Generation Interconnection

Feasibility Study Report

for

Queue Project AE2-047

RIDGEWAY-SOLITE 69 KV

30 MW Capacity / 50 MW Energy

October, 2019

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1 Preface

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

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

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

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

2 General

The Interconnection Customer has proposed to install a Solar generating facility located in Henry County, Virginia (See Figure 2). The installed facilities will have a total capability of 50 MW with 30 MW of this output being recognized by PJM as Capacity (the approved Capacity is 32.4 MW, but it was modeled as 30 MW in this study). The Primary Point of Interconnection will be to the Ridgeway – Solite 69 kV section of the Ridgeway – Corning Glass 69 kV circuit (See Figure 1). The Secondary Point of Interconnection will be a direct connection to the Solite 138 kV substation (See Figure 3).

The proposed in-service date for this project is December 15, 2021. This study does not imply AEP's commitment to this in-service date.

The objective of this Feasibility Study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the AEP transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required for maintaining the reliability of the AEP transmission system.

The Feasibility Study includes Short Circuit and Peak Load steady state power flow analyses. The conduct of power flow studies at other load levels, stability analysis, and coordination with non-PJM Transmission Planners, as required under the PJM planning process, is not performed during the Generation Interconnection Feasibility Study phase of the PJM study process. Additional reinforcement requirements for this Interconnection Request may be defined during the conduct of these additional analyses which shall be performed following execution of the System Impact Study agreement.

Queue Number	**AE2-047**
Project Name	RIDGEWAY-SOLITE 69 KV
State	Virginia
County	Henry
Transmission Owner	AEP
MFO	50
MWE	50
MWC	30
Fuel	Solar
Base case Study Year	2022

2.1 Primary Point of Interconnection

AE2-047 will interconnect with the AEP transmission system at the Ridgeway – Solite 138 kV section of the Ridgeway – Corning Glass 138 kV circuit.

To accommodate the interconnection on the Ridgeway - Solite 69 kV line, a new three (3) circuit breaker 69 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus will be constructed (see Figure 1). Installation of associated protection and control equipment, 69 kV line risers, SCADA, and 69 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

2.2 Cost Summary

The AE2-047 project will be responsible for the following costs:

Based upon the results of this Feasibility Study, the construction of the 50 MW (30 MW Capacity) solar generating facility of the Interconnection Customer (PJM Project #AE2-047) will require the following additional interconnection charges. This plan of service will interconnect the proposed generating facility in a manner that will provide operational reliability and flexibility to both the AEP system and the the Interconnection Customer generating facility.

Description	Total Cost
Attachment Facilities	$200,000
Direct Connection Network Upgrade	$5,050,000
Non Direct Connection Network Upgrades	$400,000
Total Costs	**$5,650,000**

In addition, the AE2-047 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	$12,800,000

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

3 Transmission Owner Scope of Work

4 Attachment Facilities

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

Description	Total Cost
69 kV Revenue Metering	$200,000
Total Attachment Facility Costs	**$200,000**

5 Direct Connection Cost Estimate

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

Description	Total Cost
Construct a new three (3) circuit breaker 69 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus. Installation of associated protection and control equipment, 69 kV line risers and SCADA will also be required.	$4,350,000
Ridgeway - Solite 69 kV T-Line Cut In	$700,000
Total Direct Connection Facility Costs	**$5,050,000**

6 Non-Direct Connection Cost Estimate

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

Description	Total Cost
Upgrade line protection and controls at the Ridgeway 69 kV substation	$200,000
Upgrade line protection and controls at the Corning Glass 69 kV substation	$200,000
Total Non-Direct Connection Facility Costs	**$400,000**

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 is responsible for all costs associated with this interconnection. The costs above are reimbursable to AEP. The cost of the Interconnection Customer's generating plant and the costs for the line connecting the generating plant to the Ridgeway - Solite 69 kV line are not included in this report; these are assumed to be the Interconnection Customer's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power 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.

Requirement from the PJM Open Access Transmission Tariff:

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 AEP Requirements

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of New Facilities or Changes to Existing Facilities Connected to the AEP Transmission System" document located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-aep/aep-interconnection-requirements.ashx

11 Network Impacts – Option 1

The Queue Project AE2-047 was evaluated as a 50 MW (Capacity 30 MW) injection to the Ridgeway – Solite 69 kV line in the AEP area. Project AE2-047 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-047 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

12 Generation Deliverability

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

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
1340242	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	AEP_P1-2_#1370	single	402.0	90.48	92.62	DC	8.58
2356154	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	single	402.0	90.48	92.62	DC	8.58

13 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1339552	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P4_#2916_05J.FERR 765_A	breaker	296.0	99.32	102.03	DC	8.05
1339966	243799	05FIELDALE 2	AEP	242736	05OAKLEV	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	223.0	78.76	81.87	DC	6.94
1341043	926050	AC1-083 TAP	AEP	242802	05SMITHMTN 1	AEP	1	AEP_P7-1_#10781-B	tower	296.0	82.76	85.49	DC	8.06

14 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	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
1339551	242544	05AXTON	AEP	941430	AE2-140 TAP	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.82	122.47	DC	6.29
1339377	941430	AE2-140 TAP	AEP	242620	05DANVL2	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.65	122.29	DC	6.29

15 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1340240	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	AEP_P1-2_#1370	operation	402.0	97.51	101.06	DC	14.3
1340241	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	Base Case	operation	275.0	83.58	86.69	DC	8.53
2356151	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	operation	402.0	97.51	101.06	DC	14.3
1340293	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P1-2_#1370	operation	296.0	99.19	101.91	DC	8.05
2356205	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	242509 05AXTON 765 242514 05J.FERR 765 1	operation	296.0	99.19	101.91	DC	8.05
1340541	941430	AE2-140 TAP	AEP	242620	05DANVL2	AEP	1	AEP_P1-2_#1370	operation	382.0	82.43	82.94	DC	4.29
2356458	941430	AE2-140 TAP	AEP	242620	05DANVL2	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	operation	382.0	82.43	82.94	DC	4.29

16 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
1339966	3	05FIELDALE2 138.0 kV - 05OAKLEV 138.0 kV Ckt 1	AEP No violation. Post queue loading less than 100%.	$0
1339551	5	05AXTON 138.0 kV - AE2-140 TAP 138.0 kV Ckt 1	AEP AEPA0004a (274) : Rebuild Axton-AE2-140 138 kV (2.5 miles) using 1590 ACSR/SSAC Falcon @ 401 deg. F Project Type : FAC Cost : $3,750,000 Time Estimate : 24-36 months Months AEPA0004b (275) : Replace 2000 A Wavetrap @ Axton w/ 3000 A Project Type : FAC Cost : $50,000 Time Estimate : 24-36 months Months	$3,800,000
1339377	7	AE2-140 TAP 138.0 kV - 05DANVL2 138.0 kV Ckt 1	AEP Current AEP Ratings are S/N: 296 MVA S/E: 392 MVA. Current AEP ratings are sufficient to mitigate the overloads.	$0
1339552	2	05EDAN 1 138.0 kV - 05EDAN 2 138.0 kV Ckt Z1	AEP n6124 (75) : PJM Network Upgrade n6124. Increasing the Danville East Danville 138 kV circuit summer rating to 572/572/572 MVA will still require us to rebuild the line. The network project has an projected in-service date of 06/01/2021. Project Type : FAC Cost : $9,000,000 Time Estimate : Months	$9,000,000
2356154,1340242	1	05DANVL2 138.0 kV - 05EDAN 1 138.0 kV Ckt 1	AEP No violation. Post queue loading less than 100%.	$0
1341043	4	AC1-083 TAP 138.0 kV - 05SMITHMTN1 138.0 kV Ckt 1	AEP No violation. Post queue loading less than 100%.	$0
			TOTAL COST	$12,800,000

17 Flow Gate Details

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

17.1 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
2356154	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	single	402.0	90.48	92.62	DC	8.58

Bus #	Bus	MW Impact
242906	05CLAY-1	0.32
242907	05CLAY-2	0.32
247723	05PHILPOTT	0.53
926461	AC1-117 C	3.86
934751	AD1-102 C	1.32
938741	AE1-100 C O1	23.49
938931	AE1-121 O1	271.61
938941	AE1-122 O1	271.61
939441	AE1-176	0.15
940601	AE2-047 C O1	8.58
941431	AE2-140 C O1	70.37
941671	AE2-166 C	27.41
942321	AE2-245	3.51
942641	AE2-280 C O1	5.48
CALDERWOOD	CALDERWOOD	0.24
CARR	CARR	0.01
CATAWBA	CATAWBA	0.61
CBM-W1	CBM-W1	1.93
CBM-W2	CBM-W2	0.02
CHEOAH	CHEOAH	0.24
CHILHOWEE	CHILHOWEE	0.07
CIN	CIN	0.92
COTTONWOOD	COTTONWOOD	0.53
HAMLET	HAMLET	1.5
IPL	IPL	0.62
LGEE	LGEE	0.29
MEC	MEC	0.99
MECS	MECS	1.48
RENSSELAER	RENSSELAER	0.01
SANTEETLA	SANTEETLA	0.08
TVA	TVA	0.37
UNIONPOWER	UNIONPOWER	0.38
WEC	WEC	0.23

17.2 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
1339552	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P4_#2916_05J.FERR 765_A	breaker	296.0	99.32	102.03	DC	8.05

Bus #	Bus	MW Impact
244012	05PINNACLE	2.39
247723	05PHILPOTT	0.29
926461	AC1-117 C	2.21
926462	AC1-117 E	3.61
936161	AD2-022 C O1	12.52
936162	AD2-022 E O1	7.51
938741	AE1-100 C O1	13.58
938742	AE1-100 E O1	7.81
938931	AE1-121 O1	157.01
938941	AE1-122 O1	157.01
939943	AE1-230 E2	0.27
940083	AE1-250 EBAT	49.74
940601	AE2-047 C O1	4.83
940602	AE2-047 E O1	3.22
941431	AE2-140 C O1	40.8
941432	AE2-140 E O1	27.2
941671	AE2-166 C	15.71
941672	AE2-166 E	10.47
942321	AE2-245	2.01
CBM-N	CBM-N	0.01
CBM-S1	CBM-S1	0.55
CBM-S2	CBM-S2	0.34
CBM-W1	CBM-W1	0.81
CBM-W2	CBM-W2	3.82
CIN	CIN	0.36
CPLE	CPLE	0.05
G-007A	G-007A	0.02
IPL	IPL	0.23
LGEE	LGEE	0.11
MEC	MEC	0.7
MECS	MECS	0.44
NYISO	NYISO	0.06
VFT	VFT	0.05
WEC	WEC	0.1

17.3 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
1339966	243799	05FIELDALE 2	AEP	242736	05OAKLEV	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	223.0	78.76	81.87	DC	6.94

Bus #	Bus	MW Impact
244012	05PINNACLE	0.63
247723	05PHILPOTT	0.32
926461	AC1-117 C	1.16
926462	AC1-117 E	1.89
938741	AE1-100 C O1	5.8
938742	AE1-100 E O1	3.33
938931	AE1-121 O1	67.04
938941	AE1-122 O1	67.04
940601	AE2-047 C O1	4.16
940602	AE2-047 E O1	2.78
941431	AE2-140 C O1	15.48
941432	AE2-140 E O1	10.32
941671	AE2-166 C	8.24
941672	AE2-166 E	5.5
942321	AE2-245	1.05
BLUEG	BLUEG	0.47
CANNELTON	CANNELTON	0.01
CARR	CARR	0.01
CBM-S1	CBM-S1	0.56
CBM-S2	CBM-S2	1.94
CBM-W2	CBM-W2	2.88
COFFEEN	COFFEEN	0.01
CPLE	CPLE	1.06
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.03
ELMERSMITH	ELMERSMITH	0.01
G-007	G-007	0.01
GIBSON	GIBSON	0.01
MEC	MEC	0.05
NEWTON	NEWTON	0.04
O-066	O-066	0.06
RENSSELAER	RENSSELAER	0.01
TILTON	TILTON	0.04
TRIMBLE	TRIMBLE	0.06

17.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1341043	926050	AC1-083 TAP	AEP	242802	05SMITHMTN1	AEP	1	AEP_P7-1_#10781-B	tower	296.0	82.76	85.49	DC	8.06

Bus #	Bus	MW Impact
244012	05PINNACLE	3.29
926051	AC1-083 C O1	25.0
926052	AC1-083 E O1	40.78
926461	AC1-117 C	1.07
926462	AC1-117 E	1.75
933941	AD1-017 C	5.0
933942	AD1-017 E	8.16
936161	AD2-022 C O1	18.75
936162	AD2-022 E O1	11.25
936171	AD2-023 C O1	10.95
936172	AD2-023 E O1	5.95
938741	AE1-100 C O1	6.6
938742	AE1-100 E O1	3.8
938931	AE1-121 O1	76.31
938941	AE1-122 O1	76.31
939943	AE1-230 E2	0.42
940081	AE1-250 C	48.34
940082	AE1-250 E	32.23
940601	AE2-047 C O1	4.83
940602	AE2-047 E O1	3.22
941431	AE2-140 C O1	21.06
941432	AE2-140 E O1	14.04
941671	AE2-166 C	7.63
941672	AE2-166 E	5.08
942321	AE2-245	0.98
CARR	CARR	0.0
CBM-S1	CBM-S1	1.19
CBM-S2	CBM-S2	0.35
CBM-W1	CBM-W1	1.89
CBM-W2	CBM-W2	8.3
CIN	CIN	0.86
G-007	G-007	0.04
IPL	IPL	0.55
LGEE	LGEE	0.26
MEC	MEC	1.59
MECS	MECS	1.03
O-066	O-066	0.25
RENSSELAER	RENSSELAER	0.0
WEC	WEC	0.22

17.5 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
1339551	242544	05AXTON	AEP	941430	AE2-140 TAP	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.82	122.47	DC	6.29

Bus #	Bus	MW Impact
247723	05PHILPOTT	0.49
926461	AC1-117 C	3.69
926462	AC1-117 E	6.03
938741	AE1-100 C O1	22.65
938742	AE1-100 E O1	13.03
938931	AE1-121 O1	261.96
938941	AE1-122 O1	261.96
939441	AE1-176	0.14
940083	AE1-250 EBAT	6.02
940601	AE2-047 C O1	3.77
940602	AE2-047 E O1	2.52
941671	AE2-166 C	26.25
941672	AE2-166 E	17.5
942321	AE2-245	3.36
CALDERWOOD	CALDERWOOD	0.22
CARR	CARR	0.01
CATAWBA	CATAWBA	0.56
CBM-W1	CBM-W1	1.75
CHEOAH	CHEOAH	0.23
CHILHOWEE	CHILHOWEE	0.07
CIN	CIN	0.84
COTTONWOOD	COTTONWOOD	0.5
G-007	G-007	0.09
HAMLET	HAMLET	1.38
IPL	IPL	0.56
LGEE	LGEE	0.26
MEC	MEC	0.89
MECS	MECS	1.35
O-066	O-066	0.55
RENSSELAER	RENSSELAER	0.01
SANTEETLA	SANTEETLA	0.07
TVA	TVA	0.35
UNIONPOWER	UNIONPOWER	0.35
WEC	WEC	0.2

17.6 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1339377	941430	AE2-140 TAP	AEP	242620	05DANVL2	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.65	122.29	DC	6.29

Bus #	Bus	MW Impact
247723	05PHILPOTT	0.49
926461	AC1-117 C	3.69
926462	AC1-117 E	6.03
938741	AE1-100 C O1	22.65
938742	AE1-100 E O1	13.03
938931	AE1-121 O1	261.96
938941	AE1-122 O1	261.96
940083	AE1-250 EBAT	6.02
940601	AE2-047 C O1	3.77
940602	AE2-047 E O1	2.52
941431	AE2-140 C O1	69.89
941432	AE2-140 E O1	46.59
941671	AE2-166 C	26.25
941672	AE2-166 E	17.5
942321	AE2-245	3.36
CALDERWOOD	CALDERWOOD	0.22
CARR	CARR	0.01
CATAWBA	CATAWBA	0.56
CBM-W1	CBM-W1	1.75
CHEOAH	CHEOAH	0.23
CHILHOWEE	CHILHOWEE	0.07
CIN	CIN	0.84
COTTONWOOD	COTTONWOOD	0.5
G-007	G-007	0.09
HAMLET	HAMLET	1.38
IPL	IPL	0.56
LGEE	LGEE	0.26
MEC	MEC	0.89
MECS	MECS	1.35
O-066	O-066	0.55
RENSSELAER	RENSSELAER	0.01
SANTEETLA	SANTEETLA	0.07
TVA	TVA	0.35
UNIONPOWER	UNIONPOWER	0.35
WEC	WEC	0.2

Affected Systems

18 Affected Systems

18.1 LG&E

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

18.2 MISO

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

18.3 TVA

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

18.4 Duke Energy Progress

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

18.5 NYISO

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

19 Contingency Descriptions

Contingency Name	Contingency Definition
242509 05AXTON 765 242514 05J.FERR 765 1	CONTINGENCY '242509 05AXTON 765 242514 05J.FERR 765 1' / 8403 OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 END
AEP_P1-2_#1370	CONTINGENCY 'AEP_P1-2_#1370' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB END
AEP_P4_#2916_05J.FERR 765_A	CONTINGENCY 'AEP_P4_#2916_05J.FERR 765_A' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242511 TO BUS 242514 CKT 1 / 242511 05BROADF 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB OPEN BRANCH FROM BUS 242566 TO BUS 242567 CKT ZB / 242566 05BROADF 138 242567 05BROADX 138 ZB END
AEP_P4_#10171_05AXTON 138_G	CONTINGENCY 'AEP_P4_#10171_05AXTON 138_G' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB OPEN BRANCH FROM BUS 242544 TO BUS 242619 CKT 2 / 242544 05AXTON 138 242619 05DANVL1 138 2 END
Base Case	

Contingency Name	Contingency Definition
AEP_P7-1_#10781-B	CONTINGENCY 'AEP_P7-1_#10781-B' OPEN BRANCH FROM BUS 936160 TO BUS 304024 CKT 1 / 936160 AD2-022 TAP 230 304024 6ROXSEP230 T 230 1 OPEN BRANCH FROM BUS 936170 TO BUS 304094 CKT 1 / 936170 AD2-023 TAP 230 304094 6YANCY TAP 230 1 OPEN BRANCH FROM BUS 304098 TO BUS 304094 CKT 1 / 304098 6CONCRD230TT 230 304094 6YANCY TAP 230 1 OPEN BRANCH FROM BUS 304094 TO BUS 304095 CKT 1 / 304094 6YANCY TAP 230 304095 6YANCYVILLE 230 1 END

Short Circuit

20 Short Circuit

The following Breakers are over-duty

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

None

22 Secondary Point of Interconnection

AE2-047 will interconnect with the AEP transmission system at the Solite 69 kV substation.

To accommodate the interconnection at the Solite 69 kV substation, the Solite 69 kV substation will have to be expanded to a new four (4) circuit breaker 69 kV ring bus substation (see Figure 3). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion, and compliance requirements.

23 Network Impacts – Option 2

The Queue Project AE2-047 was evaluated as a 50.0 MW (Capacity 30.0 MW) injection at the Solite 69 kV substation in the AEP area. Project AE2-047 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-047 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

Summer Peak Load Flow

24 Generation Deliverability

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

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
1340242	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	AEP_P1-2_#1370	single	402.0	90.46	92.55	DC	8.42
2356154	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	single	402.0	90.46	92.55	DC	8.42

25 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1339552	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P4_#2916_05J.FERR 765_A	breaker	296.0	99.28	101.97	DC	7.95
1339966	243799	05FIELDALE 2	AEP	242736	05OAKLEV	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	223.0	78.76	81.61	DC	6.36
1341043	926050	AC1-083 TAP	AEP	242802	05SMITHMTN 1	AEP	1	AEP_P7-1_#10781-B	tower	296.0	82.72	85.78	DC	9.05

26 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	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
11552003	242544	05AXTON	AEP	242620	05DANVL2	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.8	121.32	DC	4.34

27 Potential Congestion due to Local Energy Deliverability

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

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

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

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1340240	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	AEP_P1-2_#1370	operation	402.0	97.49	100.98	DC	14.03
1340241	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	Base Case	operation	275.0	83.49	86.51	DC	8.32
2356151	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	operation	402.0	97.49	100.98	DC	14.03
1340293	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P1-2_#1370	operation	296.0	99.19	101.88	DC	7.96
2356205	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	242509 05AXTON 765 242514 05J.FERR 765 1	operation	296.0	99.19	101.88	DC	7.96

28 Flow Gate Details

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

28.1 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
2356154	242620	05DANVL2	AEP	242631	05EDAN 1	AEP	1	242509 05AXTON 765 242514 05J.FERR 765 1	single	402.0	90.46	92.55	DC	8.42

Bus #	Bus	MW Impact
242906	05CLAY-1	0.32
242907	05CLAY-2	0.32
247723	05PHILPOTT	0.53
926461	AC1-117 C	3.86
934751	AD1-102 C	1.32
938741	AE1-100 C O1	23.49
938931	AE1-121 O1	271.61
938941	AE1-122 O1	271.61
939441	AE1-176	0.15
940601	AE2-047 C O2	8.42
941431	AE2-140 C O2	67.64
941671	AE2-166 C	27.41
942321	AE2-245	3.51
942641	AE2-280 C O2	5.14
CALDERWOOD	CALDERWOOD	0.24
CARR	CARR	0.01
CATAWBA	CATAWBA	0.61
CBM-W1	CBM-W1	1.93
CBM-W2	CBM-W2	0.02
CHEOAH	CHEOAH	0.24
CHILHOWEE	CHILHOWEE	0.07
CIN	CIN	0.92
COTTONWOOD	COTTONWOOD	0.53
HAMLET	HAMLET	1.5
IPL	IPL	0.62
LGEE	LGEE	0.29
MEC	MEC	0.98
MECS	MECS	1.48
RENSSELAER	RENSSELAER	0.01
SANTEETLA	SANTEETLA	0.08
TVA	TVA	0.37
UNIONPOWER	UNIONPOWER	0.38
WEC	WEC	0.23

28.2 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
1339552	242631	05EDAN 1	AEP	242632	05EDAN 2	AEP	Z1	AEP_P4_#2916_05J.FERR 765_A	breaker	296.0	99.28	101.97	DC	7.95

Bus #	Bus	MW Impact
244012	05PINNACLE	2.39
247723	05PHILPOTT	0.29
926461	AC1-117 C	2.21
926462	AC1-117 E	3.61
936161	AD2-022 C O1	12.52
936162	AD2-022 E O1	7.51
938741	AE1-100 C O1	13.58
938742	AE1-100 E O1	7.81
938931	AE1-121 O1	157.01
938941	AE1-122 O1	157.01
939943	AE1-230 E2	0.27
940083	AE1-250 EBAT	49.74
940601	AE2-047 C O2	4.77
940602	AE2-047 E O2	3.18
941431	AE2-140 C O2	39.1
941432	AE2-140 E O2	26.07
941671	AE2-166 C	15.71
941672	AE2-166 E	10.47
942321	AE2-245	2.01
CBM-N	CBM-N	0.01
CBM-S1	CBM-S1	0.55
CBM-S2	CBM-S2	0.34
CBM-W1	CBM-W1	0.81
CBM-W2	CBM-W2	3.82
CIN	CIN	0.36
CPLE	CPLE	0.05
G-007A	G-007A	0.02
IPL	IPL	0.23
LGEE	LGEE	0.11
MEC	MEC	0.7
MECS	MECS	0.44
NYISO	NYISO	0.06
VFT	VFT	0.05
WEC	WEC	0.1

28.3 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
1339966	243799	05FIELDALE 2	AEP	242736	05OAKLEV	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	223.0	78.76	81.61	DC	6.36

Bus #	Bus	MW Impact
244012	05PINNACLE	0.63
247723	05PHILPOTT	0.32
926461	AC1-117 C	1.16
926462	AC1-117 E	1.89
938741	AE1-100 C O1	5.8
938742	AE1-100 E O1	3.33
938931	AE1-121 O1	67.04
938941	AE1-122 O1	67.04
940601	AE2-047 C O2	3.81
940602	AE2-047 E O2	2.54
941431	AE2-140 C O2	16.7
941432	AE2-140 E O2	11.13
941671	AE2-166 C	8.24
941672	AE2-166 E	5.5
942321	AE2-245	1.05
BLUEG	BLUEG	0.47
CANNELTON	CANNELTON	0.01
CARR	CARR	0.01
CBM-S1	CBM-S1	0.56
CBM-S2	CBM-S2	1.94
CBM-W2	CBM-W2	2.88
COFFEEN	COFFEEN	0.01
CPLE	CPLE	1.06
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.03
ELMERSMITH	ELMERSMITH	0.01
G-007	G-007	0.01
GIBSON	GIBSON	0.01
MEC	MEC	0.05
NEWTON	NEWTON	0.04
O-066	O-066	0.07
RENSSELAER	RENSSELAER	0.01
TILTON	TILTON	0.04
TRIMBLE	TRIMBLE	0.06

28.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1341043	926050	AC1-083 TAP	AEP	242802	05SMITHMTN1	AEP	1	AEP_P7-1_#10781-B	tower	296.0	82.72	85.78	DC	9.05

Bus #	Bus	MW Impact
244012	05PINNACLE	3.29
926051	AC1-083 C O1	25.0
926052	AC1-083 E O1	40.78
926461	AC1-117 C	1.07
926462	AC1-117 E	1.75
933941	AD1-017 C	5.0
933942	AD1-017 E	8.16
936161	AD2-022 C O1	18.75
936162	AD2-022 E O1	11.25
936171	AD2-023 C O1	10.95
936172	AD2-023 E O1	5.95
938741	AE1-100 C O1	6.6
938742	AE1-100 E O1	3.8
938931	AE1-121 O1	76.3
938941	AE1-122 O1	76.3
939943	AE1-230 E2	0.42
940081	AE1-250 C	48.34
940082	AE1-250 E	32.23
940601	AE2-047 C O2	5.43
940602	AE2-047 E O2	3.62
941431	AE2-140 C O2	19.0
941432	AE2-140 E O2	12.67
941671	AE2-166 C	7.62
941672	AE2-166 E	5.08
942321	AE2-245	0.98
CARR	CARR	0.0
CBM-S1	CBM-S1	1.19
CBM-S2	CBM-S2	0.35
CBM-W1	CBM-W1	1.89
CBM-W2	CBM-W2	8.3
CIN	CIN	0.86
G-007	G-007	0.04
IPL	IPL	0.55
LGEE	LGEE	0.26
MEC	MEC	1.59
MECS	MECS	1.03
O-066	O-066	0.25
RENSSELAER	RENSSELAER	0.0
WEC	WEC	0.22

28.5 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
11552003	247254	05AXTON	AEP	247620	05DANVL2	AEP	1	AEP_P4_#10171_05AXTON 138_G	breaker	382.0	120.8	121.32	DC	4.34

Bus #	Bus	MW Impact
247723	05PHILPOTT	0.49
926461	AC1-117 C	3.69
926462	AC1-117 E	6.03
938741	AE1-100 C O1	22.65
938742	AE1-100 E O1	13.03
938931	AE1-121 O1	261.96
938941	AE1-122 O1	261.96
940083	AE1-250 EBAT	6.02
940601	AE2-047 C O2	2.61
940602	AE2-047 E O2	1.74
941431	AE2-140 C O2	65.24
941432	AE2-140 E O2	43.49
941671	AE2-166 C	26.24
941672	AE2-166 E	17.5
942321	AE2-245	3.36
CALDERWOOD	CALDERWOOD	0.22
CARR	CARR	0.01
CATAWBA	CATAWBA	0.56
CBM-W1	CBM-W1	1.75
CHEOAH	CHEOAH	0.23
CHILHOWEE	CHILHOWEE	0.07
CIN	CIN	0.84
COTTONWOOD	COTTONWOOD	0.5
G-007	G-007	0.09
HAMLET	HAMLET	1.38
IPL	IPL	0.56
LGEE	LGEE	0.26
MEC	MEC	0.89
MECS	MECS	1.35
O-066	O-066	0.54
RENSSELAER	RENSSELAER	0.01
SANTEETLA	SANTEETLA	0.07
TVA	TVA	0.35
UNIONPOWER	UNIONPOWER	0.35
WEC	WEC	0.2

Affected Systems

29 Affected Systems

29.1 LG&E

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

29.2 MISO

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

29.3 TVA

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

29.4 Duke Energy Progress

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

29.5 NYISO

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

Contingency Name	Contingency Definition
242509 05AXTON 765 242514 05J.FERR 765 1	CONTINGENCY '242509 05AXTON 765 242514 05J.FERR 765 1' / 8403 OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 END
AEP_P1-2_#1370	CONTINGENCY 'AEP_P1-2_#1370' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB END
AEP_P4_#2916_05J.FERR 765_A	CONTINGENCY 'AEP_P4_#2916_05J.FERR 765_A' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242511 TO BUS 242514 CKT 1 / 242511 05BROADF 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB OPEN BRANCH FROM BUS 242566 TO BUS 242567 CKT ZB / 242566 05BROADF 138 242567 05BROADX 138 ZB END
AEP_P4_#10171_05AXTON 138_G	CONTINGENCY 'AEP_P4_#10171_05AXTON 138_G' OPEN BRANCH FROM BUS 242509 TO BUS 242514 CKT 1 / 242509 05AXTON 765 242514 05J.FERR 765 1 OPEN BRANCH FROM BUS 242509 TO BUS 242545 CKT 1 / 242509 05AXTON 765 242545 05AXTONX 138 1 OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT SR / 242544 05AXTON 138 242545 05AXTONX 138 SR OPEN BRANCH FROM BUS 242544 TO BUS 242545 CKT ZB / 242544 05AXTON 138 242545 05AXTONX 138 ZB OPEN BRANCH FROM BUS 242544 TO BUS 242619 CKT 2 / 242544 05AXTON 138 242619 05DANVL1 138 2 END
Base Case	
AEP_P7-1_#10781-B	CONTINGENCY 'AEP_P7-1_#10781-B' OPEN BRANCH FROM BUS 936160 TO BUS 304024 CKT 1 / 936160 AD2-022 TAP 230 304024 6ROXSEP230 T 230 1 OPEN BRANCH FROM BUS 936170 TO BUS 304094 CKT 1 / 936170 AD2-023 TAP 230 304094 6YANCY TAP 230 1 OPEN BRANCH FROM BUS 304098 TO BUS 304094 CKT 1 / 304098 6CONCRD230TT 230 304094 6YANCY TAP 230 1 OPEN BRANCH FROM BUS 304094 TO BUS 304095 CKT 1 / 304094 6YANCY TAP 230 304095 6YANCYVILLE 230 1 END

Short Circuit

30 Short Circuit

The following Breakers are over-duty

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

None