / 246509 05CAMERON 69.0 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 247174 TO BUS 246550 CKT 1 / 247174 05ROTHDEW 34.5 246550 05VALLEY 34.5 1 END
AEP_SUBT_P4_#1281_05POKAGON 69.0_H	CONTINGENCY 'AEP_SUBT_P4_#1281_05POKAGON 69.0_H' OPEN BRANCH FROM BUS 243360 TO BUS 246480 CKT 1 / 243360 05POKAGO 138 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246505 TO BUS 246506 CKT 1 / 246505 05BARRETT8 69.0 246506 05BARRETTZ 69.0 1 OPEN BRANCH FROM BUS 246506 TO BUS 246511 CKT 1 / 246506 05BARRETTZ 69.0 246511 05COLBY 69.0 1 OPEN BRANCH FROM BUS 246506 TO BUS 246480 CKT 1 / 246506 05BARRETTZ 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246516 TO BUS 246480 CKT 1 / 246516 05DAILEY 8 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246464 TO BUS 246480 CKT 1 / 246464 05LAKE ST 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246511 TO BUS 243420 CKT 1 / 246511 05COLBY 69.0 243420 05COLBY 34.5 1 REMOVE SWSHUNT FROM BUS 246480 / 246480 05POKAGON 69.0 END
AEP_P1-2_#358	CONTINGENCY 'AEP_P1-2_#358' OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1 END

Contingency Name	Contingency Definition
AEP_P1-2_#5577	CONTINGENCY 'AEP_P1-2_#5577' OPEN BRANCH FROM BUS 243287 TO BUS 243346 CKT 1 / 243287 05E.ELKHART 138 243346 05MOTTV 138 1 END
AEP_P4_#9218_05KENZIE 138_G	CONTINGENCY 'AEP_P4_#9218_05KENZIE 138_G' OPEN BRANCH FROM BUS 939390 TO BUS 243322 CKT 1 / 939390 AE1-170 TAP 138 243322 05KENZIE 138 1 OPEN BRANCH FROM BUS 243322 TO BUS 244510 CKT 1 / 243322 05KENZIE 138 244510 05BLOSSOM TR 138 1 OPEN BRANCH FROM BUS 244510 TO BUS 243365 CKT 1 / 244510 05BLOSSOM TR 138 243365 05RIVRS 138 1 END
ATSI-P2-3-TE-345-015T	CONTINGENCY 'ATSI-P2-3-TE-345-015T' /* LEMOYNE BK-34505 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 238890 CKT 1 /* 02LEMOYN 345 02LEMOYN 138 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 J1046 TAP 345 END
ATSI-P1-2-TE-345-604T-A	CONTINGENCY 'ATSI-P1-2-TE-345-604T-A' /*LINE OUTAGE: LEMOYNE TO ITC MAJESTIC DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 END
AEP_SUBT_P4_#1282_05POKAGON 69.0_E	CONTINGENCY 'AEP_SUBT_P4_#1282_05POKAGON 69.0_E' OPEN BRANCH FROM BUS 243360 TO BUS 246480 CKT 1 / 243360 05POKAGO 138 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246506 TO BUS 246480 CKT 1 / 246506 05BARRETTZ 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246516 TO BUS 246480 CKT 1 / 246516 05DAILEY 8 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246464 TO BUS 246480 CKT 1 / 246464 05LAKE ST 69.0 246480 05POKAGON 69.0 1 REMOVE SWSHUNT FROM BUS 246480 / 246480 05POKAGON 69.0 END

Contingency Name	Contingency Definition
AEP_SUBT_P4_#1247_05MOORE PK 69.0_B	CONTINGENCY 'AEP_SUBT_P4_#1247_05MOORE PK 69.0_B' OPEN BRANCH FROM BUS 243345 TO BUS 246535 CKT 1 / 243345 05MOORPK 138 246535 05MOORE PK 69.0 1 OPEN BRANCH FROM BUS 246515 TO BUS 246547 CKT 1 / 246515 05COREY 69.0 246547 05MOOREPKZ 69.0 1 OPEN BRANCH FROM BUS 246517 TO BUS 244519 CKT 1 / 246517 05DOCKFNDR 69.0 244519 05RIPPLE 69.0 1 OPEN BRANCH FROM BUS 246517 TO BUS 246553 CKT 1 / 246517 05DOCKFNDR 69.0 246553 05WHEELR S 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246547 CKT 1 / 246535 05MOORE PK 69.0 246547 05MOOREPKZ 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246542 CKT 1 / 246535 05MOORE PK 69.0 246542 05SCHLCFR8 69.0 1 OPEN BRANCH FROM BUS 246535 TO BUS 246553 CKT 1 / 246535 05MOORE PK 69.0 246553 05WHEELR S 69.0 1 OPEN BRANCH FROM BUS 246547 TO BUS 243401 CKT 1 / 246547 05MOOREPKZ 69.0 243401 05STURGIS IP69.0 1 REMOVE SWSHUNT FROM BUS 246535 / 246535 05MOORE PK 69.0 END
AEP_SUBT_P2-2_#1279_05POKAGON 69.0_1	CONTINGENCY 'AEP_SUBT_P2-2_#1279_05POKAGON 69.0_1' OPEN BRANCH FROM BUS 243360 TO BUS 246480 CKT 1 / 243360 05POKAGO 138 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246506 TO BUS 246480 CKT 1 / 246506 05BARRETTZ 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246516 TO BUS 246480 CKT 1 / 246516 05DAILEY 8 69.0 246480 05POKAGON 69.0 1 OPEN BRANCH FROM BUS 246464 TO BUS 246480 CKT 1 / 246464 05LAKE ST 69.0 246480 05POKAGON 69.0 1 REMOVE SWSHUNT FROM BUS 246480 / 246480 05POKAGON 69.0 END
ATSI-P7-1-TE-345-022T	CONTINGENCY 'ATSI-P7-1-TE-345-022T' /* Y1-069-MONROE/LEMOYNE-MAJ 345 DISCONNECT BRANCH FROM BUS 241901 TO BUS 264612 CKT 1 /* 02_Y1-069 345 19MON12 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 19MAJTC 345 END
AEP_P1-2_#5574-B	CONTINGENCY 'AEP_P1-2_#5574-B' OPEN BRANCH FROM BUS 939390 TO BUS 243322 CKT 1 / 939390 AE1-170 TAP 138 243322 05KENZIE 138 1 END
ATSI-P2-3-TE-345-016T	CONTINGENCY 'ATSI-P2-3-TE-345-016T' /* LEMOYNE BK-34506 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 955620 CKT 1 /* 02LEMOYN 345 J1046 TAP 345 DISCONNECT BRANCH FROM BUS 238889 TO BUS 242936 CKT 1 /* 02LEMOYN 345 05FOSTOR 345 END

Contingency Name	Contingency Definition
Base Case	
AEP_P4_#7443_05DUMONT 765_A	CONTINGENCY 'AEP_P4_#7443_05DUMONT 765_A' OPEN BRANCH FROM BUS 243205 TO BUS 243206 CKT 1 / 243205 05COOK 765 243206 05DUMONT 765 1 OPEN BRANCH FROM BUS 243206 TO BUS 246999 CKT 1 / 243206 05DUMONT 765 246999 05SORENS 765 1 END
AEP_SUBT_P4_#1342_05VALLEY 69.0_A	CONTINGENCY 'AEP_SUBT_P4_#1342_05VALLEY 69.0_A' OPEN BRANCH FROM BUS 243204 TO BUS 243386 CKT 1 / 243204 05VALLEYEQ 999 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243204 TO BUS 246551 CKT 1 / 243204 05VALLEYEQ 999 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 243204 TO BUS 246550 CKT 1 / 243204 05VALLEYEQ 999 246550 05VALLEY 34.5 1 OPEN BRANCH FROM BUS 243261 TO BUS 243386 CKT 1 / 243261 05COLBYTAPSS 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 243307 TO BUS 243386 CKT 1 / 243307 05HARTFO 138 243386 05VALLY 138 1 OPEN BRANCH FROM BUS 247329 TO BUS 243386 CKT 1 / 247329 05STINGER 138 243386 05VALLY 138 1 REMOVE SWSHUNT FROM BUS 243386 / 243386 05VALLY 138 OPEN BRANCH FROM BUS 246502 TO BUS 246509 CKT 1 / 246502 05ALMENA 69.0 246509 05CAMERON 69.0 1 OPEN BRANCH FROM BUS 246509 TO BUS 246551 CKT 1 / 246509 05CAMERON 69.0 246551 05VALLEY 69.0 1 OPEN BRANCH FROM BUS 247174 TO BUS 246550 CKT 1 / 247174 05ROTHDEW 34.5 246550 05VALLEY 34.5 1 END
AEP_P4_#8621_05COOK 345_K	CONTINGENCY 'AEP_P4_#8621_05COOK 345_K' OPEN BRANCH FROM BUS 243205 TO BUS 243215 CKT 4 / 243205 05COOK 765 243215 05COOK 345 4 OPEN BRANCH FROM BUS 243215 TO BUS 920210 CKT 1 / 243215 05COOK 345 920210 AA2-116 TAPK 345 1 OPEN BRANCH FROM BUS 243224 TO BUS 920210 CKT 1 / 243224 05KENZIE 345 920210 AA2-116 TAPK 345 1 END
ATSI-P1-2-TE-345-605T	CONTINGENCY 'ATSI-P1-2-TE-345-605T' /*LINE OUTAGE: AJ TO ITC MOROCCO DISCONNECT BRANCH FROM BUS 238530 TO BUS 256583 CKT 1 END

Contingency Name	Contingency Definition
ATSI-P7-1-TE-138-027T-A	CONTINGENCY 'ATSI-P7-1-TE-138-027T-A' /* ALLEN-MIL-MONRO & BAYSH-MONRO 345KV DISCONNECT BRANCH FROM BUS 264594 TO BUS 256583 CKT 1 /* 19LULU 345 18LENAAWEE 345 DISCONNECT BRANCH FROM BUS 264594 TO BUS 264839 CKT 1 /* 19LULU 345 19MILAN 345 DISCONNECT BRANCH FROM BUS 264594 TO BUS 955720 CKT 1 /* 19LULU 345 J1056 TAP 345 DISCONNECT BRANCH FROM BUS 241901 TO BUS 264612 CKT 1 /* 02_Y1-069 345 19MON12 345 END

16 Light Load Analysis – Secondary POI

Light Load Studies (As applicable).

To be determined during later study phases.

17 Short Circuit Analysis – Secondary POI

The following Breakers are overdutied

To be determined during later study phases.

18 Stability and Reactive Power Assessment – Secondary POI

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be determined during later study phases.

19 Affected Systems – Secondary POI

19.1 TVA

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

19.2 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

19.3 MISO

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

19.4 LG&E

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