



**Generation Interconnection
Feasibility Study Report
for
Queue Project AE1-130
MEADS STORE-MONETA 138 KV LINE
65.1 MW Capacity / 97 MW Energy**

June, 2019

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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.

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

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of

way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The Interconnection Customer has proposed to install PJM project # AE1-130, a Solar generating facility located in Bedford County, Virginia (See Figure 2). The installed facilities will have a total capability of 97 MW with 65.1 MW of this output being recognized by PJM as Capacity. The Primary Point of Interconnection will be to the Meads Store – Moneta 138 kV section of the Cloverdale - Smith Mountain 138 kV circuit (See Figure 1). The secondary Point of Interconnection will be the Meads Store substation (See Figure 3).

The proposed in-service date for this project is November 30, 2020. 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	AE1-130
Project Name	MEADS STORE-MONETA 138 KV LINE
State	Virginia
County	Bedford
Transmission Owner	AEP
MFO	97
MWE	97
MWC	65.1
Fuel	Solar
Basecase Study Year	2022

Primary Point of Interconnection

AE1-130 will interconnect with the AEP transmission system via a new station cut into the Meads Store to Moneta 138 kV line.

To accommodate the interconnection on the Meads Store - Moneta 138 kV line on the Cloverdale – Smith Mountain circuit, a new three (3) circuit breaker 138 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, 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.

Cost Summary

The AE1-130 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$6,000,000
Direct Connection Network Upgrade	\$1,000,000
Non Direct Connection Network Upgrades	\$750,000
Total Costs	\$7,750,000

In addition, the AE1-130 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	\$49,766,000

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

Transmission Owner Scope of Work

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
Construct a new three (3) circuit breaker 138 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus (See Figure 1). Installation of associated protection and control equipment, 138 kV line risers and SCADA will also be required.	\$6,000,000
Total Attachment Facility Costs	\$6,000,000

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
Meads Store - Moneta 138 kV T-Line Cut In	\$1,000,000
Total Direct Connection Facility Costs	\$1,000,000

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
138 kV Revenue Metering	\$250,000
Upgrade line protection and controls at the Cloverdale 138 kV substation	\$250,000
Upgrade line protection and controls at the Smith Mountain 138 kV substation	\$250,000
Total Non-Direct Connection Facility Costs	\$750,000

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.

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 Meads Store to Moneta 138 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.

Revenue Metering and SCADA Requirements

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.

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>

Network Impacts – Option 1

The Queue Project AE1-130 was evaluated as a 97 MW (Capacity 65.1 MW) injection tapping the Meads Store to Moneta 138 kV line in the AEP area. Project AE1-130 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-130 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

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
691109	242632	05EDAN 2	AEP	242631	05EDAN 1	AEP	Z1	AEP_P1-2_#8677	single	296.0	89.46	90.93	DC	4.35
393171	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5419-A	single	284.0	95.9	102.05	DC	17.48
691004	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5419-A	single	284.0	95.9	102.05	DC	17.48
690802	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#5366-B	single	277.0	95.43	111.35	DC	44.1
690806	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	Base Case	single	277.0	81.49	96.43	DC	41.37

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
69013 2	24254 9	05BANSTR	AEP	24263 2	05EDAN 2	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	296.0	91.37	101.84	DC	31.01
69013 3	24254 9	05BANSTR	AEP	24263 2	05EDAN 2	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	91.27	101.68	DC	30.81
69049 7	24280 2	05SMITHMTN 1	AEP	92605 0	AC1-083 TAP	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	296.0	72.95	83.43	DC	31.01
69049 8	24280 2	05SMITHMTN 1	AEP	92605 0	AC1-083 TAP	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	72.91	83.32	DC	30.81
69044 1	24749 9	05SMITHMTN 2	AEP	24270 1	05LEESVI	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	284.0	91.63	100.72	DC	25.83
69024 6	92605 0	AC1-083 TAP	AEP	24255 0	05BEARSK	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	296.0	93.3	103.78	DC	31.01
69024 7	92605 0	AC1-083 TAP	AEP	24255 0	05BEARSK	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	93.19	103.6	DC	30.81
69170 4	93901 0	AE1-130 TAP	AEP	24389 2	05MEADS 8	AEP	1	AEP_P7-1_#10817-A	tower	409.0	92.26	108.99	DC	68.43
69170 5	93901 0	AE1-130 TAP	AEP	24389 2	05MEADS 8	AEP	1	AEP_P7-1_#10808-A	tower	409.0	87.6	104.34	DC	68.44
69050 7	94008 0	AE1-250 TAP	AEP	24254 9	05BANSTR	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	392.0	70.39	78.3	DC	31.01
69050 8	94008 0	AE1-250 TAP	AEP	24254 9	05BANSTR	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	392.0	70.34	78.21	DC	30.81

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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
690918	242687	05JOHNMT	AEP	242734	05NEWLDN	AEP	1	AEP_P1-2_#5471-A	single	240.0	101.19	102.76	DC	3.76
690919	242687	05JOHNMT	AEP	242734	05NEWLDN	AEP	1	DVP_P1-2: LN 1016-B	single	240.0	100.72	102.35	DC	3.9
392219	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	284.0	106.61	115.7	DC	25.8
393170	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	single	205.0	107.4	110.53	DC	6.41
690251	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	284.0	106.61	115.7	DC	25.8
691003	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	single	205.0	107.4	110.53	DC	6.41
690887	242741	05OTTER	AEP	242687	05JOHNMT	AEP	1	AEP_P1-2_#5471-A	single	245.0	102.8	104.33	DC	3.76
690888	242741	05OTTER	AEP	242687	05JOHNMT	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	102.38	103.97	DC	3.9
690801	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#6213	single	277.0	103.49	118.9	DC	42.66
691529	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10817-A	tower	277.0	133.8	158.51	DC	68.43
691530	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10808-A	tower	277.0	126.93	151.64	DC	68.44
392909	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.68	106.21	DC	3.76
392910	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	104.26	105.85	DC	3.9
690854	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.68	106.21	DC	3.76
690855	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	104.26	105.85	DC	3.9

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
690967	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P1-2_#5419-A	operation	296.0	91.12	101.51	DC	30.77
393165	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	operation	205.0	117.23	119.33	DC	9.55
393166	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5419-A	operation	284.0	106.26	115.43	DC	26.04
690998	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	operation	205.0	117.23	119.33	DC	9.55
690999	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5419-A	operation	284.0	106.26	115.43	DC	26.04
691405	242802	05SMITHMTN1	AEP	926050	AC1-083 TAP	AEP	1	AEP_P1-2_#5419-A	operation	296.0	72.74	83.13	DC	30.77
690795	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#5366-B	operation	277.0	118.79	142.51	DC	65.71
690800	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	Base Case	operation	277.0	98.04	120.3	DC	61.65
691297	247499	05SMITHMTN2	AEP	242701	05LEESVI	AEP	1	AEP_P1-2_#5419-A	operation	284.0	91.26	100.44	DC	26.07
691298	247499	05SMITHMTN2	AEP	242701	05LEESVI	AEP	1	Base Case	operation	205.0	96.68	98.78	DC	9.57
691076	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P1-2_#5419-A	operation	296.0	93.01	103.4	DC	30.77
691406	926520	AC1-123 TAP	AEP	242575	05CAMDLM	AEP	1	AEP_P1-2_#5419-A	operation	284.0	88.73	95.91	DC	20.39
691242	939010	AE1-130 TAP	AEP	243892	05MEADS8	AEP	1	AEP_P1-2_#5366-B	operation	409.0	82.12	98.18	DC	65.71
691398	940080	AE1-250 TAP	AEP	242549	05BANSTR	AEP	1	AEP_P1-2_#5419-A	operation	392.0	70.21	78.06	DC	30.77

System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
690441	6	05SMITHMTN2 138.0 kV - 05LEESVI 138.0 kV Ckt 1	AEP Description: Current End Ratings: S/N: 205, S/E: 255 1) Replace three Sub cond 795 AAC 37 Str at Leesville. Estimated cost: \$100,000 2) Replace a Sub cond 795 AAC 37 Str at Smith Mountain. Estimated cost: \$100,000 3) Rebuild/reconductor 8.1 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE conductor to mitigate the overload. Estimated cost: \$12.15 million. 4) An engineering study will need to be conducted to determine if the CT Thermal limit settings at Leesville can be adjusted to mitigate the overload. Estimated Cost \$25,000. New relay packages will be required if the settings cannot be adjusted, Estimated Cost: \$600,000. Time Estimate : 24-36 Months Cost : \$12,375,000.	\$12,375,000
690801,690802,691530,690806,691529	3	05MEADS8 138.0 kV - 05CLOVRD 138.0 kV Ckt 1	AEP Description: Current Ratings: S/N: 348, S/E: 407 1) Replace two Sub cond 1700 kcm AAC 61 Str at Cloverdale. Estimated cost: \$100,000. 2) A sag study will be required on the 14 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE conductor to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between \$56,000 (no remediation required just sag study) and \$37.35 million (complete line reconductor/rebuild required). New rating: S/N: 409, S/E: 527. 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. Cost: \$156,000.	\$156,000
690246,690247	7	AC1-083 TAP 138.0 kV - 05BEARSK 138.0 kV Ckt 1	AEP Description: A sag study will be required on the 0.3 miles of ACSR ~ 1033.5 ~ 45/7 ~ ORTOLAN conductor section 1 to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between \$20,000 (no remediation required just sag study) and \$450,000 (complete line reconductor/rebuild required). New rating: S/N: 296, S/E: 361. 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. Cost: \$20,000.	\$20,000

ID	Index	Facility	Upgrade Description	Cost
392219,690251,393170,393171,691003,691004	2	05LEESVI 138.0 kV - 4ALTVSTA 138.0 kV Ckt 1	DVP Description : APCO Tie Line - Upgrade Terminal Equipment Time Estimate : 16-20 Months Cost : \$2,000,000 AEP Description: Current AEP End Ratings: S/N: 205, S/E: 255 1) Replace 5 Sub cond 795 AAC 37 Str at Leesville. Estimated cost: \$100,000. 2) Rebuild/ reconductor 8.5 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE Conductor Section 1. Estimated cost: \$12.75 million. 3) An Engineering Study will need to be conducted to determine if the Relay Thermal Limit 1197 Amps setting at Leesville can be adjusted to mitigate the overload. Estimated cost: \$25,000. New relay packages will be required if the settings cannot be adjusted. Estimated Cost: \$600,000. 4) An engineering study will need to be conducted to determine if the CT Thermal Limit 1197 Amps setting at Leesville can be adjusted to mitigate the overload. Estimated cost: \$25,000. New relay packages will be required if the settings cannot be adjusted. Estimated Cost: \$600,000. 5) An engineering study will need to be conducted to determine if the Relay Compliance Trip Limit 1330 Amps setting at Leesville can be adjusted to mitigate the overload. Estimated cost: \$25,000. New relay packages will be required if the settings cannot be adjusted. Estimated Cost: \$600,000. Time Estimate : 24-36 Months Cost : \$12,925,000	\$14,925,000
690497,690498	5	05SMITHMTN1 138.0 kV - AC1-083 TAP 138.0 kV Ckt 1	AEP Description: No Violation. Current AEP End Ratings: S/N: 296, S/E: 296.	\$0
691704,691705	8	AE1-130 TAP 138.0 kV - 05MEADS8 138.0 kV Ckt 1	AEP Description: Current AEP End Ratings: S/N: 409, S/E: 409 1) A Sag Study will be required on the 0.25 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE conductor to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between \$20,000 (no remediation required just sag study and \$375,000 (complete line reconductor/ rebuild). New ratings : S/N: 409, S/E: 568 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. Cost : \$20,000	\$20,000
690507,690508	9	AE1-250 TAP 138.0 kV - 05BANSTR 138.0 kV Ckt 1	AEP Description: No violation. Current Ratings: S/N: 335 MVA, S/E: 392 MVA	\$0
690918,690919	10	05JOHNMT 138.0 kV - 05NEWLDN 138.0 kV Ckt 1	AEP Description: Current Station Rating: S/N: 167, S/E: 240 1) Rebuild/reconductor 6.5 miles of ACSR ~ 397.5 ~ 30/7 ~ LARK ~ Fe Clamps 9 d Conductor. Estimated cost: \$9.75 million. Time Estimate : 24-36 Months Cost : \$9,750,000	\$9,750,000

ID	Index	Facility	Upgrade Description	Cost
691109	1	05EDAN 2 138.0 kV - 05EDAN 1 138.0 kV Ckt Z1	<u>AEP</u> Description: No Violation. Current AEP End Ratings: S/N: 305, S/E: 305.	\$0
690888,690887	11	05OTTER 138.0 kV - 05JOHNMT 138.0 kV Ckt 1	<u>AEP</u> Description: Current AEP End Ratings: S/N: 164, S/E: 205 1) Replace Sub cond 477 ACSR 26/7 STD at Otter. Estimated cost: \$100,000. 2) Rebuild/reconductor 7 miles of ACSR ~ 397.5 ~ 30/7 ~ LARK Conductor. Estimated cost: \$10.5 million. Time Estimate : 18-24 Months Cost : \$10,600,000	\$10,600,000
690855,392909,3929 10,690854	12	4ALTVSTA 138.0 kV - 05OTTER 138.0 kV Ckt 1	<u>DVP</u> Description : Replace Terminal Equipment Time Estimate : 20-24 Months Cost : \$300,000 <u>AEP</u> Description: Current End Ratings: S/N: 164, S/E: 205 1) Replace Sub cond 477 ACSR 26/7 STD at Otter. Estimated Cost: \$100,000. 2) Rebuild/ reconductor 1 mile of ACSR ~ 397.5 ~ 30/7 ~ LARK Conductor Section 1. Estimated cost: \$1.5 million. Time Estimate : 24-36 Months Cost : \$1,600,000	\$1,900,000
690132,690133	4	05BANSTR 138.0 kV - 05EDAN 2 138.0 kV Ckt 1	<u>AEP</u> A Sag Study will be required on the 0.04 miles of ACSR ~ 1033.5 ~ 45/7 ~ ORTOLAN conductor section 1 to mitigate the overload. Depending on the sag study results, the cost for this upgrade is expected to be between \$20,000 (no remediation required just sag study and \$60,000 (complete line reconductor/ rebuild). New ratings : S/N: 296 S/E: 392 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. Cost : \$20,000	\$20,000
			TOTAL COST	\$49,766,000

Flow Gate Details

The following appendices contain additional information about each flow gate presented in the body of the report. For each appendix, a description of the flow gate 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 flow gate 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.

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
691109	242632	05EDAN 2	AEP	242631	05EDAN 1	AEP	Z1	AEP_P1-2_#8677	single	296.0	89.46	90.93	DC	4.35

Bus #	Bus	MW Impact
246843	05SMG1	1.5
246844	05SMG2	3.94
246845	05SMG3	2.31
246846	05SMG4	4.08
246847	05SMG5	1.54
247284	05LEESVG	0.86
315156	1HALLBR1	0.68
315165	1HURT 1	3.09
315166	1HURT 2	3.09
919841	AA2-070	0.75
925661	AC1-042 C	1.26
925991	AC1-075 C	1.97
926021	AC1-080 C	0.66
926051	AC1-083 C O1	10.74
926521	AC1-123 C O1	5.65
926641	AC1-145 C	1.51
932821	AC2-107 C	3.49
933941	AD1-017 C	2.15
936171	AD2-023 C O1	8.88
938451	AE1-064 C	9.34
939011	AE1-130 C O1	4.35
939941	AE1-230 C1	0.57
940081	AE1-250 C	34.72
BAYOU	BAYOU	0.21
BIG_CAJUN1	BIG_CAJUN1	0.29
BIG_CAJUN2	BIG_CAJUN2	0.58
BLUEG	BLUEG	2.88
CALDERWOOD	CALDERWOOD	0.08
CANNELTON	CANNELTON	0.16
CBM-N	CBM-N	0.04
CBM-S2	CBM-S2	1.58
CHEOAH	CHEOAH	0.06
CHILHOWEE	CHILHOWEE	0.03
CHOCTAW	CHOCTAW	0.18
COFFEEN	COFFEEN	0.25
COTTONWOOD	COTTONWOOD	0.89
CPL	CPL	1.27
DEARBORN	DEARBORN	0.43
DUCKCREEK	DUCKCREEK	0.57
EDWARDS	EDWARDS	0.26
ELMERSMITH	ELMERSMITH	0.26

Bus #	Bus	MW Impact
FARMERCITY	FARMERCITY	0.15
G-007A	G-007A	0.26
GIBSON	GIBSON	0.11
NEWTON	NEWTON	0.68
NYISO	NYISO	0.15
O-066A	O-066A	0.12
PRAIRIE	PRAIRIE	1.1
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.08
TATANKA	TATANKA	0.28
TILTON	TILTON	0.33
TRIMBLE	TRIMBLE	0.32
TVA	TVA	0.45
UNIONPOWER	UNIONPOWER	0.06
VFT	VFT	0.68

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
690251	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P4_#10210_05CLOVRD 138_A2	breaker	284.0	106.61	115.7	DC	25.8

Bus #	Bus	MW Impact
246843	05SMG1	2.77
246844	05SMG2	7.29
246845	05SMG3	4.28
246846	05SMG4	7.54
246847	05SMG5	2.85
247284	05LEESVG	3.49
919841	AA2-070	1.38
926051	AC1-083 C O1	7.39
926052	AC1-083 E O1	12.07
926521	AC1-123 C O1	8.43
926522	AC1-123 E O1	3.97
932823	AC2-107 BAT	17.41
933941	AD1-017 C	1.48
933942	AD1-017 E	2.41
938451	AE1-064 C	21.12
938452	AE1-064 E	10.83
939011	AE1-130 C O1	17.32
939012	AE1-130 E O1	8.49
939943	AE1-230 E2	2.75
940081	AE1-250 C	12.76
940082	AE1-250 E	8.51
CARR	CARR	0.05
CBM-S1	CBM-S1	0.55
CBM-S2	CBM-S2	0.68
CBM-W1	CBM-W1	0.47
CBM-W2	CBM-W2	3.51
CIN	CIN	0.23
CPL	CPL	0.34
G-007	G-007	0.16
IPL	IPL	0.14
LGEE	LGEE	0.07
MEC	MEC	0.51
MECS	MECS	0.16
O-066	O-066	0.54
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.06

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
691529	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10817-A	tower	277.0	133.8	158.51	DC	68.43

Bus #	Bus	MW Impact
244012	05PINNACLE	0.79
246843	05SMG1	4.19
246844	05SMG2	11.01
246845	05SMG3	6.46
246846	05SMG4	11.37
246847	05SMG5	4.31
247284	05LEESVG	3.08
919841	AA2-070	2.09
926051	AC1-083 C O1	11.27
926052	AC1-083 E O1	18.39
933941	AD1-017 C	2.25
933942	AD1-017 E	3.68
938451	AE1-064 C	40.02
938452	AE1-064 E	20.52
939011	AE1-130 C O1	45.92
939012	AE1-130 E O1	22.5
940081	AE1-250 C	19.71
940082	AE1-250 E	13.14
BLUEG	BLUEG	1.17
CANNELTON	CANNELTON	0.05
CARR	CARR	0.07
CBM-S1	CBM-S1	0.29
CBM-S2	CBM-S2	2.15
CBM-W2	CBM-W2	0.71
COFFEEN	COFFEEN	0.08
CPL	CPL	1.3
DEARBORN	DEARBORN	0.24
DUCKCREEK	DUCKCREEK	0.2
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.07
FARMERCITY	FARMERCITY	0.03
G-007	G-007	0.17
GIBSON	GIBSON	0.04
NEWTON	NEWTON	0.21
O-066	O-066	0.59
PRAIRIE	PRAIRIE	0.19
RENSSELAER	RENSSELAER	0.05
TATANKA	TATANKA	0.08
TILTON	TILTON	0.13
TRIMBLE	TRIMBLE	0.13

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690133	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	91.27	101.68	DC	30.81

Bus #	Bus	MW Impact
246843	05SMG1	3.31
246844	05SMG2	8.73
246845	05SMG3	5.12
246846	05SMG4	9.02
246847	05SMG5	3.41
247284	05LEESVG	1.89
315156	1HALLBR1	1.43
315165	1HURT 1	6.46
315166	1HURT 2	6.46
919841	AA2-070	1.66
924572	AB2-109 E	0.7
925661	AC1-042 C	2.71
925662	AC1-042 E	4.43
925991	AC1-075 C	2.88
925992	AC1-075 E	1.63
926021	AC1-080 C	0.96
926022	AC1-080 E	0.54
926051	AC1-083 C O1	19.02
926052	AC1-083 E O1	31.03
926521	AC1-123 C O1	12.77
926522	AC1-123 E O1	6.01
926641	AC1-145 C	3.23
926642	AC1-145 E	5.27
932821	AC2-107 C	5.13
932822	AC2-107 E	2.4
933621	AC2-180 C	0.35
933622	AC2-180 E	0.69
933941	AD1-017 C	3.8
933942	AD1-017 E	6.21
934921	AD1-124 C	0.67
934922	AD1-124 E	0.33
935241	AD1-161 C	2.62
935242	AD1-161 E	2.15
938451	AE1-064 C	25.22
938452	AE1-064 E	12.93
939011	AE1-130 C O1	20.68
939012	AE1-130 E O1	10.13
939941	AE1-230 C1	1.22
939942	AE1-230 E1	0.82
939943	AE1-230 E2	1.36
940081	AE1-250 C	57.24

Bus #	Bus	MW Impact
940082	AE1-250 E	38.16
BAYOU	BAYOU	0.6
BIG_CAJUN1	BIG_CAJUN1	0.98
BIG_CAJUN2	BIG_CAJUN2	1.98
BLUEG	BLUEG	0.26
CALDERWOOD	CALDERWOOD	0.39
CANNELTON	CANNELTON	0.04
CARR	CARR	0.03
CATAWBA	CATAWBA	0.59
CHEOAH	CHEOAH	0.38
CHILHOWEE	CHILHOWEE	0.13
CHOCTAW	CHOCTAW	0.68
COFFEEN	COFFEEN	0.08
COTTONWOOD	COTTONWOOD	2.33
DUCKCREEK	DUCKCREEK	0.14
EDWARDS	EDWARDS	0.06
ELMERSMITH	ELMERSMITH	0.09
FARMERCITY	FARMERCITY	0.08
G-007	G-007	0.11
GIBSON	GIBSON	0.02
HAMLET	HAMLET	2.48
NEWTON	NEWTON	0.21
O-066	O-066	0.36
PRAIRIE	PRAIRIE	0.65
RENSSELAER	RENSSELAER	0.02
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.07
TATANKA	TATANKA	0.12
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.95
UNIONPOWER	UNIONPOWER	0.58

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690498	242802	05SMITHMTN1	AEP	926050	AC1-083 TAP	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	72.91	83.32	DC	30.81

Bus #	Bus	MW Impact
246843	05SMG1	3.31
246844	05SMG2	8.73
246845	05SMG3	5.12
246846	05SMG4	9.02
246847	05SMG5	3.41
247284	05LEESVG	1.89
315156	1HALLBR1	1.43
315165	1HURT 1	6.46
315166	1HURT 2	6.46
919841	AA2-070	1.66
924572	AB2-109 E	0.7
925661	AC1-042 C	2.71
925662	AC1-042 E	4.43
925991	AC1-075 C	2.88
925992	AC1-075 E	1.63
926021	AC1-080 C	0.96
926022	AC1-080 E	0.54
926521	AC1-123 C O1	12.77
926522	AC1-123 E O1	6.01
926641	AC1-145 C	3.23
926642	AC1-145 E	5.27
932821	AC2-107 C	5.13
932822	AC2-107 E	2.4
933621	AC2-180 C	0.35
933622	AC2-180 E	0.69
934921	AD1-124 C	0.67
934922	AD1-124 E	0.33
935241	AD1-161 C	2.62
935242	AD1-161 E	2.15
938451	AE1-064 C	25.22
938452	AE1-064 E	12.93
939011	AE1-130 C O1	20.68
939012	AE1-130 E O1	10.13
939941	AE1-230 C1	1.22
939942	AE1-230 E1	0.82
939943	AE1-230 E2	1.36
940083	AE1-250 EBAT	54.6
BAYOU	BAYOU	0.6
BIG_CAJUN1	BIG_CAJUN1	0.98
BIG_CAJUN2	BIG_CAJUN2	1.98

Bus #	Bus	MW Impact
BLUEG	BLUEG	0.26
CALDERWOOD	CALDERWOOD	0.39
CANNELTON	CANNELTON	0.04
CARR	CARR	0.03
CATAWBA	CATAWBA	0.59
CHEOAH	CHEOAH	0.38
CHILHOWEE	CHILHOWEE	0.13
CHOCTAW	CHOCTAW	0.68
COFFEEN	COFFEEN	0.08
COTTONWOOD	COTTONWOOD	2.33
DUCKCREEK	DUCKCREEK	0.14
EDWARDS	EDWARDS	0.06
ELMERSMITH	ELMERSMITH	0.09
FARMERCITY	FARMERCITY	0.08
G-007	G-007	0.11
GIBSON	GIBSON	0.02
HAMLET	HAMLET	2.48
NEWTON	NEWTON	0.21
O-066	O-066	0.36
PRAIRIE	PRAIRIE	0.65
RENSSELAER	RENSSELAER	0.02
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.07
TATANKA	TATANKA	0.12
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.95
UNIONPOWER	UNIONPOWER	0.58

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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
69044 1	24749 9	05SMITHMTN 2	AEP	24270 1	05LEESV I	AEP	1	AEP_P4_#10210_05CLOVR D 138_A2	breaker	284.0	91.63	100.72	DC	25.83

Bus #	Bus	MW Impact
246843	05SMG1	2.78
246844	05SMG2	7.3
246845	05SMG3	4.28
246846	05SMG4	7.54
246847	05SMG5	2.86
919841	AA2-070	1.39
926051	AC1-083 C O1	7.41
926052	AC1-083 E O1	12.08
926521	AC1-123 C O1	8.45
926522	AC1-123 E O1	3.97
932823	AC2-107 BAT	17.38
933941	AD1-017 C	1.48
933942	AD1-017 E	2.42
938451	AE1-064 C	21.14
938452	AE1-064 E	10.84
939011	AE1-130 C O1	17.33
939012	AE1-130 E O1	8.49
939943	AE1-230 E2	2.75
940081	AE1-250 C	12.79
940082	AE1-250 E	8.52
CARR	CARR	0.04
CBM-S1	CBM-S1	0.63
CBM-S2	CBM-S2	0.72
CBM-W1	CBM-W1	0.63
CBM-W2	CBM-W2	4.15
CIN	CIN	0.29
CPL	CPL	0.36
G-007	G-007	0.13
IPL	IPL	0.18
LGEE	LGEE	0.09
MEC	MEC	0.64
MECS	MECS	0.26
O-066	O-066	0.44
RENSSELAER	RENSSELAER	0.03
WEC	WEC	0.08

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690247	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	296.0	93.19	103.6	DC	30.81

Bus #	Bus	MW Impact
246843	05SMG1	3.31
246844	05SMG2	8.73
246845	05SMG3	5.12
246846	05SMG4	9.02
246847	05SMG5	3.41
247284	05LEESVG	1.89
315156	1HALLBR1	1.43
315165	1HURT 1	6.46
315166	1HURT 2	6.46
919841	AA2-070	1.66
924572	AB2-109 E	0.7
925661	AC1-042 C	2.71
925662	AC1-042 E	4.43
925991	AC1-075 C	2.88
925992	AC1-075 E	1.63
926021	AC1-080 C	0.96
926022	AC1-080 E	0.54
926051	AC1-083 C O1	19.02
926052	AC1-083 E O1	31.03
926521	AC1-123 C O1	12.77
926522	AC1-123 E O1	6.01
926641	AC1-145 C	3.23
926642	AC1-145 E	5.27
932821	AC2-107 C	5.13
932822	AC2-107 E	2.4
933621	AC2-180 C	0.35
933622	AC2-180 E	0.69
933941	AD1-017 C	3.8
933942	AD1-017 E	6.21
934921	AD1-124 C	0.67
934922	AD1-124 E	0.33
935241	AD1-161 C	2.62
935242	AD1-161 E	2.15
938451	AE1-064 C	25.22
938452	AE1-064 E	12.93
939011	AE1-130 C O1	20.68
939012	AE1-130 E O1	10.13
939941	AE1-230 C1	1.22
939942	AE1-230 E1	0.82
939943	AE1-230 E2	1.36

Bus #	Bus	MW Impact
940083	AE1-250 EBAT	54.6
BAYOU	BAYOU	0.6
BIG_CAJUN1	BIG_CAJUN1	0.98
BIG_CAJUN2	BIG_CAJUN2	1.98
BLUEG	BLUEG	0.26
CALDERWOOD	CALDERWOOD	0.39
CANNELTON	CANNELTON	0.04
CARR	CARR	0.03
CATAWBA	CATAWBA	0.59
CHEOAH	CHEOAH	0.38
CHILHOWEE	CHILHOWEE	0.13
CHOCTAW	CHOCTAW	0.68
COFFEEN	COFFEEN	0.08
COTTONWOOD	COTTONWOOD	2.33
DUCKCREEK	DUCKCREEK	0.14
EDWARDS	EDWARDS	0.06
ELMERSMITH	ELMERSMITH	0.09
FARMERCITY	FARMERCITY	0.08
G-007	G-007	0.11
GIBSON	GIBSON	0.02
HAMLET	HAMLET	2.48
NEWTON	NEWTON	0.21
O-066	O-066	0.36
PRAIRIE	PRAIRIE	0.65
RENSSELAER	RENSSELAER	0.02
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.07
TATANKA	TATANKA	0.12
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.95
UNIONPOWER	UNIONPOWER	0.58

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
691704	939010	AE1-130 TAP	AEP	243892	05MEADS8	AEP	1	AEP_P7-1_#10817-A	tower	409.0	92.26	108.99	DC	68.43

Bus #	Bus	MW Impact
244012	05PINNACLE	0.79
246843	05SMG1	4.19
246844	05SMG2	11.01
246845	05SMG3	6.46
246846	05SMG4	11.37
246847	05SMG5	4.31
247284	05LEESVG	3.08
919841	AA2-070	2.09
926051	AC1-083 C O1	11.27
926052	AC1-083 E O1	18.39
933941	AD1-017 C	2.25
933942	AD1-017 E	3.68
938451	AE1-064 C	40.02
938452	AE1-064 E	20.52
939011	AE1-130 C O1	45.92
939012	AE1-130 E O1	22.5
940081	AE1-250 C	19.71
940082	AE1-250 E	13.14
BLUEG	BLUEG	1.17
CANNELTON	CANNELTON	0.05
CARR	CARR	0.07
CBM-S1	CBM-S1	0.29
CBM-S2	CBM-S2	2.15
CBM-W2	CBM-W2	0.71
COFFEEN	COFFEEN	0.08
CPL	CPL	1.3
DEARBORN	DEARBORN	0.24
DUCKCREEK	DUCKCREEK	0.2
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.07
FARMERCITY	FARMERCITY	0.03
G-007	G-007	0.17
GIBSON	GIBSON	0.04
NEWTON	NEWTON	0.21
O-066	O-066	0.59
PRAIRIE	PRAIRIE	0.19
RENSSELAER	RENSSELAER	0.05
TATANKA	TATANKA	0.08
TILTON	TILTON	0.13
TRIMBLE	TRIMBLE	0.13

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690508	940080	AE1-250 TAP	AEP	242549	05BANSTR	AEP	1	AEP_P4_#10213_05CLOV4 EQ 999_A	breaker	392.0	70.34	78.21	DC	30.81

Bus #	Bus	MW Impact
246843	05SMG1	3.31
246844	05SMG2	8.73
246845	05SMG3	5.12
246846	05SMG4	9.02
246847	05SMG5	3.41
247284	05LEESVG	1.89
315156	1HALLBR1	1.43
315165	1HURT 1	6.46
315166	1HURT 2	6.46
919841	AA2-070	1.66
924572	AB2-109 E	0.7
925661	AC1-042 C	2.71
925662	AC1-042 E	4.43
925991	AC1-075 C	2.88
925992	AC1-075 E	1.63
926021	AC1-080 C	0.96
926022	AC1-080 E	0.54
926051	AC1-083 C O1	19.02
926052	AC1-083 E O1	31.03
926521	AC1-123 C O1	12.77
926522	AC1-123 E O1	6.01
926641	AC1-145 C	3.23
926642	AC1-145 E	5.27
932821	AC2-107 C	5.13
932822	AC2-107 E	2.4
933621	AC2-180 C	0.35
933622	AC2-180 E	0.69
933941	AD1-017 C	3.8
933942	AD1-017 E	6.21
934921	AD1-124 C	0.67
934922	AD1-124 E	0.33
935241	AD1-161 C	2.62
935242	AD1-161 E	2.15
938451	AE1-064 C	25.22
938452	AE1-064 E	12.93
939011	AE1-130 C O1	20.68
939012	AE1-130 E O1	10.13
939941	AE1-230 C1	1.22
939942	AE1-230 E1	0.82
939943	AE1-230 E2	1.36

Bus #	Bus	MW Impact
940081	AE1-250 C	57.24
940082	AE1-250 E	38.16
BAYOU	BAYOU	0.6
BIG_CAJUN1	BIG_CAJUN1	0.98
BIG_CAJUN2	BIG_CAJUN2	1.98
BLUEG	BLUEG	0.26
CALDERWOOD	CALDERWOOD	0.39
CANNELTON	CANNELTON	0.04
CARR	CARR	0.03
CATAWBA	CATAWBA	0.59
CHEOAH	CHEOAH	0.38
CHILHOWEE	CHILHOWEE	0.13
CHOCTAW	CHOCTAW	0.68
COFFEEN	COFFEEN	0.08
COTTONWOOD	COTTONWOOD	2.33
DUCKCREEK	DUCKCREEK	0.14
EDWARDS	EDWARDS	0.06
ELMERSMITH	ELMERSMITH	0.09
FARMERCITY	FARMERCITY	0.08
G-007	G-007	0.11
GIBSON	GIBSON	0.02
HAMLET	HAMLET	2.48
NEWTON	NEWTON	0.21
O-066	O-066	0.36
PRAIRIE	PRAIRIE	0.65
RENSSELAER	RENSSELAER	0.02
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.07
TATANKA	TATANKA	0.12
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.02
TVA	TVA	0.95
UNIONPOWER	UNIONPOWER	0.58

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690919	242687	05JOHNMT	AEP	242734	05NEWLDN	AEP	1	DVP_P1-2: LN 1016-B	single	240.0	100.72	102.35	DC	3.9

Bus #	Bus	MW Impact
246843	05SMG1	1.35
246844	05SMG2	3.56
246845	05SMG3	2.09
246846	05SMG4	3.68
246847	05SMG5	1.39
247284	05LEESVG	2.09
315156	1HALLBR1	3.76
315165	1HURT 1	16.97
315166	1HURT 2	16.97
919841	AA2-070	0.68
925661	AC1-042 C	6.79
925991	AC1-075 C	15.67
926021	AC1-080 C	5.24
926051	AC1-083 C O1	3.65
926521	AC1-123 C O1	3.23
926641	AC1-145 C	8.09
927261	AC1-222 C	9.37
932821	AC2-107 C	27.85
933941	AD1-017 C	0.73
934311	AD1-055 C	6.5
936331	AD2-043 C	12.27
938451	AE1-064 C	8.44
939011	AE1-130 C O1	3.9
939941	AE1-230 C1	3.06
940081	AE1-250 C	6.38
BLUEG	BLUEG	0.4
CANNELTON	CANNELTON	0.02
CARR	CARR	0.03
CBM-S1	CBM-S1	0.05
CBM-S2	CBM-S2	0.65
COFFEEN	COFFEEN	0.03
CPL	CPL	0.4
DEARBORN	DEARBORN	0.08
DUCKCREEK	DUCKCREEK	0.07
EDWARDS	EDWARDS	0.03
ELMERSMITH	ELMERSMITH	0.03
FARMERCITY	FARMERCITY	0.01
GIBSON	GIBSON	0.01
NEWTON	NEWTON	0.08
PRAIRIE	PRAIRIE	0.08

Bus #	Bus	MW Impact
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.0
TATANKA	TATANKA	0.03
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.05

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690887	242741	05OTTER	AEP	242687	05JOHNMT	AEP	1	AEP_P1-2_#5471-A	single	245.0	102.8	104.33	DC	3.76

Bus #	Bus	MW Impact
246843	05SMG1	1.42
246844	05SMG2	3.72
246845	05SMG3	2.18
246846	05SMG4	3.85
246847	05SMG5	1.46
247284	05LEESVG	1.84
315156	1HALLBR1	2.9
315165	1HURT 1	13.07
315166	1HURT 2	13.07
315266	1PLYWOOD A	0.4
919841	AA2-070	0.71
925661	AC1-042 C	5.58
925991	AC1-075 C	6.98
926021	AC1-080 C	2.33
926051	AC1-083 C O1	3.89
926271	AC1-105 C O1	1.96
926521	AC1-123 C O1	7.38
926641	AC1-145 C	6.65
927261	AC1-222 C	2.05
932821	AC2-107 C	12.41
933941	AD1-017 C	0.78
934311	AD1-055 C	1.43
936331	AD2-043 C	2.79
938451	AE1-064 C	8.69
939011	AE1-130 C O1	3.76
939941	AE1-230 C1	2.52
940081	AE1-250 C	6.98
BLUEG	BLUEG	1.46
CANNELTON	CANNELTON	0.07
CARR	CARR	0.02
CBM-S2	CBM-S2	1.4
COFFEEN	COFFEEN	0.12
CPL	CPL	0.93
DEARBORN	DEARBORN	0.25
DUCKCREEK	DUCKCREEK	0.28
EDWARDS	EDWARDS	0.13
ELMERSMITH	ELMERSMITH	0.12
FARMERCITY	FARMERCITY	0.06
GIBSON	GIBSON	0.05
NEWTON	NEWTON	0.32

Bus #	Bus	MW Impact
PRAIRIE	PRAIRIE	0.45
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.03
TATANKA	TATANKA	0.13
TILTON	TILTON	0.17
TRIMBLE	TRIMBLE	0.17
TVA	TVA	0.04

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
690854	314667	4ALTVSTA	DVP	242741	050TTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.68	106.21	DC	3.76

Bus #	Bus	MW Impact
246843	05SMG1	1.42
246844	05SMG2	3.72
246845	05SMG3	2.18
246846	05SMG4	3.85
246847	05SMG5	1.46
247284	05LEESVG	1.84
315156	1HALLBR1	2.9
315165	1HURT 1	13.07
315166	1HURT 2	13.07
315266	1PLYWOOD A	0.4
919841	AA2-070	0.71
925661	AC1-042 C	5.58
925991	AC1-075 C	6.98
926021	AC1-080 C	2.33
926051	AC1-083 C O1	3.89
926271	AC1-105 C O1	1.96
926521	AC1-123 C O1	7.38
926641	AC1-145 C	6.65
927261	AC1-222 C	2.05
932821	AC2-107 C	12.41
933941	AD1-017 C	0.78
934311	AD1-055 C	1.43
936331	AD2-043 C	2.79
938451	AE1-064 C	8.69
939011	AE1-130 C O1	3.76
939941	AE1-230 C1	2.52
940081	AE1-250 C	6.98
BLUEG	BLUEG	1.46
CANNELTON	CANNELTON	0.07
CARR	CARR	0.02
CBM-S2	CBM-S2	1.4
COFFEEN	COFFEEN	0.12
CPL	CPL	0.93
DEARBORN	DEARBORN	0.25
DUCKCREEK	DUCKCREEK	0.28
EDWARDS	EDWARDS	0.13
ELMERSMITH	ELMERSMITH	0.12
FARMERCITY	FARMERCITY	0.06
GIBSON	GIBSON	0.05
NEWTON	NEWTON	0.32

Bus #	Bus	MW Impact
PRAIRIE	PRAIRIE	0.45
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.03
TATANKA	TATANKA	0.13
TILTON	TILTON	0.17
TRIMBLE	TRIMBLE	0.17
TVA	TVA	0.04

Affected Systems

LG&E

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

MISO

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

TVA

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

Duke Energy Progress

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

NYISO

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

Contingency Name	Contingency Definition
AEP_P1-2_#5366-B	CONTINGENCY 'AEP_P1-2_#5366-B' OPEN BRANCH FROM BUS 242549 TO BUS 940080 CKT 1 / 242549 05BANSTR 138 940080 AE1- 250 TAP 138 1 OPEN BRANCH FROM BUS 242549 TO BUS 242632 CKT 1 / 242549 05BANSTR 138 242632 05EDAN 2 138 1 OPEN BRANCH FROM BUS 242549 TO BUS 314668 CKT Z1 / 242549 05BANSTR 138 314668 4BANISTR 138 Z1 END
AEP_P1-2_#5419-A	CONTINGENCY 'AEP_P1-2_#5419-A' OPEN BRANCH FROM BUS 242607 TO BUS 243892 CKT 1 / 242607 05CLOVRD 138 243892 05MEADS8 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 939010 CKT 1 / 243892 05MEADS8 138 939010 AE1- 130 TAP 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 243893 CKT Z1 / 243892 05MEADS8 138 243893 05MEADS 8 24.9 Z1 END
AEP_P4_#10213_05CLOV4 EQ 999_A	CONTINGENCY 'AEP_P4_#10213_05CLOV4 EQ 999_A' OPEN BRANCH FROM BUS 242560 TO BUS 242607 CKT 1 / 242560 05BONSCK 138 242607 05CLOVRD 138 1 OPEN BRANCH FROM BUS 242560 TO BUS 242840 CKT 1 / 242560 05BONSCK 138 242840 05VINTON 138 1 OPEN BRANCH FROM BUS 242607 TO BUS 243892 CKT 1 / 242607 05CLOVRD 138 243892 05MEADS8 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 939010 CKT 1 / 243892 05MEADS8 138 939010 AE1- 130 TAP 138 1 OPEN BRANCH FROM BUS 242773 TO BUS 242840 CKT 1 / 242773 05ROANO1 138 242840 05VINTON 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 243893 CKT Z1 / 243892 05MEADS8 138 243893 05MEADS 8 24.9 Z1 END
AEP_P1-2_#5471-A	CONTINGENCY 'AEP_P1-2_#5471-A' OPEN BRANCH FROM BUS 242575 TO BUS 242737 CKT 1 / 242575 05CAMDLM 138 242737 05OPOSSUMCK 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 242781 CKT 1 / 242575 05CAMDLM 138 242781 05RUSTBR 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 926520 CKT 1 / 242575 05CAMDLM 138 926520 AC1- 123 TAP 138 1 END
AEP_P1-2_#8677	CONTINGENCY 'AEP_P1-2_#8677' OPEN BRANCH FROM BUS 242629 TO BUS 242632 CKT 1 / 242629 05E.MONU 138 242632 05EDAN 2 138 1 OPEN BRANCH FROM BUS 242629 TO BUS 242770 CKT 1 / 242629 05E.MONU 138 242770 05RIGIS 138 1 OPEN BRANCH FROM BUS 242629 TO BUS 243948 CKT 1 / 242629 05E.MONU 138 243948 05BRANTLY 69.0 1 REMOVE SWSHUNT FROM BUS 242629 / 242629 05E.MONU 138 END

Contingency Name	Contingency Definition
AEP_P7-1_#10817-A	CONTINGENCY 'AEP_P7-1_#10817-A' OPEN BRANCH FROM BUS 926520 TO BUS 247499 CKT 1 / 926520 AC1-123 TAP 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 314667 CKT 1 / 242701 05LEESVI 138 314667 4ALTVSTA 138 1 END
AEP_P1-2_#6213	CONTINGENCY 'AEP_P1-2_#6213' OPEN BRANCH FROM BUS 242748 TO BUS 243951 CKT 1 / 242748 05PENHOK 138 243951 05REDWOOD 138 1 OPEN BRANCH FROM BUS 242748 TO BUS 242802 CKT 1 / 242748 05PENHOK 138 242802 05SMITHMTN1 138 1 OPEN BRANCH FROM BUS 243951 TO BUS 242843 CKT 1 / 243951 05REDWOOD 138 242843 05WLAK 138 1 END
Base Case	
AEP_P7-1_#10808-A	CONTINGENCY 'AEP_P7-1_#10808-A' OPEN BRANCH FROM BUS 926520 TO BUS 247499 CKT 1 / 926520 AC1-123 TAP 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 247499 CKT 1 / 242701 05LEESVI 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 314667 CKT 1 / 242701 05LEESVI 138 314667 4ALTVSTA 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 247284 CKT 1 / 242701 05LEESVI 138 247284 05LEESVG 13.8 1 END
AEP_P4_#10210_05CLOVRD 138_A2	CONTINGENCY 'AEP_P4_#10210_05CLOVRD 138_A2' OPEN BRANCH FROM BUS 244044 TO BUS 242607 CKT 1 / 244044 05CLOV4 EQ 999 242607 05CLOVRD 138 1 OPEN BRANCH FROM BUS 244044 TO BUS 244041 CKT 1 / 244044 05CLOV4 EQ 999 244041 05CLOV 4 69.0 1 OPEN BRANCH FROM BUS 244044 TO BUS 244043 CKT 1 / 244044 05CLOV4 EQ 999 244043 05CLOV4 34.5 1 OPEN BRANCH FROM BUS 242607 TO BUS 243883 CKT 1 / 242607 05CLOVRD 138 243883 05LAKEFR 138 1 OPEN BRANCH FROM BUS 242607 TO BUS 243892 CKT 1 / 242607 05CLOVRD 138 243892 05MEADS8 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 939010 CKT 1 / 243892 05MEADS8 138 939010 AE1- 130 TAP 138 1 OPEN BRANCH FROM BUS 243892 TO BUS 243893 CKT Z1 / 243892 05MEADS8 138 243893 05MEADS 8 24.9 Z1 END
DVP_P1-2: LN 1016-B	CONTINGENCY 'DVP_P1-2: LN 1016-B' OPEN BRANCH FROM BUS 927260 TO BUS 314696 CKT 1 /* AC1-222 TAP 115.00 - 3SEEDGE HILL 115.00 END

Short Circuit

Short Circuit

The following Breakers are overduty

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

None

**Figure 1: AE1-130 Primary Point of Interconnection (Meads Store - Moneta 138 kV)
Single-Line Diagram**

Figure 2: AE1-130 Primary Point of Interconnection (Meads Store - Moneta 138 kV)

Secondary Point of Interconnection

AE1-130 will interconnect with the AEP transmission system at the Meads Store 138 kV substation.

To accommodate the interconnection at the Meads Store 138 kV substation, the substation will have to be expanded requiring the installation of a four (4) circuit breaker 138 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus (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.

Note: Although the Feasibility study analysis does not include engineering evaluation of proposed location, available information indicates that the terrain at the Meads Store station location, combined with the present ownership of most of the Meads Store station facilities and site by (ODEC-member) Southside Electric Cooperative, would likely complicate expansion of AEP facilities at that site.

Network Impacts

The Queue Project AE1-130 was evaluated as a 97 MW (Capacity 65.1 MW) injection at the Meads Store 138 kV substation in the AEP area. Project AE1-130 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE1-130 was studied with a commercial probability of 53%. Potential network impacts were as follows:

Summer Peak Load Flow

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
680889	242632	05EDAN 2	AEP	242631	05EDAN 1	AEP	Z1	AEP_P1-2_#8677	single	296.0	89.42	90.87	DC	4.29
353950	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5471-A	single	284.0	96.55	99.32	DC	7.86
680817	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5471-A	single	284.0	96.55	99.32	DC	7.86
680632	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#5366-B	single	277.0	95.35	111.39	DC	44.44
680636	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	Base Case	single	277.0	81.45	96.52	DC	41.74

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
681392	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P7-1_#10817-A	tower	296.0	90.2	96.33	DC	18.14
681393	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P7-1_#10808-A	tower	296.0	84.29	90.42	DC	18.15
680323	247499	05SMITHMTN 2	AEP	242701	05LEESVI	AEP	1	AEP_P4_#10297_05OPOSSUM CK 138_D1	breaker	284.0	92.8	96.87	DC	11.54
681469	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P7-1_#10817-A	tower	296.0	92.12	98.25	DC	18.14
681470	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P7-1_#10781-B	tower	296.0	85.49	86.79	DC	8.57

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
680733	242687	05JOHNM T	AEP	242734	05NEWLD N	AEP	1	AEP_P1-2_#5471-A	single	240.0	101.21	102.74	DC	3.66
680734	242687	05JOHNM T	AEP	242734	05NEWLD N	AEP	1	DVP_P1-2: LN 1016-B	single	240.0	100.71	102.3	DC	3.81
352866	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P4_#10297_05OPOSSUM CK 138_D1	breaker	284.0	107.71	111.77	DC	11.52

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
353948	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	single	205.0	107.37	110.44	DC	6.3
680159	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P4_#10297_05OPOSSUM CK 138_D1	breaker	284.0	107.71	111.77	DC	11.52
680815	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	single	205.0	107.37	110.44	DC	6.3
680714	242741	05OTTER	AEP	242687	05JOHNM T	AEP	1	AEP_P1-2_#5471-A	single	245.0	102.82	104.32	DC	3.66
680715	242741	05OTTER	AEP	242687	05JOHNM T	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	102.37	103.93	DC	3.81
680631	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#6213	single	277.0	103.46	118.99	DC	43.01
681305	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10817-A	tower	277.0	133.79	158.64	DC	68.85
681306	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10808-A	tower	277.0	126.91	151.77	DC	68.86
353686	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.7	106.19	DC	3.66
353687	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	104.25	105.81	DC	3.81
680692	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.7	106.19	DC	3.66
680693	314667	4ALTVSTA	DVP	242741	05OTTER	AEP	1	DVP_P1-2: LN 1016-B	single	245.0	104.25	105.81	DC	3.81

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
680915	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P1-2_#6213	operation	296.0	83.26	87.99	DC	13.98
353944	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	operation	205.0	117.16	119.23	DC	9.38
353945	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5471-A	operation	284.0	106.47	110.6	DC	11.71
680811	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	Base Case	operation	205.0	117.16	119.23	DC	9.38
680812	242701	05LEESVI	AEP	314667	4ALTVSTA	DVP	1	AEP_P1-2_#5471-A	operation	284.0	106.47	110.6	DC	11.71
680625	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P1-2_#5366-	operation	277.0	118.76	142.66	DC	66.21

							B							
680630	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	Base Case	operation	277.0	98.03	120.48	DC	62.19
681086	247499	05SMITHMTN2	AEP	242701	05LEESVI	AEP	1	Base Case	operation	205.0	96.62	98.69	DC	9.41
681087	247499	05SMITHMTN2	AEP	242701	05LEESVI	AEP	1	AEP_P1-2_#5471-A	operation	284.0	91.54	95.68	DC	11.74
680998	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P1-2_#6213	operation	296.0	85.19	89.91	DC	13.98

Flow Gate Details

The following appendices contain additional information about each flow gate presented in the body of the report. For each appendix, a description of the flow gate 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 flow gate 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.

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
680889	242632	05EDAN 2	AEP	242631	05EDAN 1	AEP	Z1	AEP_P1-2_#8677	single	296.0	89.42	90.87	DC	4.29

Bus #	Bus	MW Impact
246843	05SMG1	1.5
246844	05SMG2	3.95
246845	05SMG3	2.32
246846	05SMG4	4.08
246847	05SMG5	1.54
247284	05LEESVG	0.86
315156	1HALLBR1	0.69
315165	1HURT 1	3.1
315166	1HURT 2	3.1
919841	AA2-070	0.75
925661	AC1-042 C	1.27
925991	AC1-075 C	1.97
926021	AC1-080 C	0.66
926051	AC1-083 C O1	10.74
926521	AC1-123 C O1	5.66
926641	AC1-145 C	1.51
932821	AC2-107 C	3.5
933941	AD1-017 C	2.15
936171	AD2-023 C O1	8.88
938451	AE1-064 C	9.34
939011	AE1-130 C O2	4.29
939941	AE1-230 C1	0.57
940081	AE1-250 C	34.72
BAYOU	BAYOU	0.21
BIG_CAJUN1	BIG_CAJUN1	0.28
BIG_CAJUN2	BIG_CAJUN2	0.57
BLUEG	BLUEG	2.87
CALDERWOOD	CALDERWOOD	0.08
CANNELTON	CANNELTON	0.15
CBM-N	CBM-N	0.03
CBM-S2	CBM-S2	1.58
CHEOAH	CHEOAH	0.06
CHILHOWEE	CHILHOWEE	0.03
CHOCTAW	CHOCTAW	0.18
COFFEEN	COFFEEN	0.25
COTTONWOOD	COTTONWOOD	0.88
CPLE	CPLE	1.27
DEARBORN	DEARBORN	0.43
DUCKCREEK	DUCKCREEK	0.57
EDWARDS	EDWARDS	0.26
ELMERSMITH	ELMERSMITH	0.26

Bus #	Bus	MW Impact
FARMERCITY	FARMERCITY	0.15
G-007A	G-007A	0.26
GIBSON	GIBSON	0.11
NEWTON	NEWTON	0.68
NYISO	NYISO	0.15
O-066A	O-066A	0.12
PRAIRIE	PRAIRIE	1.09
SANTEETLA	SANTEETLA	0.01
SMITHLAND	SMITHLAND	0.08
TATANKA	TATANKA	0.28
TILTON	TILTON	0.33
TRIMBLE	TRIMBLE	0.32
TVA	TVA	0.45
UNIONPOWER	UNIONPOWER	0.06
VFT	VFT	0.68

Index 2

ID	FROM BUS#	FROM BUS	FRO M BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Ratin g MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
680159	242701	05LEESV I	AEP	314667	4ALTVST A	DVP	1	AEP_P4_#10297_05OPOSSUMC K 138_D1	breake r	284.0	107.71	111.77	DC	11.52

Bus #	Bus	MW Impact
246843	05SMG1	2.59
246844	05SMG2	6.8
246845	05SMG3	3.99
246846	05SMG4	7.03
246847	05SMG5	2.66
247284	05LEESVG	3.3
919841	AA2-070	1.29
926051	AC1-083 C O1	6.89
926052	AC1-083 E O1	11.23
926521	AC1-123 C O1	13.49
926522	AC1-123 E O1	6.35
932823	AC2-107 BAT	19.17
933941	AD1-017 C	1.38
933942	AD1-017 E	2.25
938451	AE1-064 C	16.28
938452	AE1-064 E	8.35
939011	AE1-130 C O2	7.73
939012	AE1-130 E O2	3.79
939943	AE1-230 E2	3.0
940081	AE1-250 C	11.85
940082	AE1-250 E	7.9
CARR	CARR	0.05
CBM-S1	CBM-S1	0.54
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.63
CBM-W2	CBM-W2	3.61
CIN	CIN	0.29
CPL	CPL	0.22
G-007	G-007	0.16
IPL	IPL	0.19
LGEE	LGEE	0.09
MEC	MEC	0.6
MECS	MECS	0.28
O-066	O-066	0.52
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.08

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
681305	243892	05MEADS8	AEP	242607	05CLOVRD	AEP	1	AEP_P7-1_#10817-A	tower	277.0	133.79	158.64	DC	68.85

Bus #	Bus	MW Impact
244012	05PINNACLE	0.79
246843	05SMG1	4.19
246844	05SMG2	11.0
246845	05SMG3	6.46
246846	05SMG4	11.37
246847	05SMG5	4.31
247284	05LEESVG	3.08
919841	AA2-070	2.09
926051	AC1-083 C O1	11.27
926052	AC1-083 E O1	18.39
933941	AD1-017 C	2.25
933942	AD1-017 E	3.68
938451	AE1-064 C	40.02
938452	AE1-064 E	20.52
939011	AE1-130 C O2	46.2
939012	AE1-130 E O2	22.64
940081	AE1-250 C	19.71
940082	AE1-250 E	13.14
BLUEG	BLUEG	1.18
CANNELTON	CANNELTON	0.05
CARR	CARR	0.07
CBM-S1	CBM-S1	0.28
CBM-S2	CBM-S2	2.14
CBM-W2	CBM-W2	0.66
COFFEEN	COFFEEN	0.08
CPL	CPL	1.3
DEARBORN	DEARBORN	0.24
DUCKCREEK	DUCKCREEK	0.2
EDWARDS	EDWARDS	0.1
ELMERSMITH	ELMERSMITH	0.07
FARMERCITY	FARMERCITY	0.03
G-007	G-007	0.17
GIBSON	GIBSON	0.04
NEWTON	NEWTON	0.22
O-066	O-066	0.59
PRAIRIE	PRAIRIE	0.19
RENSSELAER	RENSSELAER	0.05
TATANKA	TATANKA	0.08
TILTON	TILTON	0.13
TRIMBLE	TRIMBLE	0.14

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
681392	242549	05BANSTR	AEP	242632	05EDAN 2	AEP	1	AEP_P7-1_#10817-A	tower	296.0	90.2	96.33	DC	18.14

Bus #	Bus	MW Impact
246843	05SMG1	3.84
246844	05SMG2	10.12
246845	05SMG3	5.93
246846	05SMG4	10.46
246847	05SMG5	3.95
247284	05LEESVG	2.82
919841	AA2-070	1.92
926051	AC1-083 C O1	20.4
926052	AC1-083 E O1	33.29
933941	AD1-017 C	4.08
933942	AD1-017 E	6.66
938451	AE1-064 C	24.45
938452	AE1-064 E	12.53
939011	AE1-130 C O2	12.18
939012	AE1-130 E O2	5.97
940081	AE1-250 C	59.58
940082	AE1-250 E	39.72
BAYOU	BAYOU	0.56
BIG_CAJUN1	BIG_CAJUN1	0.91
BIG_CAJUN2	BIG_CAJUN2	1.83
CALDERWOOD	CALDERWOOD	0.37
CANNELTON	CANNELTON	0.02
CARR	CARR	0.04
CATAWBA	CATAWBA	0.61
CHEOAH	CHEOAH	0.36
CHILHOWEE	CHILHOWEE	0.12
CHOCTAW	CHOCTAW	0.63
CIN	CIN	0.01
COFFEEN	COFFEEN	0.04
COTTONWOOD	COTTONWOOD	2.13
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.01
ELMERSMITH	ELMERSMITH	0.04
FARMERCITY	FARMERCITY	0.06
G-007	G-007	0.15
GIBSON	GIBSON	0.0
HAMLET	HAMLET	2.62
IPL	IPL	0.03
LGEE	LGEE	0.02
MECS	MECS	0.26

Bus #	Bus	MW Impact
NEWTON	NEWTON	0.09
O-066	O-066	0.5
PRAIRIE	PRAIRIE	0.46
RENSSELAER	RENSSELAER	0.03
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.06
TATANKA	TATANKA	0.07
TVA	TVA	0.86
UNIONPOWER	UNIONPOWER	0.55

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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
680323	247499	05SMITHMTN2	AEP	242701	05LEESV I	AEP	1	AEP_P4_#10297_05OPOSSUM CK 138_D1	breaker	284.0	92.8	96.87	DC	11.54

Bus #	Bus	MW Impact
246843	05SMG1	2.59
246844	05SMG2	6.81
246845	05SMG3	3.99
246846	05SMG4	7.03
246847	05SMG5	2.67
919841	AA2-070	1.29
926051	AC1-083 C O1	6.9
926052	AC1-083 E O1	11.25
926521	AC1-123 C O1	13.51
926522	AC1-123 E O1	6.36
932823	AC2-107 BAT	19.14
933941	AD1-017 C	1.38
933942	AD1-017 E	2.25
938451	AE1-064 C	16.3
938452	AE1-064 E	8.36
939011	AE1-130 C O2	7.75
939012	AE1-130 E O2	3.8
939943	AE1-230 E2	3.0
940081	AE1-250 C	11.88
940082	AE1-250 E	7.92
CARR	CARR	0.04
CBM-S1	CBM-S1	0.63
CBM-S2	CBM-S2	0.54
CBM-W1	CBM-W1	0.78
CBM-W2	CBM-W2	4.24
CIN	CIN	0.36
CPL	CPL	0.24
G-007	G-007	0.13
IPL	IPL	0.23
LGEE	LGEE	0.11
MEC	MEC	0.72
MECS	MECS	0.37
O-066	O-066	0.42
RENSSELAER	RENSSELAER	0.03
WEC	WEC	0.09

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
681469	926050	AC1-083 TAP	AEP	242550	05BEARSK	AEP	1	AEP_P7-1_#10817-A	tower	296.0	92.12	98.25	DC	18.14

Bus #	Bus	MW Impact
246843	05SMG1	3.84
246844	05SMG2	10.12
246845	05SMG3	5.93
246846	05SMG4	10.46
246847	05SMG5	3.95
247284	05LEESVG	2.82
919841	AA2-070	1.92
926051	AC1-083 C O1	20.4
926052	AC1-083 E O1	33.29
933941	AD1-017 C	4.08
933942	AD1-017 E	6.66
938451	AE1-064 C	24.45
938452	AE1-064 E	12.53
939011	AE1-130 C O2	12.18
939012	AE1-130 E O2	5.97
940083	AE1-250 EBAT	50.7
BAYOU	BAYOU	0.56
BIG_CAJUN1	BIG_CAJUN1	0.91
BIG_CAJUN2	BIG_CAJUN2	1.83
CALDERWOOD	CALDERWOOD	0.37
CANNELTON	CANNELTON	0.02
CARR	CARR	0.04
CATAWBA	CATAWBA	0.61
CHEOAH	CHEOAH	0.36
CHILHOWEE	CHILHOWEE	0.12
CHOCTAW	CHOCTAW	0.63
CIN	CIN	0.01
COFFEEN	COFFEEN	0.04
COTTONWOOD	COTTONWOOD	2.13
DUCKCREEK	DUCKCREEK	0.05
EDWARDS	EDWARDS	0.01
ELMERSMITH	ELMERSMITH	0.04
FARMERCITY	FARMERCITY	0.06
G-007	G-007	0.15
GIBSON	GIBSON	0.0
HAMLET	HAMLET	2.62
IPL	IPL	0.03
LGEE	LGEE	0.02
MECS	MECS	0.26
NEWTON	NEWTON	0.09

Bus #	Bus	MW Impact
O-066	O-066	0.5
PRAIRIE	PRAIRIE	0.46
RENSSELAER	RENSSELAER	0.03
SANTEETLA	SANTEETLA	0.11
SMITHLAND	SMITHLAND	0.06
TATANKA	TATANKA	0.07
TVA	TVA	0.86
UNIONPOWER	UNIONPOWER	0.55

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
680734	242687	05JOHNMT	AEP	242734	05NEWLDN	AEP	1	DVP_P1-2: LN 1016-B	single	240.0	100.71	102.3	DC	3.81

Bus #	Bus	MW Impact
246843	05SMG1	1.35
246844	05SMG2	3.55
246845	05SMG3	2.08
246846	05SMG4	3.67
246847	05SMG5	1.39
247284	05LEESVG	2.09
315156	1HALLBR1	3.76
315165	1HURT 1	16.94
315166	1HURT 2	16.94
919841	AA2-070	0.67
925661	AC1-042 C	6.78
925991	AC1-075 C	15.63
926021	AC1-080 C	5.22
926051	AC1-083 C O1	3.63
926521	AC1-123 C O1	3.2
926641	AC1-145 C	8.07
927261	AC1-222 C	9.35
932821	AC2-107 C	27.8
933941	AD1-017 C	0.73
934311	AD1-055 C	6.49
936331	AD2-043 C	12.25
938451	AE1-064 C	8.4
939011	AE1-130 C O2	3.81
939941	AE1-230 C1	3.06
940081	AE1-250 C	6.36
BLUEG	BLUEG	0.44
CANNELTON	CANNELTON	0.02
CARR	CARR	0.03
CBM-S1	CBM-S1	0.03
CBM-S2	CBM-S2	0.65
COFFEEN	COFFEEN	0.03
CPL	CPL	0.4
DEARBORN	DEARBORN	0.09
DUCKCREEK	DUCKCREEK	0.08
EDWARDS	EDWARDS	0.04
ELMERSMITH	ELMERSMITH	0.03
FARMERCITY	FARMERCITY	0.01
GIBSON	GIBSON	0.02
NEWTON	NEWTON	0.09
PRAIRIE	PRAIRIE	0.1

Bus #	Bus	MW Impact
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.0
TATANKA	TATANKA	0.03
TILTON	TILTON	0.05
TRIMBLE	TRIMBLE	0.05

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
680714	242741	05OTTER	AEP	242687	05JOHNMT	AEP	1	AEP_P1-2_#5471-A	single	245.0	102.82	104.32	DC	3.66

Bus #	Bus	MW Impact
246843	05SMG1	1.41
246844	05SMG2	3.71
246845	05SMG3	2.17
246846	05SMG4	3.83
246847	05SMG5	1.45
247284	05LEESVG	1.83
315156	1HALLBR1	2.89
315165	1HURT 1	13.03
315166	1HURT 2	13.03
315266	1PLYWOOD A	0.4
919841	AA2-070	0.7
925661	AC1-042 C	5.57
925991	AC1-075 C	6.96
926021	AC1-080 C	2.33
926051	AC1-083 C O1	3.87
926271	AC1-105 C O1	1.96
926521	AC1-123 C O1	7.35
926641	AC1-145 C	6.63
927261	AC1-222 C	2.05
932821	AC2-107 C	12.38
933941	AD1-017 C	0.77
934311	AD1-055 C	1.42
936331	AD2-043 C	2.79
938451	AE1-064 C	8.65
939011	AE1-130 C O2	3.66
939941	AE1-230 C1	2.51
940081	AE1-250 C	6.95
BAYOU	BAYOU	0.0
BLUEG	BLUEG	1.52
CANNELTON	CANNELTON	0.08
CARR	CARR	0.02
CBM-S2	CBM-S2	1.39
COFFEEN	COFFEEN	0.12
COTTONWOOD	COTTONWOOD	0.05
CPL	CPL	0.93
DEARBORN	DEARBORN	0.26
DUCKCREEK	DUCKCREEK	0.29
EDWARDS	EDWARDS	0.14
ELMERSMITH	ELMERSMITH	0.13
FARMERCITY	FARMERCITY	0.07

Bus #	Bus	MW Impact
GIBSON	GIBSON	0.06
NEWTON	NEWTON	0.34
PRAIRIE	PRAIRIE	0.48
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.03
TATANKA	TATANKA	0.14
TILTON	TILTON	0.17
TRIMBLE	TRIMBLE	0.17
TVA	TVA	0.06

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ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
680692	314667	4ALTVSTA	DVP	242741	050TTER	AEP	1	AEP_P1-2_#5471-A	single	245.0	104.7	106.19	DC	3.66

Bus #	Bus	MW Impact
246843	05SMG1	1.41
246844	05SMG2	3.71
246845	05SMG3	2.17
246846	05SMG4	3.83
246847	05SMG5	1.45
247284	05LEESVG	1.83
315156	1HALLBR1	2.89
315165	1HURT 1	13.03
315166	1HURT 2	13.03
315266	1PLYWOOD A	0.4
919841	AA2-070	0.7
925661	AC1-042 C	5.57
925991	AC1-075 C	6.96
926021	AC1-080 C	2.33
926051	AC1-083 C O1	3.87
926271	AC1-105 C O1	1.96
926521	AC1-123 C O1	7.35
926641	AC1-145 C	6.63
927261	AC1-222 C	2.05
932821	AC2-107 C	12.38
933941	AD1-017 C	0.77
934311	AD1-055 C	1.42
936331	AD2-043 C	2.79
938451	AE1-064 C	8.65
939011	AE1-130 C O2	3.66
939941	AE1-230 C1	2.51
940081	AE1-250 C	6.95
BAYOU	BAYOU	0.0
BLUEG	BLUEG	1.52
CANNELTON	CANNELTON	0.08
CARR	CARR	0.02
CBM-S2	CBM-S2	1.39
COFFEEN	COFFEEN	0.12
COTTONWOOD	COTTONWOOD	0.05
CPL	CPL	0.93
DEARBORN	DEARBORN	0.26
DUCKCREEK	DUCKCREEK	0.29
EDWARDS	EDWARDS	0.14
ELMERSMITH	ELMERSMITH	0.13
FARMERCITY	FARMERCITY	0.07

Bus #	Bus	MW Impact
GIBSON	GIBSON	0.06
NEWTON	NEWTON	0.34
PRAIRIE	PRAIRIE	0.48
RENSSELAER	RENSSELAER	0.02
SMITHLAND	SMITHLAND	0.03
TATANKA	TATANKA	0.14
TILTON	TILTON	0.17
TRIMBLE	TRIMBLE	0.17
TVA	TVA	0.06

Affected Systems

LG&E

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

MISO

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

TVA

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

Duke Energy Progress

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

NYISO

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

Contingency Name	Contingency Definition
AEP_P1-2_#5471-A	CONTINGENCY 'AEP_P1-2_#5471-A' OPEN BRANCH FROM BUS 242575 TO BUS 242737 CKT 1 / 242575 05CAMDLM 138 242737 05OPOSSUMCK 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 242781 CKT 1 / 242575 05CAMDLM 138 242781 05RUSTBR 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 926520 CKT 1 / 242575 05CAMDLM 138 926520 AC1- 123 TAP 138 1 END
AEP_P4_#10297_05OPOSSUMCK 138_D1	CONTINGENCY 'AEP_P4_#10297_05OPOSSUMCK 138_D1' OPEN BRANCH FROM BUS 242575 TO BUS 242737 CKT 1 / 242575 05CAMDLM 138 242737 05OPOSSUMCK 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 242781 CKT 1 / 242575 05CAMDLM 138 242781 05RUSTBR 138 1 OPEN BRANCH FROM BUS 242575 TO BUS 926520 CKT 1 / 242575 05CAMDLM 138 926520 AC1- 123 TAP 138 1 /* CONTINGENCY LINE ADDED FOR AE1 BUILD OPEN BRANCH FROM BUS 242737 TO BUS 242785 CKT 1 / 242737 05OPOSSUMCK 138 242785 05S.LYNC 138 1 END
AEP_P1-2_#6213	CONTINGENCY 'AEP_P1-2_#6213' OPEN BRANCH FROM BUS 242748 TO BUS 243951 CKT 1 / 242748 05PENHOK 138 243951 05REDWOOD 138 1 OPEN BRANCH FROM BUS 242748 TO BUS 242802 CKT 1 / 242748 05PENHOK 138 242802 05SMITHMTN1 138 1 OPEN BRANCH FROM BUS 243951 TO BUS 242843 CKT 1 / 243951 05REDWOOD 138 242843 05WLAKE 138 1 END
AEP_P1-2_#5366-B	CONTINGENCY 'AEP_P1-2_#5366-B' OPEN BRANCH FROM BUS 242549 TO BUS 940080 CKT 1 / 242549 05BANSTR 138 940080 AE1- 250 TAP 138 1 OPEN BRANCH FROM BUS 242549 TO BUS 242632 CKT 1 / 242549 05BANSTR 138 242632 05EDAN 2 138 1 OPEN BRANCH FROM BUS 242549 TO BUS 314668 CKT Z1 / 242549 05BANSTR 138 314668 4BANISTR 138 Z1 END
AEP_P1-2_#8677	CONTINGENCY 'AEP_P1-2_#8677' OPEN BRANCH FROM BUS 242629 TO BUS 242632 CKT 1 / 242629 05E.MONU 138 242632 05EDAN 2 138 1 OPEN BRANCH FROM BUS 242629 TO BUS 242770 CKT 1 / 242629 05E.MONU 138 242770 05RIGIS 138 1 OPEN BRANCH FROM BUS 242629 TO BUS 243948 CKT 1 / 242629 05E.MONU 138 243948 05BRANTLY 69.0 1 REMOVE SWSHUNT FROM BUS 242629 / 242629 05E.MONU 138 END
AEP_P7-1_#10817-A	CONTINGENCY 'AEP_P7-1_#10817-A' OPEN BRANCH FROM BUS 926520 TO BUS 247499 CKT 1 / 926520 AC1-123 TAP 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 314667 CKT 1 / 242701 05LEESVI 138 314667 4ALTVSTA 138 1 END

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
Base Case	
AEP_P7-1_#10808-A	CONTINGENCY 'AEP_P7-1_#10808-A' OPEN BRANCH FROM BUS 926520 TO BUS 247499 CKT 1 / 926520 AC1-123 TAP 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 247499 CKT 1 / 242701 05LEESVI 138 247499 05SMITHMTN2 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 314667 CKT 1 / 242701 05LEESVI 138 314667 4ALTVSTA 138 1 OPEN BRANCH FROM BUS 242701 TO BUS 247284 CKT 1 / 242701 05LEESVI 138 247284 05LEESVG 13.8 1 END
DVP_P1-2: LN 1016-B	CONTINGENCY 'DVP_P1-2: LN 1016-B' OPEN BRANCH FROM BUS 927260 TO BUS 314696 CKT 1 /* AC1-222 TAP 115.00 - 3SEEDGE HILL 115.00 END

Short Circuit

Short Circuit

The following Breakers are overduty

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

None