



**Generation Interconnection  
Feasibility Study Report  
for  
Queue Project AF2-388  
DESOTO-SORENSEN 345 KV  
35.2 MW Capacity / 200 MW Energy**

July 2020

# Table of Contents

1	Introduction.....	4
2	Preface.....	4
3	General.....	5
4	Point of Interconnection.....	6
5	Cost Summary .....	6
6	Transmission Owner Scope of Work.....	7
6.1	Attachment Facilities.....	7
6.2	Direct Connection Cost Estimate.....	7
6.3	Non-Direct Connection Cost Estimate.....	7
7	Incremental Capacity Transfer Rights (ICTRs) .....	8
8	Schedule.....	8
9	Interconnection Customer Requirements.....	8
10	Revenue Metering and SCADA Requirements .....	8
10.1	PJM Requirements.....	8
10.2	Meteorological Data Reporting Requirements.....	9
10.3	Interconnected Transmission Owner Requirements.....	9
11	Summer Peak - Load Flow Analysis – Primary POI .....	10
11.1	Generation Deliverability .....	11
11.2	Multiple Facility Contingency .....	11
11.3	Contribution to Previously Identified Overloads.....	11
11.4	Potential Congestion due to Local Energy Deliverability.....	11
11.5	System Reinforcements - Summer Peak Load Flow - Primary POI.....	13
11.6	Flow Gate Details - Primary POI .....	15
11.6.1	Index 1 .....	16
11.6.2	Index 2 .....	18
11.6.3	Index 3 .....	21
11.6.4	Index 4 .....	23
11.6.5	Index 5 .....	26
11.7	Queue Dependencies .....	28
11.8	Contingency Descriptions - Primary POI.....	30
12	Light Load Analysis.....	32

13	Short Circuit Analysis.....	32
14	Stability and Reactive Power Assessment.....	32
15	Affected Systems .....	32
15.1	TVA.....	32
15.2	Duke Energy Progress.....	32
15.3	MISO .....	32
15.4	LG&E.....	32
15	Summer Peak – Load Flow Analysis – Secondary POI.....	33
15.1	Generation Deliverability .....	34
15.2	Multiple Facility Contingency .....	34
15.3	Contribution to Previously Identified Overloads.....	34
15.4	Potential Congestion due to Local Energy Deliverability.....	34
15.5	Flow Gate Details - Secondary POI.....	36
15.5.1	Index 1 .....	37
15.5.2	Index 2 .....	39
15.5.3	Index 3 .....	42
15.5.4	Index 4 .....	44
15.5.5	Index 5 .....	47
15.6	Contingency Descriptions - Secondary POI.....	49
16	Light Load Analysis – Secondary POI .....	51
17	Short Circuit Analysis – Secondary POI.....	51
18	Stability and Reactive Power Assessment – Secondary POI.....	51
19	Affected Systems – Secondary POI .....	51
19.1	TVA.....	51
19.2	Duke Energy Progress.....	51
19.3	MISO .....	51
19.4	LG&E.....	51

## 1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is AEP.

## 2 Preface

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

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

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

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

### 3 General

The Interconnection Customer (IC), has proposed a Wind generating facility located in Blackford County, Indiana. The installed facilities will have a total capability of 200 MW with 35.2 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is December 15, 2023. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AF2-388</b>
<b>Project Name</b>	DESOTO-SORENSEN 345 KV
<b>State</b>	Indiana
<b>County</b>	Blackford
<b>Transmission Owner</b>	AEP
<b>MFO</b>	200
<b>MWE</b>	200
<b>MWC</b>	35.2
<b>Fuel</b>	Wind
<b>Basecase Study Year</b>	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

AF2-388 will interconnect with the AEP transmission system along one of the following points of interconnection:

**Primary POI:** direct connection to the Desoto-Sorenson 345 kV circuit.

To accommodate the interconnection at the Desoto-Sorenson 345 kV circuit, a new station will have to be built requiring the installation of three (3) 345 kV circuit breakers (see Attachment 1). Installation of associated protection and control equipment, 345 kV line risers, SCADA, and 345 kV revenue metering will also be required. Note that the configuration shown in Figure 1 represents several changes from previous studies.

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

**Secondary POI:** Keystone – Desoto 345 kV circuit.

To accommodate the interconnection at the Keystone – Desoto 345 kV circuit, a new substation will have to be built requiring the installation of three (3) 345 kV circuit breakers (see Attachment 3 ). Installation of associated protection and control equipment, 345 kV line risers, SCADA, and 345 kV revenue metering will also be required.

## 5 Cost Summary

The AF2-388 project will be responsible for the following costs:

Description	Total Cost
<b>Total Physical Interconnection Costs</b>	\$19,822,000
<b>Total System Network Upgrade Costs</b>	\$16,043,200
<b>Total Costs</b>	<b>\$35,865,200</b>

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 onsite review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 88-129. If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

## 6 Transmission Owner Scope of Work

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

### 6.1 Attachment Facilities

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

Description	Total Cost
345 kV Revenue Metering	\$431,000
Generator lead first span exiting the POI station, including the first structure outside the fence	\$651,000
<b>Total Attachment Facility Costs</b>	<b>\$1,082,000</b>

### 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
Construct a new three (3) circuit breaker 345 kV switching station physically configured in a ring bus arrangement and operated as a ring-bus (see Single Line Diagram). Installation of associated protection and control equipment, 345 kV line risers and SCADA will also be required.	\$17,440,000
<b>Total Direct Connection Facility Costs</b>	<b>\$17,440,000</b>

### 6.3 Non-Direct Connection Cost Estimate

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

Description	Total Cost
Upgrade Line Protections & Controls at the Desoto 345 kV Substation	\$45,000
Upgrade Line Protections & Controls at the Sorenson 345 kV Substation	\$45,000
345 kV Transmission Line Cut In	\$1,210,000
<b>Total Non-Direct Connection Facility Costs</b>	<b>\$1,300,000</b>

## 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/meter<sup>2</sup>)
- Ambient air temperature (Fahrenheit) – (Accepted, not required)
- Wind speed (meters/second) – (Accepted, not required)
- Wind direction (decimal degrees from true north) – (Accepted, not required)

## 10.3 Interconnected Transmission Owner Requirements

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

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

## **11 Summer Peak - Load Flow Analysis – Primary POI**

The Queue Project AF2-388 was evaluated as a 200.0 MW (Capacity 35.2 MW) injection tapping the Desoto to Sorenson 345 kV line in the AEP area. Project AF2-388 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-388 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)

None

### 11.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528830	923880	AB2-028 TAP	345.0	AEP	243222	05FALL C	345.0	AEP	1	AEP_P7-1_#11019	tower	1195.0	98.56	104.71	DC	73.48

### 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	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528843	243233	05TANNER	345.0	AEP	248001	06DEARB1	345.0	OVEC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBT ANNERS	tower	1540.0	103.25	104.12	DC	29.74
95961952	243278	05DESO TO	138.0	AEP	946030	AF1-268 TAP	138.0	AEP	1	AEP_P7-1_#11019	tower	393.0	102.31	104.09	DC	15.51
98930105	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P2-3_C2 1403_MIAMIFORT	breaker	972.0	103.94	104.59	DC	13.78
98930106	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P2-3_C2 1401_MIAMIFORT	breaker	972.0	103.38	104.03	DC	13.79
98930688	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P7-1_C5 4504MFTANNERS4512EBT ANNERS	tower	972.0	138.03	138.87	DC	18.01
95961911	946030	AF1-268 TAP	138.0	AEP	243319	05JAY	138.0	AEP	1	AEP_P7-1_#11019	tower	393.0	111.04	112.82	DC	15.51
95961912	946030	AF1-268 TAP	138.0	AEP	243319	05JAY	138.0	AEP	1	AEP_P7-1_#11087-F	tower	393.0	106.65	108.43	DC	15.53

### 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
95528368	243218	05DESOTO	345.0	AEP	945370	AF1-202 TAP	345.0	AEP	1	AEP_P1-2_#8702-C	operation	897.0	118.48	123.86	DC	48.52
95528380	243225	05KEYSTN	345.0	AEP	243232	05SORENS	345.0	AEP	1	AEP_P1-2_#8702-C	operation	1301.0	115.72	119.43	DC	48.28
98930374	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	AEP_P1-2_#144	operation	972.0	103.35	104.0	DC	13.79
95528254	944530	AF1-118 TAP	345.0	AEP	243232	05SORENS	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	160.94	172.01	DC	107.69
95528259	944530	AF1-118 TAP	345.0	AEP	243232	05SORENS	345.0	AEP	2	Base Case	operation	971.0	117.36	128.04	DC	103.66
95528290	944540	AF1-119 TAP	345.0	AEP	243225	05KEYSTN	345.0	AEP	1	AEP_P1-2_#8702-C	operation	897.0	146.12	151.5	DC	48.52
95528296	944830	AF1-148 TAP	345.0	AEP	944530	AF1-118 TAP	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	139.22	150.28	DC	107.69
95528301	944830	AF1-148 TAP	345.0	AEP	944530	AF1-118 TAP	345.0	AEP	2	Base Case	operation	971.0	96.02	106.69	DC	103.66
95528314	945370	AF1-202 TAP	345.0	AEP	944540	AF1-119 TAP	345.0	AEP	1	AEP_P1-2_#8702-C	operation	897.0	134.18	139.55	DC	48.52
95528308	960970	AF2-388 TAP	345.0	AEP	944830	AF1-148 TAP	345.0	AEP	2	AEP_P1-2_#4817	operation	971.0	129.78	140.85	DC	107.69

## 11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
95528830	1	AB2-028 TAP 345.0 kV - 05FALL C 345.0 kV Ckt 1	<u>IPL</u> NonPJMArea : The external (i.e. Non-PJM) Transmission Owner, IPL, will not evaluate this violation until the impact study phase.	\$0
98930106,9893 0688,98930105	4	06DEARB1 345.0 kV - 06PIERCE 345.0 kV Ckt 1	<u>OVEC</u> OVEC0001a (1669) : Perform a sag study. OVECs cost estimate for performing the sag study is \$125K. Project Type : FAC Cost : \$125,000 Time Estimate : 6-12 Months  OVEC0001b (1670) : Replace 2156 KCM ACSR risers at Dearborn 345 kV Project Type : FAC Cost : \$175,000 Time Estimate : 12 -18 Months  OVEC0001c (1671) : Replace 2 1600 A switches at Dearborn 345 kV and 4 1600 A switches at Pierce 345kV Project Type : FAC Cost : \$9,000,000 Time Estimate : 12 -18 Months	\$9,300,000
95528843	2	05TANNER 345.0 kV - 06DEARB1 345.0 kV Ckt Z1	<u>AEP</u> AEP10024a (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

ID	Idx	Facility	Upgrade Description	Cost
95961912,95961911	5	AF1-268 TAP 138.0 kV - 05JAY 138.0 kV Ckt 1	<p><u>AEP</u>  <b>AEPI0019a (304) : Current AEP End Ratings are S/N :335MVA S/E: 392 MVA</b>  <b>1) Replace 2 risers( Sub cond 1590 AAC 61 Str) at Jay Station</b>  <b>Project Type : FAC</b>  <b>Cost : \$70,000</b>  <b>Time Estimate : 24- 36 Months</b></p> <p><b>AEPI0027a (328) : A Sag Study will be required on the 8.3 mile section of ACSR ~ 556.5 26/7 ~ DOVE line to mitigate the overload . New Rating after the Sag Study: S/N: 410 MVA S/E: 568 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$33,200 (No remediations required just sag study) and 9.96 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.</b>  <b>Project Type : FAC</b>  <b>Cost : \$33,200</b>  <b>Time Estimate : 6-12 Months</b></p> <p><b>AEPI0027b (329) : A Sag Study will be required on the 0.06 mile section of ACSR ~ 1781~ 84/19 ~ CHUKAR line to mitigate the overload . New Rating after the Sag Study: S/N: 418 MVA S/E: 569 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$20,000 (No remediations required just sag study) and 90,000 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.</b>  <b>Project Type : FAC</b>  <b>Cost : \$20,000</b>  <b>Time Estimate : 6-12 Months</b></p> <p><b>AEPI0027c (330) : Replace 4 Sub Cond 2000 AAC 91 Str at Jay</b>  <b>Project Type : FAC</b>  <b>Cost : \$400,000</b>  <b>Time Estimate : 12-18 Months</b></p>	\$523,200
95961952	3	05DESOTO 138.0 kV - AF1- 268 TAP 138.0 kV Ckt 1	<p><u>AEP</u>  <b>AEPI0044a (386) : A Sag Study will be required on the 4.3 mile section of ACSR ~ 556.5 26/7 ~ DOVE line to mitigate the overload . New Rating after the Sag Study: S/N: 410 MVA S/E: 568 MVA. Depending on the sag study results, cost for this upgrade is expected to be between \$20,000 (No remediations required just sag study) and 5.16 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.</b>  <b>Project Type : FAC</b>  <b>Cost : \$20,000</b>  <b>Time Estimate : 6-12 Months</b></p>	\$20,000
<b>TOTAL COST</b>			<b>\$16,043,200</b>	

## 11.6 Flow Gate Details - Primary POI

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

### 11.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528830	923880	AB2-028 TAP	AEP	243222	05FALL C	AEP	1	AEP_P7-1_#11019	tower	1195.0	98.56	104.71	DC	73.48

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243795	05HDWTR1G C	1.4152	50/50	1.4152
247292	05KEY G1	3.7709	50/50	3.7709
247293	05KEY G2	3.7709	50/50	3.7709
247294	05KEY G3	3.7709	50/50	3.7709
247295	05KEY G4	3.7709	50/50	3.7709
247536	05BLUFF P WF	0.6988	50/50	0.6988
247543	V3-007 C	1.4152	50/50	1.4152
247621	Y3-024	0.0867	50/50	0.0867
247929	S-071 E	16.2048	50/50	16.2048
247935	V3-007 E	54.9057	50/50	54.9057
247963	05HDWTR1G E	54.9057	50/50	54.9057
923881	AB2-028 C	15.6099	50/50	15.6099
923882	AB2-028 E	104.4661	50/50	104.4661
926881	AC1-175 C	23.9818	50/50	23.9818
926882	AC1-175 E	39.1282	50/50	39.1282
932681	AC2-090 C	11.9909	50/50	11.9909
932682	AC2-090 E	19.5641	50/50	19.5641
932841	AC2-111 C O1	2.5207	Adder	2.97
932842	AC2-111 E O1	4.1127	Adder	4.84
933591	AC2-176 C O1	0.5421	50/50	0.5421
933592	AC2-176 E O1	21.0332	50/50	21.0332
933601	AC2-177 C O1	8.2043	50/50	8.2043
933602	AC2-177 E O1	54.9057	50/50	54.9057
934961	AD1-128 C	12.4363	50/50	12.4363
934962	AD1-128 E	20.2907	50/50	20.2907
939761	AE1-207 C	8.5646	50/50	8.5646
939762	AE1-207 E	11.8274	50/50	11.8274
939771	AE1-208 C	6.7315	50/50	6.7315
939772	AE1-208 E	9.1793	50/50	9.1793
939781	AE1-209 C O1	4.7765	50/50	4.7765
939782	AE1-209 E O1	31.9655	50/50	31.9655
939791	AE1-210 C O1	4.7765	50/50	4.7765
939792	AE1-210 E O1	31.9655	50/50	31.9655
940981	AE2-089 C O1	13.0321	50/50	13.0321
940982	AE2-089 E O1	8.6881	50/50	8.6881
940991	AE2-090 C	12.5392	50/50	12.5392
940992	AE2-090 E	8.3595	50/50	8.3595
941691	AE2-169	4.0389	50/50	4.0389
941721	AE2-172	5.0980	50/50	5.0980
942071	AE2-219 C	6.7712	50/50	6.7712
942072	AE2-219 E	9.3508	50/50	9.3508
942081	AE2-220 C	16.5664	50/50	16.5664

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942082	AE2-220 E	22.8774	50/50	22.8774
942221	AE2-234 C O1	1.8535	Adder	2.18
942222	AE2-234 E O1	0.8383	Adder	0.99
944031	AF1-071 C	0.6302	Adder	0.74
944032	AF1-071 E	1.0282	Adder	1.21
944531	AF1-118 C O1	98.7965	50/50	98.7965
944532	AF1-118 E O1	29.7970	50/50	29.7970
944541	AF1-119 C O1	51.4388	50/50	51.4388
944542	AF1-119 E O1	22.0452	50/50	22.0452
944831	AF1-148 C O1	35.0509	50/50	35.0509
944832	AF1-148 E O1	23.3673	50/50	23.3673
945371	AF1-202 C O1	12.4923	50/50	12.4923
945372	AF1-202 E O1	60.9917	50/50	60.9917
945561	AF1-221 C O1	10.0900	Adder	11.87
945562	AF1-221 E O1	3.0328	Adder	3.57
945581	AF1-223 C O1	33.0678	50/50	33.0678
945582	AF1-223 E O1	22.0452	50/50	22.0452
946031	AF1-268 C O1	13.4613	50/50	13.4613
946032	AF1-268 E O1	6.1059	50/50	6.1059
946491	AF1-313 C O1	4.3598	50/50	4.3598
946492	AF1-313 E O1	2.9066	50/50	2.9066
957741	AF2-068 C O1	16.7373	50/50	16.7373
957742	AF2-068 E O1	11.1582	50/50	11.1582
958711	AF2-162 C	11.0226	50/50	11.0226
958712	AF2-162 E	5.5113	50/50	5.5113
958821	AF2-173 C	30.8633	50/50	30.8633
958822	AF2-173 E	42.6207	50/50	42.6207
958861	AF2-177 C	9.5529	50/50	9.5529
958862	AF2-177 E	63.9311	50/50	63.9311
959201	AF2-211 C	2.6368	Adder	5.85
959202	AF2-211 E	1.7579	Adder	3.9
960441	AF2-335 C	10.8996	50/50	10.8996
960442	AF2-335 E	7.2664	50/50	7.2664
960791	AF2-370	3.6332	50/50	3.6332
960971	AF2-388 C O1	12.9328	50/50	12.9328
960972	AF2-388 E O1	60.5492	50/50	60.5492
961162	AF2-407 BAT	92.7090	50/50	92.7090
961172	AF2-408 BAT	13.4088	50/50	13.4088
<b>NEWTON</b>	<b>NEWTON</b>	4.6913	Confirmed LTF	4.6913
<b>FARMERCITY</b>	<b>FARMERCITY</b>	0.1488	Confirmed LTF	0.1488
<b>G-007A</b>	<b>G-007A</b>	0.5251	Confirmed LTF	0.5251
<b>VFT</b>	<b>VFT</b>	1.4190	Confirmed LTF	1.4190
<b>CALDERWOOD</b>	<b>CALDERWOOD</b>	0.6148	Confirmed LTF	0.6148
<b>PRAIRIE</b>	<b>PRAIRIE</b>	8.8132	Confirmed LTF	8.8132
<b>CHEOAH</b>	<b>CHEOAH</b>	0.6096	Confirmed LTF	0.6096
<b>EDWARDS</b>	<b>EDWARDS</b>	0.9019	Confirmed LTF	0.9019
<b>TILTON</b>	<b>TILTON</b>	3.3245	Confirmed LTF	3.3245
<b>GIBSON</b>	<b>GIBSON</b>	3.8482	Confirmed LTF	3.8482
<b>BLUEG</b>	<b>BLUEG</b>	3.3331	Confirmed LTF	3.3331
<b>TRIMBLE</b>	<b>TRIMBLE</b>	0.9060	Confirmed LTF	0.9060
<b>CATAWBA</b>	<b>CATAWBA</b>	0.2194	Confirmed LTF	0.2194

## 11.6.2 Index 2

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
95528843	243233	05TANNER	AEP	248001	06DEARB1	OVENC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	1540.0	103.25	104.12	DC	29.74

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

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
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

### 11.6.3 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
95961952	243278	05DESOTO	AEP	946030	AF1-268 TAP	AEP	1	AEP_P7-1_#11019	tower	393.0	102.31	104.09	DC	15.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247935	V3-007 E	10.0128	Adder	11.78
247963	05HDWTR1G E	10.0128	Adder	11.78
923881	AB2-028 C	1.2800	Adder	1.51
923882	AB2-028 E	8.5664	Adder	10.08
926881	AC1-175 C	4.3734	Adder	5.15
926882	AC1-175 E	7.1356	Adder	8.39
927181	AC1-212 C	-0.1225	Adder	-0.14
927183	AC1-212 BAT	1.5090	Merchant Transmission	1.5090
932681	AC2-090 C	2.1867	Adder	2.57
932682	AC2-090 E	3.5678	Adder	4.2
933592	AC2-176 E O1	-53.8491	Adder	-63.35
933601	AC2-177 C O1	1.4962	Adder	1.76
933602	AC2-177 E O1	10.0128	Adder	11.78
934961	AD1-128 C	3.3886	Adder	3.99
934962	AD1-128 E	5.5288	Adder	6.5
939781	AE1-209 C O1	0.8570	Adder	1.01
939782	AE1-209 E O1	5.7356	Adder	6.75
939791	AE1-210 C O1	0.8570	Adder	1.01
939792	AE1-210 E O1	5.7356	Adder	6.75
942081	AE2-220 C	3.0211	Adder	3.55
942082	AE2-220 E	4.1720	Adder	4.91
944531	AF1-118 C O1	17.7206	Adder	20.85
944532	AF1-118 E O1	5.3445	Adder	6.29
944541	AF1-119 C O1	9.2285	Adder	10.86
944542	AF1-119 E O1	3.9551	Adder	4.65
944831	AF1-148 C O1	6.2877	Adder	7.4
944832	AF1-148 E O1	4.1918	Adder	4.93
945371	AF1-202 C O1	2.2412	Adder	2.64
945372	AF1-202 E O1	10.9423	Adder	12.87
945581	AF1-223 C O1	5.9326	Adder	6.98
945582	AF1-223 E O1	3.9551	Adder	4.65
946491	AF1-313 C O1	1.7444	Adder	2.05
946492	AF1-313 E O1	1.1629	Adder	1.37
958711	AF2-162 C	1.0481	Adder	2.33
958712	AF2-162 E	0.5240	Adder	1.16
958821	AF2-173 C	2.9350	Adder	6.51
958822	AF2-173 E	4.0531	Adder	9.0
958861	AF2-177 C	0.9082	Adder	2.02
958862	AF2-177 E	6.0781	Adder	13.49
960441	AF2-335 C	2.3113	Adder	5.13
960442	AF2-335 E	1.5409	Adder	3.42
960791	AF2-370	0.7704	Adder	1.71

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>960971</b>	AF2-388 C O1	1.2296	Adder	2.73
<b>960972</b>	AF2-388 E O1	5.7568	Adder	12.78
<b>WEC</b>	WEC	0.0148	Confirmed LTF	0.0148
<b>LGEE</b>	LGEE	0.6561	Confirmed LTF	0.6561
<b>CPL</b>	CPL	0.1429	Confirmed LTF	0.1429
<b>CBM-W2</b>	CBM-W2	6.5438	Confirmed LTF	6.5438
<b>NY</b>	NY	0.0453	Confirmed LTF	0.0453
<b>TVA</b>	TVA	0.8120	Confirmed LTF	0.8120
<b>O-066</b>	O-066	0.4771	Confirmed LTF	0.4771
<b>CBM-S2</b>	CBM-S2	1.6184	Confirmed LTF	1.6184
<b>CBM-S1</b>	CBM-S1	5.8447	Confirmed LTF	5.8447
<b>G-007</b>	G-007	0.0728	Confirmed LTF	0.0728
<b>MEC</b>	MEC	0.4910	Confirmed LTF	0.4910

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
98930688	248001	06DEARB1	OVEC	248013	06PIERC E	OVEC	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNER RS	tower	972.0	138.03	138.87	DC	18.01

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243795	05HDWTR1G C	0.6960	50/50	0.6960
247264	05LAWG1A	8.5772	50/50	8.5772
247265	05LAWG1B	8.5772	50/50	8.5772
247266	05LAWG1S	13.6964	50/50	13.6964
247267	05LAWG2A	8.5772	50/50	8.5772
247268	05LAWG2B	8.5772	50/50	8.5772
247269	05LAWG2S	13.6964	50/50	13.6964
247543	V3-007 C	0.6960	50/50	0.6960
247929	S-071 E	7.3481	Adder	8.64
247935	V3-007 E	27.0013	50/50	27.0013
247958	05WLD G2 E	13.9869	Adder	16.46
247963	05HDWTR1G E	27.0013	50/50	27.0013
247968	Z2-115 E	0.0795	Adder	0.09
250163	Y3-099 BAT	0.1995	Merchant Transmission	0.1995
250167	Y3-100 BAT	0.1995	Merchant Transmission	0.1995
251823	Z1-065 BAT	0.3781	Merchant Transmission	0.3781
913222	Y1-054 E	-1.2723	Adder	-1.5
920501	AA2-148 C OP	3.5390	50/50	3.5390
920502	AA2-148 E OP	23.6840	50/50	23.6840
923881	AB2-028 C	2.9047	50/50	2.9047
923882	AB2-028 E	19.4393	50/50	19.4393
926691	AC1-152	2.7057	50/50	2.7057
926851	AC1-172	2.7057	50/50	2.7057
926881	AC1-175 C	11.7937	50/50	11.7937
926882	AC1-175 E	19.2423	50/50	19.2423
932681	AC2-090 C	5.8968	50/50	5.8968
932682	AC2-090 E	9.6212	50/50	9.6212
932841	AC2-111 C O1	2.4220	Adder	2.85
932842	AC2-111 E O1	3.9517	Adder	4.65
933592	AC2-176 E O1	8.6195	Adder	10.14
933601	AC2-177 C O1	4.0347	50/50	4.0347
933602	AC2-177 E O1	27.0013	50/50	27.0013
934161	AD1-043 C O1	3.8066	Adder	4.48
934162	AD1-043 E O1	6.2108	Adder	7.31
934961	AD1-128 C	6.0887	50/50	6.0887
934962	AD1-128 E	9.9343	50/50	9.9343
936561	AD2-071 C	5.0577	Adder	5.95
936562	AD2-071 E	2.4911	Adder	2.93
939761	AE1-207 C	5.0243	Adder	5.91
939762	AE1-207 E	6.9383	Adder	8.16
939771	AE1-208 C	4.5086	Adder	5.3
939772	AE1-208 E	6.1481	Adder	7.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939781	AE1-209 C O1	1.6073	50/50	1.6073
939782	AE1-209 E O1	10.7567	50/50	10.7567
939791	AE1-210 C O1	1.6073	50/50	1.6073
939792	AE1-210 E O1	10.7567	50/50	10.7567
940981	AE2-089 C O1	6.1580	Adder	7.24
940982	AE2-089 E O1	4.1053	Adder	4.83
940991	AE2-090 C	6.7653	Adder	7.96
940992	AE2-090 E	4.5102	Adder	5.31
941691	AE2-169	2.7051	Adder	3.18
941711	AE2-171	2.5044	Adder	2.95
941721	AE2-172	2.9906	Adder	3.52
942071	AE2-219 C	3.2541	Adder	3.83
942072	AE2-219 E	4.4937	Adder	5.29
942081	AE2-220 C	8.1469	50/50	8.1469
942082	AE2-220 E	11.2506	50/50	11.2506
942221	AE2-234 C O1	1.5306	Adder	1.8
942222	AE2-234 E O1	0.6923	Adder	0.81
942791	AE2-297 C O1	13.9062	50/50	13.9062
942792	AE2-297 E O1	9.2708	50/50	9.2708
943772	AF1-045 BAT	3.3194	Merchant Transmission	3.3194
944031	AF1-071 C	0.6055	Adder	0.71
944032	AF1-071 E	0.9879	Adder	1.16
944121	AF1-080	1.6077	Adder	1.89
944531	AF1-118 C O1	18.8840	Adder	22.22
944532	AF1-118 E O1	5.6954	Adder	6.7
944541	AF1-119 C O1	14.2086	50/50	14.2086
944542	AF1-119 E O1	6.0894	50/50	6.0894
944831	AF1-148 C O1	6.9502	Adder	8.18
944832	AF1-148 E O1	4.6335	Adder	5.45
945371	AF1-202 C O1	3.5877	50/50	3.5877
945372	AF1-202 E O1	17.5163	50/50	17.5163
945561	AF1-221 C O1	18.2951	50/50	18.2951
945562	AF1-221 E O1	5.4991	50/50	5.4991
945581	AF1-223 C O1	9.4968	50/50	9.4968
945582	AF1-223 E O1	6.3312	50/50	6.3312
946031	AF1-268 C O1	5.9578	50/50	5.9578
946032	AF1-268 E O1	2.7024	50/50	2.7024
946491	AF1-313 C O1	2.5716	50/50	2.5716
946492	AF1-313 E O1	1.7144	50/50	1.7144
956561	J1152	12.1360	PJM External (MISO)	12.1360
957741	AF2-068 C O1	3.6353	Adder	8.07
957742	AF2-068 E O1	2.4235	Adder	5.38
958711	AF2-162 C	3.0447	50/50	3.0447
958712	AF2-162 E	1.5224	50/50	1.5224
958821	AF2-173 C	10.3858	50/50	10.3858
958822	AF2-173 E	14.3422	50/50	14.3422
958861	AF2-177 C	2.6112	50/50	2.6112
958862	AF2-177 E	17.4748	50/50	17.4748
959131	AF2-204 C O1	2.4486	Adder	5.44
959132	AF2-204 E O1	1.2923	Adder	2.87
959201	AF2-211 C	2.5335	Adder	5.62
959202	AF2-211 E	1.6890	Adder	3.75

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
960441	AF2-335 C	6.4290	50/50	6.4290
960442	AF2-335 E	4.2860	50/50	4.2860
960791	AF2-370	2.1430	50/50	2.1430
960971	AF2-388 C O1	1.4283	Adder	3.17
960972	AF2-388 E O1	6.6870	Adder	14.84
961161	AF2-407	32.1240	50/50	32.1240
961171	AF2-408	8.6224	50/50	8.6224
WEC	WEC	1.1434	Confirmed LTF	1.1434
LGEE	LGEE	0.8985	Confirmed LTF	0.8985
CBM-W2	CBM-W2	24.8075	Confirmed LTF	24.8075
NY	NY	0.5027	Confirmed LTF	0.5027
CBM-W1	CBM-W1	36.4917	Confirmed LTF	36.4917
TVA	TVA	1.8102	Confirmed LTF	1.8102
O-066	O-066	6.1488	Confirmed LTF	6.1488
CBM-S1	CBM-S1	11.4594	Confirmed LTF	11.4594
G-007	G-007	0.9516	Confirmed LTF	0.9516
MADISON	MADISON	20.2326	Confirmed LTF	20.2326
MEC	MEC	5.2691	Confirmed LTF	5.2691
CATAWBA	CATAWBA	0.0868	Confirmed LTF	0.0868

## 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
95961911	946030	AF1-268 TAP	AEP	243319	05JAY	AEP	1	AEP_P7-1_#11019	tower	393.0	111.04	112.82	DC	15.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247935	V3-007 E	10.0128	Adder	11.78
247963	05HDWTR1G E	10.0128	Adder	11.78
923881	AB2-028 C	1.2800	Adder	1.51
923882	AB2-028 E	8.5664	Adder	10.08
926881	AC1-175 C	4.3734	Adder	5.15
926882	AC1-175 E	7.1356	Adder	8.39
927181	AC1-212 C	-0.1225	Adder	-0.14
927183	AC1-212 BAT	1.5090	Merchant Transmission	1.5090
932681	AC2-090 C	2.1867	Adder	2.57
932682	AC2-090 E	3.5678	Adder	4.2
933592	AC2-176 E O1	-53.8491	Adder	-63.35
933601	AC2-177 C O1	1.4962	Adder	1.76
933602	AC2-177 E O1	10.0128	Adder	11.78
934961	AD1-128 C	3.3886	Adder	3.99
934962	AD1-128 E	5.5288	Adder	6.5
939761	AE1-207 C	3.0188	Adder	3.55
939762	AE1-207 E	4.1688	Adder	4.9
939771	AE1-208 C	2.4698	Adder	2.91
939772	AE1-208 E	3.3679	Adder	3.96
939781	AE1-209 C O1	0.8570	Adder	1.01
939782	AE1-209 E O1	5.7356	Adder	6.75
939791	AE1-210 C O1	0.8570	Adder	1.01
939792	AE1-210 E O1	5.7356	Adder	6.75
941691	AE2-169	1.4819	Adder	1.74
941721	AE2-172	1.7969	Adder	2.11
942081	AE2-220 C	3.0211	Adder	3.55
942082	AE2-220 E	4.1720	Adder	4.91
944531	AF1-118 C O1	17.7206	Adder	20.85
944532	AF1-118 E O1	5.3445	Adder	6.29
944541	AF1-119 C O1	9.2285	Adder	10.86
944542	AF1-119 E O1	3.9551	Adder	4.65
944831	AF1-148 C O1	6.2877	Adder	7.4
944832	AF1-148 E O1	4.1918	Adder	4.93
945371	AF1-202 C O1	2.2412	Adder	2.64
945372	AF1-202 E O1	10.9423	Adder	12.87
945581	AF1-223 C O1	5.9326	Adder	6.98
945582	AF1-223 E O1	3.9551	Adder	4.65
946031	AF1-268 C O1	12.9400	50/50	12.9400
946032	AF1-268 E O1	5.8695	50/50	5.8695
946491	AF1-313 C O1	1.7444	Adder	2.05
946492	AF1-313 E O1	1.1629	Adder	1.37
958711	AF2-162 C	1.0481	Adder	2.33

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
958712	AF2-162 E	0.5240	Adder	1.16
958821	AF2-173 C	2.9350	Adder	6.51
958822	AF2-173 E	4.0531	Adder	9.0
958861	AF2-177 C	0.9082	Adder	2.02
958862	AF2-177 E	6.0781	Adder	13.49
960441	AF2-335 C	2.3113	Adder	5.13
960442	AF2-335 E	1.5409	Adder	3.42
960791	AF2-370	0.7704	Adder	1.71
960971	AF2-388 C O1	1.2296	Adder	2.73
960972	AF2-388 E O1	5.7568	Adder	12.78
961161	AF2-407	6.7953	Adder	15.08
961171	AF2-408	1.8298	Adder	4.06
WEC	WEC	0.0148	Confirmed LTF	0.0148
LGEE	LGEE	0.6561	Confirmed LTF	0.6561
CPL	CPL	0.1429	Confirmed LTF	0.1429
CBM-W2	CBM-W2	6.5438	Confirmed LTF	6.5438
NY	NY	0.0453	Confirmed LTF	0.0453
TVA	TVA	0.8120	Confirmed LTF	0.8120
O-066	O-066	0.4771	Confirmed LTF	0.4771
CBM-S2	CBM-S2	1.6184	Confirmed LTF	1.6184
CBM-S1	CBM-S1	5.8447	Confirmed LTF	5.8447
G-007	G-007	0.0728	Confirmed LTF	0.0728
MEC	MEC	0.4910	Confirmed LTF	0.4910

## 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
AC1-212	Minster 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
AF1-045	Cedarville-Ford 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

<b>Queue Number</b>	<b>Project Name</b>	<b>Status</b>
AF2-335	West Del-Royerton 138 kV	Active
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
Y1-054	Rochelle 138kV	In Service
Y3-024	Bluff Point 12kV	In Service
Y3-099	Beckjord 2 MW-1	In Service
Y3-100	Beckjord 2 MW-2	In Service
Z1-065	Wiley 34.5kV	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 - Primary POI

Contingency Name	Contingency Definition
<b>DEOK_P2-3_C2 1401_MIAMIFORT</b>	CONTINGENCY 'DEOK_P2-3_C2 1401_MIAMIFORT' OPEN BRANCH FROM BUS 249567 TO BUS 250057 CKT 9 / 249567 08M.FORT 345 250057 08M.FORT 138 9 OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 END
<b>AEP_P7-1_#11087-F</b>	CONTINGENCY 'AEP_P7-1_#11087-F' OPEN BRANCH FROM BUS 944540 TO BUS 243225 CKT 1 / 944540 AF1-119 TAP 345 243225 05KEYSTN 345 1 OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 944530 AF1-118 TAP 345 243232 05SORENS 345 2 END
<b>AEP_P1-2_#144</b>	CONTINGENCY 'AEP_P1-2_#144' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 END
<b>AEP_P1-2_#8702-C</b>	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
<b>AEP_P1-2_#4817</b>	CONTINGENCY 'AEP_P1-2_#4817' OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END
<b>DEOK_P2-3_C2 1403_MIAMIFORT</b>	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
<b>Base Case</b>	

Contingency Name	Contingency Definition
<b>AEP_P7-1_#11019</b>	CONTINGENCY 'AEP_P7-1_#11019' OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 243218 05DESOTO 345 243232 05SORENS 345 2 OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END
<b>DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS</b>	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

## **12 Light Load Analysis**

*Light Load Studies (As applicable)*

To be determined during later study phases.

## **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).

## **15 Summer Peak – Load Flow Analysis – Secondary POI**

The Queue Project AF2-388 was evaluated as a 200.0 MW (Capacity 35.2 MW) injection tapping the Desoto to Keystone 345 kV line in the AEP area. Project AF2-388 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-388 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

### 15.1 Generation Deliverability

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

None

### 15.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528830	923880	AB2-028 TAP	345.0	AEP	243222	05FALL C	345.0	AEP	1	AEP_P7-1_#11019	tower	1195.0	98.42	104.57	DC	73.48

### 15.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528843	243233	05TANNER	345.0	AEP	248001	06DEARB1	345.0	OVEC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	1540.0	103.28	105.38	DC	32.4
95961952	243278	05DESO TO	138.0	AEP	946030	AF1-268 TAP	138.0	AEP	1	AEP_P7-1_#11019	tower	393.0	102.31	104.09	DC	15.51
98930105	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P2-3_C2 1403_MIAMIFORT	breaker	972.0	103.94	104.65	DC	14.92
98930106	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P2-3_C2 1401_MIAMIFORT	breaker	972.0	103.38	104.09	DC	14.92
98930688	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	972.0	138.07	138.98	DC	19.48
95961911	946030	AF1-268 TAP	138.0	AEP	243319	05JAY	138.0	AEP	1	AEP_P7-1_#11019	tower	393.0	111.01	112.79	DC	15.51
145188434	946030	AF1-268 TAP	138.0	AEP	243319	05JAY	138.0	AEP	1	AEP_P7-1_#11087-O	tower	393.0	106.65	108.43	DC	15.53

### 15.4 Potential Congestion due to Local Energy Deliverability

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

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection

Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
144461097	243218	05DESOTO	345.0	AEP	944830	AF1-148 TAP	345.0	AEP	2	AEP_P1-2_#4817	operatio n	971.0	125.48	130.49	DC	48.87
95528380	243225	05KEYST N	345.0	AEP	243232	05SOREN S	345.0	AEP	1	AEP_P1-2_#8702 -C	operatio n	1301.0	118.31	125.56	DC	94.49
95528381	243225	05KEYST N	345.0	AEP	243232	05SOREN S	345.0	AEP	1	Base Case	operatio n	897.0	122.55	132.41	DC	88.46
98930374	248001	06DEARB 1	345.0	OVEC	248013	06PIERCE	345.0	OVC	1	AEP_P1-2_#144	operatio n	972.0	103.35	104.06	DC	14.93
95528254	944530	AF1-118 TAP	345.0	AEP	243232	05SOREN S	345.0	AEP	2	AEP_P1-2_#4817	operatio n	971.0	156.63	161.64	DC	48.87
95528259	944530	AF1-118 TAP	345.0	AEP	243232	05SOREN S	345.0	AEP	2	Base Case	operatio n	971.0	111.04	111.82	DC	16.81
95528296	944830	AF1-148 TAP	345.0	AEP	944530	AF1-118 TAP	345.0	AEP	2	AEP_P1-2_#4817	operatio n	971.0	134.9	139.91	DC	48.87
103896003	945370	AF1-202 TAP	345.0	AEP	243218	05DESOTO	345.0	AEP	1	AEP_P1-2_#4817	operatio n	897.0	114.79	137.05	DC	199.75
144461038	960970	AF2-388 TAP	345.0	AEP	243225	05KEYST N	345.0	AEP	1	AEP_P1-2_#8702 -C	operatio n	897.0	149.89	160.41	DC	94.74
144461043	960970	AF2-388 TAP	345.0	AEP	243225	05KEYST N	345.0	AEP	1	Base Case	operatio n	897.0	99.13	109.02	DC	88.71

## 15.5 Flow Gate Details - Secondary POI

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

## 15.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
95528830	923880	AB2-028 TAP	AEP	243222	05FALL C	AEP	1	AEP_P7-1_#11019	tower	1195.0	98.42	104.57	DC	73.48

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243795	05HDWTR1G C	1.4152	50/50	1.4152
247292	05KEY G1	3.7709	50/50	3.7709
247293	05KEY G2	3.7709	50/50	3.7709
247294	05KEY G3	3.7709	50/50	3.7709
247295	05KEY G4	3.7709	50/50	3.7709
247536	05BLUFF P WF	0.6988	50/50	0.6988
247543	V3-007 C	1.4152	50/50	1.4152
247621	Y3-024	0.0867	50/50	0.0867
247929	S-071 E	16.2048	50/50	16.2048
247935	V3-007 E	54.9057	50/50	54.9057
247963	05HDWTR1G E	54.9057	50/50	54.9057
923881	AB2-028 C	15.6099	50/50	15.6099
923882	AB2-028 E	104.4661	50/50	104.4661
926881	AC1-175 C	23.9818	50/50	23.9818
926882	AC1-175 E	39.1282	50/50	39.1282
932681	AC2-090 C	11.9909	50/50	11.9909
932682	AC2-090 E	19.5641	50/50	19.5641
932841	AC2-111 C O1	2.5207	Adder	2.97
932842	AC2-111 E O1	4.1127	Adder	4.84
933591	AC2-176 C O1	0.5421	50/50	0.5421
933592	AC2-176 E O1	21.0332	50/50	21.0332
933601	AC2-177 C O1	8.2043	50/50	8.2043
933602	AC2-177 E O1	54.9057	50/50	54.9057
934961	AD1-128 C	12.4363	50/50	12.4363
934962	AD1-128 E	20.2907	50/50	20.2907
939761	AE1-207 C	8.5646	50/50	8.5646
939762	AE1-207 E	11.8274	50/50	11.8274
939771	AE1-208 C	6.7315	50/50	6.7315
939772	AE1-208 E	9.1793	50/50	9.1793
939781	AE1-209 C O1	4.7765	50/50	4.7765
939782	AE1-209 E O1	31.9655	50/50	31.9655
939791	AE1-210 C O1	4.7765	50/50	4.7765
939792	AE1-210 E O1	31.9655	50/50	31.9655
940981	AE2-089 C O1	13.0321	50/50	13.0321
940982	AE2-089 E O1	8.6881	50/50	8.6881
940991	AE2-090 C	12.5392	50/50	12.5392
940992	AE2-090 E	8.3595	50/50	8.3595
941691	AE2-169	4.0389	50/50	4.0389
941721	AE2-172	5.0980	50/50	5.0980
942071	AE2-219 C	6.7712	50/50	6.7712
942072	AE2-219 E	9.3508	50/50	9.3508
942081	AE2-220 C	16.5664	50/50	16.5664

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
942082	AE2-220 E	22.8774	50/50	22.8774
942221	AE2-234 C O1	1.8535	Adder	2.18
942222	AE2-234 E O1	0.8383	Adder	0.99
944031	AF1-071 C	0.6302	Adder	0.74
944032	AF1-071 E	1.0282	Adder	1.21
944531	AF1-118 C O1	98.7965	50/50	98.7965
944532	AF1-118 E O1	29.7970	50/50	29.7970
944541	AF1-119 C O1	51.4388	50/50	51.4388
944542	AF1-119 E O1	22.0452	50/50	22.0452
944831	AF1-148 C O1	35.0509	50/50	35.0509
944832	AF1-148 E O1	23.3673	50/50	23.3673
945371	AF1-202 C O1	12.4923	50/50	12.4923
945372	AF1-202 E O1	60.9917	50/50	60.9917
945561	AF1-221 C O1	10.0900	Adder	11.87
945562	AF1-221 E O1	3.0328	Adder	3.57
945581	AF1-223 C O1	33.0678	50/50	33.0678
945582	AF1-223 E O1	22.0452	50/50	22.0452
946031	AF1-268 C O1	13.4613	50/50	13.4613
946032	AF1-268 E O1	6.1059	50/50	6.1059
946491	AF1-313 C O1	4.3598	50/50	4.3598
946492	AF1-313 E O1	2.9066	50/50	2.9066
957741	AF2-068 C O2	15.6618	50/50	15.6618
957742	AF2-068 E O2	10.4412	50/50	10.4412
958711	AF2-162 C	11.0226	50/50	11.0226
958712	AF2-162 E	5.5113	50/50	5.5113
958821	AF2-173 C	30.8633	50/50	30.8633
958822	AF2-173 E	42.6207	50/50	42.6207
958861	AF2-177 C O2	9.5529	50/50	9.5529
958862	AF2-177 E O2	63.9311	50/50	63.9311
959201	AF2-211 C	2.6368	Adder	5.85
959202	AF2-211 E	1.7579	Adder	3.9
960441	AF2-335 C	10.8996	50/50	10.8996
960442	AF2-335 E	7.2664	50/50	7.2664
960791	AF2-370	3.6332	50/50	3.6332
960971	AF2-388 C O2	12.9332	50/50	12.9332
960972	AF2-388 E O2	60.5508	50/50	60.5508
961162	AF2-407 BAT	92.7090	50/50	92.7090
961172	AF2-408 BAT	13.4088	50/50	13.4088
<b>NEWTON</b>	<b>NEWTON</b>	4.6913	Confirmed LTF	4.6913
<b>FARMERCITY</b>	<b>FARMERCITY</b>	0.1488	Confirmed LTF	0.1488
<b>G-007A</b>	<b>G-007A</b>	0.5251	Confirmed LTF	0.5251
<b>VFT</b>	<b>VFT</b>	1.4190	Confirmed LTF	1.4190
<b>CALDERWOOD</b>	<b>CALDERWOOD</b>	0.6148	Confirmed LTF	0.6148
<b>PRAIRIE</b>	<b>PRAIRIE</b>	8.8132	Confirmed LTF	8.8132
<b>CHEOAH</b>	<b>CHEOAH</b>	0.6096	Confirmed LTF	0.6096
<b>EDWARDS</b>	<b>EDWARDS</b>	0.9019	Confirmed LTF	0.9019
<b>TILTON</b>	<b>TILTON</b>	3.3245	Confirmed LTF	3.3245
<b>GIBSON</b>	<b>GIBSON</b>	3.8482	Confirmed LTF	3.8482
<b>BLUEG</b>	<b>BLUEG</b>	3.3331	Confirmed LTF	3.3331
<b>TRIMBLE</b>	<b>TRIMBLE</b>	0.9060	Confirmed LTF	0.9060
<b>CATAWBA</b>	<b>CATAWBA</b>	0.2194	Confirmed LTF	0.2194

15.5.2 Index 2

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
95528843	243233	05TANNER	AEP	248001	06DEARB1	OVENC	Z1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS	tower	1540.0	103.28	105.38	DC	32.4

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

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939771	AE1-208 C	7.4660	Adder	8.78
939772	AE1-208 E	10.1809	Adder	11.98
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 O2	6.0193	Adder	13.36
957742	AF2-068 E O2	4.0129	Adder	8.91
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 O2	4.4944	50/50	4.4944
958862	AF2-177 E O2	30.0776	50/50	30.0776

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
959131	AF2-204 C O2	4.0013	Adder	8.88
959132	AF2-204 E O2	2.1118	Adder	4.69
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 O2	5.7031	50/50	5.7031
960972	AF2-388 E O2	26.7009	50/50	26.7009
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

### 15.5.3 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
95961952	243278	05DESOTO	AEP	946030	AF1-268 TAP	AEP	1	AEP_P7-1_#11019	tower	393.0	102.31	104.09	DC	15.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247935	V3-007 E	10.0128	Adder	11.78
247963	05HDWTR1G E	10.0128	Adder	11.78
923881	AB2-028 C	1.2800	Adder	1.51
923882	AB2-028 E	8.5664	Adder	10.08
926881	AC1-175 C	4.3734	Adder	5.15
926882	AC1-175 E	7.1356	Adder	8.39
927181	AC1-212 C	-0.1225	Adder	-0.14
927183	AC1-212 BAT	1.5090	Merchant Transmission	1.5090
932681	AC2-090 C	2.1867	Adder	2.57
932682	AC2-090 E	3.5678	Adder	4.2
933592	AC2-176 E O1	-53.8491	Adder	-63.35
933601	AC2-177 C O1	1.4962	Adder	1.76
933602	AC2-177 E O1	10.0128	Adder	11.78
934961	AD1-128 C	3.3886	Adder	3.99
934962	AD1-128 E	5.5288	Adder	6.5
939781	AE1-209 C O1	0.8570	Adder	1.01
939782	AE1-209 E O1	5.7356	Adder	6.75
939791	AE1-210 C O1	0.8570	Adder	1.01
939792	AE1-210 E O1	5.7356	Adder	6.75
942081	AE2-220 C	3.0211	Adder	3.55
942082	AE2-220 E	4.1720	Adder	4.91
944531	AF1-118 C O1	17.7206	Adder	20.85
944532	AF1-118 E O1	5.3445	Adder	6.29
944541	AF1-119 C O1	9.2285	Adder	10.86
944542	AF1-119 E O1	3.9551	Adder	4.65
944831	AF1-148 C O1	6.2877	Adder	7.4
944832	AF1-148 E O1	4.1918	Adder	4.93
945371	AF1-202 C O1	2.2412	Adder	2.64
945372	AF1-202 E O1	10.9423	Adder	12.87
945581	AF1-223 C O1	5.9326	Adder	6.98
945582	AF1-223 E O1	3.9551	Adder	4.65
946491	AF1-313 C O1	1.7444	Adder	2.05
946492	AF1-313 E O1	1.1629	Adder	1.37
958711	AF2-162 C	1.0481	Adder	2.33
958712	AF2-162 E	0.5240	Adder	1.16
958821	AF2-173 C	2.9350	Adder	6.51
958822	AF2-173 E	4.0531	Adder	9.0
958861	AF2-177 C O2	0.9083	Adder	2.02
958862	AF2-177 E O2	6.0789	Adder	13.49
960441	AF2-335 C	2.3113	Adder	5.13
960442	AF2-335 E	1.5409	Adder	3.42
960791	AF2-370	0.7704	Adder	1.71

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
<b>960971</b>	AF2-388 C O2	1.2296	Adder	2.73
<b>960972</b>	AF2-388 E O2	5.7568	Adder	12.78
<b>WEC</b>	WEC	0.0148	Confirmed LTF	0.0148
<b>LGEE</b>	LGEE	0.6561	Confirmed LTF	0.6561
<b>CPL</b>	CPL	0.1429	Confirmed LTF	0.1429
<b>CBM-W2</b>	CBM-W2	6.5438	Confirmed LTF	6.5438
<b>NY</b>	NY	0.0453	Confirmed LTF	0.0453
<b>TVA</b>	TVA	0.8120	Confirmed LTF	0.8120
<b>O-066</b>	O-066	0.4771	Confirmed LTF	0.4771
<b>CBM-S2</b>	CBM-S2	1.6184	Confirmed LTF	1.6184
<b>CBM-S1</b>	CBM-S1	5.8447	Confirmed LTF	5.8447
<b>G-007</b>	G-007	0.0728	Confirmed LTF	0.0728
<b>MEC</b>	MEC	0.4910	Confirmed LTF	0.4910

15.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPACT
98930688	248001	06DEARB1	OVEC	248013	06PIERC E	OVEC	1	DEOK_P7-1_C5 4504MFTANNERS4512EBTANNER RS	tower	972.0	138.07	138.98	DC	19.48

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243795	05HDWTR1G C	0.6960	50/50	0.6960
247264	05LAWG1A	8.5772	50/50	8.5772
247265	05LAWG1B	8.5772	50/50	8.5772
247266	05LAWG1S	13.6964	50/50	13.6964
247267	05LAWG2A	8.5772	50/50	8.5772
247268	05LAWG2B	8.5772	50/50	8.5772
247269	05LAWG2S	13.6964	50/50	13.6964
247543	V3-007 C	0.6960	50/50	0.6960
247929	S-071 E	7.3481	Adder	8.64
247935	V3-007 E	27.0013	50/50	27.0013
247958	05WLD G2 E	13.9869	Adder	16.46
247963	05HDWTR1G E	27.0013	50/50	27.0013
247968	Z2-115 E	0.0795	Adder	0.09
250163	Y3-099 BAT	0.1995	Merchant Transmission	0.1995
250167	Y3-100 BAT	0.1995	Merchant Transmission	0.1995
251823	Z1-065 BAT	0.3781	Merchant Transmission	0.3781
913222	Y1-054 E	-1.2723	Adder	-1.5
920501	AA2-148 C OP	3.5390	50/50	3.5390
920502	AA2-148 E OP	23.6840	50/50	23.6840
923881	AB2-028 C	2.9047	50/50	2.9047
923882	AB2-028 E	19.4393	50/50	19.4393
926691	AC1-152	2.7057	50/50	2.7057
926851	AC1-172	2.7057	50/50	2.7057
926881	AC1-175 C	11.7937	50/50	11.7937
926882	AC1-175 E	19.2423	50/50	19.2423
932681	AC2-090 C	5.8968	50/50	5.8968
932682	AC2-090 E	9.6212	50/50	9.6212
932841	AC2-111 C O1	2.4220	Adder	2.85
932842	AC2-111 E O1	3.9517	Adder	4.65
933592	AC2-176 E O1	8.6195	Adder	10.14
933601	AC2-177 C O1	4.0347	50/50	4.0347
933602	AC2-177 E O1	27.0013	50/50	27.0013
934161	AD1-043 C O1	3.8066	Adder	4.48
934162	AD1-043 E O1	6.2108	Adder	7.31
934961	AD1-128 C	6.0887	50/50	6.0887
934962	AD1-128 E	9.9343	50/50	9.9343
936561	AD2-071 C	5.0577	Adder	5.95
936562	AD2-071 E	2.4911	Adder	2.93
939761	AE1-207 C	5.0243	Adder	5.91
939762	AE1-207 E	6.9383	Adder	8.16
939771	AE1-208 C	4.5086	Adder	5.3
939772	AE1-208 E	6.1481	Adder	7.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939781	AE1-209 C O1	1.6073	50/50	1.6073
939782	AE1-209 E O1	10.7567	50/50	10.7567
939791	AE1-210 C O1	1.6073	50/50	1.6073
939792	AE1-210 E O1	10.7567	50/50	10.7567
940981	AE2-089 C O1	6.1580	Adder	7.24
940982	AE2-089 E O1	4.1053	Adder	4.83
940991	AE2-090 C	6.7653	Adder	7.96
940992	AE2-090 E	4.5102	Adder	5.31
941691	AE2-169	2.7051	Adder	3.18
941711	AE2-171	2.5044	Adder	2.95
941721	AE2-172	2.9906	Adder	3.52
942071	AE2-219 C	3.2541	Adder	3.83
942072	AE2-219 E	4.4937	Adder	5.29
942081	AE2-220 C	8.1469	50/50	8.1469
942082	AE2-220 E	11.2506	50/50	11.2506
942221	AE2-234 C O1	1.5306	Adder	1.8
942222	AE2-234 E O1	0.6923	Adder	0.81
942791	AE2-297 C O1	13.9062	50/50	13.9062
942792	AE2-297 E O1	9.2708	50/50	9.2708
943772	AF1-045 BAT	3.3194	Merchant Transmission	3.3194
944031	AF1-071 C	0.6055	Adder	0.71
944032	AF1-071 E	0.9879	Adder	1.16
944121	AF1-080	1.6077	Adder	1.89
944531	AF1-118 C O1	18.8840	Adder	22.22
944532	AF1-118 E O1	5.6954	Adder	6.7
944541	AF1-119 C O1	14.2086	50/50	14.2086
944542	AF1-119 E O1	6.0894	50/50	6.0894
944831	AF1-148 C O1	6.9502	Adder	8.18
944832	AF1-148 E O1	4.6335	Adder	5.45
945371	AF1-202 C O1	3.5877	50/50	3.5877
945372	AF1-202 E O1	17.5163	50/50	17.5163
945561	AF1-221 C O1	18.2951	50/50	18.2951
945562	AF1-221 E O1	5.4991	50/50	5.4991
945581	AF1-223 C O1	9.4968	50/50	9.4968
945582	AF1-223 E O1	6.3312	50/50	6.3312
946031	AF1-268 C O1	5.9578	50/50	5.9578
946032	AF1-268 E O1	2.7024	50/50	2.7024
946491	AF1-313 C O1	2.5716	50/50	2.5716
946492	AF1-313 E O1	1.7144	50/50	1.7144
956561	J1152	12.1360	PJM External (MISO)	12.1360
957741	AF2-068 C O2	3.5108	Adder	7.79
957742	AF2-068 E O2	2.3405	Adder	5.2
958711	AF2-162 C	3.0447	50/50	3.0447
958712	AF2-162 E	1.5224	50/50	1.5224
958821	AF2-173 C	10.3858	50/50	10.3858
958822	AF2-173 E	14.3422	50/50	14.3422
958861	AF2-177 C O2	2.6887	50/50	2.6887
958862	AF2-177 E O2	17.9933	50/50	17.9933
959131	AF2-204 C O2	2.4745	Adder	5.49
959132	AF2-204 E O2	1.3060	Adder	2.9
959201	AF2-211 C	2.5335	Adder	5.62
959202	AF2-211 E	1.6890	Adder	3.75

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
960441	AF2-335 C	6.4290	50/50	6.4290
960442	AF2-335 E	4.2860	50/50	4.2860
960791	AF2-370	2.1430	50/50	2.1430
960971	AF2-388 C O2	1.5448	Adder	3.43
960972	AF2-388 E O2	7.2327	Adder	16.05
961161	AF2-407	32.1240	50/50	32.1240
961171	AF2-408	8.6224	50/50	8.6224
WEC	WEC	1.1434	Confirmed LTF	1.1434
LGEE	LGEE	0.8985	Confirmed LTF	0.8985
CBM-W2	CBM-W2	24.8075	Confirmed LTF	24.8075
NY	NY	0.5027	Confirmed LTF	0.5027
CBM-W1	CBM-W1	36.4917	Confirmed LTF	36.4917
TVA	TVA	1.8102	Confirmed LTF	1.8102
O-066	O-066	6.1488	Confirmed LTF	6.1488
CBM-S1	CBM-S1	11.4594	Confirmed LTF	11.4594
G-007	G-007	0.9516	Confirmed LTF	0.9516
MADISON	MADISON	20.2326	Confirmed LTF	20.2326
MEC	MEC	5.2707	Confirmed LTF	5.2707
CATAWBA	CATAWBA	0.0868	Confirmed LTF	0.0868

## 15.5.5 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
95961911	946030	AF1-268 TAP	AEP	243319	05JAY	AEP	1	AEP_P7-1_#11019	tower	393.0	111.01	112.79	DC	15.51

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247935	V3-007 E	10.0128	Adder	11.78
247963	05HDWTR1G E	10.0128	Adder	11.78
923881	AB2-028 C	1.2800	Adder	1.51
923882	AB2-028 E	8.5664	Adder	10.08
926881	AC1-175 C	4.3734	Adder	5.15
926882	AC1-175 E	7.1356	Adder	8.39
927181	AC1-212 C	-0.1225	Adder	-0.14
927183	AC1-212 BAT	1.5090	Merchant Transmission	1.5090
932681	AC2-090 C	2.1867	Adder	2.57
932682	AC2-090 E	3.5678	Adder	4.2
933592	AC2-176 E O1	-53.8491	Adder	-63.35
933601	AC2-177 C O1	1.4962	Adder	1.76
933602	AC2-177 E O1	10.0128	Adder	11.78
934961	AD1-128 C	3.3886	Adder	3.99
934962	AD1-128 E	5.5288	Adder	6.5
939761	AE1-207 C	3.0188	Adder	3.55
939762	AE1-207 E	4.1688	Adder	4.9
939771	AE1-208 C	2.4698	Adder	2.91
939772	AE1-208 E	3.3679	Adder	3.96
939781	AE1-209 C O1	0.8570	Adder	1.01
939782	AE1-209 E O1	5.7356	Adder	6.75
939791	AE1-210 C O1	0.8570	Adder	1.01
939792	AE1-210 E O1	5.7356	Adder	6.75
941691	AE2-169	1.4819	Adder	1.74
941721	AE2-172	1.7969	Adder	2.11
942081	AE2-220 C	3.0211	Adder	3.55
942082	AE2-220 E	4.1720	Adder	4.91
944531	AF1-118 C O1	17.7206	Adder	20.85
944532	AF1-118 E O1	5.3445	Adder	6.29
944541	AF1-119 C O1	9.2285	Adder	10.86
944542	AF1-119 E O1	3.9551	Adder	4.65
944831	AF1-148 C O1	6.2877	Adder	7.4
944832	AF1-148 E O1	4.1918	Adder	4.93
945371	AF1-202 C O1	2.2412	Adder	2.64
945372	AF1-202 E O1	10.9423	Adder	12.87
945581	AF1-223 C O1	5.9326	Adder	6.98
945582	AF1-223 E O1	3.9551	Adder	4.65
946031	AF1-268 C O1	12.9400	50/50	12.9400
946032	AF1-268 E O1	5.8695	50/50	5.8695
946491	AF1-313 C O1	1.7444	Adder	2.05
946492	AF1-313 E O1	1.1629	Adder	1.37
958711	AF2-162 C	1.0481	Adder	2.33

<b>Bus #</b>	<b>Bus</b>	<b>Gendeliv MW Impact</b>	<b>Type</b>	<b>Full MW Impact</b>
958712	AF2-162 E	0.5240	Adder	1.16
958821	AF2-173 C	2.9350	Adder	6.51
958822	AF2-173 E	4.0531	Adder	9.0
958861	AF2-177 C O2	0.9083	Adder	2.02
958862	AF2-177 E O2	6.0789	Adder	13.49
960441	AF2-335 C	2.3113	Adder	5.13
960442	AF2-335 E	1.5409	Adder	3.42
960791	AF2-370	0.7704	Adder	1.71
960971	AF2-388 C O2	1.2296	Adder	2.73
960972	AF2-388 E O2	5.7568	Adder	12.78
961161	AF2-407	6.7953	Adder	15.08
961171	AF2-408	1.8298	Adder	4.06
WEC	WEC	0.0148	Confirmed LTF	0.0148
LGEE	LGEE	0.6561	Confirmed LTF	0.6561
CPL	CPL	0.1429	Confirmed LTF	0.1429
CBM-W2	CBM-W2	6.5438	Confirmed LTF	6.5438
NY	NY	0.0453	Confirmed LTF	0.0453
TVA	TVA	0.8120	Confirmed LTF	0.8120
O-066	O-066	0.4771	Confirmed LTF	0.4771
CBM-S2	CBM-S2	1.6184	Confirmed LTF	1.6184
CBM-S1	CBM-S1	5.8447	Confirmed LTF	5.8447
G-007	G-007	0.0728	Confirmed LTF	0.0728
MEC	MEC	0.4910	Confirmed LTF	0.4910

## 15.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
<b>AEP_P7-1_#11087-O</b>	CONTINGENCY 'AEP_P7-1_#11087-O' OPEN BRANCH FROM BUS 960970 TO BUS 243225 CKT 1 / 960970 AF2-388 TAP 345 243225 05KEYSTN 345 1 OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 944530 AF1-118 TAP 345 243232 05SORENS 345 2 END
<b>DEOK_P2-3_C2 1401_MIAMIFORT</b>	CONTINGENCY 'DEOK_P2-3_C2 1401_MIAMIFORT' OPEN BRANCH FROM BUS 249567 TO BUS 250057 CKT 9 / 249567 08M.FORT 345 250057 08M.FORT 138 9 OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 END
<b>AEP_P1-2_#4817</b>	CONTINGENCY 'AEP_P1-2_#4817' OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END
<b>AEP_P1-2_#8702-C</b>	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
<b>AEP_P1-2_#144</b>	CONTINGENCY 'AEP_P1-2_#144' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 END
<b>DEOK_P2-3_C2 1403_MIAMIFORT</b>	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
<b>Base Case</b>	

Contingency Name	Contingency Definition
<b>AEP_P7-1_#11019</b>	CONTINGENCY 'AEP_P7-1_#11019' OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 243218 05DESOTO 345 243232 05SORENS 345 2 OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END
<b>DEOK_P7-1_C5 4504MFTANNERS4512EBTANNERS</b>	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

## **16 Light Load Analysis – Secondary POI**

*Light Load Studies (As applicable)*

To be determined during later study phases.

## **17 Short Circuit Analysis – Secondary POI**

The following Breakers are overdutied:

To be determined during later study phases.

## **18 Stability and Reactive Power Assessment – Secondary POI**

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

To be determined during later study phases.

## **19 Affected Systems – Secondary POI**

### **19.1 TVA**

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

### **19.2 Duke Energy Progress**

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

### **19.3 MISO**

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

### **19.4 LG&E**

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