



Generation Interconnection

Feasibility Study Report

for

Queue Project AE2-235

MURPHYSVILLE-PLUMVILLE 69 KV

41.9 MW Capacity / 60 MW Energy

July, 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.

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

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

2 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Mason County, Kentucky. The installed facilities will have a total capability of 60 MW with 41.9 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is 7/31/2021. This study does not imply a TO commitment to this in-service date.

Queue Number	AE2-235
Project Name	MURPHYSVILLE-PLUMVILLE 69 KV
State	Kentucky
County	Mason
Transmission Owner	EKPC
MFO	60
MWE	60
MWC	41.9
Fuel	Solar
Basecase Study Year	2022

2.1 Point of Interconnection

AE2-235 will interconnect with the EKPC transmission system tapping the Murphysville to Plumville 69kV line.

2.2 Cost Summary

The AE2-235 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$250,000
Direct Connection Network Upgrade	\$4,650,000
Non Direct Connection Network Upgrades	\$100,000
Total Costs	\$5,000,000

In addition, the AE2-235 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	\$30,664,000

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
Install a 69 kV switch structure at the point of demarcation.	\$250,000
Total Attachment Facility Costs	\$250,000

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
Build 69 kV switching station at along the Murphyville - Plumville 69kV Line. Estimated Time to Construct: 24 months	\$4,650,000
Total Direct Connection Facility Costs	\$4,650,000

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
Relaying Upgrades at the remote end substations	\$100,000
Total Non-Direct Connection Facility Costs	\$100,000

7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

8 Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

9 Revenue Metering and SCADA Requirements

9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

9.2 EKPC Requirements

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

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

10 Option -1 Network Impacts

The Queue Project AE2-235 was evaluated as a 60.0 MW (Capacity 41.9 MW) injection tapping the Murphysville to Plumville 69kV line in the EKPC area. Project AE2-235 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-235 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

Summer Peak Load Flow

11 Generation Deliverability

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

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
8873527	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	EKPC_P1-2_SPUR-STU345	single	63.0	75.78	102.86	DC	17.06

12 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	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
7247200	247034	05EMERSS	AEP	246946	05WLDCAT	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCKDPLEK	tower	185.0	99.01	102.9	DC	7.19
8873995	342559	4BOONECO	EKPC	250054	08LONGBR	DEO&K	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCKDPLEK	tower	284.0	99.85	102.15	DC	6.47
8872958	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	EKPC_P4-2_GODDARD E5-814	breaker	63.0	84.71	124.73	DC	25.22
8872959	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	EKPC_P4-2_GODDARD E5-824	breaker	63.0	84.55	124.58	DC	25.22
8872960	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	EKPC_P4-2_GODDARD E5-834	breaker	63.0	84.55	124.58	DC	25.22
8873863	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCKDPLEK	tower	63.0	92.76	132.57	DC	25.08

13 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	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
7245658	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	DAY_P4_STUART_HH	breaker	185.0	119.2	120.56	DC	5.59
7246923	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCKDPLEK	tower	185.0	150.89	154.77	DC	7.19
7247179	324267	4KENTON	LGEE	247034	05EMERSS	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCKDPLEK	tower	185.0	100.69	104.57	DC	7.19
8872973	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.138.DEO&K.C2 816_SILVERGROVE	breaker	1421.0	119.03	120.52	DC	21.1
8872974	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.C2 1493_RED BANK	breaker	1421.0	118.92	120.41	DC	21.08
8873533	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	single	1421.0	114.49	115.53	DC	14.72
8873536	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	Base Case	single	1240.0	110.44	111.54	DC	13.7

14 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	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
7246532	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	EKPC_P1-2_SPUR-STU345	operation	185.0	118.66	120.02	DC	5.6
8873532	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	operation	1421.0	118.85	120.34	DC	21.08
8873534	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	Base Case	operation	1240.0	113.57	115.15	DC	19.62
8873524	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	EKPC_P1-2_GODD-PLUM 138-A	operation	63.0	84.26	123.95	DC	25.0
8873526	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	Base Case	operation	53.0	57.47	102.98	DC	24.12

15 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
8873995	3	4BOONE CO 138.0 kV - 08LONGBR 138.0 kV Ckt 1	r0009 (646) : Increase MOT of Boone-Longbranch 138kV line section 954 MCM conductor to 275F (~2.25 miles) Project Type : FAC Cost : \$200,000 Time Estimate : 6 Months	\$200,000
8873863,8872960,8872958,8873527,8872959	1	AE2-235 TAP 69.0 kV - 2MURPHYSVIL 69.0 kV Ckt 1	r0007 (643) : rebuild Murphysville-AE2-235 69kV line section using 556 MCM conductor at 212F (~6.1 miles) Project Type : FAC Cost : \$4,500,000 Time Estimate : 18 Months r0008 (644) : rebuild Murphysville 69kV bus using 500 MCM conductor or equivalent Project Type : FAC Cost : \$750,000 Time Estimate : 12 Months	\$5,250,000
7247179	5	4KENTON 138.0 kV - 05EMERSS 138.0 kV Ckt 1	<u>AEP</u> AEPO0005a (112) : Perform sag study on AEP's portion of Wildcat-Kenton 138kV circuit, 23.5 miles 477 ACSR 26/7 Hawk conductor. Project Type : FAC Cost : \$94,000 Time Estimate : 6-12 Months <u>LGEE</u> NonPJMArea (778) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$94,000
7247200	2	05EMERSS 138.0 kV - 05WLDCAT 138.0 kV Ckt 1	AEPO0006a (114) : Perform sag study on AEP's portion of Wildcat-Kenton 138kV circuit, 1.3 miles of 477 ACSR 26/7 Hawk. Project Type : FAC Cost : \$20,000 Time Estimate : 6-12 Months	\$20,000

ID	Index	Facility	Upgrade Description	Cost
8872974,8873536,8872973,8873533	6	7SPURLOCK 345.0 kV - 09STUART 345.0 kV Ckt 1	<p>r190002 (353) : Replace substation riser conductor with 2500AAC (parallel) Project Type : FAC Cost : \$100,000 Time Estimate : 12.0 Months</p> <p>r190004 (355) : Reconductor line with 795 ACCR high temperature conductor in a twin bundle Project Type : FAC Cost : \$10,000,000 Time Estimate : 18.0 Months</p> <p>r0005 (640) : No Violation. EKPC emergency rating 1792 MVA. Project Type : FAC Cost : \$0 Time Estimate : N/A Months</p>	\$10,100,000
7246923,7245658	4	05WLDCAT 138.0 kV - 05HILLSB 138.0 kV Ckt 1	<p>AEP_AE1_REF_r0027 (141) : Rebuild / reconductor 10 miles of ACSR ~ 477 ~ 26/7 ~ HAWK- Conductor Section 1. Estimated cost: \$15 million. Project Type : FAC Cost : \$15,000,000 Time Estimate : 24-36 Months</p>	\$15,000,000
			TOTAL COST	\$30,664,000

16 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.

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16.1 Index 1

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
8873863	942230	AE2-235 TAP	EKPC	341923	2MURPHYSVIL	EKPC	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	63.0	92.76	132.57	DC	25.08

Bus #	Bus	MW Impact
939141	AE1-144 C O1	8.01
939142	AE1-144 E O1	3.98
940531	AE2-038 C O1	5.35
940532	AE2-038 E O1	2.65
942231	AE2-235 C O1	17.51
942232	AE2-235 E O1	7.57
BLUEG	BLUEG	0.2
CARR	CARR	0.01
CBM-S1	CBM-S1	0.1
CBM-S2	CBM-S2	0.03
CBM-W2	CBM-W2	0.09
COFFEEN	COFFEEN	0.01
CPLE	CPLE	0.01
DUCKCREEK	DUCKCREEK	0.03
EDWARDS	EDWARDS	0.02
FARMERCITY	FARMERCITY	0.0
G-007	G-007	0.03
GIBSON	GIBSON	0.01
NEWTON	NEWTON	0.03
O-066	O-066	0.17
PRAIRIE	PRAIRIE	0.02
RENSELAER	RENSELAER	0.01
TATANKA	TATANKA	0.01
TILTON	TILTON	0.02
TRIMBLE	TRIMBLE	0.03

16.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
7247200	247034	05EMERSS	AEP	246946	05WLDCAT	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRLLCKSTUARTSPURLOCK DPLEK	tower	185.0	99.01	102.9	DC	7.19

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.37
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O1	5.19
940532	AE2-038 E O1	2.57
941411	AE2-138 C	10.6
941412	AE2-138 E	3.92
941981	AE2-210 C O1	3.63
941982	AE2-210 E O1	1.36
942231	AE2-235 C O1	5.02
942232	AE2-235 E O1	2.17
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.87
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPLE	CPLE	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

16.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
8873995	342559	4BOON E CO	EKPC	250054	08LONGB R	DEO& K	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSPRLCKSTUARTSPURLOCK DPLEK	tower	284.0	99.85	102.15	DC	6.47

Bus #	Bus	MW Impact
342957	1SPURLK1G	4.49
342960	1SPURLK2G	7.03
342963	1SPURLK3G	3.69
342966	1SPURLK4G	3.69
925981	AC1-074 C O1	9.17
925982	AC1-074 E O1	3.93
932551	AC2-075 C	2.18
932552	AC2-075 E	1.1
935011	AD1-134	5.06
936281	AD2-036 C	6.55
936282	AD2-036 E	3.27
936381	AD2-048 C	5.97
936382	AD2-048 E	2.98
936571	AD2-072 C O1	3.35
936572	AD2-072 E O1	1.64
939141	AE1-144 C O1	8.69
939142	AE1-144 E O1	4.31
940531	AE2-038 C O1	5.79
940532	AE2-038 E O1	2.87
941411	AE2-138 C	16.37
941412	AE2-138 E	6.05
941981	AE2-210 C O1	5.66
941982	AE2-210 E O1	2.13
942231	AE2-235 C O1	4.52
942232	AE2-235 E O1	1.95
942411	AE2-254 C O1	1.61
942412	AE2-254 E O1	1.07
942591	AE2-275 C O1	4.63
942592	AE2-275 E O1	1.74
942891	AE2-308 C O1	8.29
942892	AE2-308 E O1	3.01
943111	AE2-339 C	3.03
943112	AE2-339 E	1.49
CARR	CARR	0.05
CBM-S1	CBM-S1	4.34
CBM-S2	CBM-S2	0.84
CBM-W1	CBM-W1	0.14
CBM-W2	CBM-W2	15.68
CIN	CIN	1.16
CPL	CPL	0.25

Bus #	Bus	MW Impact
G-007	G-007	0.12
IPL	IPL	0.49
LGEE	LGEE	1.78
MEC	MEC	1.39
O-066	O-066	0.78
RENSELAER	RENSELAER	0.04
WEC	WEC	0.04

16.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
7246923	246946	05WLDC AT	AEP	243019	05HILLS B	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	185.0	150.89	154.77	DC	7.19

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.37
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
926101	AC1-089 C O1	38.82
926102	AC1-089 E O1	63.35
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O1	5.19
940532	AE2-038 E O1	2.57
941411	AE2-138 C	10.6
941412	AE2-138 E	3.92
941981	AE2-210 C O1	3.63
941982	AE2-210 E O1	1.36
942231	AE2-235 C O1	5.02
942232	AE2-235 E O1	2.17
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.87
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPL	CPL	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

16.5 Index 5

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
7247179	324267	4KENTON	LGEE	247034	05EMERSS	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	185.0	100.69	104.57	DC	7.19

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.37
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O1	5.19
940532	AE2-038 E O1	2.57
941411	AE2-138 C	10.6
941412	AE2-138 E	3.92
941981	AE2-210 C O1	3.63
941982	AE2-210 E O1	1.36
942231	AE2-235 C O1	5.02
942232	AE2-235 E O1	2.17
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.87
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPLE	CPLE	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

16.6 Index 6

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
8872974	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.C2 1493_RED BANK	breaker	1421.0	118.92	120.41	DC	21.08

Bus #	Bus	MW Impact
251968	08ZIMRHP	33.39
251969	08ZIMRLP	18.29
251970	08MELDL1	1.69
251971	08MELDL2	1.69
251972	08MELDL3	1.7
342957	1SPURLK1G	17.48
342960	1SPURLK2G	33.1
342963	1SPURLK3G	17.39
342966	1SPURLK4G	17.39
925981	AC1-074 C O1	15.31
925982	AC1-074 E O1	6.56
926951	AC1-182	0.8
932551	AC2-075 C	3.64
932552	AC2-075 E	1.83
935011	AD1-134	17.48
936281	AD2-036 C	10.93
936282	AD2-036 E	5.47
936381	AD2-048 C	11.97
936382	AD2-048 E	5.97
936571	AD2-072 C O1	9.64
936572	AD2-072 E O1	4.73
936821	AD2-105 C O1	4.08
936822	AD2-105 E O1	5.98
936831	AD2-106 C O1	2.82
936832	AD2-106 E O1	3.9
936841	AD2-107 C O1	2.23
936842	AD2-107 E O1	3.08
939131	AE1-143 C	7.15
939132	AE1-143 E	3.54
939141	AE1-144 C O1	32.16
939142	AE1-144 E O1	15.96
940531	AE2-038 C O1	21.45
940532	AE2-038 E O1	10.63
941411	AE2-138 C	62.82
941412	AE2-138 E	23.23
941961	AE2-208	2.43
941981	AE2-210 C O1	21.29
941982	AE2-210 E O1	8.01
942231	AE2-235 C O1	14.72
942232	AE2-235 E O1	6.36
942411	AE2-254 C O1	4.87

Bus #	Bus	MW Impact
942412	AE2-254 E O1	3.25
942591	AE2-275 C O1	15.67
942592	AE2-275 E O1	5.89
942891	AE2-308 C O1	26.79
942892	AE2-308 E O1	9.74
943111	AE2-339 C	9.06
943112	AE2-339 E	4.46
CARR	CARR	0.51
CBM-S1	CBM-S1	13.72
CBM-S2	CBM-S2	1.86
CBM-W1	CBM-W1	3.85
CBM-W2	CBM-W2	65.29
CIN	CIN	7.07
CPLE	CPLE	0.39
G-007	G-007	1.38
IPL	IPL	4.27
LGEE	LGEE	5.18
MEC	MEC	7.85
O-066	O-066	8.9
RENSSELAER	RENSSELAER	0.4
WEC	WEC	0.68

Affected Systems

17 Affected Systems

17.1 LG&E

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

17.2 MISO

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

17.3 TVA

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

17.4 Duke Energy Progress

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

17.5 NYISO

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

Contingency Name	Contingency Definition
DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLKSTUARTSPURLOCK KDPLEK	CONTINGENCY 'DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLKSTUARTSPURLOCKDPLEK' OPEN BRANCH FROM BUS 342838 TO BUS 249581 CKT 1 OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 END
EKPC_P4-2_GODDARD E5-824	CONTINGENCY 'EKPC_P4-2_GODDARD E5-824' /* OPEN BUS 342589 /* 4GODDARD DROPS BUS END
.138.DEO&K.C2 816_SILVERGROVE	CONTINGENCY '.138.DEO&K.C2 816_SILVERGROVE' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249988 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250042 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250052 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250053 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 END
EKPC_P4-2_GODDARD E5-814	CONTINGENCY 'EKPC_P4-2_GODDARD E5-814' /* OPEN BUS 342589 /* 4GODDARD DROPS BUS OPEN BRANCH FROM BUS 342583 TO BUS 342664 CKT 1 /* 342583 4FLEMINGSBRG138.00 342664 4SPURLOCK 138.00 END
.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	CONTINGENCY '.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545' OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 END
EKPC_P1-2_SPUR-STU345	CONTINGENCY 'EKPC_P1-2_SPUR-STU345' /* SPURLOCK - STUART OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 END
Base Case	
.345.DEO&K.C2 1493_RED BANK	CONTINGENCY '.345.DEO&K.C2 1493_RED BANK' OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 250092 CKT 1 END
DAY_P4_STUART_HH	CONTINGENCY 'DAY_P4_STUART_HH' OPEN LINE FROM BUS 253077 TO BUS 342838 CKT 1 / 253077 09STUART 345 342838 7SPURLOCK 345 1 OPEN LINE FROM BUS 253077 TO BUS 253076 CKT 1 / 253077 09STUART 345 253076 09STUART 138 1 END

Contingency Name	Contingency Definition
EKPC_P1-2_GODD-PLUM 138-A	CONTINGENCY 'EKPC_P1-2_GODD-PLUM 138-A' /* GODDARD - PLUMVILLE OPEN BRANCH FROM BUS 342589 TO BUS 939140 CKT 1 /* 342589 4GODDARD 138.00 939140 AE1-144 TAP 138.00 END
EKPC_P4-2_GODDARD E5-834	CONTINGENCY 'EKPC_P4-2_GODDARD E5-834' /* OPEN BUS 342589 /* 4GODDARD OPEN BRANCH FROM BUS 342571 TO BUS 342649 CKT 1 /* 342571 4CRANSTON 138.00 342649 4ROWAN CO 138.00 END

Short Circuit

18 Short Circuit

The following Breakers are overduty

19 Secondary Point of Interconnection:

AE2-235 will interconnect with the EKPC transmission system at the Maysville Industrial 138kV substation.

20 Option 2 : Network Impacts

The Queue Project AE2-235 was evaluated as a 60.0 MW (Capacity 41.9 MW) injection at the Maysville Industrial 138kV substation in the EKPC area. Project AE2-235 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-235 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

Summer Peak Load Flow

21 Generation Deliverability

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

None

22 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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
7247200	247034	05EMERSS	AEP	246946	05WLDCAT	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOCK DPLEK	tower	185.0	99.05	100.37	DC	5.42
8873995	342559	4BOONECO	EKPC	250054	08LONGBR	DEO&K	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOCK DPLEK	tower	284.0	99.72	102.27	DC	7.19

23 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
7245658	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	DAY_P4_STUART_HH	breaker	185.0	119.22	120.02	DC	3.29
7246923	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOCK DPLEK	tower	185.0	150.93	152.25	DC	5.42
7247179	324267	4KENTON	LGEE	247034	05EMERSS	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOCK DPLEK	tower	185.0	100.73	102.05	DC	5.42
8872973	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.138.DEO&K.C2 816_SILVERGROVE	breaker	1421.0	118.64	120.59	DC	27.63
8872974	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.C2 1493_RED BANK	breaker	1421.0	118.52	120.48	DC	27.62
8873533	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	single	1421.0	114.31	115.67	DC	19.28
8873536	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	Base Case	single	1240.0	110.33	111.77	DC	17.85

24 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
7246532	246946	05WLDCAT	AEP	243019	05HILLSB	AEP	1	EKPC_P1-2_SPUR-STU345	operation	185.0	118.7	119.5	DC	3.3
8873532	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	operation	1421.0	118.46	120.41	DC	27.62
8873534	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	Base Case	operation	1240.0	113.4	115.47	DC	25.56

25 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.

25.1 Index 1

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
7247200	247034	05EMERSS	AEP	246946	05WLDCAT	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRLLCKSTUARTSPURLOCK DPLEK	tower	185.0	99.05	100.37	DC	5.42

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.38
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O2	5.19
940532	AE2-038 E O2	2.59
941411	AE2-138 C O2	10.52
941412	AE2-138 E O2	3.89
941981	AE2-210 C O2	3.65
941982	AE2-210 E O2	1.37
942231	AE2-235 C O2	3.78
942232	AE2-235 E O2	1.63
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.88
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPLE	CPLE	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

25.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
8873995	342559	4BOON E CO	EKPC	250054	08LONGB R	DEO&K	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	284.0	99.72	102.27	DC	7.19

Bus #	Bus	MW Impact
342957	1SPURLK1G	4.49
342960	1SPURLK2G	7.03
342963	1SPURLK3G	3.69
342966	1SPURLK4G	3.69
925981	AC1-074 C O1	9.16
925982	AC1-074 E O1	3.93
932551	AC2-075 C	2.18
932552	AC2-075 E	1.1
935011	AD1-134	5.06
936281	AD2-036 C	6.55
936282	AD2-036 E	3.27
936381	AD2-048 C	5.97
936382	AD2-048 E	2.98
936571	AD2-072 C O1	3.35
936572	AD2-072 E O1	1.64
939141	AE1-144 C O1	8.69
939142	AE1-144 E O1	4.31
940531	AE2-038 C O2	5.46
940532	AE2-038 E O2	2.72
941411	AE2-138 C O2	16.44
941412	AE2-138 E O2	6.08
941981	AE2-210 C O2	5.64
941982	AE2-210 E O2	2.12
942231	AE2-235 C O2	5.02
942232	AE2-235 E O2	2.17
942411	AE2-254 C O2	1.62
942412	AE2-254 E O2	1.08
942591	AE2-275 C O2	4.58
942592	AE2-275 E O2	1.72
942891	AE2-308 C O1	7.72
942892	AE2-308 E O1	2.81
943111	AE2-339 C	3.03
943112	AE2-339 E	1.49
CARR	CARR	0.05
CBM-S1	CBM-S1	4.34
CBM-S2	CBM-S2	0.84
CBM-W1	CBM-W1	0.14
CBM-W2	CBM-W2	15.68
CIN	CIN	1.16
CPL	CPL	0.25

Bus #	Bus	MW Impact
G-007	G-007	0.12
IPL	IPL	0.49
LGEE	LGEE	1.78
MEC	MEC	1.39
O-066	O-066	0.78
RENSELAER	RENSELAER	0.04
WEC	WEC	0.04

25.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
7246923	246946	05WLDC AT	AEP	243019	05HILLS B	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	185.0	150.93	152.25	DC	5.42

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.38
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
926101	AC1-089 C O1	38.82
926102	AC1-089 E O1	63.34
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O2	5.19
940532	AE2-038 E O2	2.59
941411	AE2-138 C O2	10.52
941412	AE2-138 E O2	3.89
941981	AE2-210 C O2	3.65
941982	AE2-210 E O2	1.37
942231	AE2-235 C O2	3.78
942232	AE2-235 E O2	1.63
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.88
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPL	CPL	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

25.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC D C	MW IMPAC T
7247179	324267	4KENTON	LGEE	247034	05EMERSS	AEP	1	DEO&K-DAY-EKPC.C5 4541MELDAHLSRRLCKSTUARTSPURLOCK DPLEK	tower	185.0	100.73	102.05	DC	5.42

Bus #	Bus	MW Impact
916272	Z1-080 E	0.56
918802	AA1-099 E	0.38
925981	AC1-074 C O1	3.21
925982	AC1-074 E O1	1.38
932551	AC2-075 C	0.76
932552	AC2-075 E	0.38
936281	AD2-036 C	2.3
936282	AD2-036 E	1.15
936381	AD2-048 C	3.99
936382	AD2-048 E	1.99
939141	AE1-144 C O1	7.78
939142	AE1-144 E O1	3.86
940531	AE2-038 C O2	5.19
940532	AE2-038 E O2	2.59
941411	AE2-138 C O2	10.52
941412	AE2-138 E O2	3.89
941981	AE2-210 C O2	3.65
941982	AE2-210 E O2	1.37
942231	AE2-235 C O2	3.78
942232	AE2-235 E O2	1.63
943111	AE2-339 C	1.72
943112	AE2-339 E	0.85
CARR	CARR	0.06
CBM-S1	CBM-S1	2.9
CBM-S2	CBM-S2	0.49
CBM-W1	CBM-W1	0.88
CBM-W2	CBM-W2	13.06
CIN	CIN	1.27
CPLE	CPLE	0.13
G-007	G-007	0.15
IPL	IPL	0.71
LGEE	LGEE	1.12
MEC	MEC	1.58
O-066	O-066	0.96
RENSSELAER	RENSSELAER	0.04
WEC	WEC	0.14

25.5 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
8872974	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	.345.DEO&K.C2 1493_RED BANK	breaker	1421.0	118.52	120.48	DC	27.62

Bus #	Bus	MW Impact
251968	08ZIMRHP	33.39
251969	08ZIMRLP	18.29
251970	08MELDL1	1.69
251971	08MELDL2	1.69
251972	08MELDL3	1.7
342957	1SPURLK1G	17.48
342960	1SPURLK2G	33.1
342963	1SPURLK3G	17.39
342966	1SPURLK4G	17.39
925981	AC1-074 C O1	15.31
925982	AC1-074 E O1	6.56
926951	AC1-182	0.8
932551	AC2-075 C	3.64
932552	AC2-075 E	1.83
935011	AD1-134	17.48
936281	AD2-036 C	10.93
936282	AD2-036 E	5.47
936381	AD2-048 C	11.97
936382	AD2-048 E	5.97
936571	AD2-072 C O1	9.64
936572	AD2-072 E O1	4.73
936821	AD2-105 C O1	4.08
936822	AD2-105 E O1	5.98
936841	AD2-107 C O1	2.23
936842	AD2-107 E O1	3.08
939131	AE1-143 C	7.15
939132	AE1-143 E	3.54
939141	AE1-144 C O1	32.16
939142	AE1-144 E O1	15.96
940531	AE2-038 C O2	20.11
940532	AE2-038 E O2	10.02
941411	AE2-138 C O2	61.77
941412	AE2-138 E O2	22.85
941961	AE2-208	2.43
941981	AE2-210 C O2	21.64
941982	AE2-210 E O2	8.14
942231	AE2-235 C O2	19.29
942232	AE2-235 E O2	8.33
942411	AE2-254 C O2	4.88
942412	AE2-254 E O2	3.25
942591	AE2-275 C O2	15.55

Bus #	Bus	MW Impact
942592	AE2-275 E O2	5.85
942891	AE2-308 C O1	25.76
942892	AE2-308 E O1	9.37
943111	AE2-339 C	9.06
943112	AE2-339 E	4.46
CARR	CARR	0.51
CBM-S1	CBM-S1	13.73
CBM-S2	CBM-S2	1.86
CBM-W1	CBM-W1	3.87
CBM-W2	CBM-W2	65.34
CIN	CIN	7.07
CPLE	CPLE	0.39
G-007	G-007	1.38
IPL	IPL	4.27
LGEE	LGEE	5.19
MEC	MEC	7.86
O-066	O-066	8.9
RENSSELAER	RENSSELAER	0.4
WEC	WEC	0.68

Affected Systems

26 Affected Systems

26.1 LG&E

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

26.2 MISO

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

26.3 TVA

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

26.4 Duke Energy Progress

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

26.5 NYISO

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

Contingency Name	Contingency Definition
DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOC KDPLEK	CONTINGENCY 'DEO&K-DAY-EKPC.C5 4541MELDAHLSRCLCKSTUARTSPURLOCKDPLEK' OPEN BRANCH FROM BUS 342838 TO BUS 249581 CKT 1 OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 END
.138.DEO&K.C2 816_SILVERGROVE	CONTINGENCY '.138.DEO&K.C2 816_SILVERGROVE' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249988 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250042 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250052 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 250053 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 END
.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545	CONTINGENCY '.345.DEO&K.B2 RED BANK-SG-ZIMMER 4545' OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 END
EKPC_P1-2_SPUR-STU345	CONTINGENCY 'EKPC_P1-2_SPUR-STU345' /* SPURLOCK - STUART OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 END
Base Case	
.345.DEO&K.C2 1493_RED BANK	CONTINGENCY '.345.DEO&K.C2 1493_RED BANK' OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 OPEN BRANCH FROM BUS 249571 TO BUS 250092 CKT 1 END
DAY_P4_STUART_HH	CONTINGENCY 'DAY_P4_STUART_HH' OPEN LINE FROM BUS 253077 TO BUS 342838 CKT 1 / 253077 09STUART 345 342838 7SPURLOCK 345 1 OPEN LINE FROM BUS 253077 TO BUS 253076 CKT 1 / 253077 09STUART 345 253076 09STUART 138 1 END

Short Circuit

27 Short Circuit

The following Breakers are overduty

None