Generation Interconnection

Feasibility Study Report

for

Queue Project AF1-251

AVON-NORTH CLARK 345 KV

132 MW Capacity / 220 MW Energy

January, 2020

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1 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

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

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

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.

2 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Clark County, KY. The installed facilities will have a total capability of 220 MW with 132 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is 5/15/2023. This study does not imply a TO commitment to this in-service date.

Queue Number	**AF1-251**
Project Name	AVON-NORTH CLARK 345 KV
State	Kentucky
County	Clark
Transmission Owner	EKPC
MFO	220
MWE	220
MWC	132
Fuel	Solar
Basecase Study Year	2023

2.1 Point of Interconnection

AF1-251 will interconnect with the EKPC transmission system tapping the Avon to North Clark 345 kV line.

2.2 Cost Summary

The AF1-251 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$ 890,000
Direct Connection Network Upgrade	$ 7,235,000
Non Direct Connection Network Upgrades	$ 585,000
Total Costs	$ 8,710,000

In addition, the AF1-251 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	$ 132,285,300

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

3 Transmission Owner Scope of Work

4 Attachment Facilities

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

Description	Total Cost
Install necessary equipment (a 345 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panels) at the new Northwest Clark County substation to accept the IC generator lead line/bus (Estimated time to implement is 12 months)	$890,000
Total Attachment Facility Costs	$890,000

5 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
Construct a new 345 kV switching station ("Northwest Clark County") to facilitate connection of the IC solar generation project to the existing North Clark-Avon 345 kV line (Estimated time to implement is 24 months)	$7,235,000
Total Direct Connection Facility Costs	$7,235,000

6 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
Construct facilities to loop the existing North Clark-Avon 345 kV line into the new Northwest Clark County switching station (Estimated time to implement is 24 months)	$450,000
Modify relays and/or settings at North Clark substation for the existing line to the new Northwest Clark County switching station (Estimated time to implement is 9 months)	$90,000
Modify relays and/or settings at Avon substation for the existing line to the new Northwest Clark County switching station (Estimated time to implement is 9 months)	$45,000
Total Non-Direct Connection Facility Costs	$585,000

7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

8 Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

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

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 Sections 24.1 and 24.2.

9.2 EKPC Requirements

The Interconnection Customer will be required to comply with all EKPC Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "EKPC Facility Connection Requirements" document located at the following link:

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

10 Network Impacts

The Queue Project AF1-251 was evaluated as a 220.0 MW (Capacity 132.0 MW) injection tapping the Avon to North Clark 345 kV line in the EKPC area. Project AF1-251 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-251 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

Summer Peak Load Flow

11 Generation Deliverability

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

None

12 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
41661367	342541	4AVON	138.0	EKPC	342631	4PARIS T	138.0	EKPC	1	EKPC_P4-6_NCLK E114-151T	breaker	220.0	89.78	115.51	DC	56.59
41873780	342541	4AVON	138.0	EKPC	342631	4PARIS T	138.0	EKPC	1	EKPC_P2-4_NCLK E114-151T-B	bus	220.0	89.78	115.51	DC	56.59
41661283	342544	4AVON-R	138.0	EKPC	324275	4LOUDON AVE	138.0	LGEE	1	EKPC_P4-6_NCLK E114-151T	breaker	203.0	95.06	124.01	DC	58.77
41873727	342544	4AVON-R	138.0	EKPC	324275	4LOUDON AVE	138.0	LGEE	1	EKPC_P2-4_NCLK E114-151T-B	bus	203.0	95.06	124.01	DC	58.77

13 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
43568935	243453	05BEATTY	345.0	AEP	243454	05BIXBY	345.0	AEP	1	AEP_P4_#3196_05BEATTY 345_302E	breaker	1203.0	134.61	135.33	DC	19.23
43568936	243453	05BEATTY	345.0	AEP	243454	05BIXBY	345.0	AEP	1	AEP_P4_#10715_05COLE 345_C	breaker	1203.0	132.61	133.31	DC	18.52
43568995	243453	05BEATTY	345.0	AEP	244022	05COLE	345.0	AEP	1	AEP_P4_#3195_05BEATTY 345_304E	breaker	1203.0	121.32	121.92	DC	16.19
43568996	243453	05BEATTY	345.0	AEP	244022	05COLE	345.0	AEP	1	AEP_P4_#8094_05BIXBY 345_C	breaker	1203.0	119.37	119.97	DC	15.97
43569040	243454	05BIXBY	345.0	AEP	243459	05KIRK	345.0	AEP	1	AEP_P4_#10715_05COLE 345_C	breaker	1409.0	113.28	113.77	DC	17.93
43569041	243454	05BIXBY	345.0	AEP	243459	05KIRK	345.0	AEP	1	AEP_P4_#3196_05BEATTY 345_302E	breaker	1409.0	114.05	114.63	DC	18.31
43952910	246800		138.0	AEP	247034	05EMERSS	138.0	AEP	1	DAY_P734541 34553	tower	185.0	108.11	111.06	DC	12.09
43952814	246946	05WLDCAT	138.0	AEP	243019	05HILLSB	138.0	AEP	1	DAY_P734541 34553	tower	185.0	160.86	163.8	DC	12.09
43952911	247034	05EMERSS	138.0	AEP	246946	05WLDCAT	138.0	AEP	1	DAY_P734541 34553	tower	185.0	106.87	109.82	DC	12.09
41048484	250054	08LONGBR	138.0	DEO&K	250077	08MTZION	138.0	DEO&K	1	DAY_P734541 34553	tower	284.0	113.31	116.41	DC	19.48
41048535	250077	08MTZION	138.0	DEO&K	249991	08BUFTN1	138.0	DEO&K	1	DAY_P734541 34553	tower	298.0	103.66	106.62	DC	19.48

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
42784655	253014	09CLINTO	345.0	DAY	253027	09GREENE	345.0	DAY	1	DAY_P734569 34598 34524	tower	1374.0	109.49	110.0	DC	15.42
42784656	253014	09CLINTO	345.0	DAY	253027	09GREENE	345.0	DAY	1	DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTERBATH	tower	1374.0	102.46	102.93	DC	14.21
41048471	253038	09KILLEN	345.0	DAY	242938	05MARQUI	345.0	AEP	1	DAY_P7_34506 34542_1-A	tower	1372.0	104.85	105.84	DC	30.2
41048472	253038	09KILLEN	345.0	DAY	242938	05MARQUI	345.0	AEP	1	DAY_P7_34506 34542_1-B	tower	1372.0	102.27	103.26	DC	30.2
42784619	253077	09STUART	345.0	DAY	253038	09KILLEN	345.0	DAY	1	DAY_P7_34506 34542_1-A	tower	1374.0	104.7	105.69	DC	30.2
42784620	253077	09STUART	345.0	DAY	253038	09KILLEN	345.0	DAY	1	DAY_P7_34506 34542_1-B	tower	1374.0	102.12	103.11	DC	30.2
42262390	253100	09ATLNTA	345.0	DAY	253110	09ADKINS	345.0	DAY	1	AEP_P4_#6774_05MARQUI 345_D	breaker	1195.0	113.67	114.39	DC	19.09
42262391	253100	09ATLNTA	345.0	DAY	253110	09ADKINS	345.0	DAY	1	AEP_P4_#2900_05MARQUI 345_D2	breaker	1195.0	110.94	111.66	DC	19.26
42262392	253100	09ATLNTA	345.0	DAY	253110	09ADKINS	345.0	DAY	1	DAY_P4_L34510-1	breaker	1195.0	110.72	111.45	DC	19.35
43569595	324267	4KENTON	138.0	LGEE	246800		138.0	AEP	1	DAY_P734541 34553	tower	185.0	111.14	114.09	DC	12.09
41048460	342559	4BOONECO	138.0	EKPC	250054	08LONGBR	138.0	DEO&K	1	DAY_P734541 34553	tower	284.0	120.64	123.74	DC	19.48
41048536	342661	4SPUR-KENT-R	138.0	EKPC	324267	4KENTON	138.0	LGEE	1	DAY_P734541 34553	tower	281.0	106.0	108.4	DC	14.82
41048574	342664	4SPURLOCK	138.0	EKPC	342661	4SPUR-KENT-R	138.0	EKPC	1	DAY_P734541 34553	tower	291.0	102.46	104.78	DC	14.82
41048427	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER	tower	1532.0	125.33	130.05	DC	72.08
41347223	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	single	1532.0	117.68	120.52	DC	43.24
41661183	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-3_C2 816_SILVERGROVE	breaker	1532.0	125.48	130.21	DC	72.12
41661184	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-3_C2 1493_RED BANK	breaker	1532.0	125.38	130.11	DC	72.07
41873670	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-2_C1 SILVER GROVE 345 BUS	bus	1532.0	125.32	130.04	DC	72.07
42784646	926060	AC1-085 TAP	345.0	DAY	942090	AE2-221 TAP	345.0	DAY	1	DAY_P734569 34598 34524	tower	1374.0	109.58	110.12	DC	16.44
42784647	926060	AC1-085 TAP	345.0	DAY	942090	AE2-221 TAP	345.0	DAY	1	DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTERBATH	tower	1374.0	103.61	104.11	DC	15.13
42262384	942090	AE2-221 TAP	345.0	DAY	253014	09CLINTO	345.0	DAY	1	DEOK_P5-5_FOSTER345 BUS1+RELAYFAIL	breaker	1374.0	110.15	110.65	DC	15.35
42262385	942090	AE2-221 TAP	345.0	DAY	253014	09CLINTO	345.0	DAY	1	DEOK_P2-3_C2 1349_FOSTER	breaker	1374.0	109.64	110.14	DC	15.29
42784580	942090	AE2-221 TAP	345.0	DAY	253014	09CLINTO	345.0	DAY	1	DAY_P734569 34598 34524	tower	1374.0	121.76	122.3	DC	16.44
42784581	942090	AE2-221 TAP	345.0	DAY	253014	09CLINTO	345.0	DAY	1	DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTERBATH	tower	1374.0	115.58	116.07	DC	15.13
42784789	944520	AF1-117 TAP	345.0	DAY	253100	09ATLNTA	345.0	DAY	1	DAY_P7_495	tower	1195.0	100.75	101.41	DC	17.36

14 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
4356928 7	243453	05BEATTY	345.0	AEP	243454	05BIXBY	345.0	AEP	1	AEP_P1-2_#714	operation	1203.0	123.82	124.48	DC	17.59
4356941 2	243453	05BEATTY	345.0	AEP	244022	05COLE	345.0	AEP	1	AEP_P1-2_#713	operation	1203.0	112.78	113.36	DC	15.38
4356941 8	243454	05BIXBY	345.0	AEP	243459	05KIRK	345.0	AEP	1	AEP_P1-2_#10137	operation	1409.0	110.16	110.74	DC	17.93
4257210 7	253100	09ATLNTA	345.0	DAY	253110	09ADKINS	345.0	DAY	1	DAY_P1-2_#764	operation	1195.0	110.43	111.15	DC	19.08
4257210 8	253100	09ATLNTA	345.0	DAY	253110	09ADKINS	345.0	DAY	1	DAY_P1_894_B2	operation	1195.0	110.43	111.15	DC	19.08
4134736 2	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#363	operation	1451.0	125.08	125.63	DC	17.84
4134736 3	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	Base Case	operation	1134.0	122.74	123.46	DC	18.16
4134770 5	342541	4AVON	138.0	EKPC	342631	4PARIS T	138.0	EKPC	1	EKPC_P1-2_AVON-NCLA345-C	operation	220.0	76.89	101.38	DC	53.87
4134744 8	342544	4AVON-R	138.0	EKPC	324275	4LOUDON AVE	138.0	LGEE	1	EKPC_P1-2_AVON-NCLA345-C	operation	203.0	93.42	122.07	DC	58.17
4134768 3	342676	4THREE FKT	138.0	EKPC	342577	4FAWKES EK	138.0	EKPC	1	EKPC_P1-2_AVON-NCLA345-C	operation	203.0	86.67	104.64	DC	36.48
4134722 0	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	Base Case	operation	1240.0	129.34	134.77	DC	67.17
4134722 1	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	operation	1532.0	125.28	130.0	DC	72.07
4257206 8	941510	AE2-148 TAP	345.0	DAY	945630	AF1-228 TAP	345.0	DAY	1	DAY_P1-2_#762	operation	1374.0	107.0	107.52	DC	16.08
4257204 9	942090	AE2-221 TAP	345.0	DAY	253014	09CLINTO	345.0	DAY	1	DAY_P1-2_#762	operation	1374.0	109.54	110.02	DC	14.82
4134767 0	942890	AE2-308 TAP	138.0	EKPC	342676	4THREE FKT	138.0	EKPC	1	EKPC_P1-2_AVON-NCLA345-C	operation	203.0	87.9	105.87	DC	36.48
4134737 4	945630	AF1-228 TAP	345.0	DAY	243453	05BEATTY	345.0	AEP	1	DAY_P1-2_#762	operation	1374.0	114.88	115.4	DC	16.08

15 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
42784647,42784646	20	AC1-085 TAP 345.0 kV - AE2-221 TAP 345.0 kV Ckt 1	DAY DAYr190050 (1199) : Replace 2000A wave traps with 3000A at AC1-085 sub and AE2-221 sub Project Type : FAC Cost : $200,000 Time Estimate : 12.0 Months	$200,000
42784789	22	AF1-117 TAP 345.0 kV - 09ATLNTA 345.0 kV Ckt 1	DAY DAYr190027 (1176) : Replace Atlanta metering equipment to increase thermal line rating Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months	$100,000
43952910	6	138.0 kV - 05EMERSS 138.0 kV Ckt 1	AEP AEPO0039a (649) : A Sag Study will be required on the 4.5 miles ofACSR ~ 477 ~ 26/7 ~ HAWK- Conductor to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between $18,000 (no remediations required, just sag study) and $6.75 million (complete line reconductor/rebuild). New rating after sag study: S/N: 185 S/E: 257. 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 : $18,000 Time Estimate : Sag Study : 6 - 12 months Months	$18,000
43952814	7	05WLDCAT 138.0 kV - 05HILLSB 138.0 kV Ckt 1	AEP N5472 (491) : A Sag Study will be required on the 10 miles ofACSR ~ 477 ~ 26/7 ~ HAWK- Conductor to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between $40,000 (no remediations required, just sag study) and $15 million (complete line reconductor/rebuild). New rating after sag study: S/N: 185 S/E: 257. 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 : $186,000 Time Estimate : 6-12 Months N5857 (492) : Rebuild / reconductor 10 miles of ACSR ~ 477 ~ 26/7 ~ HAWK- Conductor Section 1. Estimated cost: $15 million. Project Type : FAC Cost : $15,040,000 Time Estimate : 24-36 Months	$15,226,000

ID	Index	Facility	Upgrade Description	Cost
42784619,42784620	13	09STUART 345.0 kV - 09KILLEN 345.0 kV Ckt 1	DAY DAYr190028 (1177) : Reconductor Stuart-Killen 345kV line with 795 ACCR high temperature conductor in a twin bundle Project Type : FAC Cost : $31,000,000 Time Estimate : 42.0 Months DAYr190029 (1178) : Replace 2000A wave trap with 3000A at both Stuart and Killen substations Project Type : FAC Cost : $200,000 Time Estimate : 12.0 Months DAYr190030 (1179) : Replace substation riser conductor with 2500AAC (parallel) at both Stuart and Killen substations Project Type : FAC Cost : $200,000 Time Estimate : 12.0 Months DAYr190031 (1180) : Replace 2000A disconnect switch at Killen with 1600A (parallel) Project Type : FAC Cost : $125,000 Time Estimate : 12.0 Months	$31,525,000
42784656,42784655	11	09CLINTO 345.0 kV - 09GREENE 345.0 kV Ckt 1	DAY r190005 (1122) : Replace 2000A wave trap with 3000A Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months r190007 (1124) : Replace 2000A wave trap with 3000A Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months	$200,000
41048535	10	08MTZION 138.0 kV - 08BUFTN1 138.0 kV Ckt 1	DEOK n6785 (1209) : Rebuild the line and Substation Bus Conductor on the Buffington terminal at Mt. Zion, Replace equipment at Buffington Project Type : FAC Cost : $4,973,025 Time Estimate : 30.0 Months	$4,973,025

ID	Index	Facility	Upgrade Description	Cost
42784581,42784580, 42262385,42262384	21	AE2-221 TAP 345.0 kV - 09CLINTO 345.0 kV Ckt 1	DAY DAYr190046 (1150) : Replace Clinton 2000A wave trap with 3000A Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months DAYr190047 (1151) : Reconductor AE2-221 Tap to Clinton line with twin bundle 1351 ACSR Project Type : FAC Cost : $15,000,000 Time Estimate : 18.0 Months DAYr190048 (1197) : Replace Clinton substation riser conductor with 2500AAC (parallel) Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months DAYr190049 (1198) : Replace Clinton 2000A disconnect switch with 1600A (parallel) Project Type : FAC Cost : $125,000 Time Estimate : 12.0 Months	$15,325,000
41048427,41661183, 41873670,41347223, 41661184	19	7SPURLOCK 345.0 kV - 09STUART 345.0 kV Ckt 1	DAY DAYr190039 (1188) : Reconductor Stuart-Spurlock line with twin bundle 1033 Curlew ACCR conductor Project Type : FAC Cost : $17,000,000 Time Estimate : 18.0 Months DAYr190040 (1189) : Replace Stuart substation riser conductor with 2500AAC (parallel) Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months DAYr190041 (1190) : Reconductor Stuart substation conductor with twin bundle 1033 Curlew ACCR conductor Project Type : FAC Cost : $250,000 Time Estimate : 12.0 Months EKPC r0040 (1853) : Replace the 1500A interconnection metering CTs with 2000A equipment. Project Type : FAC Cost : $150,000 Time Estimate : 9.0 Months r0042 (1855) : Construct a new 345 kV circuit (Id 2) between the EKPC Spurlock and DP&L Stuart substations (circuit length approximately 8.5 miles) Project Type : CON Cost : $30,000,000 Time Estimate : 48.0 Months	$47,500,000

ID	Index	Facility	Upgrade Description	Cost
43569041,43569040	5	05BIXBY 345.0 kV - 05KIRK 345.0 kV Ckt 1	AEP AEPO0038a (641) : Replace Kirk Riser, Sub Cond 954 ACSR 45/7 Project Type : FAC Cost : $100,000 Time Estimate : 12-18 months Months AEPO0038b (642) : An engineering study will need to be conducted to determine if the Kirk Relay Thermal limits 1386 Amps settings can be adjusted to mitigate the overload, Estimated Cost $25,000. New relay packages will be required if the settings cannot be adjusted. Estimated Cost: $600,000. Project Type : FAC Cost : $25,000 Time Estimate : 12-18 months Months AEPO0038c (643) : Replace two Kirk risers, Sub cond 1700 kcm AAC 61 Str. Project Type : FAC Cost : $200,000 Time Estimate : 12-18 months Months AEPO0038d (644) : Sag Study will be required on 37.9 miles of line between Bixby and kirk .The cost is expected to be 151,600.New Ratings after sag study : S/N: 1409MVA S/E: 1887 MVA.Rebuild/Reconductor, cost : $ 75.8 million Project Type : FAC Cost : $151,600 Time Estimate : Sag Study : 6 - 12 months Months AEPO0038e (645) : An engineering study will need to be conducted to determine if the Kirk Compliance Thermal limits 2396 Amps settings can be adjusted to mitigate the overload, Estimated Cost $25,000. New relay packages will be required if the settings cannot be adjusted. Estimated Cost: $600,000. Project Type : FAC Cost : $25,000 Time Estimate : 12-18 months Months AEPO0038f (646) : Replace Bixby switch (2000A) Project Type : FAC Cost : $100,000 Time Estimate : 12-18 months Months AEPO0038g (647) : Replace Bixby Riser, Sub Cond 954 ACSR 45/7 Project Type : FAC Cost : $100,000 Time Estimate : 12-18 months Months AEPO0038h (648) : Replace Kirk Riser, Sub Cond 954 ACSR 45/7 Project Type : FAC Cost : $100,000 Time Estimate : 12-18 months Months	$801,600

ID	Index	Facility	Upgrade Description	Cost
42262390,42262391, 42262392	14	09ATLNTA 345.0 kV - 09ADKINS 345.0 kV Ckt 1	**DEOK** **r190011 (1171) : Replace metering equipment to increase thermal line rating** **Project Type : FAC** **Cost : $100,000** **Time Estimate : 12.0 Months**	$100,000
41048460	16	4BOONE CO 138.0 kV - 08LONGBR 138.0 kV Ckt 1	**EKPC** **r0009 (1821) : Increase MOT of Boone-Longbranch 138kV line section 954 MCM conductor to 275F (~2.25 miles)** **Project Type : FAC** **Cost : $200,000** **Time Estimate : 6.0 Months** **r0010 (1822) : Upgrade bus and jumpers associated with Boone 138 kV bus using 2-500 MCM 37 CU conductor or equivalent** **Project Type : FAC** **Cost : $170,000** **Time Estimate : 6.0 Months**	$370,000
41048536	17	4SPUR-KENT-R 138.0 kV - 4KENTON 138.0 kV Ckt 1	**EKPC** **n6041 (1815) : Replace the 5% 1200A reactor at Spurlock with a 7.5% 1600A reactor** **Project Type : FAC** **Cost : $600,000** **Time Estimate : 9.0 Months** **LGEE** **NonPJMArea : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.**	$600,000
41873727,41661283	2	4AVON-R 138.0 kV - 4LOUDON AVE 138.0 kV Ckt 1	**EKPC** **r0020 (1833) : LGEE violation (non PJM area). EKPC emergency rating is 281 MVA.** **The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months**	$0
43952911	8	05EMERSS 138.0 kV - 05WLDCAT 138.0 kV Ckt 1	**AEP** **AEPO0006a (467) : Perform sag study on AEP's portion of Wildcat-Kenton 138kV circuit, , 1.3 miles of 477 ACSR 26/7 Hawk.** **Project Type : FAC** **Cost : $20,000** **Time Estimate : 6-12 Months**	$20,000

ID	Index	Facility	Upgrade Description	Cost
41661367,41873780	1	4AVON 138.0 kV - 4PARIS T 138.0 kV Ckt 1	EKPC r0030 (1843) : Increase the maximum operating temperature of the 636 MCM ACSR conductor in the Avon-Paris Tap 138 kV line section to 293 degrees F (6.9 miles) Project Type : FAC Cost : $625,000 Time Estimate : 8.0 Months	$625,000
41048471,41048472	12	09KILLEN 345.0 kV - 05MARQUI 345.0 kV Ckt 1	AEP AEPO0007a (468) : Perform sag study on Don Marquis-Killen 345kV circuit, 32.1 miles of 2-983.1 ACAR 30/7 Rail5 conductor.Since Killen will be retired, the conductor between Don Marquis and Stuart will become a complete circuit and the whole circuit will need to be sag studied. Perform sag study on Killen-Stuart 345kV circuit, 15.2 miles of 2-983.1 ACAR 30/7 Rail5 conductor. Project Type : FAC Cost : $190,000 Time Estimate : 6-12 Months DAY DAYr190042 (1191) : Replace 2000A wave trap with 3000A Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months DAYr190043 (1192) : Reconductor Killen-Marquis line with 795 ACCR high temperature conductor in a twin bundle Project Type : FAC Cost : $6,500,000 Time Estimate : 18.0 Months DAYr190044 (1193) : Replace Killen substation riser conductor with 2-1024.5 ACAR 30x7 Project Type : FAC Cost : $100,000 Time Estimate : 12.0 Months DAYr190045 (1194) : Replace Killen 2000A disconnect switch with 1600A (parallel) Project Type : FAC Cost : $125,000 Time Estimate : 12.0 Months	$7,015,000

ID	Index	Facility	Upgrade Description	Cost
43569595	15	4KENTON 138.0 kV - 138.0 kV Ckt 1	**AEP** **AEPO0040a (650) : A Sag Study will be required on the 24 miles ofACSR ~ 477 ~ 26/7 ~ HAWK- Conductor section 1 to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between $96,000 (no remediations required, just sag study) and $36 million (complete line reconductor/rebuild). New rating after sag study: S/N: 185 S/E: 257. 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 : $96,000** **Time Estimate : Sag Study : 6 - 12 months Months** **LGEE** **NonPJMArea : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.**	$96,000
43568936,43568935	3	05BEATTY 345.0 kV - 05BIXBY 345.0 kV Ckt 1	**AEP** **AEPO0003a (463) : Upgrade/Replace Three 345kV 1600A switches and 2-954 ACSR risers at Beatty station** **Project Type : FAC** **Cost : $1,500,000** **Time Estimate : 12-18 Months** **AEPO0003b (607) : 1) A sag study will be required on the 9.5 miles of ACSR ~ 954 ~ 45/7 ~ Bundled - Conductor Section 1 to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between $38,000 (no remediation required, just sag study) and $19 million (complete line reconductor/rebuild). New rating after sag study: S/N:1409 S/E: 1887 . 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 : $38,000** **Time Estimate : 12-18 Months** **AEPO0003c (608) : Upgrade/Replace four 345kV 2000A Bixby switches** **Project Type : FAC** **Cost : $1,500,000** **Time Estimate : 12-18 Months** **AEPO0003d (609) : Replace 2-954 ACSR risers at Bixby station** **Project Type : FAC** **Cost : $175,000** **Time Estimate : 12-19 Months**	$3,213,000

ID	Index	Facility	Upgrade Description	Cost
43568995,43568996	4	05BEATTY 345.0 kV - 05COLE 345.0 kV Ckt 1	**AEP** **AEPO0001a (459) : Upgrade/Replace 3-345kV 1600A switches at Beatty station** **Project Type : FAC** **Cost : $1,500,000** **Time Estimate : 12-18 Months** **AEPO0001b (460) : 1) A sag study will be required on the 9.7 miles of ACSR ~ 954 ~ 45/7 ~ Bundled - Conductor Section 1 to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between $42,000 (no remediation required, just sag study) and $40 million (complete line reconductor/rebuild). New rating after sag study: S/N:1409 S/E: 1887 . 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 : $42,000** **Time Estimate : 6-12 Months** **AEPO0001c (610) : Replace 2-954 ACSR risers at Beatty station** **Project Type : FAC** **Cost : $175,000** **Time Estimate : 12-20 Months**	$1,717,000
41048484	9	08LONGBR 138.0 kV - 08MTZION 138.0 kV Ckt 1	**DEOK** **n30581 (1208) : Rebuild the line and Substation Bus Conductor on the Longbranch terminal at Mt. Zion** **Project Type : FAC** **Cost : $2,660,676** **Time Estimate : 30.0 Months**	$2,660,676
41048574	18	4SPURLOCK 138.0 kV - 4SPUR-KENT-R 138.0 kV Ckt 1	**EKPC** **n6041 (1815) : Replace the 5% 1200A reactor at Spurlock with a 7.5% 1600A reactor** **Project Type : FAC** **Cost : $600,000** **Time Estimate : 9.0 Months**	$600,000
			TOTAL COST	**$132,285,300**

16 Flow Gate Details

The following indices contain additional information about each flowgate presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

16.1 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
41873780	342541	4AVON	EKPC	342631	4PARIS T	EKPC	1	EKPC_P2-4_NCLK E114-151T-B	bus	220.0	89.78	115.51	DC	56.59

Bus #	Bus	MW Impact
941411	AE2-138 C	48.8242
941412	AE2-138 E	18.0582
941981	AE2-210 C O1	16.8235
941982	AE2-210 E O1	6.3281
942411	AE2-254 C O1	1.2908
942412	AE2-254 E O1	0.8605
942591	AE2-275 C O1	4.1365
942592	AE2-275 E O1	1.5559
942891	AE2-308 C O1	8.9246
942892	AE2-308 E O1	3.2453
943111	AE2-339 C	6.8940
943112	AE2-339 E	3.3956
944621	AF1-127 C O1	13.7881
944622	AF1-127 E O1	6.7911
945861	AF1-251 C	33.9557
945862	AF1-251 E	22.6371
946021	AF1-267 C O1	1.1795
946022	AF1-267 E O1	0.5419
LGEE	LGEE	0.6641
CPLE	CPLE	0.2216
WEC	WEC	0.0403
CBM-W2	CBM-W2	4.2097
NY	NY	0.0160
CBM-W1	CBM-W1	1.1885
TVA	TVA	1.1312
O-066	O-066	0.1142
CBM-S2	CBM-S2	2.5143
CBM-S1	CBM-S1	7.4465
G-007	G-007	0.0166
MADISON	MADISON	2.0019
MEC	MEC	0.4449

16.2 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
41873727	342544	4AVON-R	EKPC	324275	4LOUDON AVE	LGEE	1	EKPC_P2-4_NCLK E114-151T-B	bus	203.0	95.06	124.01	DC	58.77

Bus #	Bus	MW Impact
925981	AC1-074 C O1	7.2173
925982	AC1-074 E O1	3.0931
932551	AC2-075 C	1.7141
932552	AC2-075 E	0.8635
941411	AE2-138 C	50.6994
941412	AE2-138 E	18.7518
941981	AE2-210 C O1	17.4696
941982	AE2-210 E O1	6.5712
942891	AE2-308 C O1	6.4047
942892	AE2-308 E O1	2.3290
943111	AE2-339 C	7.1588
943112	AE2-339 E	3.5260
944621	AF1-127 C O1	14.3176
944622	AF1-127 E O1	7.0520
945861	AF1-251 C	35.2598
945862	AF1-251 E	23.5066
DUCKCREEK	DUCKCREEK	0.1992
NEWTON	NEWTON	0.2525
FARMERCITY	FARMERCITY	0.0102
G-007A	G-007A	0.0168
VFT	VFT	0.0452
PRAIRIE	PRAIRIE	0.5657
COFFEEN	COFFEEN	0.1136
EDWARDS	EDWARDS	0.0585
CHEOAH	CHEOAH	0.0516
TILTON	TILTON	0.1380
GIBSON	GIBSON	0.2102
CALDERWOOD	CALDERWOOD	0.0522
BLUEG	BLUEG	1.1961
TRIMBLE	TRIMBLE	0.3812
CATAWBA	CATAWBA	0.0178

16.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
43568935	243453	05BEATTY	AEP	243454	05BIXBY	AEP	1	AEP_P4_#3196_05BEATTY 345_302E	breaker	1203.0	134.61	135.33	DC	19.23

Bus #	Bus	MW Impact
250164	08BKJDB1	0.1465
250165	08BKJDB2	0.1465
251827	WILLYESP	0.4700
251828	CLNTESP1	0.4757
251829	CLNTESP2	0.3171
253077	**09STUART (Deativation : 09/30/17)**	**200.3363**
253110	09ADKINS	30.1137
253261	09MON D	0.2593
902531	**W2-040 C (Withdrawn : 01/23/2020)**	**0.9122**
902532	**W2-040 E (Withdrawn : 01/23/2020)**	**1.4882**
904722	V4-073 E	0.2005
913222	Y1-054 E	1.5322
918802	AA1-099 E	0.3171
923522	AB1-169 C OP	128.8336
925242	**AB2-178 E (Withdrawn : 12/10/2019)**	**1.4507**
925921	AC1-068 C	12.4535
925922	AC1-068 E	5.8239
925931	AC1-069 C	12.4535
925932	AC1-069 E	5.8239
925981	AC1-074 C O1	4.0931
925982	AC1-074 E O1	1.7542
926011	AC1-078 C O1	7.8899
926012	AC1-078 E O1	13.1498
926061	AC1-085 C	23.9628
926062	AC1-085 E	39.0972
926101	AC1-089 C O1	4.2166
926102	AC1-089 E O1	6.8797
926791	AC1-165 C	12.3070
926792	AC1-165 E	5.9704
926801	AC1-166 C	12.3070
926802	AC1-166 E	5.9704
926951	AC1-182	1.7969
930062	AB1-014 E	8.0585
932381	AC2-055 C	1.8528
932382	AC2-055 E	3.0229
932421	AC2-060 C	6.5693
932422	AC2-060 E	3.6953
932431	AC2-061 C	4.2851
932432	AC2-061 E	4.3441
932461	AC2-066 C	2.9634
932462	AC2-066 E	4.8351
932481	AC2-068 C	3.1003

Bus #	Bus	MW Impact
932482	AC2-068 E	5.0775
932551	AC2-075 C	0.9721
932552	AC2-075 E	0.4897
932651	**AC2-087 C O1 (Withdrawn : 01/15/2020)**	**4.8654**
932652	**AC2-087 E O1 (Withdrawn : 01/15/2020)**	**3.8595**
932661	AC2-088 C O1	4.0470
932662	AC2-088 E O1	3.3304
934491	AD1-073 C	1.3549
934492	AD1-073 E	0.6980
934561	AD1-081 C	1.5780
934562	AD1-081 E	0.8129
935031	AD1-136 C	0.5691
935032	AD1-136 E	0.4848
935041	AD1-140 C O1	11.5264
935042	AD1-140 E O1	9.5291
936251	AD2-031 C O1	2.4065
936252	AD2-031 E O1	3.9264
936381	AD2-048 C	3.3665
936382	AD2-048 E	1.6797
938051	AE1-007 C	0.8892
938052	AE1-007 E	1.4507
938271	AE1-040 C O1	4.0620
938272	AE1-040 E O1	2.0439
938921	AE1-120	4.5751
939141	AE1-144 C O1	6.9240
939142	AE1-144 E O1	3.4361
940531	AE2-038 C O1	4.6189
940532	AE2-038 E O1	2.2879
941411	AE2-138 C	14.2019
941412	AE2-138 E	5.2528
941511	AE2-148 C	184.4227
941512	AE2-148 E	83.4149
941981	AE2-210 C O1	4.8936
941982	AE2-210 E O1	1.8407
942051	AE2-217 C	9.8015
942052	AE2-217 E	6.5343
942061	AE2-218 C	10.6174
942062	AE2-218 E	7.2118
942091	AE2-221 C	30.1050
942092	AE2-221 E	20.0700
942521	AE2-267 C O1	1.4378
942522	AE2-267 E O1	0.8888
942621	AE2-278 C	6.7842
942622	AE2-278 E	4.5253
942951	AE2-315	3.0392
942981	AE2-320 C O1	24.5041
942982	AE2-320 E O1	12.1239
943111	AE2-339 C	1.8424
943112	AE2-339 E	0.9075
943191	AE2-319 C O1	24.5041
943192	AE2-319 E O1	12.1239
943201	AE2-318 C	6.6168

Bus #	Bus	MW Impact
943202	AE2-318 E	3.2296
943771	AF1-045	2.7241
943943	AF1-062 BAT	20.5100
944521	AF1-117 C	52.2154
944522	AF1-117 E	16.0847
944621	AF1-127 C O1	2.0938
944622	AF1-127 E O1	1.0313
944941	AF1-159	0.7384
945631	AF1-228 C	45.6007
945632	AF1-228 E	30.4005
945681	AF1-233 C O1	6.9168
945682	AF1-233 E O1	3.4171
945821	**AF1-247 C (Withdrawn : 01/27/2020)**	**1.4378**
945822	**AF1-247 E (Withdrawn : 01/27/2020)**	**0.8888**
945841	AF1-249 C	0.6205
945842	AF1-249 E	0.2920
945861	AF1-251 C	5.1973
945862	AF1-251 E	3.4649
945911	AF1-256 C	2.2292
945912	AF1-256 E	1.4861
946171	AF1-282 C	9.4590
946172	AF1-282 E	6.3060
946181	AF1-283 C	12.2967
946182	AF1-283 E	8.1978
946511	AF1-315 C O1	1.8917
946512	AF1-315 E O1	1.2611
LGEE	LGEE	3.2216
CPLE	CPLE	0.2156
WEC	WEC	0.7349
CBM-W2	CBM-W2	24.0458
NY	NY	0.9727
CBM-W1	CBM-W1	22.6681
TVA	TVA	3.5112
O-066	O-066	11.6256
CBM-S2	CBM-S2	4.3870
CBM-S1	CBM-S1	26.3353
G-007	G-007	1.7919
MEC	MEC	4.0472

16.4 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
43568995	243453	05BEATTY	AEP	244022	05COLE	AEP	1	AEP_P4_#3195_05BEATTY 345_304E	breaker	1203.0	121.32	121.92	DC	16.19

Bus #	Bus	MW Impact
247964	Y1-063 BAT	0.3062
250164	08BKJDB1	0.1221
250165	08BKJDB2	0.1221
251827	WILLYESP	0.3864
251828	CLNTESP1	0.4043
251829	CLNTESP2	0.2696
253077	**09STUART (Deativation : 09/30/17)**	**170.8071**
253110	09ADKINS	25.3067
253261	09MON D	0.2050
902531	**W2-040 C (Withdrawn : 01/23/2020)**	**0.7288**
902532	**W2-040 E (Withdrawn : 01/23/2020)**	**1.1891**
904722	V4-073 E	0.1611
913222	Y1-054 E	1.2662
918802	AA1-099 E	0.2696
923522	AB1-169 C OP	109.8438
925242	**AB2-178 E (Withdrawn : 12/10/2019)**	**1.2092**
925921	AC1-068 C	10.4859
925922	AC1-068 E	4.9037
925931	AC1-069 C	10.4859
925932	AC1-069 E	4.9037
925981	AC1-074 C O1	3.4396
925982	AC1-074 E O1	1.4741
926011	AC1-078 C O1	4.7584
926012	AC1-078 E O1	7.9307
926061	AC1-085 C	20.0108
926062	AC1-085 E	32.6492
926101	AC1-089 C O1	3.6623
926102	AC1-089 E O1	5.9754
926791	AC1-165 C	10.3626
926792	AC1-165 E	5.0271
926801	AC1-166 C	10.3626
926802	AC1-166 E	5.0271
926951	AC1-182	1.4999
930062	AB1-014 E	6.7608
932381	AC2-055 C	1.7366
932382	AC2-055 E	2.8334
932421	AC2-060 C	6.1575
932422	AC2-060 E	3.4636
932431	AC2-061 C	3.7241
932432	AC2-061 E	3.7754
932461	AC2-066 C	2.4862
932462	AC2-066 E	4.0565

Bus #	Bus	MW Impact
932481	AC2-068 C	2.4559
932482	AC2-068 E	4.0221
932551	AC2-075 C	0.8169
932552	AC2-075 E	0.4115
932651	**AC2-087 C O1 (Withdrawn : 01/15/2020)**	**4.5604**
932652	**AC2-087 E O1 (Withdrawn : 01/15/2020)**	**3.6176**
932661	AC2-088 C O1	3.4190
932662	AC2-088 E O1	2.8136
934491	AD1-073 C	1.2700
934492	AD1-073 E	0.6542
934561	AD1-081 C	0.9517
934562	AD1-081 E	0.4903
935031	AD1-136 C	0.4808
935032	AD1-136 E	0.4096
935041	AD1-140 C O1	8.3962
935042	AD1-140 E O1	6.9414
936251	AD2-031 C O1	2.3877
936252	AD2-031 E O1	3.8958
936381	AD2-048 C	2.8334
936382	AD2-048 E	1.4137
938051	AE1-007 C	0.7043
938052	AE1-007 E	1.1492
938271	AE1-040 C O1	4.3077
938272	AE1-040 E O1	2.1675
938921	AE1-120	3.8384
939141	AE1-144 C O1	5.8769
939142	AE1-144 E O1	2.9165
940531	AE2-038 C O1	3.9204
940532	AE2-038 E O1	1.9419
941411	AE2-138 C	11.9578
941412	AE2-138 E	4.4227
941511	AE2-148 C	154.4305
941512	AE2-148 E	69.8494
941981	AE2-210 C O1	4.1203
941982	AE2-210 E O1	1.5498
942061	AE2-218 C	7.9874
942062	AE2-218 E	5.4254
942091	AE2-221 C	24.9318
942092	AE2-221 E	16.6212
942521	AE2-267 C O1	1.1814
942522	AE2-267 E O1	0.7303
942951	AE2-315	2.4419
942981	AE2-320 C O1	20.6326
942982	AE2-320 E O1	10.2084
943191	AE2-319 C O1	20.6326
943192	AE2-319 E O1	10.2084
943201	AE2-318 C	5.5321
943202	AE2-318 E	2.7002
943771	AF1-045	2.2775
944521	AF1-117 C	43.9679
944522	AF1-117 E	13.5441
944621	AF1-127 C O1	1.7620

Bus #	Bus	MW Impact
944622	AF1-127 E O1	0.8678
944941	AF1-159	1.3824
945631	AF1-228 C	38.2221
945632	AF1-228 E	25.4814
945681	AF1-233 C O1	5.8720
945682	AF1-233 E O1	2.9009
945821	**AF1-247 C (Withdrawn : 01/27/2020)**	**1.1814**
945822	**AF1-247 E (Withdrawn : 01/27/2020)**	**0.7303**
945841	AF1-249 C	0.5126
945842	AF1-249 E	0.2412
945861	AF1-251 C	4.3749
945862	AF1-251 E	2.9166
945911	AF1-256 C	1.8921
945912	AF1-256 E	1.2614
946102	AF1-275 BAT	18.6700
946171	AF1-282 C	7.8990
946172	AF1-282 E	5.2660
946181	AF1-283 C	10.2687
946182	AF1-283 E	6.8458
946511	AF1-315 C O1	1.5829
946512	AF1-315 E O1	1.0553
LGEE	LGEE	2.6157
CPLE	CPLE	0.2514
WEC	WEC	0.4158
CBM-W2	CBM-W2	17.8624
NY	NY	0.7250
CBM-W1	CBM-W1	11.5217
TVA	TVA	2.7944
O-066	O-066	8.6486
CBM-S2	CBM-S2	4.1443
CBM-S1	CBM-S1	21.1040
G-007	G-007	1.3322
MEC	MEC	2.6028

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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
43569041	243454	05BIXBY	AEP	243459	05KIRK	AEP	1	AEP_P4_#3196_05BEATTY 345_302E	breaker	1409.0	114.05	114.63	DC	18.31

Bus #	Bus	MW Impact
250164	08BKJDB1	0.1401
250165	08BKJDB2	0.1401
251827	WILLYESP	0.4269
251828	CLNTESP1	0.4890
251829	CLNTESP2	0.3260
253077	**09STUART (Deativation : 09/30/17)**	**183.9360**
253110	09ADKINS	20.9360
902531	**W2-040 C (Withdrawn : 01/23/2020)**	**0.7175**
902532	**W2-040 E (Withdrawn : 01/23/2020)**	**1.1707**
904722	V4-073 E	0.1565
913222	Y1-054 E	1.4170
918802	AA1-099 E	0.3260
923522	AB1-169 C OP	118.2868
924351	AB2-083 C O1	4.8226
924352	AB2-083 E O1	2.2694
924371	AB2-085 C O1	5.1516
924372	AB2-085 E O1	2.4243
925242	**AB2-178 E (Withdrawn : 12/10/2019)**	**1.3870**
925341	AC1-001 C O1	9.6451
925342	AC1-001 E O1	4.5389
925921	AC1-068 C	9.0239
925922	AC1-068 E	4.2200
925931	AC1-069 C	9.0239
925932	AC1-069 E	4.2200
925981	AC1-074 C O1	3.9170
925982	AC1-074 E O1	1.6787
926011	AC1-078 C O1	6.5558
926012	AC1-078 E O1	10.9264
926061	AC1-085 C	20.2099
926062	AC1-085 E	32.9741
926101	AC1-089 C O1	4.7127
926102	AC1-089 E O1	7.6892
926791	AC1-165 C	8.9178
926792	AC1-165 E	4.3262
926801	AC1-166 C	8.9178
926802	AC1-166 E	4.3262
926951	AC1-182	1.6402
930062	AB1-014 E	7.2522
932201	AC2-029 C	4.9527
932202	AC2-029 E	8.0806
932381	AC2-055 C	3.1871
932382	AC2-055 E	5.2000

Bus #	Bus	MW Impact
932411	AC2-059 C	13.0337
932412	AC2-059 E	13.4508
932421	AC2-060 C	11.3005
932422	AC2-060 E	6.3565
932431	AC2-061 C	4.8452
932432	AC2-061 E	4.9119
932451	**AC2-064 C (Withdrawn : 12/09/2019)**	**5.1413**
932452	**AC2-064 E (Withdrawn : 12/09/2019)**	**3.4275**
932461	AC2-066 C	2.6669
932462	AC2-066 E	4.3513
932481	AC2-068 C	2.4113
932482	AC2-068 E	3.9491
932551	AC2-075 C	0.9303
932552	AC2-075 E	0.4686
932651	**AC2-087 C O1 (Withdrawn : 01/15/2020)**	**8.3694**
932652	**AC2-087 E O1 (Withdrawn : 01/15/2020)**	**6.6390**
932661	AC2-088 C O1	3.7164
932662	AC2-088 E O1	3.0583
934481	AD1-072 C	2.8633
934482	AD1-072 E	1.3075
934491	AD1-073 C	2.3307
934492	AD1-073 E	1.2007
934561	AD1-081 C	1.3112
934562	AD1-081 E	0.6755
935031	AD1-136 C	0.5226
935032	AD1-136 E	0.4452
935041	AD1-140 C O1	8.4190
935042	AD1-140 E O1	6.9602
935051	AD1-141 C O1	2.2080
935052	AD1-141 E O1	1.4720
936111	AD2-016 C	13.0337
936112	AD2-016 E	13.4508
936251	AD2-031 C O1	2.5846
936252	AD2-031 E O1	4.2169
936381	AD2-048 C	3.2494
936382	AD2-048 E	1.6212
937231	AD2-162 C	14.8845
937232	AD2-162 E	7.2981
938051	AE1-007 C	0.6915
938052	AE1-007 E	1.1283
938271	AE1-040 C O1	5.7781
938272	AE1-040 E O1	2.9073
938921	AE1-120	4.1174
939141	AE1-144 C O1	6.5927
939142	AE1-144 E O1	3.2717
940531	AE2-038 C O1	4.3979
940532	AE2-038 E O1	2.1784
941411	AE2-138 C	13.5130
941412	AE2-138 E	4.9980
941511	AE2-148 C	126.1070
941512	AE2-148 E	57.0386
941521	AE2-149 C	100.8623

Bus #	Bus	MW Impact
941522	AE2-149 E	37.5897
941981	AE2-210 C O1	4.6562
941982	AE2-210 E O1	1.7514
942051	AE2-217 C	7.0365
942052	AE2-217 E	4.6910
942061	AE2-218 C	7.8387
942062	AE2-218 E	5.3244
942091	AE2-221 C	24.4944
942092	AE2-221 E	16.3296
942521	AE2-267 C O1	1.2694
942522	AE2-267 E O1	0.7846
942831	AE2-302 C O1	1.4413
942832	AE2-302 E O1	0.9609
942951	AE2-315	2.3734
942981	AE2-320 C O1	17.7559
942982	AE2-320 E O1	8.7851
943041	AE2-327 C	6.3220
943042	AE2-327 E	4.2046
943111	AE2-339 C	1.7702
943112	AE2-339 E	0.8719
943191	AE2-319 C O1	17.7559
943192	AE2-319 E O1	8.7851
943201	AE2-318 C	5.9765
943202	AE2-318 E	2.9171
943771	AF1-045	2.4605
943943	AF1-062 BAT	43.2400
944521	AF1-117 C	37.8993
944522	AF1-117 E	11.6747
944621	AF1-127 C O1	1.9955
944622	AF1-127 E O1	0.9829
944941	AF1-159	1.4963
945631	AF1-228 C	31.0620
945632	AF1-228 E	20.7080
945681	AF1-233 C O1	6.5824
945682	AF1-233 E O1	3.2518
945821	**AF1-247 C (Withdrawn : 01/27/2020)**	**1.2694**
945822	**AF1-247 E (Withdrawn : 01/27/2020)**	**0.7846**
945841	AF1-249 C	0.5606
945842	AF1-249 E	0.2638
945861	AF1-251 C	4.9494
945862	AF1-251 E	3.2996
945911	AF1-256 C	2.1168
945912	AF1-256 E	1.4112
946171	AF1-282 C	7.9776
946172	AF1-282 E	5.3184
946181	AF1-283 C	10.3709
946182	AF1-283 E	6.9139
946441	AF1-308 C O1	1.8690
946442	AF1-308 E O1	1.2460
946511	AF1-315 C O1	1.7095
946512	AF1-315 E O1	1.1397
LGEE	LGEE	3.1788

Bus #	Bus	MW Impact
CPLE	CPLE	0.6211
WEC	WEC	0.5906
CBM-W2	CBM-W2	24.2014
NY	NY	0.9545
CBM-W1	CBM-W1	19.4906
TVA	TVA	3.9746
O-066	O-066	11.4240
CBM-S2	CBM-S2	8.0920
CBM-S1	CBM-S1	28.5164
G-007	G-007	1.7597
MEC	MEC	3.6293

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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
43952910	246800		AEP	247034	05EMERSS	AEP	1	DAY_P734541 34553	tower	185.0	108.11	111.06	DC	12.09

Bus #	Bus	MW Impact
251831	Z1-080 BAT	0.5186
918802	AA1-099 E	-0.2939
918803	AA1-099 BAT	0.3457
925981	AC1-074 C O1	2.6670
925982	AC1-074 E O1	1.1430
932551	AC2-075 C	0.6334
932552	AC2-075 E	0.3191
936381	AD2-048 C	3.0966
936382	AD2-048 E	1.5450
939141	AE1-144 C O1	6.3793
939142	AE1-144 E O1	3.1658
940531	AE2-038 C O1	4.2556
940532	AE2-038 E O1	2.1079
941411	AE2-138 C	8.9377
941412	AE2-138 E	3.3057
941981	AE2-210 C O1	3.0797
941982	AE2-210 E O1	1.1584
943111	AE2-339 C	1.1504
943112	AE2-339 E	0.5666
944621	AF1-127 C O1	1.3160
944622	AF1-127 E O1	0.6482
945681	AF1-233 C O1	6.2207
945682	AF1-233 E O1	3.0732
945861	AF1-251 C	3.2688
945862	AF1-251 E	2.1792
945911	AF1-256 C	1.9773
945912	AF1-256 E	1.3182
LGEE	LGEE	0.9231
CPLE	CPLE	0.1376
WEC	WEC	0.0617
CBM-W2	CBM-W2	4.4472
NY	NY	0.0824
CBM-W1	CBM-W1	1.7264
TVA	TVA	1.0108
O-066	O-066	0.9341
CBM-S2	CBM-S2	1.7860
CBM-S1	CBM-S1	7.5743
G-007	G-007	0.1435
MADISON	MADISON	1.9212
MEC	MEC	0.5244

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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
43952814	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	DAY_P734541 34553	tower	185.0	160.86	163.8	DC	12.09

Bus #	Bus	MW Impact
251831	Z1-080 BAT	0.5186
918802	AA1-099 E	-0.2939
918803	AA1-099 BAT	0.3457
925981	AC1-074 C O1	2.6670
925982	AC1-074 E O1	1.1430
926101	AC1-089 C O1	40.2705
926102	AC1-089 E O1	65.7045
932551	AC2-075 C	0.6334
932552	AC2-075 E	0.3191
936381	AD2-048 C	3.0966
936382	AD2-048 E	1.5450
939141	AE1-144 C O1	6.3793
939142	AE1-144 E O1	3.1658
940531	AE2-038 C O1	4.2556
940532	AE2-038 E O1	2.1079
941411	AE2-138 C	8.9377
941412	AE2-138 E	3.3057
941981	AE2-210 C O1	3.0797
941982	AE2-210 E O1	1.1584
943111	AE2-339 C	1.1504
943112	AE2-339 E	0.5666
944621	AF1-127 C O1	1.3160
944622	AF1-127 E O1	0.6482
945681	AF1-233 C O1	6.2207
945682	AF1-233 E O1	3.0732
945861	AF1-251 C	3.2688
945862	AF1-251 E	2.1792
945911	AF1-256 C	1.9773
945912	AF1-256 E	1.3182
LGEE	LGEE	0.9231
CPLE	CPLE	0.1376
WEC	WEC	0.0617
CBM-W2	CBM-W2	4.4472
NY	NY	0.0824
CBM-W1	CBM-W1	1.7264
TVA	TVA	1.0108
O-066	O-066	0.9341
CBM-S2	CBM-S2	1.7860
CBM-S1	CBM-S1	7.5743
G-007	G-007	0.1435
MADISON	MADISON	1.9212
MEC	MEC	0.5244

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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
43952911	247034	05EMERSS	AEP	246946	05WLDCAT	AEP	1	DAY_P734541 34553	tower	185.0	106.87	109.82	DC	12.09

Bus #	Bus	MW Impact
251831	Z1-080 BAT	0.5186
918802	AA1-099 E	-0.2939
918803	AA1-099 BAT	0.3457
925981	AC1-074 C O1	2.6670
925982	AC1-074 E O1	1.1430
932551	AC2-075 C	0.6334
932552	AC2-075 E	0.3191
936381	AD2-048 C	3.0966
936382	AD2-048 E	1.5450
939141	AE1-144 C O1	6.3793
939142	AE1-144 E O1	3.1658
940531	AE2-038 C O1	4.2556
940532	AE2-038 E O1	2.1079
941411	AE2-138 C	8.9377
941412	AE2-138 E	3.3057
941981	AE2-210 C O1	3.0797
941982	AE2-210 E O1	1.1584
943111	AE2-339 C	1.1504
943112	AE2-339 E	0.5666
944621	AF1-127 C O1	1.3160
944622	AF1-127 E O1	0.6482
945681	AF1-233 C O1	6.2207
945682	AF1-233 E O1	3.0732
945861	AF1-251 C	3.2688
945862	AF1-251 E	2.1792
945911	AF1-256 C	1.9773
945912	AF1-256 E	1.3182
LGEE	LGEE	0.9231
CPLE	CPLE	0.1376
WEC	WEC	0.0617
CBM-W2	CBM-W2	4.4472
NY	NY	0.0824
CBM-W1	CBM-W1	1.7264
TVA	TVA	1.0108
O-066	O-066	0.9341
CBM-S2	CBM-S2	1.7860
CBM-S1	CBM-S1	7.5743
G-007	G-007	0.1435
MADISON	MADISON	1.9212
MEC	MEC	0.5244

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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
41048484	250054	08LONGBR	DEO&K	250077	08MTZION	DEO&K	1	DAY_P734541 34553	tower	284.0	113.31	116.41	DC	19.48

Bus #	Bus	MW Impact
342957	1SPURLK1G	5.1535
342960	1SPURLK2G	8.0926
342963	1SPURLK3G	4.2526
342966	1SPURLK4G	4.2526
925981	AC1-074 C O1	9.2562
925982	AC1-074 E O1	3.9670
932551	AC2-075 C	2.1984
932552	AC2-075 E	1.1074
936381	AD2-048 C	6.0729
936382	AD2-048 E	3.0299
936571	AD2-072 C O1	2.9465
936572	AD2-072 E O1	1.4447
939141	AE1-144 C O1	8.7899
939142	AE1-144 E O1	4.3621
940531	AE2-038 C O1	5.8636
940532	AE2-038 E O1	2.9044
941411	AE2-138 C	14.2325
941412	AE2-138 E	5.2641
941981	AE2-210 C O1	4.9041
941982	AE2-210 E O1	1.8447
942411	AE2-254 C O1	1.4096
942412	AE2-254 E O1	0.9398
942591	AE2-275 C O1	4.0264
942592	AE2-275 E O1	1.5145
942891	AE2-308 C O1	6.9274
942892	AE2-308 E O1	2.5191
943111	AE2-339 C	2.0999
943112	AE2-339 E	1.0343
944211	AF1-089 C O1	1.5157
944212	AF1-089 E O1	0.4638
944621	AF1-127 C O1	2.1479
944622	AF1-127 E O1	1.0579
945541	AF1-219 C O1	0.6926
945542	AF1-219 E O1	0.2248
945681	AF1-233 C O1	16.4726
945682	AF1-233 E O1	8.1379
945861	AF1-251 C	5.2663
945862	AF1-251 E	3.5109
945911	AF1-256 C	5.3174
945912	AF1-256 E	3.5450
946021	AF1-267 C O1	1.1808
946022	AF1-267 E O1	0.5425

Bus #	Bus	MW Impact
LGEE	LGEE	1.7069
CPLE	CPLE	0.2792
WEC	WEC	0.0350
CBM-W2	CBM-W2	6.2080
NY	NY	0.0735
CBM-W1	CBM-W1	0.6755
TVA	TVA	1.6156
O-066	O-066	0.7325
CBM-S2	CBM-S2	3.3062
CBM-S1	CBM-S1	12.7459
G-007	G-007	0.1123
MADISON	MADISON	3.7740
MEC	MEC	0.5673

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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
41048535	250077	08MTZION	DEO&K	249991	08BUFTN1	DEO&K	1	DAY_P734541 34553	tower	298.0	103.66	106.62	DC	19.48

Bus #	Bus	MW Impact
342957	1SPURLK1G	5.1535
342960	1SPURLK2G	8.0926
342963	1SPURLK3G	4.2526
342966	1SPURLK4G	4.2526
925981	AC1-074 C O1	9.2562
925982	AC1-074 E O1	3.9670
932551	AC2-075 C	2.1984
932552	AC2-075 E	1.1074
936381	AD2-048 C	6.0729
936382	AD2-048 E	3.0299
936571	AD2-072 C O1	2.9465
936572	AD2-072 E O1	1.4447
939141	AE1-144 C O1	8.7899
939142	AE1-144 E O1	4.3621
940531	AE2-038 C O1	5.8636
940532	AE2-038 E O1	2.9044
941411	AE2-138 C	14.2325
941412	AE2-138 E	5.2641
941981	AE2-210 C O1	4.9041
941982	AE2-210 E O1	1.8447
942411	AE2-254 C O1	1.4096
942412	AE2-254 E O1	0.9398
942591	AE2-275 C O1	4.0264
942592	AE2-275 E O1	1.5145
942891	AE2-308 C O1	6.9274
942892	AE2-308 E O1	2.5191
943111	AE2-339 C	2.0999
943112	AE2-339 E	1.0343
944211	AF1-089 C O1	1.5157
944212	AF1-089 E O1	0.4638
944621	AF1-127 C O1	2.1479
944622	AF1-127 E O1	1.0579
945541	AF1-219 C O1	0.6926
945542	AF1-219 E O1	0.2248
945681	AF1-233 C O1	16.4726
945682	AF1-233 E O1	8.1379
945861	AF1-251 C	5.2663
945862	AF1-251 E	3.5109
945911	AF1-256 C	5.3174
945912	AF1-256 E	3.5450
946021	AF1-267 C O1	1.1808
946022	AF1-267 E O1	0.5425

Bus #	Bus	MW Impact
LGEE	LGEE	1.7069
CPLE	CPLE	0.2792
WEC	WEC	0.0350
CBM-W2	CBM-W2	6.2080
NY	NY	0.0735
CBM-W1	CBM-W1	0.6755
TVA	TVA	1.6156
O-066	O-066	0.7325
CBM-S2	CBM-S2	3.3062
CBM-S1	CBM-S1	12.7459
G-007	G-007	0.1123
MADISON	MADISON	3.7740
MEC	MEC	0.5673

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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
42784655	253014	09CLINTO	DAY	253027	09GREENE	DAY	1	DAY_P734569 34598 34524	tower	1374.0	109.49	110.0	DC	15.42

Bus #	Bus	MW Impact
250166	HLCRST AB114	0.8140
251830	BIOENGRY	0.0779
253077	**09STUART (Deativation : 09/30/17)**	**250.2975**
342957	1SPURLK1G	4.1980
342960	1SPURLK2G	7.8641
342963	1SPURLK3G	4.1325
342966	1SPURLK4G	4.1325
923522	AB1-169 C OP	160.9630
925981	AC1-074 C O1	2.9755
925982	AC1-074 E O1	1.2752
926061	AC1-085 C	59.0870
926062	AC1-085 E	96.4050
926951	AC1-182	0.9739
927181	AC1-212 C	-0.1251
927182	AC1-212 E	-1.1848
927183	AC1-212 BAT	1.5411
930062	AB1-014 E	9.5147
932381	AC2-055 C	1.2064
932382	AC2-055 E	1.9683
932421	AC2-060 C	4.2775
932422	AC2-060 E	2.4061
932461	AC2-066 C	3.4989
932462	AC2-066 E	5.7088
932481	AC2-068 C	-2.6203
932482	AC2-068 E	-4.2914
932551	AC2-075 C	0.7067
932552	AC2-075 E	0.3560
932651	**AC2-087 C O1 (Withdrawn : 01/15/2020)**	**3.1680**
932652	**AC2-087 E O1 (Withdrawn : 01/15/2020)**	**2.5130**
932661	AC2-088 C O1	4.4625
932662	AC2-088 E O1	3.6722
934491	AD1-073 C	0.8822
934492	AD1-073 E	0.4545
935031	AD1-136 C	0.6275
935032	AD1-136 E	0.5346
936251	AD2-031 C O1	6.1741
936252	AD2-031 E O1	10.0735
936381	AD2-048 C	2.4277
936382	AD2-048 E	1.2113
938271	AE1-040 C O1	2.2216
938272	AE1-040 E O1	1.1178
938921	AE1-120	5.4019

Bus #	Bus	MW Impact
939141	AE1-144 C O1	5.9260
939142	AE1-144 E O1	2.9408
940531	AE2-038 C O1	3.9531
940532	AE2-038 E O1	1.9581
941411	AE2-138 C	11.4512
941412	AE2-138 E	4.2354
941981	AE2-210 C O1	3.9458
941982	AE2-210 E O1	1.4842
942091	AE2-221 C	91.0746
942092	AE2-221 E	60.7164
942591	AE2-275 C O1	2.9957
942592	AE2-275 E O1	1.1268
942891	AE2-308 C O1	5.0275
942892	AE2-308 E O1	1.8282
943111	AE2-339 C	1.3843
943112	AE2-339 E	0.6818
943201	AE2-318 C	4.7844
943202	AE2-318 E	2.3352
943771	AF1-045	1.9697
943863	AF1-054 BAT	3.1424
944521	AF1-117 C	3.7203
944522	AF1-117 E	1.1460
944621	AF1-127 C O1	1.6685
944622	AF1-127 E O1	0.8218
944941	AF1-159	3.5745
945681	AF1-233 C O1	5.9527
945682	AF1-233 E O1	2.9408
945861	AF1-251 C	4.1680
945862	AF1-251 E	2.7786
945911	AF1-256 C	1.9248
945912	AF1-256 E	1.2832
946021	AF1-267 C O1	0.8829
946022	AF1-267 E O1	0.4057
946171	AF1-282 C	23.3238
946172	AF1-282 E	15.5492
946181	AF1-283 C	30.3209
946182	AF1-283 E	20.2140
946511	AF1-315 C O1	1.4244
946512	AF1-315 E O1	0.9496
LGEE	LGEE	1.2945
CPLE	CPLE	0.3903
WEC	WEC	0.0180
CBM-W2	CBM-W2	6.9943
NY	NY	0.1781
TVA	TVA	1.6436
O-066	O-066	1.9354
CBM-S2	CBM-S2	4.3061
CBM-S1	CBM-S1	11.7320
G-007	G-007	0.2954
MEC	MEC	0.5848

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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
41048471	253038	09KILLEN	DAY	242938	05MARQUI	AEP	1	DAY_P7_34506 34542_1-A	tower	1372.0	104.85	105.84	DC	30.2

Bus #	Bus	MW Impact
250164	08BKJDB1	0.1315
250165	08BKJDB2	0.1315
251827	WILLYESP	0.4460
251828	CLNTESP1	0.3871
251829	CLNTESP2	0.2581
253077	**09STUART (Deativation : 09/30/17)**	**461.4416**
902531	**W2-040 C (Withdrawn : 01/23/2020)**	**0.5727**
902532	**W2-040 E (Withdrawn : 01/23/2020)**	**0.9344**
904722	V4-073 E	0.1255
913222	Y1-054 E	1.4751
918802	AA1-099 E	0.2581
923522	AB1-169 C OP	296.7470
925242	**AB2-178 E (Withdrawn : 12/10/2019)**	**1.3020**
925921	AC1-068 C	6.6522
925922	AC1-068 E	3.1109
925931	AC1-069 C	6.6522
925932	AC1-069 E	3.1109
925981	AC1-074 C O1	6.0171
925982	AC1-074 E O1	2.5788
926061	AC1-085 C	26.2741
926062	AC1-085 E	42.8683
926101	AC1-089 C O1	3.6846
926102	AC1-089 E O1	6.0118
926791	AC1-165 C	6.5739
926792	AC1-165 E	3.1891
926801	AC1-166 C	6.5739
926802	AC1-166 E	3.1891
926951	AC1-182	2.3555
930062	AB1-014 E	11.3792
932461	AC2-066 C	4.1846
932462	AC2-066 E	6.8275
932481	AC2-068 C	1.9444
932482	AC2-068 E	3.1843
932551	AC2-075 C	1.4291
932552	AC2-075 E	0.7199
932661	AC2-088 C O1	6.3233
932662	AC2-088 E O1	5.2036
935031	AD1-136 C	0.8892
935032	AD1-136 E	0.7575
935041	AD1-140 C O1	6.0722
935042	AD1-140 E O1	5.0201
936251	AD2-031 C O1	1.9159

Bus #	Bus	MW Impact
936252	AD2-031 E O1	3.1259
936381	AD2-048 C	4.8805
936382	AD2-048 E	2.4350
936571	AD2-072 C O1	4.2702
936572	AD2-072 E O1	2.0937
938051	AE1-007 C	0.5576
938052	AE1-007 E	0.9098
938271	AE1-040 C O1	2.1426
938272	AE1-040 E O1	1.0781
938921	AE1-120	6.4605
939141	AE1-144 C O1	11.3551
939142	AE1-144 E O1	5.6351
940531	AE2-038 C O1	7.5748
940532	AE2-038 E O1	3.7520
941411	AE2-138 C	22.4007
941412	AE2-138 E	8.2852
941511	AE2-148 C	19.2747
941512	AE2-148 E	8.7180
941981	AE2-210 C O1	7.7187
941982	AE2-210 E O1	2.9034
942061	AE2-218 C	6.7476
942062	AE2-218 E	4.5833
942091	AE2-221 C	26.1997
942092	AE2-221 E	17.4665
942411	AE2-254 C O1	2.0288
942412	AE2-254 E O1	1.3525
942521	AE2-267 C O1	1.2986
942522	AE2-267 E O1	0.8027
942591	AE2-275 C O1	5.8970
942592	AE2-275 E O1	2.2181
942891	AE2-308 C O1	9.9185
942892	AE2-308 E O1	3.6067
942951	AE2-315	1.9022
942981	AE2-320 C O1	13.0892
942982	AE2-320 E O1	6.4761
943111	AE2-339 C	2.7505
943112	AE2-339 E	1.3547
943191	AE2-319 C O1	13.0892
943192	AE2-319 E O1	6.4761
943201	AE2-318 C	8.4800
943202	AE2-318 E	4.1391
943771	AF1-045	3.4912
944211	AF1-089 C O1	1.6314
944212	AF1-089 E O1	0.4991
944521	AF1-117 C	39.4834
944522	AF1-117 E	12.1626
944621	AF1-127 C O1	3.2724
944622	AF1-127 E O1	1.6118
944941	AF1-159	0.5879
945541	AF1-219 C O1	1.0344
945542	AF1-219 E O1	0.3357
945631	AF1-228 C	4.5114

Bus #	Bus	MW Impact
945632	AF1-228 E	3.0076
945681	AF1-233 C O1	11.3885
945682	AF1-233 E O1	5.6262
945821	**AF1-247 C (Withdrawn : 01/27/2020)**	**1.2986**
945822	**AF1-247 E (Withdrawn : 01/27/2020)**	**0.8027**
945841	AF1-249 C	0.5690
945842	AF1-249 E	0.2678
945861	AF1-251 C	8.1629
945862	AF1-251 E	5.4419
945911	AF1-256 C	3.6862
945912	AF1-256 E	2.4575
946021	AF1-267 C O1	1.7305
946022	AF1-267 E O1	0.7951
946171	AF1-282 C	5.4968
946172	AF1-282 E	3.6645
946181	AF1-283 C	7.1459
946182	AF1-283 E	4.7639
946511	AF1-315 C O1	2.4671
946512	AF1-315 E O1	1.6447
LGEE	LGEE	3.2981
WEC	WEC	0.6505
CBM-W2	CBM-W2	19.9508
NY	NY	0.7405
CBM-W1	CBM-W1	21.7424
TVA	TVA	2.7216
O-066	O-066	9.1325
CBM-S1	CBM-S1	22.6376
G-007	G-007	1.4123
MEC	MEC	3.4624
CATAWBA	CATAWBA	0.0735

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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
42784619	253077	09STUART	DAY	253038	09KILLEN	DAY	1	DAY_P7_34506 34542_1-A	tower	1374.0	104.7	105.69	DC	30.2

Bus #	Bus	MW Impact
250164	08BKJDB1	0.1315
250165	08BKJDB2	0.1315
251827	WILLYESP	0.4460
251828	CLNTESP1	0.3871
251829	CLNTESP2	0.2581
253077	**09STUART (Deativation : 09/30/17)**	**461.4416**
902531	**W2-040 C (Withdrawn : 01/23/2020)**	**0.5727**
902532	**W2-040 E (Withdrawn : 01/23/2020)**	**0.9344**
904722	V4-073 E	0.1255
913222	Y1-054 E	1.4751
918802	AA1-099 E	0.2581
923522	AB1-169 C OP	296.7470
925242	**AB2-178 E (Withdrawn : 12/10/2019)**	**1.3020**
925921	AC1-068 C	6.6522
925922	AC1-068 E	3.1109
925931	AC1-069 C	6.6522
925932	AC1-069 E	3.1109
925981	AC1-074 C O1	6.0171
925982	AC1-074 E O1	2.5788
926061	AC1-085 C	26.2741
926062	AC1-085 E	42.8683
926101	AC1-089 C O1	3.6846
926102	AC1-089 E O1	6.0118
926791	AC1-165 C	6.5739
926792	AC1-165 E	3.1891
926801	AC1-166 C	6.5739
926802	AC1-166 E	3.1891
926951	AC1-182	2.3555
930062	AB1-014 E	11.3792
932461	AC2-066 C	4.1846
932462	AC2-066 E	6.8275
932481	AC2-068 C	1.9444
932482	AC2-068 E	3.1843
932551	AC2-075 C	1.4291
932552	AC2-075 E	0.7199
932661	AC2-088 C O1	6.3233
932662	AC2-088 E O1	5.2036
935031	AD1-136 C	0.8892
935032	AD1-136 E	0.7575
935041	AD1-140 C O1	6.0722
935042	AD1-140 E O1	5.0201
936251	AD2-031 C O1	1.9159

Bus #	Bus	MW Impact
936252	AD2-031 E O1	3.1259
936381	AD2-048 C	4.8805
936382	AD2-048 E	2.4350
936571	AD2-072 C O1	4.2702
936572	AD2-072 E O1	2.0937
938051	AE1-007 C	0.5576
938052	AE1-007 E	0.9098
938271	AE1-040 C O1	2.1426
938272	AE1-040 E O1	1.0781
938921	AE1-120	6.4605
939141	AE1-144 C O1	11.3551
939142	AE1-144 E O1	5.6351
940531	AE2-038 C O1	7.5748
940532	AE2-038 E O1	3.7520
941411	AE2-138 C	22.4007
941412	AE2-138 E	8.2852
941511	AE2-148 C	19.2747
941512	AE2-148 E	8.7180
941981	AE2-210 C O1	7.7187
941982	AE2-210 E O1	2.9034
942061	AE2-218 C	6.7476
942062	AE2-218 E	4.5833
942091	AE2-221 C	26.1997
942092	AE2-221 E	17.4665
942411	AE2-254 C O1	2.0288
942412	AE2-254 E O1	1.3525
942521	AE2-267 C O1	1.2986
942522	AE2-267 E O1	0.8027
942591	AE2-275 C O1	5.8970
942592	AE2-275 E O1	2.2181
942891	AE2-308 C O1	9.9185
942892	AE2-308 E O1	3.6067
942951	AE2-315	1.9022
942981	AE2-320 C O1	13.0892
942982	AE2-320 E O1	6.4761
943111	AE2-339 C	2.7505
943112	AE2-339 E	1.3547
943191	AE2-319 C O1	13.0892
943192	AE2-319 E O1	6.4761
943201	AE2-318 C	8.4800
943202	AE2-318 E	4.1391
943771	AF1-045	3.4912
944211	AF1-089 C O1	1.6314
944212	AF1-089 E O1	0.4991
944521	AF1-117 C	39.4834
944522	AF1-117 E	12.1626
944621	AF1-127 C O1	3.2724
944622	AF1-127 E O1	1.6118
944941	AF1-159	0.5879
945541	AF1-219 C O1	1.0344
945542	AF1-219 E O1	0.3357
945631	AF1-228 C	4.5114

Bus #	Bus	MW Impact
945632	AF1-228 E	3.0076
945681	AF1-233 C O1	11.3885
945682	AF1-233 E O1	5.6262
945821	**AF1-247 C (Withdrawn : 01/27/2020)**	**1.2986**
945822	**AF1-247 E (Withdrawn : 01/27/2020)**	**0.8027**
945841	AF1-249 C	0.5690
945842	AF1-249 E	0.2678
945861	AF1-251 C	8.1629
945862	AF1-251 E	5.4419
945911	AF1-256 C	3.6862
945912	AF1-256 E	2.4575
946021	AF1-267 C O1	1.7305
946022	AF1-267 E O1	0.7951
946171	AF1-282 C	5.4968
946172	AF1-282 E	3.6645
946181	AF1-283 C	7.1459
946182	AF1-283 E	4.7639
946511	AF1-315 C O1	2.4671
946512	AF1-315 E O1	1.6447
LGEE	LGEE	3.2981
WEC	WEC	0.6505
CBM-W2	CBM-W2	19.9508
NY	NY	0.7405
CBM-W1	CBM-W1	21.7424
TVA	TVA	2.7216
O-066	O-066	9.1325
CBM-S1	CBM-S1	22.6376
G-007	G-007	1.4123
MEC	MEC	3.4624
CATAWBA	CATAWBA	0.0735

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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
42262390	253100	09ATLNTA	DAY	253110	09ADKINS	DAY	1	AEP_P4_#6774_05MARQUI 345_D	breaker	1195.0	113.67	114.39	DC	19.09

Bus #	Bus	MW Impact
250166	HLCRST AB114	0.6783
251830	BIOENGRY	0.0784
253077	**09STUART (Deativation : 09/30/17)**	**282.4720**
342957	1SPURLK1G	5.0082
342960	1SPURLK2G	9.2771
342963	1SPURLK3G	4.8751
342966	1SPURLK4G	4.8751
923522	AB1-169 C OP	181.6540
925921	AC1-068 C	19.0737
925922	AC1-068 E	8.9197
925931	AC1-069 C	19.0737
925932	AC1-069 E	8.9197
926061	AC1-085 C	17.1927
926062	AC1-085 E	28.0513
926791	AC1-165 C	18.8493
926792	AC1-165 E	9.1441
926801	AC1-166 C	18.8493
926802	AC1-166 E	9.1441
926951	AC1-182	1.4159
930062	AB1-014 E	7.9283
932381	AC2-055 C	1.4318
932382	AC2-055 E	2.3360
932421	AC2-060 C	5.0766
932422	AC2-060 E	2.8556
932461	AC2-066 C	2.9156
932462	AC2-066 E	4.7570
932651	**AC2-087 C O1 (Withdrawn : 01/15/2020)**	**3.7599**
932652	**AC2-087 E O1 (Withdrawn : 01/15/2020)**	**2.9825**
932661	AC2-088 C O1	4.4959
932662	AC2-088 E O1	3.6997
934491	AD1-073 C	1.0471
934492	AD1-073 E	0.5394
935031	AD1-136 C	0.6322
935032	AD1-136 E	0.5386
938271	AE1-040 C O1	3.9465
938272	AE1-040 E O1	1.9858
938921	AE1-120	4.5012
939141	AE1-144 C O1	8.3889
939142	AE1-144 E O1	4.1631
940531	AE2-038 C O1	5.5961
940532	AE2-038 E O1	2.7719
941411	AE2-138 C	14.1486

Bus #	Bus	MW Impact
941412	AE2-138 E	5.2331
941981	AE2-210 C O1	4.8752
941982	AE2-210 E O1	1.8338
942091	AE2-221 C	13.4548
942092	AE2-221 E	8.9699
942981	AE2-320 C O1	37.5302
942982	AE2-320 E O1	18.5688
943191	AE2-319 C O1	37.5302
943192	AE2-319 E O1	18.5688
943201	AE2-318 C	5.0031
943202	AE2-318 E	2.4420
943771	AF1-045	2.0598
944521	AF1-117 C	83.3412
944522	AF1-117 E	25.6728
944621	AF1-127 C O1	2.0706
944622	AF1-127 E O1	1.0198
945681	AF1-233 C O1	15.8687
945682	AF1-233 E O1	7.8395
945861	AF1-251 C	5.1599
945862	AF1-251 E	3.4399
945911	AF1-256 C	5.1274
945912	AF1-256 E	3.4182
946171	AF1-282 C	6.7866
946172	AF1-282 E	4.5244
946181	AF1-283 C	8.8226
946182	AF1-283 E	5.8817
946511	AF1-315 C O1	1.4580
946512	AF1-315 E O1	0.9720
LGEE	LGEE	2.2341
CPLE	CPLE	0.3003
WEC	WEC	0.3676
CBM-W2	CBM-W2	15.1269
NY	NY	0.4568
CBM-W1	CBM-W1	10.6585
TVA	TVA	2.5438
O-066	O-066	5.4029
CBM-S2	CBM-S2	4.2194
CBM-S1	CBM-S1	18.8036
G-007	G-007	0.8320
MEC	MEC	2.2580

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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
43569595	324267	4KENTON	LGEE	246800		AEP	1	DAY_P734541 34553	tower	185.0	111.14	114.09	DC	12.09

Bus #	Bus	MW Impact
251831	Z1-080 BAT	0.5186
918802	AA1-099 E	-0.2939
918803	AA1-099 BAT	0.3457
925981	AC1-074 C O1	2.6670
925982	AC1-074 E O1	1.1430
932551	AC2-075 C	0.6334
932552	AC2-075 E	0.3191
936381	AD2-048 C	3.0966
936382	AD2-048 E	1.5450
939141	AE1-144 C O1	6.3793
939142	AE1-144 E O1	3.1658
940531	AE2-038 C O1	4.2556
940532	AE2-038 E O1	2.1079
941411	AE2-138 C	8.9377
941412	AE2-138 E	3.3057
941981	AE2-210 C O1	3.0797
941982	AE2-210 E O1	1.1584
943111	AE2-339 C	1.1504
943112	AE2-339 E	0.5666
944621	AF1-127 C O1	1.3160
944622	AF1-127 E O1	0.6482
945681	AF1-233 C O1	6.2207
945682	AF1-233 E O1	3.0732
945861	AF1-251 C	3.2688
945862	AF1-251 E	2.1792
945911	AF1-256 C	1.9773
945912	AF1-256 E	1.3182
LGEE	LGEE	0.9231
CPLE	CPLE	0.1376
WEC	WEC	0.0617
CBM-W2	CBM-W2	4.4472
NY	NY	0.0824
CBM-W1	CBM-W1	1.7264
TVA	TVA	1.0108
O-066	O-066	0.9341
CBM-S2	CBM-S2	1.7860
CBM-S1	CBM-S1	7.5743
G-007	G-007	0.1435
MADISON	MADISON	1.9212
MEC	MEC	0.5244

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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
41048460	342559	4BOONE CO	EKPC	250054	08LONGBR	DEO&K	1	DAY_P734541 34553	tower	284.0	120.64	123.74	DC	19.48

Bus #	Bus	MW Impact
342957	1SPURLK1G	5.1535
342960	1SPURLK2G	8.0926
342963	1SPURLK3G	4.2526
342966	1SPURLK4G	4.2526
925981	AC1-074 C O1	9.2562
925982	AC1-074 E O1	3.9670
932551	AC2-075 C	2.1984
932552	AC2-075 E	1.1074
936381	AD2-048 C	6.0729
936382	AD2-048 E	3.0299
936571	AD2-072 C O1	2.9465
936572	AD2-072 E O1	1.4447
939141	AE1-144 C O1	8.7899
939142	AE1-144 E O1	4.3621
940531	AE2-038 C O1	5.8636
940532	AE2-038 E O1	2.9044
941411	AE2-138 C	14.2325
941412	AE2-138 E	5.2641
941981	AE2-210 C O1	4.9041
941982	AE2-210 E O1	1.8447
942411	AE2-254 C O1	1.4096
942412	AE2-254 E O1	0.9398
942591	AE2-275 C O1	4.0264
942592	AE2-275 E O1	1.5145
942891	AE2-308 C O1	6.9274
942892	AE2-308 E O1	2.5191
943111	AE2-339 C	2.0999
943112	AE2-339 E	1.0343
944211	AF1-089 C O1	1.5157
944212	AF1-089 E O1	0.4638
944621	AF1-127 C O1	2.1479
944622	AF1-127 E O1	1.0579
945541	AF1-219 C O1	0.6926
945542	AF1-219 E O1	0.2248
945681	AF1-233 C O1	16.4726
945682	AF1-233 E O1	8.1379
945861	AF1-251 C	5.2663
945862	AF1-251 E	3.5109
945911	AF1-256 C	5.3174
945912	AF1-256 E	3.5450
946021	AF1-267 C O1	1.1808
946022	AF1-267 E O1	0.5425

Bus #	Bus	MW Impact
LGEE	LGEE	1.7069
CPLE	CPLE	0.2792
WEC	WEC	0.0350
CBM-W2	CBM-W2	6.2080
NY	NY	0.0735
CBM-W1	CBM-W1	0.6755
TVA	TVA	1.6156
O-066	O-066	0.7325
CBM-S2	CBM-S2	3.3062
CBM-S1	CBM-S1	12.7459
G-007	G-007	0.1123
MADISON	MADISON	3.7740
MEC	MEC	0.5673

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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
41048536	342661	4SPUR-KENT-R	EKPC	324267	4KENTON	LGEE	1	DAY_P734541 34553	tower	281.0	106.0	108.4	DC	14.82

Bus #	Bus	MW Impact
342957	1SPURLK1G	6.4835
342960	1SPURLK2G	9.4323
342963	1SPURLK3G	4.9566
342966	1SPURLK4G	4.9566
925981	AC1-074 C O1	2.4428
925982	AC1-074 E O1	1.0469
932551	AC2-075 C	0.5802
932552	AC2-075 E	0.2923
939141	AE1-144 C O1	5.2600
939142	AE1-144 E O1	2.6103
940531	AE2-038 C O1	3.5089
940532	AE2-038 E O1	1.7380
941411	AE2-138 C	11.1398
941412	AE2-138 E	4.1202
941981	AE2-210 C O1	3.8385
941982	AE2-210 E O1	1.4438
944621	AF1-127 C O1	1.5826
944622	AF1-127 E O1	0.7795
945681	AF1-233 C O1	5.8686
945682	AF1-233 E O1	2.8992
945861	AF1-251 C	4.0068
945862	AF1-251 E	2.6712
945911	AF1-256 C	2.0212
945912	AF1-256 E	1.3475
LGEE	LGEE	0.3206
CPLE	CPLE	0.0582
WEC	WEC	0.0038
CBM-W2	CBM-W2	2.0721
NY	NY	0.0841
TVA	TVA	0.6020
O-066	O-066	0.9744
CBM-S2	CBM-S2	0.9132
CBM-S1	CBM-S1	3.8766
G-007	G-007	0.1498
MADISON	MADISON	1.0786
MEC	MEC	0.1700

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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
41048574	342664	4SPURLOCK	EKPC	342661	4SPUR-KENT-R	EKPC	1	DAY_P734541 34553	tower	291.0	102.46	104.78	DC	14.82

Bus #	Bus	MW Impact
342957	1SPURLK1G	6.4835
342960	1SPURLK2G	9.4323
342963	1SPURLK3G	4.9566
342966	1SPURLK4G	4.9566
925981	AC1-074 C O1	2.4428
925982	AC1-074 E O1	1.0469
932551	AC2-075 C	0.5802
932552	AC2-075 E	0.2923
939141	AE1-144 C O1	5.2600
939142	AE1-144 E O1	2.6103
940531	AE2-038 C O1	3.5089
940532	AE2-038 E O1	1.7380
941411	AE2-138 C	11.1398
941412	AE2-138 E	4.1202
941981	AE2-210 C O1	3.8385
941982	AE2-210 E O1	1.4438
944621	AF1-127 C O1	1.5826
944622	AF1-127 E O1	0.7795
945681	AF1-233 C O1	5.8686
945682	AF1-233 E O1	2.8992
945861	AF1-251 C	4.0068
945862	AF1-251 E	2.6712
945911	AF1-256 C	2.0212
945912	AF1-256 E	1.3475
LGEE	LGEE	0.3206
CPLE	CPLE	0.0582
WEC	WEC	0.0038
CBM-W2	CBM-W2	2.0721
NY	NY	0.0841
TVA	TVA	0.6020
O-066	O-066	0.9744
CBM-S2	CBM-S2	0.9132
CBM-S1	CBM-S1	3.8766
G-007	G-007	0.1498
MADISON	MADISON	1.0786
MEC	MEC	0.1700

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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
41873670	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	DEOK_P2-2_C1 SILVER GROVE 345 BUS	bus	1532.0	125.32	130.04	DC	72.07

Bus #	Bus	MW Impact
251968	08ZIMRHP	39.2669
251969	08ZIMRLP	21.5033
251970	08MELDL1	1.9892
251971	08MELDL2	1.9892
251972	08MELDL3	1.9946
342957	1SPURLK1G	20.1913
342960	1SPURLK2G	38.4191
342963	1SPURLK3G	20.1889
342966	1SPURLK4G	20.1889
925921	AC1-068 C	-3.5400
925922	AC1-068 E	-1.6555
925931	AC1-069 C	-3.5400
925932	AC1-069 E	-1.6555
925981	AC1-074 C O1	15.7063
925982	AC1-074 E O1	6.7313
926101	AC1-089 C O1	4.0790
926102	AC1-089 E O1	6.6552
926791	AC1-165 C	-3.4983
926792	AC1-165 E	-1.6971
926801	AC1-166 C	-3.4983
926802	AC1-166 E	-1.6971
926951	AC1-182	6.6980
932461	AC2-066 C	-3.1887
932462	AC2-066 E	-5.2027
932551	AC2-075 C	3.7303
932552	AC2-075 E	1.8791
936381	AD2-048 C	10.7895
936382	AD2-048 E	5.3832
936571	AD2-072 C O1	8.5203
936572	AD2-072 E O1	4.1776
936821	AD2-105 C O1	3.6360
936822	AD2-105 E O1	5.3196
936831	AD2-106 C O1	2.5615
936832	AD2-106 E O1	3.5374
936841	AD2-107 C O1	2.0318
936842	AD2-107 E O1	2.8059
939131	AE1-143 C	6.3754
939132	AE1-143 E	3.1579
939141	AE1-144 C O1	32.8515
939142	AE1-144 E O1	16.3029

Bus #	Bus	MW Impact
940531	AE2-038 C O1	21.9147
940532	AE2-038 E O1	10.8549
941411	AE2-138 C	63.0876
941412	AE2-138 E	23.3338
941961	AE2-208	2.1989
941981	AE2-210 C O1	21.7383
941982	AE2-210 E O1	8.1768
942411	AE2-254 C O1	4.2815
942412	AE2-254 E O1	2.8543
942591	AE2-275 C O1	13.4850
942592	AE2-275 E O1	5.0723
942891	AE2-308 C O1	22.6036
942892	AE2-308 E O1	8.2195
943111	AE2-339 C	7.4394
943112	AE2-339 E	3.6642
943701	AF1-038 C	1.6966
943702	AF1-038 E	1.1310
943772	AF1-045 BAT	4.6964
943821	AF1-050 C	1.5068
943822	AF1-050 E	1.0045
944151	AF1-083 C O1	1.5843
944152	AF1-083 E O1	1.0562
944211	AF1-089 C O1	2.4799
944212	AF1-089 E O1	0.7588
944511	AF1-116 C	3.7895
944512	AF1-116 E	2.5263
944621	AF1-127 C O1	17.2758
944622	AF1-127 E O1	8.5090
945541	AF1-219 C O1	2.0568
945542	AF1-219 E O1	0.6674
945681	AF1-233 C O1	62.3740
945682	AF1-233 E O1	30.8142
945861	AF1-251 C	43.2419
945862	AF1-251 E	28.8279
945911	AF1-256 C	20.2128
945912	AF1-256 E	13.4752
946021	AF1-267 C O1	3.9648
946022	AF1-267 E O1	1.8217
LGEE	LGEE	4.6422
CPLE	CPLE	0.4545
WEC	WEC	0.3597
LGE-0012019	LGE-0012019	6.2986
CBM-W2	CBM-W2	24.2260
NY	NY	0.7897
CBM-W1	CBM-W1	9.0572
TVA	TVA	5.1954
O-066	O-066	9.2400
CBM-S2	CBM-S2	7.3522
CBM-S1	CBM-S1	38.6212
G-007	G-007	1.4248
MADISON	MADISON	3.2780
MEC	MEC	2.9190

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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
42784646	926060	AC1-085 TAP	DAY	942090	AE2-221 TAP	DAY	1	DAY_P734569 34598 34524	tower	1374.0	109.58	110.12	DC	16.44

Bus #	Bus	MW Impact
250166	HLCRST AB114	0.8727
251830	BIOENGRY	0.0826
253077	**09STUART (Deativation : 09/30/17)**	**270.4985**
342957	1SPURLK1G	4.4622
342960	1SPURLK2G	8.4450
342963	1SPURLK3G	4.4377
342966	1SPURLK4G	4.4377
923522	AB1-169 C OP	173.9540
925981	AC1-074 C O1	3.1445
925982	AC1-074 E O1	1.3476
926061	AC1-085 C	65.1806
926062	AC1-085 E	106.3474
926951	AC1-182	1.0406
927181	AC1-212 C	-0.1208
927182	AC1-212 E	-1.1441
927183	AC1-212 BAT	1.4881
930062	AB1-014 E	10.2006
932461	AC2-066 C	3.7512
932462	AC2-066 E	6.1203
932481	AC2-068 C	-2.8280
932482	AC2-068 E	-4.6315
932551	AC2-075 C	0.7468
932552	AC2-075 E	0.3762
932661	AC2-088 C O1	4.7332
932662	AC2-088 E O1	3.8950
935031	AD1-136 C	0.6656
935032	AD1-136 E	0.5670
936381	AD2-048 C	2.5107
936382	AD2-048 E	1.2527
938921	AE1-120	5.7913
939141	AE1-144 C O1	6.2171
939142	AE1-144 E O1	3.0853
940531	AE2-038 C O1	4.1473
940532	AE2-038 E O1	2.0543
941411	AE2-138 C	12.2143
941412	AE2-138 E	4.5176
941981	AE2-210 C O1	4.2087
941982	AE2-210 E O1	1.5831
942591	AE2-275 C O1	3.1697
942592	AE2-275 E O1	1.1923
942891	AE2-308 C O1	5.3173
942892	AE2-308 E O1	1.9336

Bus #	Bus	MW Impact
943111	AE2-339 C	1.4695
943112	AE2-339 E	0.7238
943201	AE2-318 C	5.0460
943202	AE2-318 E	2.4629
943771	AF1-045	2.0774
943863	AF1-054 BAT	3.0940
944521	AF1-117 C	3.6452
944522	AF1-117 E	1.1229
944621	AF1-127 C O1	1.7784
944622	AF1-127 E O1	0.8759
945681	AF1-233 C O1	6.2553
945682	AF1-233 E O1	3.0903
945861	AF1-251 C	4.4439
945862	AF1-251 E	2.9626
945911	AF1-256 C	2.0255
945912	AF1-256 E	1.3503
946021	AF1-267 C O1	0.9341
946022	AF1-267 E O1	0.4292
946171	AF1-282 C	25.7292
946172	AF1-282 E	17.1528
946181	AF1-283 C	33.4480
946182	AF1-283 E	22.2986
946511	AF1-315 C O1	1.5052
946512	AF1-315 E O1	1.0035
LGEE	LGEE	1.3658
CPLE	CPLE	0.3890
WEC	WEC	0.0343
CBM-W2	CBM-W2	7.4693
NY	NY	0.1886
TVA	TVA	1.7178
O-066	O-066	2.0698
CBM-S2	CBM-S2	4.3408
CBM-S1	CBM-S1	12.3029
G-007	G-007	0.3172
MEC	MEC	0.6706

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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
42784580	942090	AE2-221 TAP	DAY	253014	09CLINTO	DAY	1	DAY_P734569 34598 34524	tower	1374.0	121.76	122.3	DC	16.44

Bus #	Bus	MW Impact
250166	HLCRST AB114	0.8727
251830	BIOENGRY	0.0826
253077	**09STUART (Deativation : 09/30/17)**	**270.4985**
342957	1SPURLK1G	4.4622
342960	1SPURLK2G	8.4450
342963	1SPURLK3G	4.4377
342966	1SPURLK4G	4.4377
923522	AB1-169 C OP	173.9540
925981	AC1-074 C O1	3.1445
925982	AC1-074 E O1	1.3476
926061	AC1-085 C	65.1806
926062	AC1-085 E	106.3474
926951	AC1-182	1.0406
927181	AC1-212 C	-0.1208
927182	AC1-212 E	-1.1441
927183	AC1-212 BAT	1.4881
930062	AB1-014 E	10.2006
932461	AC2-066 C	3.7512
932462	AC2-066 E	6.1203
932481	AC2-068 C	-2.8280
932482	AC2-068 E	-4.6315
932551	AC2-075 C	0.7468
932552	AC2-075 E	0.3762
932661	AC2-088 C O1	4.7332
932662	AC2-088 E O1	3.8950
935031	AD1-136 C	0.6656
935032	AD1-136 E	0.5670
936381	AD2-048 C	2.5107
936382	AD2-048 E	1.2527
938921	AE1-120	5.7913
939141	AE1-144 C O1	6.2171
939142	AE1-144 E O1	3.0853
940531	AE2-038 C O1	4.1473
940532	AE2-038 E O1	2.0543
941411	AE2-138 C	12.2143
941412	AE2-138 E	4.5176
941981	AE2-210 C O1	4.2087
941982	AE2-210 E O1	1.5831
942091	AE2-221 C	100.7514
942092	AE2-221 E	67.1676
942591	AE2-275 C O1	3.1697
942592	AE2-275 E O1	1.1923

Bus #	Bus	MW Impact
942891	AE2-308 C O1	5.3173
942892	AE2-308 E O1	1.9336
943111	AE2-339 C	1.4695
943112	AE2-339 E	0.7238
943201	AE2-318 C	5.0460
943202	AE2-318 E	2.4629
943771	AF1-045	2.0774
943863	AF1-054 BAT	3.0940
944521	AF1-117 C	3.6452
944522	AF1-117 E	1.1229
944621	AF1-127 C O1	1.7784
944622	AF1-127 E O1	0.8759
945681	AF1-233 C O1	6.2553
945682	AF1-233 E O1	3.0903
945861	AF1-251 C	4.4439
945862	AF1-251 E	2.9626
945911	AF1-256 C	2.0255
945912	AF1-256 E	1.3503
946021	AF1-267 C O1	0.9341
946022	AF1-267 E O1	0.4292
946171	AF1-282 C	25.7292
946172	AF1-282 E	17.1528
946181	AF1-283 C	33.4480
946182	AF1-283 E	22.2986
946511	AF1-315 C O1	1.5052
946512	AF1-315 E O1	1.0035
LGEE	LGEE	1.3658
CPLE	CPLE	0.3890
WEC	WEC	0.0343
CBM-W2	CBM-W2	7.4693
NY	NY	0.1886
TVA	TVA	1.7178
O-066	O-066	2.0698
CBM-S2	CBM-S2	4.3408
CBM-S1	CBM-S1	12.3029
G-007	G-007	0.3172
MEC	MEC	0.6706

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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
42784789	944520	AF1-117 TAP	DAY	253100	09ATLNTA	DAY	1	DAY_P7_495	tower	1195.0	100.75	101.41	DC	17.36

Bus #	Bus	MW Impact
251830	BIOENGRY	0.0706
253077	**09STUART (Deativation : 09/30/17)**	**260.9026**
342957	1SPURLK1G	4.5610
342960	1SPURLK2G	8.4862
342963	1SPURLK3G	4.4594
342966	1SPURLK4G	4.4594
923522	AB1-169 C OP	167.7830
925921	AC1-068 C	-8.0420
925922	AC1-068 E	-3.7608
925931	AC1-069 C	-8.0420
925932	AC1-069 E	-3.7608
925981	AC1-074 C O1	3.4448
925982	AC1-074 E O1	1.4763
926061	AC1-085 C	23.1846
926062	AC1-085 E	37.8274
926791	AC1-165 C	-7.9474
926792	AC1-165 E	-3.8554
926801	AC1-166 C	-7.9474
926802	AC1-166 E	-3.8554
926951	AC1-182	1.2464
930062	AB1-014 E	5.9920
932461	AC2-066 C	2.2035
932462	AC2-066 E	3.5952
932551	AC2-075 C	0.8181
932552	AC2-075 E	0.4121
932661	AC2-088 C O1	4.0439
932662	AC2-088 E O1	3.3278
935031	AD1-136 C	0.5687
935032	AD1-136 E	0.4844
936381	AD2-048 C	2.7941
936382	AD2-048 E	1.3941
938921	AE1-120	3.4019
939141	AE1-144 C O1	6.4721
939142	AE1-144 E O1	3.2118
940531	AE2-038 C O1	4.3174
940532	AE2-038 E O1	2.1385
941411	AE2-138 C	12.8709
941412	AE2-138 E	4.7605
941981	AE2-210 C O1	4.4350
941982	AE2-210 E O1	1.6682
942091	AE2-221 C	27.4554
942092	AE2-221 E	18.3036

Bus #	Bus	MW Impact
942591	AE2-275 C O1	3.4699
942592	AE2-275 E O1	1.3052
942891	AE2-308 C O1	5.8307
942892	AE2-308 E O1	2.1202
943111	AE2-339 C	1.5910
943112	AE2-339 E	0.7836
943201	AE2-318 C	4.3708
943202	AE2-318 E	2.1334
943771	AF1-045	1.7995
944521	AF1-117 C	85.5888
944522	AF1-117 E	26.3652
944621	AF1-127 C O1	1.8822
944622	AF1-127 E O1	0.9271
945681	AF1-233 C O1	6.4948
945682	AF1-233 E O1	3.2086
945861	AF1-251 C	4.6925
945862	AF1-251 E	3.1283
945911	AF1-256 C	2.0990
945912	AF1-256 E	1.3994
946021	AF1-267 C O1	1.0226
946022	AF1-267 E O1	0.4698
946102	AF1-275 BAT	3.4935
946171	AF1-282 C	9.1518
946172	AF1-282 E	6.1012
946181	AF1-283 C	11.8973
946182	AF1-283 E	7.9316
946511	AF1-315 C O1	1.2775
946512	AF1-315 E O1	0.8517
LGEE	LGEE	1.9517
CPLE	CPLE	0.3731
WEC	WEC	0.2750
CBM-W2	CBM-W2	13.1040
NY	NY	0.3788
CBM-W1	CBM-W1	7.1933
TVA	TVA	2.3464
O-066	O-066	4.4150
CBM-S2	CBM-S2	4.6702
CBM-S1	CBM-S1	17.0400
G-007	G-007	0.6791
MEC	MEC	1.8258

Affected Systems

17 Affected Systems

17.1 LG&E

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

17.2 MISO

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

17.3 TVA

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

17.4 Duke Energy Progress

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

17.5 NYISO

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

18 Contingency Descriptions

Contingency Name	Contingency Definition
Base Case	
DAY_P734569 34598 34524	CONTINGENCY 'DAY_P734569 34598 34524' OPEN BRANCH FROM BUS 249566 TO BUS 249578 CKT 1 / OPEN BRANCH FROM BUS 249566 TO BUS 253006 CKT 1 / 249566 08FOSTER 345 253006 09BATH 345 1 OPEN BRANCH FROM BUS 249566 TO BUS 253079 CKT 1 / 249566 08FOSTER 345 253079 09SUGRCK 345 1 END
DEOK_P2-3_C2 1493_RED BANK	CONTINGENCY 'DEOK_P2-3_C2 1493_RED BANK' OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249571 TO BUS 250092 CKT 1 / 249571 08REDBK1 345 250092 08REDBK1 138 1 END
DAY_P1-2_#764	CONTINGENCY 'DAY_P1-2_#764' OPEN BRANCH FROM BUS 242938 TO BUS 253038 CKT 1 / 242938 05MARQUI 345 253038 09KILLEN 345 1 END
DAY_P1_894_B2	CONTINGENCY 'DAY_P1_894_B2' OPEN BRANCH FROM BUS 253038 TO BUS 253077 CKT 1 / 253038 09KILLEN 345 253077 09STUART 345 1 END
DAY_P1-2_#762	CONTINGENCY 'DAY_P1-2_#762' OPEN BRANCH FROM BUS 243453 TO BUS 253110 CKT 1 / 243453 05BEATTY 345 253110 09ADKINS 345 1 END
DAY_P4_L34510-1	CONTINGENCY 'DAY_P4_L34510-1' OPEN LINE FROM BUS 253077 TO BUS 253038 CKT 1 /* 09STUART 345 - 09KILLEN 345 OPEN LINE FROM BUS 253077 TO BUS 253076 CKT 1 /* 09STUART 345 - 09STUART 138 END
AEP_P4_#3195_05BEATTY 345_304E	CONTINGENCY 'AEP_P4_#3195_05BEATTY 345_304E' OPEN BRANCH FROM BUS 243453 TO BUS 243454 CKT 1 / 243453 05BEATTY 345 243454 05BIXBY 345 1 OPEN BRANCH FROM BUS 243453 TO BUS 243468 CKT 4 / 243453 05BEATTY 345 243468 05BEATTX 138 4 END

Contingency Name	Contingency Definition
EKPC_P1-2_AVON-NCLA345-C	CONTINGENCY 'EKPC_P1-2_AVON-NCLA345-C' /* AVON - N CLARK OPEN BRANCH FROM BUS 941410 TO BUS 342835 CKT 1 /* 941410 AE2-138 TAP 345.00 342835 7N CLARK 345.00 END
DAY_P7_34506 34542_1-B	CONTINGENCY 'DAY_P7_34506 34542_1-B' OPEN BRANCH FROM BUS 243453 TO BUS 253110 CKT 1 / 243453 05BEATTY 345 253110 09ADKINS 345 1 OPEN BRANCH FROM BUS 941510 TO BUS 253248 CKT 1 / 941510 AE2-148 TAP 345 253248 09SCHARL 345 1 END
DAY_P7_34506 34542_1-A	CONTINGENCY 'DAY_P7_34506 34542_1-A' OPEN BRANCH FROM BUS 243453 TO BUS 253110 CKT 1 / 243453 05BEATTY 345 253110 09ADKINS 345 1 OPEN BRANCH FROM BUS 243453 TO BUS 945630 CKT 1 / 243453 05BEATTY 345 941510 AF1-228 TAP 345 1 END
DAY_P734541 34553	CONTINGENCY 'DAY_P734541 34553' OPEN BRANCH FROM BUS 249581 TO BUS 342838 CKT 1 /* 249581 08MELDAL 345.00 342838 7SPURLOCK 345.00 OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 END
DEOK_P5-5_FOSTER345 BUS1+RELAYFAIL	CONTINGENCY 'DEOK_P5-5_FOSTER345 BUS1+RELAYFAIL' OPEN BRANCH FROM BUS 249566 TO BUS 250035 CKT 1 / 249566 08FOSTER 345 250035 08FTRM11 138 1 OPEN BRANCH FROM BUS 249566 TO BUS 249578 CKT 1 / 249566 08FOSTER 345 249578 08HILCRT 345 1 OPEN BRANCH FROM BUS 249566 TO BUS 253079 CKT 1 / 249566 08FOSTER 345 253079 09SUGRCK 345 1 END
AEP_P4_#2900_05MARQUI 345_D2	CONTINGENCY 'AEP_P4_#2900_05MARQUI 345_D2' OPEN BRANCH FROM BUS 242938 TO BUS 248003 CKT 1 / 242938 05MARQUI 345 248003 06DOE530 345 1 OPEN BRANCH FROM BUS 242938 TO BUS 253038 CKT 1 / 242938 05MARQUI 345 253038 09KILLEN 345 1 OPEN BRANCH FROM BUS 242938 TO BUS 243034 CKT 3 / 242938 05MARQUI 345 243034 05MARQUI 138 3 END
AEP_P4_#10715_05COLE 345_C	CONTINGENCY 'AEP_P4_#10715_05COLE 345_C' OPEN BRANCH FROM BUS 244022 TO BUS 243457 CKT 1 / 244022 05COLE 345 243457 05HAYDEN 345 1 OPEN BRANCH FROM BUS 244022 TO BUS 244023 CKT 1 / 244022 05COLE 345 244023 05COLE 138 1 END

Contingency Name	Contingency Definition
DEOK_P2-2_C1 SILVER GROVE 345 BUS	CONTINGENCY 'DEOK_P2-2_C1 SILVER GROVE 345 BUS' OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 END
DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER	CONTINGENCY 'DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER' OPEN BRANCH FROM BUS 249989 TO BUS 250080 CKT 1 / 249989 08BKJ246 138 250080 08NWTWN2 138 1 OPEN BRANCH FROM BUS 250079 TO BUS 250080 CKT Z1 / 250079 08NWTWN1 138 250080 08NWTWN2 138 Z1 OPEN BRANCH FROM BUS 250079 TO BUS 250092 CKT 1 / 250079 08NWTWN1 138 250092 08REDBK1 138 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 END
AEP_P4_#8094_05BIXBY 345_C	CONTINGENCY 'AEP_P4_#8094_05BIXBY 345_C' OPEN BRANCH FROM BUS 243453 TO BUS 243454 CKT 1 / 243453 05BEATTY 345 243454 05BIXBY 345 1 OPEN BRANCH FROM BUS 941520 TO BUS 243454 CKT 1 / 941520 AE2-149 TAP 345 243454 05BIXBY 345 1 END
DEOK_P2-3_C2 816_SILVERGROVE	CONTINGENCY 'DEOK_P2-3_C2 816_SILVERGROVE' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249988 TO BUS 250097 CKT 1 / 249988 08BKJ135 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250042 TO BUS 250097 CKT 1 / 250042 08HANDS1 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250052 TO BUS 250097 CKT 1 / 250052 08KYUNIV 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250053 TO BUS 250097 CKT 1 / 250053 08LAFARG 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 END
DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTERBATH	CONTINGENCY 'DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTERBATH' OPEN BRANCH FROM BUS 249566 TO BUS 253079 CKT 1 / 249566 08FOSTER 345 253079 09SUGRCK 345 1 OPEN BRANCH FROM BUS 249566 TO BUS 253006 CKT 1 / 249566 08FOSTER 345 253006 09BATH 345 1 END

Contingency Name	Contingency Definition
AEP_P1-2_#714	CONTINGENCY 'AEP_P1-2_#714' OPEN BRANCH FROM BUS 244022 TO BUS 243457 CKT 1 / 244022 05COLE 345 243457 05HAYDEN 345 1 END
AEP_P1-2_#713	CONTINGENCY 'AEP_P1-2_#713' OPEN BRANCH FROM BUS 243453 TO BUS 243454 CKT 1 / 243453 05BEATTY 345 243454 05BIXBY 345 1 END
DEOK_P2-3_C2 1349_FOSTER	CONTINGENCY 'DEOK_P2-3_C2 1349_FOSTER' OPEN BRANCH FROM BUS 249566 TO BUS 253006 CKT 1 / 249566 08FOSTER 345 253006 09BATH 345 1 OPEN BRANCH FROM BUS 249566 TO BUS 249578 CKT 1 / 249566 08FOSTER 345 249578 08HILCRT 345 1 END
DAY_P7_495	CONTINGENCY 'DAY_P7_495' OPEN BRANCH FROM BUS 249566 TO BUS 253006 CKT 1 / 249566 08FOSTER 345 253006 09BATH 345 1 OPEN BRANCH FROM BUS 253014 TO BUS 253027 CKT 1 / 253014 09CLINTO 345 253027 09GREENE 345 1 OPEN BRANCH FROM BUS 253014 TO BUS 253013 CKT 1 / 253014 09CLINTO 345 253013 09CLINTO 69.0 1 OPEN BRANCH FROM BUS 253014 TO BUS 253013 CKT 2 / 253014 09CLINTO 345 253013 09CLINTO 69.0 1 END
DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	CONTINGENCY 'DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 END
AEP_P1-2_#10137	CONTINGENCY 'AEP_P1-2_#10137' OPEN BRANCH FROM BUS 243453 TO BUS 244022 CKT 1 / 243453 05BEATTY 345 244022 05COLE 345 1 END
AEP_P1-2_#363	CONTINGENCY 'AEP_P1-2_#363' OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 END
EKPC_P2-4_NCLK E114-151T-B	CONTINGENCY 'EKPC_P2-4_NCLK E114-151T-B' /* NORTH CLARK OPEN BRANCH FROM BUS 342832 TO BUS 342835 CKT 1 /* 342832 7JK SMITH 345.00 342835 7N CLARK 345.00 OPEN BRANCH FROM BUS 941410 TO BUS 342835 CKT 1 /* 941410 AE2-138 TAP 345.00 342835 7N CLARK 345.00 END

Contingency Name	Contingency Definition
AEP_P4_#6774_05MARQUI 345_D	CONTINGENCY 'AEP_P4_#6774_05MARQUI 345_D' OPEN BRANCH FROM BUS 246888 TO BUS 242938 CKT 1 / 246888 05BIERSR 345 242938 05MARQUI 345 1 OPEN BRANCH FROM BUS 242938 TO BUS 253038 CKT 1 / 242938 05MARQUI 345 253038 09KILLEN 345 1 END
AEP_P4_#3196_05BEATTY 345_302E	CONTINGENCY 'AEP_P4_#3196_05BEATTY 345_302E' OPEN BRANCH FROM BUS 243453 TO BUS 244022 CKT 1 / 243453 05BEATTY 345 244022 05COLE 345 1 OPEN BRANCH FROM BUS 243453 TO BUS 243468 CKT 4 / 243453 05BEATTY 345 243468 05BEATTX 138 4 END
EKPC_P4-6_NCLK E114-151T	CONTINGENCY 'EKPC_P4-6_NCLK E114-151T' OPEN BRANCH FROM BUS 342832 TO BUS 342835 CKT 1 /* 342832 7JK SMITH 345.00 342835 7N CLARK 345.00 OPEN BRANCH FROM BUS 941410 TO BUS 342835 CKT 1 /* 941410 AE2-138 TAP 345.00 342835 7N CLARK 345.00 END

Short Circuit

19 Short Circuit

The following Breakers are overduty

Bus Number	Bus Name	BREAKER	Type	Capacity (Amps)	Duty Percentage Post Queue	Duty Percentage Pre Queue