



**Generation Interconnection
Feasibility Study Report
for
Queue Project AF2-211
COLLEGE CORNER 138 KV
60 MW Capacity / 100 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.

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

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

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

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Henry County, Indiana. The installed facilities will have a total capability of 100 MW with 60 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 31, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-211
Project Name	COLLEGE CORNER 138 KV
State	Indiana
County	Henry
Transmission Owner	AEP
MFO	100
MWE	100
MWC	60
Fuel	Solar
Basecase Study Year	2023

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AF2-211 will interconnect with the AEP transmission system via a direct connection to the College Corner 138 kV station.

To accommodate the interconnection at the College Corner 138 kV substation, the substation will have to be expanded requiring the extension of the 138 kV bus, installation of two (2) 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.

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 AF2-211 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ 2,363,000
Total System Network Upgrade Costs	\$106,944,046
Total Costs	\$109,307.046

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.

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.

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
138 kV 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
Installation of two (2) circuit breakers and associated protection and control equipment, 138 kV line risers, and SCADA equipment	\$1,530,000
Total Direct Connection Facility Costs	\$1,530,000

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
Update Relay Settings at College Corner 138 kV station	\$45,000
Total Non-Direct Connection Facility Costs	\$ 45,000

7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

8 Schedule

It is anticipated that the time between receipt of executed Agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would generally be between 24 to 36 months after signing Agreement execution.

9 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.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 Meteorological Data Reporting Requirements

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)

10.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/>

11 Summer Peak - Load Flow Analysis

The Queue Project AF2-211 was evaluated as a 100.0 MW (Capacity 60.0 MW) injection at the College Corner 138 kV substation in the AEP area. Project AF2-211 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-211 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
95361001	243262	05COLLCO	138.0	AEP	250001	08COLIN V	138.0	DEO&K	1	AEP_P1-2_#6372	single	167.0	98.07	107.24	DC	15.32

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FRO M BUS#	FROM BUS	kV	FRO M BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rati ng MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC DC	MW IMPAC T
95361540	243262	05COLLCO	138.0	AEP	250168	08TREN T2	138.0	DEO &K	1	DAY_P734569 34598 34524	towe r	198.0	96.82	103.78	DC	13.76
95361541	243262	05COLLCO	138.0	AEP	250168	08TREN T2	138.0	DEO &K	1	DEOK_P7-1_C5 4524FOSTRSUGRCRCK34598FO STERBATH	towe r	198.0	95.92	102.84	DC	13.7
100635447	250001	08COLI NV	138.0	DEO &K	250144	08HUST RC	138.0	DEO &K	1	AEP_P2-2_#2812_05TANNER 345_2	bus	178.0	96.03	110.96	DC	26.57
100635639	250001	08COLI NV	138.0	DEO &K	250144	08HUST RC	138.0	DEO &K	1	AEP_P4_#3027_05TANNER 345_R2	break er	178.0	96.86	111.79	DC	26.58
100635640	250001	08COLI NV	138.0	DEO &K	250144	08HUST RC	138.0	DEO &K	1	AEP_P4_#3026_05TANNER 345_S2	break er	178.0	96.4	111.34	DC	26.57
100636403	250001	08COLI NV	138.0	DEO &K	250144	08HUST RC	138.0	DEO &K	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTAN NERS	towe r	178.0	97.39	109.94	DC	22.33
100635455	250144	08HUST RC	138.0	DEO &K	250116	08TREN T1	138.0	DEO &K	1	AEP_P2-2_#2812_05TANNER 345_2	bus	178.0	94.96	109.89	DC	26.57
100635651	250144	08HUST RC	138.0	DEO &K	250116	08TREN T1	138.0	DEO &K	1	AEP_P4_#3027_05TANNER 345_R2	break er	178.0	95.79	110.73	DC	26.58
100635652	250144	08HUST RC	138.0	DEO &K	250116	08TREN T1	138.0	DEO &K	1	AEP_P4_#3026_05TANNER 345_S2	break er	178.0	95.39	110.32	DC	26.57
100636409	250144	08HUST RC	138.0	DEO &K	250116	08TREN T1	138.0	DEO &K	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTAN NERS	towe r	178.0	96.32	108.87	DC	22.33
95788634	934960	AD1-128 TAP	138.0	AEP	243278	05DESO TO	138.0	AEP	1	AEP_P4_#6923_05COLLCO 138_C2	break er	185.0	92.07	101.41	DC	17.27
95788635	934960	AD1-128 TAP	138.0	AEP	243278	05DESO TO	138.0	AEP	1	AEP_P4_#10527_05BLUFFP 138_B2	break er	185.0	93.9	100.87	DC	12.89
95789257	934960	AD1-128 TAP	138.0	AEP	243278	05DESO TO	138.0	AEP	1	DEOK_P7-1_C5 CIRCUIT3281&13803	towe r	185.0	92.18	101.52	DC	17.27

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC/DC	MW IMPACT
95361515	243233	05TANNER	345.0	AEP	248001	06DEARB1	345.0	OVEC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	1540.0	100.67	101.86	DC	18.23
95360571	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	AEP_P2-2_#2812_05TANNER345_2	bus	167.0	137.32	153.24	DC	26.57
95360715	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	DEOK_P2-3_C2 1403_MIAMIFORT	breaker	167.0	132.72	145.97	DC	22.14
95361000	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	AEP_P1-2_#144	single	167.0	101.14	109.09	DC	13.28
95361429	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	167.0	138.78	152.15	DC	22.33

11.4 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC/DC	MW IMPACT
95361040	243218	05DESOTO	345.0	AEP	945370	AF1-202 TAP	345.0	AEP	1	AEP_P1-2_#870 2-C	operation	897.0	115.77	116.28	DC	10.28
95361048	243218	05DESOTO	345.0	AEP	958860	AF2-177 TAP	345.0	AEP	2	AEP_P1-2_#481 7	operation	971.0	118.05	118.52	DC	10.31
95360994	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	AEP_P1-2_#637 2	operation	167.0	127.59	142.88	DC	25.53
95360999	243262	05COLLCO	138.0	AEP	250001	08COLINV	138.0	DEO&K	1	Base Case	operation	167.0	103.28	116.41	DC	21.93
95361156	243262	05COLLCO	138.0	AEP	250168	08TRENT 2	138.0	DEO&K	1	AEP_P1-2_#549 7	operation	198.0	91.52	100.34	DC	17.45
100636013	250001	08COLINV	138.0	DEO&K	250144	08HUSTRC	138.0	DEO&K	1	AEP_P1-2_#637 2	operation	178.0	86.9	101.24	DC	25.53
100636022	250144	08HUSTRC	138.0	DEO&K	250116	08TRENT 1	138.0	DEO&K	1	AEP_P1-2_#637 2	operation	178.0	85.83	100.17	DC	25.53
95360926	944530	AF1-118 TAP	345.0	AEP	243232	05SORENS	345.0	AEP	2	AEP_P1-2_#481 7	operation	971.0	158.42	158.89	DC	10.31
95360962	944540	AF1-119 TAP	345.0	AEP	243225	05KEYSTN	345.0	AEP	1	AEP_P1-2_#870 2-C	operation	897.0	143.41	143.92	DC	10.28

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
95360968	944830	AF1-148 TAP	345.0	AEP	944530	AF1-118 TAP	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	136.69	137.17	DC	10.31
95360986	945370	AF1-202 TAP	345.0	AEP	944540	AF1-119 TAP	345.0	AEP	1	AEP_P1-2_#8702-C	operation	897.0	131.47	131.98	DC	10.28
95361016	958860	AF2-177 TAP	345.0	AEP	960970	AF2-388 TAP	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	127.25	127.72	DC	10.31
95360980	960970	AF2-388 TAP	345.0	AEP	944830	AF1-148 TAP	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	127.26	127.74	DC	10.31

11.5 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost
100635640,100 636403,100635 639,100635447	3	08COLINV 138.0 kV - 08HUSTRC 138.0 kV Ckt 1	DEO&K: r3281b (1010) : Rebuild the line Project Type : FAC Cost : \$11,824,495 Time Estimate : 24.0 Months	\$11,824,495
95361541,9536 1540	2	05COLLCO 138.0 kV - 08TRENT2 138.0 kV Ckt 1	AEP: AEPI0005a (271): A Sag Study will be required on the 0.15 mile section of line to mitigate the overload. New Rating after the Sag Study: S/N: 167 MVA S/E: 245 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$600 (no remediations required just sag study) and \$0.3 million (complete line Reconductor/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 : \$600 Time Estimate : 6-12 Months DEO&K: r13803 (1005) : Rebuild the line and Substation Bus Conductor at Trenton Project Type : FAC Cost : \$50,229,558 Time Estimate : 62.0 Months	\$50,230,158
95360715,9536 1429,95361000, 95361001,9536 0571	1	05COLLCO 138.0 kV - 08COLINV 138.0 kV Ckt 1	AEP: AEPI0005a (271): A Sag Study will be required on the 0.15 mile section of line to mitigate the overload. New Rating after the Sag Study: S/N: 167 MVA S/E: 245 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$600 (no remediations required just sag study) and \$0.3 million (complete line reconductor/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 : \$600 Time Estimate : 6-12 Months AEPI0005b (272) : Reconductor/Rebuild the 0.15 mile section of ACSR~397.5~30/7~ LARK Project Type : FAC Cost : \$225,000 Time Estimate : 24-36 Months DEO&K: r3281 (1009) : Rebuild the line Project Type : FAC Cost : \$26,493,745 Time Estimate : 35.0 Months	\$26,718,745

ID	Idx	Facility	Upgrade Description	Cost
95789257,95788634,95788635	5	AD1-128 TAP 138.0 kV - 05DESOTO 138.0 kV Ckt 1	<u>AEP:</u> AEPI0021a (318): A Sag Study will be required on the 10 miles section of ACSR ~ 477 ~ 26/7 ~ HAWK line to mitigate the overload. New Ratings after the sag study S/N : 185MVA S/E: 257MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$40,000 (no remediations required just sag study) and \$15 million (complete line reconductor/rebuild required) Project Type : FAC Cost : \$40,000 Time Estimate : sag study : 6-12 Months	\$40,000
95361515	6	05TANNER 345.0 kV - 06DEARB1 345.0 kV Ckt Z1	<u>AEP:</u> AEPI0024a (321) : Replace Tanner's Creek 345 kV Riser (Sub Cond 2870 MCM ACSR) Project Type : FAC Cost : \$100,000 Time Estimate : 12-18 Months <u>OVEC:</u> OVEC0002a (1676) : Replace 4 1600 A switches at Dearborn 345 kV Project Type : FAC Cost : \$6,000,000 Time Estimate : 12 -18 Months OVEC0002b (1677) : Replace 2870 MCM ACSR (72/7) bus at Dearborn 345 kV (OVEC) and Tanner's Creek 345 kV (AEP) Project Type : FAC Cost : \$100,000 Time Estimate : 12 -18 Months	\$6,200,000
100636409,100635455,100635652,100635651	4	08HUSTRC 138.0 kV - 08TRENTO 138.0 kV Ckt 1	<u>DEO&K:</u> r3281c (1011) : Rebuild the line and Substation Bus Conductor at Trenton Project Type : FAC Cost : \$11,930,648 Time Estimate : 27.0 Months	\$11,930,648
			TOTAL COST	\$106,944,046

11.6 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95360571	243262	05COLLCO	AEP	250001	08COLINV	DEO&K	1	AEP_P2- 2_#2812_05TANNER 345_2	bus	167.0	137.32	153.24	DC	26.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243415	05WWWSTA	2.9782	50/50	2.9782
247288	05RICHG1	0.9848	50/50	0.9848
247289	05RICHG2	0.9848	50/50	0.9848
247929	S-071 E	6.8177	Adder	8.02
920501	AA2-148 C OP	1.7179	Adder	2.02
920502	AA2-148 E OP	11.4970	Adder	13.53
932841	AC2-111 C O1	8.0776	50/50	8.0776
932842	AC2-111 E O1	13.1792	50/50	13.1792
933592	AC2-176 E O1	4.9692	Adder	5.85
934961	AD1-128 C	4.5432	Adder	5.34
934962	AD1-128 E	7.4125	Adder	8.72
940991	AE2-090 C	12.4701	50/50	12.4701
940992	AE2-090 E	8.3134	50/50	8.3134
942071	AE2-219 C	4.4449	50/50	4.4449
942072	AE2-219 E	6.1381	50/50	6.1381
942791	AE2-297 C O1	6.5992	Adder	7.76
942792	AE2-297 E O1	4.3995	Adder	5.18
944031	AF1-071 C	2.0194	50/50	2.0194
944032	AF1-071 E	3.2948	50/50	3.2948
945561	AF1-221 C O1	34.2554	50/50	34.2554
945562	AF1-221 E O1	10.2964	50/50	10.2964
957741	AF2-068 C O1	2.0958	Adder	4.65
957742	AF2-068 E O1	1.3972	Adder	3.1
959201	AF2-211 C	15.9426	50/50	15.9426
959202	AF2-211 E	10.6284	50/50	10.6284
WEC	WEC	0.2110	Confirmed LTF	0.2110
CALDERWOOD	CALDERWOOD	0.0020	Confirmed LTF	0.0020
CBM-W2	CBM-W2	3.4070	Confirmed LTF	3.4070
NY	NY	0.0481	Confirmed LTF	0.0481
CBM-W1	CBM-W1	6.9055	Confirmed LTF	6.9055
TVA	TVA	0.1764	Confirmed LTF	0.1764
O-066	O-066	0.5914	Confirmed LTF	0.5914
CHEOAH	CHEOAH	0.0025	Confirmed LTF	0.0025
CBM-S1	CBM-S1	0.6901	Confirmed LTF	0.6901
G-007	G-007	0.0915	Confirmed LTF	0.0915
MADISON	MADISON	8.7232	Confirmed LTF	8.7232
MEC	MEC	0.8883	Confirmed LTF	0.8883
BLUEG	BLUEG	0.1059	Confirmed LTF	0.1059
TRIMBLE	TRIMBLE	0.0529	Confirmed LTF	0.0529
CATAWBA	CATAWBA	0.0186	Confirmed LTF	0.0186

11.6.2 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
95361540	243262	05COLLCO	AEP	250168	08TRENT2	DEO&K	1	DAY_P734569 34598 34524	tower	198.0	96.82	103.78	DC	13.76

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
932481	AC2-068 C	-1.9441	Adder	-2.29
932841	AC2-111 C O1	4.1840	50/50	4.1840
932842	AC2-111 E O1	6.8264	50/50	6.8264
940991	AE2-090 C	5.4838	Adder	6.45
940992	AE2-090 E	3.6558	Adder	4.3
942071	AE2-219 C	1.9464	Adder	2.29
942072	AE2-219 E	2.6878	Adder	3.16
944031	AF1-071 C	1.0460	50/50	1.0460
944032	AF1-071 E	1.7066	50/50	1.7066
945561	AF1-221 C O1	15.6240	50/50	15.6240
945562	AF1-221 E O1	4.6962	50/50	4.6962
959201	AF2-211 C	8.2578	50/50	8.2578
959202	AF2-211 E	5.5052	50/50	5.5052
WEC	WEC	0.1578	Confirmed LTF	0.1578
LGEE	LGEE	0.3503	Confirmed LTF	0.3503
CPL	CPL	0.0179	Confirmed LTF	0.0179
CBM-W2	CBM-W2	4.0213	Confirmed LTF	4.0213
NY	NY	0.0835	Confirmed LTF	0.0835
CBM-W1	CBM-W1	4.6787	Confirmed LTF	4.6787
TVA	TVA	0.4326	Confirmed LTF	0.4326
O-066	O-066	1.0013	Confirmed LTF	1.0013
CBM-S2	CBM-S2	0.4162	Confirmed LTF	0.4162
CBM-S1	CBM-S1	3.1098	Confirmed LTF	3.1098
G-007	G-007	0.1539	Confirmed LTF	0.1539
MEC	MEC	0.7770	Confirmed LTF	0.7770

11.6.3 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
100635640	250001	08COLIN V	DEO&K	250144	08HUSTR C	DEO&K	1	AEP_P4_#3026_05TANNER 345_S2	breaker	178.0	96.4	111.34	DC	26.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243415	05WWVSTA	2.9780	50/50	2.9780
247288	05RICHG1	0.9847	50/50	0.9847
247289	05RICHG2	0.9847	50/50	0.9847
247929	S-071 E	6.8169	Adder	8.02
920501	AA2-148 C OP	1.7178	Adder	2.02
920502	AA2-148 E OP	11.4957	Adder	13.52
932841	AC2-111 C O1	8.0773	50/50	8.0773
932842	AC2-111 E O1	13.1787	50/50	13.1787
933592	AC2-176 E O1	4.9692	Adder	5.85
934961	AD1-128 C	4.5432	Adder	5.34
934962	AD1-128 E	7.4125	Adder	8.72
940991	AE2-090 C	12.4701	50/50	12.4701
940992	AE2-090 E	8.3134	50/50	8.3134
942071	AE2-219 C	4.4444	50/50	4.4444
942072	AE2-219 E	6.1376	50/50	6.1376
942791	AE2-297 C O1	6.5984	Adder	7.76
942792	AE2-297 E O1	4.3990	Adder	5.18
944031	AF1-071 C	2.0193	50/50	2.0193
944032	AF1-071 E	3.2947	50/50	3.2947
945561	AF1-221 C O1	34.2554	50/50	34.2554
945562	AF1-221 E O1	10.2964	50/50	10.2964
957741	AF2-068 C O1	2.0958	Adder	4.65
957742	AF2-068 E O1	1.3972	Adder	3.1
959201	AF2-211 C	15.9420	50/50	15.9420
959202	AF2-211 E	10.6280	50/50	10.6280
WEC	WEC	0.2107	Confirmed LTF	0.2107
CALDERWOOD	CALDERWOOD	0.0025	Confirmed LTF	0.0025
CBM-W2	CBM-W2	3.3988	Confirmed LTF	3.3988
NY	NY	0.0487	Confirmed LTF	0.0487
CBM-W1	CBM-W1	6.8930	Confirmed LTF	6.8930
TVA	TVA	0.1750	Confirmed LTF	0.1750
O-066	O-066	0.5981	Confirmed LTF	0.5981
CHEOAH	CHEOAH	0.0030	Confirmed LTF	0.0030
CBM-S1	CBM-S1	0.6816	Confirmed LTF	0.6816
G-007	G-007	0.0926	Confirmed LTF	0.0926
MADISON	MADISON	8.7232	Confirmed LTF	8.7232
MEC	MEC	0.8867	Confirmed LTF	0.8867
BLUEG	BLUEG	0.1076	Confirmed LTF	0.1076
TRIMBLE	TRIMBLE	0.0534	Confirmed LTF	0.0534
CATAWBA	CATAWBA	0.0189	Confirmed LTF	0.0189

11.6.4 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 PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
100635652	250144	08HUSTR C	DEO&K	250116	08TRENT1	DEO&K	1	AEP_P4_#3026_05TANNER 345_S2	breaker	178.0	95.39	110.32	DC	26.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243415	05WWVSTA	2.9780	50/50	2.9780
247288	05RICHG1	0.9847	50/50	0.9847
247289	05RICHG2	0.9847	50/50	0.9847
247929	S-071 E	6.8169	Adder	8.02
920501	AA2-148 C OP	1.7178	Adder	2.02
920502	AA2-148 E OP	11.4957	Adder	13.52
932841	AC2-111 C O1	8.0773	50/50	8.0773
932842	AC2-111 E O1	13.1787	50/50	13.1787
933592	AC2-176 E O1	4.9692	Adder	5.85
934961	AD1-128 C	4.5432	Adder	5.34
934962	AD1-128 E	7.4125	Adder	8.72
940991	AE2-090 C	12.4701	50/50	12.4701
940992	AE2-090 E	8.3134	50/50	8.3134
942071	AE2-219 C	4.4444	50/50	4.4444
942072	AE2-219 E	6.1376	50/50	6.1376
942791	AE2-297 C O1	6.5984	Adder	7.76
942792	AE2-297 E O1	4.3990	Adder	5.18
944031	AF1-071 C	2.0193	50/50	2.0193
944032	AF1-071 E	3.2947	50/50	3.2947
945561	AF1-221 C O1	34.2554	50/50	34.2554
945562	AF1-221 E O1	10.2964	50/50	10.2964
957741	AF2-068 C O1	2.0958	Adder	4.65
957742	AF2-068 E O1	1.3972	Adder	3.1
959201	AF2-211 C	15.9420	50/50	15.9420
959202	AF2-211 E	10.6280	50/50	10.6280
WEC	WEC	0.2107	Confirmed LTF	0.2107
CALDERWOOD	CALDERWOOD	0.0025	Confirmed LTF	0.0025
CBM-W2	CBM-W2	3.3988	Confirmed LTF	3.3988
NY	NY	0.0487	Confirmed LTF	0.0487
CBM-W1	CBM-W1	6.8930	Confirmed LTF	6.8930
TVA	TVA	0.1750	Confirmed LTF	0.1750
O-066	O-066	0.5981	Confirmed LTF	0.5981
CHEOAH	CHEOAH	0.0030	Confirmed LTF	0.0030
CBM-S1	CBM-S1	0.6816	Confirmed LTF	0.6816
G-007	G-007	0.0926	Confirmed LTF	0.0926
MADISON	MADISON	8.7232	Confirmed LTF	8.7232
MEC	MEC	0.8867	Confirmed LTF	0.8867
BLUEG	BLUEG	0.1076	Confirmed LTF	0.1076
TRIMBLE	TRIMBLE	0.0534	Confirmed LTF	0.0534
CATAWBA	CATAWBA	0.0189	Confirmed LTF	0.0189

11.6.5 Index 5

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
95789257	934960	AD1-128 TAP	AEP	243278	05DESOTO	AEP	1	DEOK_P7-1_C5 CIRCUIT3281&13803	tower	185.0	92.18	101.52	DC	17.27

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243415	05WWWVSTA	2.5316	50/50	2.5316
247288	05RICHG1	0.9590	50/50	0.9590
247289	05RICHG2	0.9590	50/50	0.9590
932841	AC2-111 C O1	5.2501	50/50	5.2501
932842	AC2-111 E O1	8.5659	50/50	8.5659
934961	AD1-128 C	41.3472	50/50	41.3472
934962	AD1-128 E	67.4613	50/50	67.4613
940991	AE2-090 C	9.0202	50/50	9.0202
940992	AE2-090 E	6.0134	50/50	6.0134
942071	AE2-219 C	2.5240	Adder	2.97
942072	AE2-219 E	3.4855	Adder	4.1
944031	AF1-071 C	1.3125	50/50	1.3125
944032	AF1-071 E	2.1415	50/50	2.1415
945561	AF1-221 C O1	19.2930	50/50	19.2930
945562	AF1-221 E O1	5.7990	50/50	5.7990
959201	AF2-211 C	10.3620	50/50	10.3620
959202	AF2-211 E	6.9080	50/50	6.9080
LGEE	LGEE	0.1061	Confirmed LTF	0.1061
NEWTON	NEWTON	0.0903	Confirmed LTF	0.0903
CPLE	CPLE	0.0132	Confirmed LTF	0.0132
FARMERCITY	FARMERCITY	0.0063	Confirmed LTF	0.0063
G-007A	G-007A	0.0072	Confirmed LTF	0.0072
VFT	VFT	0.0193	Confirmed LTF	0.0193
TVA	TVA	0.0126	Confirmed LTF	0.0126
PRAIRIE	PRAIRIE	0.1937	Confirmed LTF	0.1937
EDWARDS	EDWARDS	0.0602	Confirmed LTF	0.0602
CBM-S2	CBM-S2	0.1214	Confirmed LTF	0.1214
CBM-S1	CBM-S1	0.3578	Confirmed LTF	0.3578
TILTON	TILTON	0.0869	Confirmed LTF	0.0869
GIBSON	GIBSON	0.0120	Confirmed LTF	0.0120

11.6.6 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 PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC/D C	MW IMPAC T
95361515	243233	05TANNER	AEP	248001	06DEARB1	OVENC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	1540.0	100.67	101.86	DC	18.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243415	05WWVSTA	2.7727	50/50	2.7727
243795	05HDWTR1G C	1.2020	50/50	1.2020
247264	05LAWG1A	15.3679	50/50	15.3679
247265	05LAWG1B	15.3679	50/50	15.3679
247266	05LAWG1S	24.5402	50/50	24.5402
247267	05LAWG2A	15.3679	50/50	15.3679
247268	05LAWG2B	15.3679	50/50	15.3679
247269	05LAWG2S	24.5402	50/50	24.5402
247543	V3-007 C	1.2020	50/50	1.2020
247929	S-071 E	12.8724	Adder	15.14
247935	V3-007 E	46.6355	50/50	46.6355
247958	05WLD G2 E	22.3802	Adder	26.33
247963	05HDWTR1G E	46.6355	50/50	46.6355
247968	Z2-115 E	0.1196	Adder	0.14
250163	Y3-099 BAT	0.1781	Merchant Transmission	0.1781
250167	Y3-100 BAT	0.1781	Merchant Transmission	0.1781
920501	AA2-148 C OP	6.1063	50/50	6.1063
920502	AA2-148 E OP	40.8654	50/50	40.8654
923881	AB2-028 C	4.7663	50/50	4.7663
923882	AB2-028 E	31.8977	50/50	31.8977
926691	AC1-152	4.8479	50/50	4.8479
926851	AC1-172	4.8479	50/50	4.8479
926881	AC1-175 C	20.3695	50/50	20.3695
926882	AC1-175 E	33.2345	50/50	33.2345
932681	AC2-090 C	10.1848	50/50	10.1848
932682	AC2-090 E	16.6172	50/50	16.6172
932841	AC2-111 C O1	5.5404	50/50	5.5404
932842	AC2-111 E O1	9.0396	50/50	9.0396
933592	AC2-176 E O1	14.8307	Adder	17.45
933601	AC2-177 C O1	6.9685	50/50	6.9685
933602	AC2-177 E O1	46.6355	50/50	46.6355
934161	AD1-043 C O1	6.1338	Adder	7.22
934162	AD1-043 E O1	10.0077	Adder	11.77
934961	AD1-128 C	10.6248	50/50	10.6248
934962	AD1-128 E	17.3352	50/50	17.3352
936561	AD2-071 C	7.9599	Adder	9.36
936562	AD2-071 E	3.9205	Adder	4.61
939761	AE1-207 C	7.9894	Adder	9.4
939762	AE1-207 E	11.0329	Adder	12.98
939771	AE1-208 C	7.4660	Adder	8.78
939772	AE1-208 E	10.1809	Adder	11.98

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939781	AE1-209 C O1	2.7235	50/50	2.7235
939782	AE1-209 E O1	18.2265	50/50	18.2265
939791	AE1-210 C O1	2.7235	50/50	2.7235
939792	AE1-210 E O1	18.2265	50/50	18.2265
940981	AE2-089 C O1	10.4330	Adder	12.27
940982	AE2-089 E O1	6.9553	Adder	8.18
940991	AE2-090 C	14.4426	50/50	14.4426
940992	AE2-090 E	9.6284	50/50	9.6284
941691	AE2-169	4.4796	Adder	5.27
941711	AE2-171	4.0354	Adder	4.75
941721	AE2-172	4.7556	Adder	5.59
942071	AE2-219 C	6.7935	50/50	6.7935
942072	AE2-219 E	9.3815	50/50	9.3815
942081	AE2-220 C	14.0710	50/50	14.0710
942082	AE2-220 E	19.4315	50/50	19.4315
942221	AE2-234 C O1	2.4961	Adder	2.94
942222	AE2-234 E O1	1.1289	Adder	1.33
942791	AE2-297 C O1	23.9309	50/50	23.9309
942792	AE2-297 E O1	15.9539	50/50	15.9539
944031	AF1-071 C	1.3851	50/50	1.3851
944032	AF1-071 E	2.2599	50/50	2.2599
944121	AF1-080	2.5724	Adder	3.03
944531	AF1-118 C O1	30.9043	Adder	36.36
944532	AF1-118 E O1	9.3207	Adder	10.97
944541	AF1-119 C O1	23.7146	50/50	23.7146
944542	AF1-119 E O1	10.1634	50/50	10.1634
944831	AF1-148 C O1	11.4183	Adder	13.43
944832	AF1-148 E O1	7.6122	Adder	8.96
945371	AF1-202 C O1	6.0075	50/50	6.0075
945372	AF1-202 E O1	29.3305	50/50	29.3305
945561	AF1-221 C O1	34.3149	50/50	34.3149
945562	AF1-221 E O1	10.3143	50/50	10.3143
945581	AF1-223 C O1	15.9021	50/50	15.9021
945582	AF1-223 E O1	10.6014	50/50	10.6014
946031	AF1-268 C O1	10.1461	50/50	10.1461
946032	AF1-268 E O1	4.6022	50/50	4.6022
946491	AF1-313 C O1	4.3128	50/50	4.3128
946492	AF1-313 E O1	2.8752	50/50	2.8752
953351	J805	18.4692	PJM External (MISO)	18.4692
954351	J903	9.5450	PJM External (MISO)	9.5450
955151	J993	18.8560	PJM External (MISO)	18.8560
956561	J1152	21.6000	PJM External (MISO)	21.6000
957741	AF2-068 C O1	6.2549	Adder	13.88
957742	AF2-068 E O1	4.1699	Adder	9.26
958711	AF2-162 C	5.0817	50/50	5.0817
958712	AF2-162 E	2.5409	50/50	2.5409
958821	AF2-173 C	17.5980	50/50	17.5980
958822	AF2-173 E	24.3020	50/50	24.3020
958861	AF2-177 C	4.3540	50/50	4.3540
958862	AF2-177 E	29.1380	50/50	29.1380
959131	AF2-204 C O1	3.9546	Adder	8.78
959132	AF2-204 E O1	2.0871	Adder	4.63

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959201	AF2-211 C	10.9350	50/50	10.9350
959202	AF2-211 E	7.2900	50/50	7.2900
960441	AF2-335 C	10.7820	50/50	10.7820
960442	AF2-335 E	7.1880	50/50	7.1880
960791	AF2-370	3.5940	50/50	3.5940
960971	AF2-388 C O1	2.3582	Adder	5.23
960972	AF2-388 E O1	11.0406	Adder	24.51
961161	AF2-407	51.9390	50/50	51.9390
961171	AF2-408	14.0632	50/50	14.0632
WEC	WEC	1.2723	Confirmed LTF	1.2723
CALDERWOOD	CALDERWOOD	0.2271	Confirmed LTF	0.2271
CBM-W2	CBM-W2	24.2834	Confirmed LTF	24.2834
NY	NY	0.6415	Confirmed LTF	0.6415
CBM-W1	CBM-W1	39.8443	Confirmed LTF	39.8443
TVA	TVA	0.7252	Confirmed LTF	0.7252
O-066	O-066	7.4995	Confirmed LTF	7.4995
CHEOAH	CHEOAH	0.2352	Confirmed LTF	0.2352
G-007	G-007	1.1617	Confirmed LTF	1.1617
MADISON	MADISON	18.3295	Confirmed LTF	18.3295
MEC	MEC	5.4630	Confirmed LTF	5.4630
BLUEG	BLUEG	6.5864	Confirmed LTF	6.5864
TRIMBLE	TRIMBLE	2.5009	Confirmed LTF	2.5009
CATAWBA	CATAWBA	0.3234	Confirmed LTF	0.3234

11.7 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AA2-148	Madison-Tanners Creek 138kV	Active
AB2-028	Fall Creek-Desoto 345kV	Active
AC1-152	Lawrenceburg 345kV PB I	In Service
AC1-172	Lawrenceburg 345kV PB II	Partially in Service - Under Construction
AC1-175	Losantville 345kV	Active
AC2-068	Camden-Crystal II 69kV	Engineering and Procurement
AC2-090	Losantville 345kV	Active
AC2-111	College Corner 138kV	Active
AC2-176	Jay 138 kV	Under Construction
AC2-177	Desoto-Tanners Creek 345kV	Active
AD1-043	Makahoy 138 kV	Active
AD1-128	Modoc-Delaware 138 kV	Active
AD2-071	Strawton-Pipe Creek 138 kV	Active
AE1-207	Mississinewa-Gaston 138 kV	Active
AE1-208	Delaware-Van Buren 138 kV	Active
AE1-209	Desoto 345 kV	Active
AE1-210	Desoto 345 kV	Active
AE2-089	Pennville-Adams 138 kV	Active
AE2-090	Randolph-Hodgin 138 kV	Active
AE2-169	Delaware-Van Buren 138 kV	Active
AE2-171	Makahoy 138 kV	Active
AE2-172	Mississinewa-Gaston 138 kV	Active
AE2-219	Bluff Point-Randolph 138 kV	Active
AE2-220	Losantville 345 kV	Active
AE2-234	Liberty Center-Buckeye Tap 69 kV	Active
AE2-297	Madison-Tanners Creek 138 kV	Active
AF1-071	College Corner 138 kV	Active
AF1-080	Deer Creek-Fisher Body-Mullin 138 kV	Active
AF1-118	Sorenson-Desoto 345 kV	Active
AF1-119	Keystone-Desoto 345 kV	Active
AF1-148	Sorenson-Desoto 345 kV	Active
AF1-202	Keystone-Desoto 345 kV	Active
AF1-221	College Corner-Drewersburg 138 kV	Active
AF1-223	Jay-Desoto 138 kV	Active
AF1-268	Desoto-Jay 138 kV	Active
AF1-313	Wes Del-Royerton 138 kV	Active
AF2-068	Jay 138 kV	Active
AF2-162	Keystone-Desoto 345 kV	Active
AF2-173	Desoto 345 kV	Active
AF2-177	Sorenson-DeSoto #2 345 kV	Active
AF2-204	Van Buren 138 kV	Active
AF2-211	College Corner 138 kV	Active
AF2-335	West Del-Royerton 138 kV	Active

Queue Number	Project Name	Status
AF2-370	West Del-Royerton 138 kV	Active
AF2-388	Desoto-Sorenson 345 kV	Active
AF2-407	Fall Creek 345 kV	Active
AF2-408	Fall Creek 138 kV	Active
V3-007	Desoto-Tanners Creek #1 345kV	Under Construction
Y3-099	Beckjord 2 MW-1	In Service
Y3-100	Beckjord 2 MW-2	In Service
Z2-115	Deer Creek 12.47kV	In Service
J1152	MISO	MISO
J805	MISO	MISO
J903	MISO	MISO
J993	MISO	MISO

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
AEP_P4_#3026_05TANNER 345_S2	CONTINGENCY 'AEP_P4_#3026_05TANNER 345_S2' OPEN BRANCH FROM BUS 243227 TO BUS 243233 CKT 2 / 243227 05LAWBG2 345 243233 05TANNER 345 2 OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 243233 TO BUS 243382 CKT 5 / 243233 05TANNER 345 243382 05TANNER 138 5 END
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
AEP_P1-2_#6372	CONTINGENCY 'AEP_P1-2_#6372' OPEN BRANCH FROM BUS 243262 TO BUS 250168 CKT 1 / 243262 05COLLCO 138 250168 08TRENT2 138 1 OPEN BRANCH FROM BUS 250168 TO BUS 250106 CKT 1 / 250168 08TRENT2 138 250106 08TODHJT 138 1 END
AEP_P4_#10527_05BLUFFP 138_B2	CONTINGENCY 'AEP_P4_#10527_05BLUFFP 138_B2' OPEN BRANCH FROM BUS 243253 TO BUS 243319 CKT 1 / 243253 05BLUFFP 138 243319 05JAY 138 1 OPEN BRANCH FROM BUS 243253 TO BUS 246014 CKT 1 / 243253 05BLUFFP 138 246014 05BLUFFPNT 69.0 1 END
AEP_P1-2_#8702-C	CONTINGENCY 'AEP_P1-2_#8702-C' OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 944530 AF1-118 TAP 345 243232 05SORENS 345 2 END
AEP_P1-2_#144	CONTINGENCY 'AEP_P1-2_#144' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 END

Contingency Name	Contingency Definition
DEOK_P2-3_C2 1403_MIAMIFORT	CONTINGENCY 'DEOK_P2-3_C2 1403_MIAMIFORT' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 249567 TO BUS 251950 CKT 7 / 249567 08M.FORT 345 251950 08M.FRT7 22.0 7 END
Base Case	
AEP_P1-2_#5497	CONTINGENCY 'AEP_P1-2_#5497' OPEN BRANCH FROM BUS 243262 TO BUS 250001 CKT 1 / 243262 05COLLCO 138 250001 08COLINV 138 1 END
DEOK_P7-1_C5 4524FOSTRSUGRCRK34598FOSTER BATH	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
AEP_P4_#3027_05TANNER 345_R2	CONTINGENCY 'AEP_P4_#3027_05TANNER 345_R2' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 243233 TO BUS 254524 CKT 1 / 243233 05TANNER 345 254524 16HANNA 345 1 OPEN BRANCH FROM BUS 243233 TO BUS 243382 CKT 5 / 243233 05TANNER 345 243382 05TANNER 138 5 END
AEP_P4_#6923_05COLLCO 138_C2	CONTINGENCY 'AEP_P4_#6923_05COLLCO 138_C2' OPEN BRANCH FROM BUS 243262 TO BUS 250001 CKT 1 / 243262 05COLLCO 138 250001 08COLINV 138 1 OPEN BRANCH FROM BUS 243262 TO BUS 250168 CKT 1 / 243262 05COLLCO 138 250168 08TRENT2 138 1 OPEN BRANCH FROM BUS 250168 TO BUS 250106 CKT 1 / 250168 08TRENT2 138 250106 08TODHJT 138 1 END
DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	CONTINGENCY 'DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 243233 TO BUS 249565 CKT 1 / 243233 05TANNER 345 249565 08EBEND

Contingency Name	Contingency Definition
AEP_P1-2_#4817	CONTINGENCY 'AEP_P1-2_#4817' OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END
DEOK_P7-1_C5 CIRCUIT3281&13803	CONTINGENCY 'DEOK_P7-1_C5 CIRCUIT3281&13803' OPEN BRANCH FROM BUS 250001 TO BUS 250144 CKT 1 / 250001 08COLINV 138 250144 08HUSTRC 138 1 OPEN BRANCH FROM BUS 250116 TO BUS 250144 CKT 1 / 250116 08TRENTO 138 250144 08HUSTRC 138 1 OPEN BRANCH FROM BUS 250001 TO BUS 251296 CKT 1 / 250001 08COLINV 138 251296 08COLINV 69.0 1 OPEN BRANCH FROM BUS 243262 TO BUS 250001 CKT 1 / 243262 05COLLCO 138 250001 08COLINV 138 1 OPEN BRANCH FROM BUS 243262 TO BUS 250168 CKT 1 / 243262 05COLLCO 138 250168 08TRENT2 138 1 OPEN BRANCH FROM BUS 250106 TO BUS 250168 CKT 1 / 250106 08TODHJT 138 253057 08TRENT2 138 1 OPEN BRANCH FROM BUS 250106 TO BUS 253057 CKT 1 / 250106 08TODHJT 138 253057 09OHH 138 1 END
AEP_P2-2_#2812_05TANNER 345_2	CONTINGENCY 'AEP_P2-2_#2812_05TANNER 345_2' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 243233 TO BUS 243382 CKT 5 / 243233 05TANNER 345 243382 05TANNER 138 5 END

12 Light Load Analysis

Light Load Studies (As applicable).

Not Applicable.

13 Short Circuit Analysis

The following Breakers are overdutied

To be determined during later study phases.

14 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.

15 Affected Systems

15.1 TVA

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

15.2 Duke Energy Progress

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

15.3 MISO

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

15.4 LG&E

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