Generation Interconnection

Feasibility Study Report

for

Queue Project AG1-320

GLENDALE-STEPHENSBURG 69 KV

54.8 MW Capacity / 82 MW Energy

January 2021

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1 Introduction

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

2 Preface

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

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

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

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

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Hardin County, Kentucky. The installed facilities will have a total capability of 82 MW with 54.8 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is October 01, 2023. This study does not imply a TO commitment to this in-service date.

Queue Number	AG1-320
Project Name	GLENDALE-STEPHENSBURG 69 KV
State	Kentucky
County	Hardin
Transmission Owner	EKPC
MFO	82
MWE	82
MWC	54.8
Fuel	Solar
Basecase Study Year	2024

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

4 Point of Interconnection

AG1-320 will interconnect with the EKPC transmission system along one of the following Points of Interconnection:

Primary POI: Glendale to Stephensburg 69 kV line.

Secondary POI: Glendale 69 kV substation.

5 Cost Summary

The AG1-320 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$6,350,000
Total System Network Upgrade Costs	$15,305,000
Total Costs	**$21,655,000**

This cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

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

6 Transmission Owner Scope of Work

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

6.1 Attachment Facilities

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

Description	Total Cost
Install necessary equipment (a 69 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panel) at the new South Hardin switching station, to accept the IC generator lead line/bus (Estimated time to implement is 21 months)	$1,170,000
Total Attachment Facility Costs	**$1,170,000**

6.2 Direct Connection Cost Estimate

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

Description	Total Cost
Construct a new 69 kV switching station (South Hardin) to facilitate connection of the IC solar generation project to the existing Stephensburg-Glendale 69 kV line (Estimated time to implement is 21 months)	$3,510,000
Total Direct Connection Facility Costs	**$3,510,000**

6.3 Non-Direct Connection Cost Estimate

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

Description	Total Cost
Construct facilities to loop the existing Stephensburg-Glendale 69 kV line into the new South Hardin switching station (Estimated time to implement is 21 months)	$240,000
Modify relays and/or settings at Stephensburg substation for the existing line to the new South Hardin switching station (Estimated time to implement is 9 months)	$85,000
Modify relays and/or settings at Hodgenville substation for the existing line to the new South Hardin switching station (Estimated time to implement is 9 months)	$85,000
Connect existing OPGW infrastructure on the Stephensburg-Glendale 69 kV line into the new South Hardin switching station (Estimated time to implement is 9 months)	$210,000
Install OPGW on the Stephensburg-Central Hardin 69 kV line (7.25 miles) (Estimated time to implement is 21 months)	$1,050,000
Total Non-Direct Connection Facility Costs	**$1,670,000**

7 Interconnection Customer Requirements

It is understood that the Interconnection Customer (IC) is responsible for all costs associated with this interconnection. The costs above are reimbursable to the Transmission Owner. The cost of the IC's generating plant and the costs for the line connecting the generating plant to the Point of Interconnection are not included in this report; these are assumed to be the IC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for the Transmission Owner to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

8 Revenue Metering and SCADA Requirements

8.1 PJM Requirements

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

8.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Irradiance (Watts/meter2) - (Required for plants with Maximum Facility Output of 3 MW or higher)
- Ambient air temperature (Fahrenheit) - (Accepted, not required)
- Wind speed (meters/second) - (Accepted, not required)
- Wind direction (decimal degrees from true north) - (Accepted, not required)

8.3 Interconnected Transmission Owner Requirements

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

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

9 Summer Peak - Load Flow Analysis - Primary POI

The Queue Project AG1-320 was evaluated as a 82.0 MW (Capacity 54.8 MW) injection tapping the Glendale to Stephensburg 69 kV line in the EKPC area. Project AG1-320 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-320 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

9.1 Generation Deliverability

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

None

9.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165344051	342307	2STEPHENSBRG	69.0	EKPC	324509	2EASTVIEW	69.0	LGEE	1	EKPC_P2-2_KU HODG 69	bus	45.0	81.42	114.95	DC	15.09
166765713	959690	AF2-260 TAP	69.0	EKPC	960170	AF2-308 TAP	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	70.98	123.19	DC	51.17

9.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169416786	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00	single	98.0	178.25	192.06	DC	13.54
169416788	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EXT_3242444ETOWN 138 3242614HARDIN CO 138 1	single	98.0	123.08	132.37	DC	9.11
169416789	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	Base Case	single	89.0	113.23	124.18	DC	9.74
169416783	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00	single	86.0	184.4	200.14	DC	13.54
169416784	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	Base Case	single	68.0	124.67	139.0	DC	9.74
169416843	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EXT_3243084SHREWSBURY 138 3248004MERE TVA 138 1	single	39.0	122.87	139.77	DC	6.59
169416845	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EXT_B-138-115	single	39.0	111.24	129.41	DC	7.09
166765666	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	135.71	187.92	DC	51.17

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765667	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	122.61	156.11	DC	32.83

9.4 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
164517354	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#363_1682	operation	1451.0	113.32	114.47	DC	16.68
169416785	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P2-1_4HARDINCO 138.00 TO 4CENT HARDIN138.00	operation	98.0	253.6	274.28	DC	20.26
169416787	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	Base Case	operation	89.0	161.99	178.37	DC	14.58
169416965	341287	2CENT HARDIN	69.0	EKPC	342568	4CENT HARDIN	138.0	EKPC	1	EKPC_P1-2_C HAR-KU ETN69	operation	175.0	89.25	105.06	DC	27.67
169416897	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P1-2_C HAR-KU ETN69	operation	66.0	95.77	145.17	DC	32.61
169416898	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	Base Case	operation	53.0	82.91	141.33	DC	30.96
169416781	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P2-1_4HARDINCO 138.00 TO 4CENT HARDIN138.00	operation	86.0	270.27	293.83	DC	20.26
169416782	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	Base Case	operation	68.0	188.49	209.93	DC	14.58
169416841	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EXT_3243084SHREWSBURY 138 324800 4MERE TVA 138 1	operation	39.0	144.77	170.06	DC	9.86
169416844	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	Base Case	operation	35.0	102.07	130.7	DC	10.02
169417076	342307	2STEPHENSBRG	69.0	EKPC	324509	2EASTVIEW	69.0	LGEE	1	EKPC_P1-2_C HAR-KU ETN69	operation	45.0	79.97	103.8	DC	10.72
169417030	342403	2UPTON T	69.0	EKPC	341161	2BONNIVEK	69.0	EKPC	1	EXT_3243084SHREWSBURY 138 324800 4MERE TVA 138 1	operation	54.0	99.37	117.64	DC	9.86
169416941	342568	4CENT HARDIN	138.0	EKPC	324261	4HARDIN CO	138.0	LGEE	1	EKPC_P1-2_C HAR-KU ETN69	operation	265.0	114.14	122.44	DC	21.99
169975171	959690	AF2-260 TAP	69.0	EKPC	960170	AF2-308 TAP	69.0	EKPC	1	EXT_P12:345:BREC:WILSON EHV-DAVIESS EHV [TIE] [NO SPS]:7WILSON:7DAVIESS:1::::	operation	98.0	71.65	103.42	DC	31.14

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
169416865	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	Base Case	operation	89.0	124.23	159.28	DC	31.2
169416866	960170	AF2-308 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EXT_P12:345:BREC:WILSON EHV-DAVIESS EHV [TIE] [NO SPS]:7WILSON:7DAVIESS:1::::	operation	98.0	125.52	157.29	DC	31.14
169975127	964570	AG1-320 TAP	69.0	EKPC	341533	2GLENDALE	69.0	EKPC	1	EKPC_P1-2_C HAR-KUETN69	operation	90.0	76.34	112.57	DC	32.61
169975128	964570	AG1-320 TAP	69.0	EKPC	341533	2GLENDALE	69.0	EKPC	1	Base Case	operation	77.0	64.08	104.29	DC	30.96

9.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166765666,166765667	6	AF2-308 TAP 69.0 kV - 2CENT HARDIN 69.0 kV Ckt 1	**EKPC** **EKPC-r0087b (2275) : Replace the 556 MCM ACSR jumpers at the Central Hardin substation using bundled 500 MCM copper or equivalent** **Project Type : FAC** **Cost : $25,000** **Time Estimate : 6.0 Months** **EKPC-r0087c (2276) : Rebuild the AF2-308 Tap-Central Hardin 69 kV line section using 954 MCM ACSS conductor at 392 degrees F (4.15 miles)** **Project Type : FAC** **Cost : $3,210,000** **Time Estimate : 16.0 Months** **EKPC-r0087d (2277) : Change the Zone 3 relay setting at Central Hardin associated with the line protection to at least 187 MVA LTE rating.** **Project Type : FAC** **Cost : $0** **Time Estimate : 6.0 Months** **EKPC-r0087e (2278) : Replace the 750 MCM copper jumpers at the Central Hardin substation using bundled 500 MCM copper or equivalent** **Project Type : FAC** **Cost : $25,000** **Time Estimate : 6.0 Months** **EKPC-r0087f (2279) : Replace the 1200A disconnect switches W124-633 and W124-635 at Central Hardin substation.** **Project Type : FAC** **Cost : $145,000** **Time Estimate : 9.0 Months**	$3,405,000
166765713	2	AF2-260 TAP 69.0 kV - AF2-308 TAP 69.0 kV Ckt 1	**EKPC** **EKPC-r0108a (2329) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the AF2-260 Tap-AF2-308 Tap 69 kV line section to 302 degrees F (1.0 miles)** **Project Type : FAC** **Cost : $70,000** **Time Estimate : 9.0 Months**	$70,000

ID	Idx	Facility	Upgrade Description	Cost
169416789,169416788,169416786	3	2CENT HARDIN 69.0 kV - 2KARGLE 69.0 kV Ckt 1	**EKPC** **EKPC-r0086a (2268) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Central Hardin-Kargle 69 kV line section to 302 degrees F (0.6 miles)** **Project Type : FAC** **Cost : $40,000** **Time Estimate : 6.0 Months** **EKPC-r0086b (2269) : Replace the 556 MCM ACSR jumpers at the Central Hardin substation using bundled 500 MCM copper or equivalent** **Project Type : FAC** **Cost : $15,000** **Time Estimate : 6.0 Months** **EKPC-r0086c (2270) : Rebuild the Central Hardin-Kargle 69 kV line section using 954 MCM ACSS conductor at 392 degrees F (0.6 miles)** **Project Type : FAC** **Cost : $450,000** **Time Estimate : 12.0 Months** **EKPC-r0086e (2272) : Replace the 750 MCM ACSR jumpers at the Central Hardin substation using bundled 500 MCM copper or equivalent** **Project Type : FAC** **Cost : $15,000** **Time Estimate : 6.0 Months** **EKPC-r0086f (2273) : Replace the 1200A disconnect switches W124-623 and W124-625 at Central Hardin substation and W80-605 at the Kargle tap location..** **Project Type : FAC** **Cost : $300,000** **Time Estimate : 12.0 Months**	$820,000
165344051	1	2STEPHENSBRG 69.0 kV - 2EASTVIEW 69.0 kV Ckt 1	**EKPC** **EKPC-r0121b (2343) : LGEE violation (non PJM area). EKPC emergency rating at 56 MVA** **Project Type : FAC** **Cost : $0** **Time Estimate : 0.0 Months** **LGEE** **NonPJMArea (2250) : 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 : 0.0 Months**	$0

ID	Idx	Facility	Upgrade Description	Cost
169416783,169416784	4	2KARGLE 69.0 kV - 2ETOWN KU 69.0 kV Ckt 1	**EKPC** **EKPC-r0090a (2283) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Kargle-KU Elizabethtown 69 kV line section to 302 degrees F (1.45 miles)** **Project Type : FAC** **Cost : $100,000** **Time Estimate : 9.0 Months** **EKPC-r0090b (2284) : Rebuild the 556 MCM ACSR conductor section of the Kargle-KU Elizabethtown 69 kV line section using 954 MCM ACSR conductor (1.45 miles)** **Project Type : FAC** **Cost : $2,010,000** **Time Estimate : 15.0 Months** **LGEE** **NonPJMArea (2250) : 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 : 0.0 Months**	$2,110,000
169416843,169416845	5	2STEPHENSBRG 69.0 kV - 2UPTON T 69.0 kV Ckt 1	**EKPC** **EKPC-r0089 (2281) : Increase the maximum operating temperature of the 4/0 ACSR conductor in the Stephensburg-Upton Tap 69 kV line section to 212 degrees F (10.75 miles)** **Project Type : FAC** **Cost : $730,000** **Time Estimate : 18.0 Months** **EKPC-r0089b (2282) : Rebuild the Stephensburg-Upton Tap 69 kV line section using 556 MCM ACSR conductor (10.75 miles)** **Project Type : FAC** **Cost : $8,170,000** **Time Estimate : 24.0 Months**	$8,900,000
			TOTAL COST	**$15,305,000**

9.6 Flow Gate Details - Primary POI

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

9.6.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165344051	342307	2STEPHENSBRG	EKPC	324509	2EASTVIEW	LGEE	1	EKPC_P2-2_KU HODG 69	bus	45.0	81.42	114.95	DC	15.09

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	8.9058	50/50	8.9058
959692	AF2-260 E	4.4529	50/50	4.4529
960171	AF2-308	3.7537	50/50	3.7537
960181	AF2-309 C	5.6305	50/50	5.6305
960182	AF2-309 E	3.7537	50/50	3.7537
961001	AF2-391 C O1	3.7522	Adder	4.41
961002	AF2-391 E O1	2.5014	Adder	2.94
964571	AG1-320 C O1	10.0837	50/50	10.0837
964572	AG1-320 E O1	5.0051	50/50	5.0051
966221	AG1-491 C O1	1.1600	Adder	2.57
966222	AG1-491 E O1	0.7734	Adder	1.72
LGEE	LGEE	0.1596	Confirmed LTF	0.1596
G-007A	G-007A	0.0024	Confirmed LTF	0.0024
VFT	VFT	0.0064	Confirmed LTF	0.0064
CALDERWOOD	CALDERWOOD	0.0621	Confirmed LTF	0.0621
PRAIRIE	PRAIRIE	0.4701	Confirmed LTF	0.4701
CHEOAH	CHEOAH	0.0616	Confirmed LTF	0.0616
CBM-N	CBM-N	0.0012	Confirmed LTF	0.0012
COTTONWOOD	COTTONWOOD	0.4158	Confirmed LTF	0.4158
HAMLET	HAMLET	0.0358	Confirmed LTF	0.0358
GIBSON	GIBSON	0.0497	Confirmed LTF	0.0497
CATAWBA	CATAWBA	0.0245	Confirmed LTF	0.0245

9.6.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765713	959690	AF2-260 TAP	EKPC	960170	AF2-308 TAP	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	70.98	123.19	DC	51.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	41.8212	50/50	41.8212
959692	AF2-260 E	20.9106	50/50	20.9106
960172	AF2-308 BAT	7.6580	50/50	7.6580
960741	AF2-365 C O1	3.4533	50/50	3.4533
960742	AF2-365 E O1	2.3022	50/50	2.3022
961003	AF2-391 BAT	14.9160	50/50	14.9160
962473	AG1-096 BAT	0.7580	Merchant Transmission	0.7580
964571	AG1-320 C O1	34.1968	50/50	34.1968
964572	AG1-320 E O1	16.9736	50/50	16.9736
966031	AG1-472 C	1.2488	Adder	2.77
966032	AG1-472 E	0.8325	Adder	1.85
WEC	WEC	0.0110	Confirmed LTF	0.0110
CPLE	CPLE	0.0908	Confirmed LTF	0.0908
G-007A	G-007A	0.0240	Confirmed LTF	0.0240
VFT	VFT	0.0645	Confirmed LTF	0.0645
CBM-W2	CBM-W2	2.1683	Confirmed LTF	2.1683
TVA	TVA	0.6412	Confirmed LTF	0.6412
CBM-S2	CBM-S2	1.8374	Confirmed LTF	1.8374
CBM-S1	CBM-S1	0.1102	Confirmed LTF	0.1102
CBM-N	CBM-N	0.0108	Confirmed LTF	0.0108
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0426	Confirmed LTF	0.0426
BLUEG	BLUEG	0.9496	Confirmed LTF	0.9496
TRIMBLE	TRIMBLE	0.2660	Confirmed LTF	0.2660
LAGN	LAGN	0.6247	Confirmed LTF	0.6247
CBM-W1	CBM-W1	0.4907	Confirmed LTF	0.4907

9.6.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169416786	341287	2CENT HARDIN	EKPC	341713	2KARGLE	EKPC	1	EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00	single	98.0	178.25	192.06	DC	13.54

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
952821	J762	14.3260	PJM External (MISO)	14.3260
957961	AF2-090 C	31.5295	80/20	31.5295
959691	AF2-260 C	25.1352	80/20	25.1352
960171	AF2-308	12.5731	80/20	12.5731
960181	AF2-309 C	18.8597	80/20	18.8597
960741	AF2-365 C O1	1.8420	80/20	1.8420
961001	AF2-391 C O1	43.3087	80/20	43.3087
964571	AG1-320 C O1	13.5416	80/20	13.5416
966221	AG1-491 C O1	25.2634	80/20	25.2634
WEC	WEC	0.0482	Confirmed LTF	0.0482
CPLE	CPLE	0.0949	Confirmed LTF	0.0949
CBM-W2	CBM-W2	4.3546	Confirmed LTF	4.3546
NY	NY	0.0044	Confirmed LTF	0.0044
TVA	TVA	0.8820	Confirmed LTF	0.8820
SIGE	SIGE	0.1227	Confirmed LTF	0.1227
CBM-S2	CBM-S2	2.0045	Confirmed LTF	2.0045
CBM-S1	CBM-S1	0.1436	Confirmed LTF	0.1436
MEC	MEC	0.4497	Confirmed LTF	0.4497
BLUEG	BLUEG	1.3385	Confirmed LTF	1.3385
TRIMBLE	TRIMBLE	0.3740	Confirmed LTF	0.3740
LAGN	LAGN	0.9118	Confirmed LTF	0.9118
CBM-W1	CBM-W1	1.8787	Confirmed LTF	1.8787

9.6.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169416783	341713	2KARGLE	EKPC	324519	2ETOWN KU	LGEE	1	EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00	single	86.0	184.4	200.14	DC	13.54

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
952821	J762	14.3260	PJM External (MISO)	14.3260
957961	AF2-090 C	31.5295	80/20	31.5295
959691	AF2-260 C	25.1352	80/20	25.1352
960171	AF2-308	12.5731	80/20	12.5731
960181	AF2-309 C	18.8597	80/20	18.8597
960741	AF2-365 C O1	1.8420	80/20	1.8420
961001	AF2-391 C O1	43.3087	80/20	43.3087
964571	AG1-320 C O1	13.5416	80/20	13.5416
966221	AG1-491 C O1	25.2634	80/20	25.2634
WEC	WEC	0.0482	Confirmed LTF	0.0482
CPLE	CPLE	0.0949	Confirmed LTF	0.0949
CBM-W2	CBM-W2	4.3546	Confirmed LTF	4.3546
NY	NY	0.0044	Confirmed LTF	0.0044
TVA	TVA	0.8820	Confirmed LTF	0.8820
SIGE	SIGE	0.1227	Confirmed LTF	0.1227
CBM-S2	CBM-S2	2.0045	Confirmed LTF	2.0045
CBM-S1	CBM-S1	0.1436	Confirmed LTF	0.1436
MEC	MEC	0.4497	Confirmed LTF	0.4497
BLUEG	BLUEG	1.3385	Confirmed LTF	1.3385
TRIMBLE	TRIMBLE	0.3740	Confirmed LTF	0.3740
LAGN	LAGN	0.9118	Confirmed LTF	0.9118
CBM-W1	CBM-W1	1.8787	Confirmed LTF	1.8787

9.6.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
169416843	342307	2STEPHENSBRG	EKPC	342403	2UPTON T	EKPC	1	EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1	single	39.0	122.87	139.77	DC	6.59

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	7.4904	80/20	7.4904
960171	AF2-308	3.1548	80/20	3.1548
960181	AF2-309 C	4.7321	80/20	4.7321
961001	AF2-391 C O1	3.6806	80/20	3.6806
964571	AG1-320 C O1	6.5919	80/20	6.5919
966221	AG1-491 C O1	2.1470	80/20	2.1470
WEC	WEC	0.0158	Confirmed LTF	0.0158
LGEE	LGEE	0.0980	Confirmed LTF	0.0980
CALDERWOOD	CALDERWOOD	0.1014	Confirmed LTF	0.1014
NY	NY	0.0061	Confirmed LTF	0.0061
SIGE	SIGE	0.0435	Confirmed LTF	0.0435
CHEOAH	CHEOAH	0.1001	Confirmed LTF	0.1001
COTTONWOOD	COTTONWOOD	0.2163	Confirmed LTF	0.2163
HAMLET	HAMLET	0.0491	Confirmed LTF	0.0491
MEC	MEC	0.0365	Confirmed LTF	0.0365
CATAWBA	CATAWBA	0.0336	Confirmed LTF	0.0336
CBM-W1	CBM-W1	0.5608	Confirmed LTF	0.5608

9.6.6 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
166765666	960170	AF2-308 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	135.71	187.92	DC	51.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	41.8212	50/50	41.8212
959692	AF2-260 E	20.9106	50/50	20.9106
960171	AF2-308	20.3420	50/50	20.3420
960181	AF2-309 C	30.5130	50/50	30.5130
960182	AF2-309 E	20.3420	50/50	20.3420
960741	AF2-365 C O1	3.4533	50/50	3.4533
960742	AF2-365 E O1	2.3022	50/50	2.3022
961003	AF2-391 BAT	14.9160	50/50	14.9160
962473	AG1-096 BAT	0.7580	Merchant Transmission	0.7580
964571	AG1-320 C O1	34.1968	50/50	34.1968
964572	AG1-320 E O1	16.9736	50/50	16.9736
966031	AG1-472 C	1.2488	Adder	2.77
966032	AG1-472 E	0.8325	Adder	1.85
WEC	WEC	0.0110	Confirmed LTF	0.0110
CPLE	CPLE	0.0908	Confirmed LTF	0.0908
G-007A	G-007A	0.0240	Confirmed LTF	0.0240
VFT	VFT	0.0645	Confirmed LTF	0.0645
CBM-W2	CBM-W2	2.1683	Confirmed LTF	2.1683
TVA	TVA	0.6412	Confirmed LTF	0.6412
CBM-S2	CBM-S2	1.8374	Confirmed LTF	1.8374
CBM-S1	CBM-S1	0.1102	Confirmed LTF	0.1102
CBM-N	CBM-N	0.0108	Confirmed LTF	0.0108
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0426	Confirmed LTF	0.0426
BLUEG	BLUEG	0.9496	Confirmed LTF	0.9496
TRIMBLE	TRIMBLE	0.2660	Confirmed LTF	0.2660
LAGN	LAGN	0.6247	Confirmed LTF	0.6247
CBM-W1	CBM-W1	0.4907	Confirmed LTF	0.4907

9.7 Queue Dependencies – Primary POI

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

Queue Number	Project Name	Status
AF2-090	Central Hardin 138 kV	Active
AF2-260	Stephensburg 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
AG1-096	Rineyville 69 kV	Active
AG1-320	Glendale-Stephensburg 69 kV	Active
AG1-472	Seymour-Cave City 69 kV	Active
AG1-491	Central Hardin 69 kV	Active
J762	MISO	MISO

9.8 Contingency Descriptions - Primary POI

Contingency Name	Contingency Definition
EXT_324244 4ETOWN 138 324261 4HARDIN CO 138 1	CONTINGENCY 'EXT_324244 4ETOWN 138 324261 4HARDIN CO 138 1' OPEN BRANCH FROM BUS 324244 TO BUS 324261 CKT 1 END
AEP_P1-2_#363_1682	CONTINGENCY 'AEP_P1-2_#363_1682' OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 END
EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00	CONTINGENCY 'EKPC_P2-1_4HARDIN CO 138.00 TO 4CENT HARDIN138.00' OPEN BRANCH FROM BUS 324261 TO BUS 342568 CKT 1 /*4HARDIN CO 138.004CENT HARDIN138.00 END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1	CONTINGENCY 'EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1' OPEN BRANCH FROM BUS 324308 TO BUS 324800 CKT 1 END
EXT_P12:345:BREC:WILSON EHV-DAVIESS EHV [TIE] [NO SPS]:7WILSON:7DAVIESS:1::::	CONTINGENCY 'EXT_P12:345:BREC:WILSON EHV-DAVIESS EHV [TIE] [NO SPS]:7WILSON:7DAVIESS:1::::'/ 9162 OPEN BRANCH FROM BUS 324104 TO BUS 340561 CKT 1 / 324104 7DAVIESS 345 340561 7WILSON 345 1 END
Base Case	
EKPC_P1-2_C HAR-KU ETN69	CONTINGENCY 'EKPC_P1-2_C HAR-KU ETN69' /* CENTRAL HARDIN - KU ETOWN OPEN BRANCH FROM BUS 341287 TO BUS 341713 CKT 1 /* 341287 2CENT HARDIN69.000 341713 2KARGLE 69.000 OPEN BRANCH FROM BUS 324519 TO BUS 341713 CKT 1 /* 324519 2ETOWN KU 69.000 341713 2KARGLE 69.000 END

Contingency Name	Contingency Definition
EXT_B-138-115	CONTINGENCY 'EXT_B-138-115' / 2206 OPEN BRANCH FROM BUS 324272 TO BUS 324308 CKT 1 / 324272 4LEITCHFIELD 138 324308 4SHREWSBURY 138 1 OPEN BRANCH FROM BUS 324291 TO BUS 324308 CKT 1 / 324291 4OHIO COUNTY 138 324308 4SHREWSBURY 138 1 OPEN BRANCH FROM BUS 324308 TO BUS 324800 CKT 1 / 324308 4SHREWSBURY 138 324800 4MERE TVA 138 1 END
EKPC_P2-2_KU HODG 69	CONTINGENCY 'EKPC_P2-2_KU HODG 69' /* KU HODGENVILLE 69 TIE OPEN BUS 341632 /* 2HODGENVILLE END

10 Short Circuit Analysis - Primary POI

The following Breakers are overdutied:

None.

11 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-320 was evaluated as a 82.0 MW (Capacity 54.8 MW) injection at the Glendale 69 kV substation in the EKPC area. Project AG1-320 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-320 was studied with a commercial probability of 53.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765718	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	66.0	75.62	137.27	DC	40.69
166765719	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P2-2_NELSON 138/69	bus	66.0	72.92	133.71	DC	40.12
166765935	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P7-1_BULL 161 DBL	tower	66.0	69.74	130.48	DC	40.09
166765936	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P7-1_COOP 161 DBL 1	tower	66.0	67.12	127.89	DC	40.11
173866309	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	EKPC_P2-3_GREENW45-1014	breaker	66.0	74.34	134.4	DC	39.64
165344051	342307	2STEPHENSBRG	69.0	EKPC	324509	2EASTVIEW	69.0	LGEE	1	EKPC_P2-2_KUHODG 69	bus	45.0	81.42	114.95	DC	15.09
174053696	342307	2STEPHENSBRG	69.0	EKPC	324509	2EASTVIEW	69.0	LGEE	1	EKPC_P2-4_CHARD W124-91T	breaker	45.0	81.7	102.31	DC	9.27
166765741	342403	2UPTON T	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P2-2_KUHODG 69	bus	54.0	79.95	109.1	DC	15.74
166765713	959690	AF2-260 TAP	69.0	EKPC	960170	AF2-308 TAP	69.0	EKPC	1	EKPC_P2-2_KUHODG 69	bus	98.0	70.97	123.19	DC	51.17

11.3 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765661	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P2-2_HARD-CHARD 138	bus	98.0	253.59	269.37	DC	15.47
166765663	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	163.03	190.39	DC	26.81
166765864	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P7-1_BULL 161 DBL	tower	98.0	149.13	160.14	DC	10.8

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC| DC	MW IMPACT
166765865	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	98.0	147.82	158.89	DC	10.85
169416788	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EXT_324244 4ETOWN 138 324261 4HARDIN CO 138 1	single	98.0	123.08	129.73	DC	6.52
169416789	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	Base Case	single	89.0	113.23	121.37	DC	7.24
173866230	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	EKPC_P4-5_BULL W84-1024	breaker	98.0	149.38	160.34	DC	10.74
165343971	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P2-2_HARD-CHARD 138	bus	86.0	270.25	288.23	DC	15.47
165343973	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P2-2_KU HODG 69	bus	86.0	167.17	198.35	DC	26.81
165344224	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P7-1_BULL 161 DBL	tower	86.0	151.33	163.88	DC	10.8
165344225	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	86.0	149.84	162.46	DC	10.85
169416784	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	Base Case	single	68.0	124.67	135.32	DC	7.24
173866192	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	EKPC_P2-4_CHARD W124-91T	breaker	86.0	293.65	319.51	DC	22.24
166765670	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	39.0	117.88	158.24	DC	15.74
169416843	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1	single	39.0	122.87	136.84	DC	5.45
172310740	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	135.71	187.92	DC	51.17
172310741	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	98.0	122.7	149.77	DC	26.53
172310976	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	DEOK_P7_4512EBTANNERS4516 TERMINALEB	tower	98.0	113.39	139.14	DC	25.24
172310977	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	AEP_P7-1_#11028	tower	98.0	113.28	139.03	DC	25.24
173866294	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	AEP_P5_#11280_05ROCK_05ROCK	breaker	98.0	115.29	141.04	DC	25.24
172310736	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	134.83	187.05	DC	51.17
172310737	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	DEOK_P2-2_1448_ZIMMER	bus	98.0	113.69	139.44	DC	25.24
172310933	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	DEOK_P7_4512EBTANNERS4516 TERMINALEB	tower	98.0	113.19	138.94	DC	25.24
172310934	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	AEP_P7-1_#11028	tower	98.0	113.08	138.83	DC	25.24
173866222	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	AEP_P5_#11280_05ROCK_05ROCK	breaker	98.0	115.08	140.84	DC	25.24

11.4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed

with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
164517354	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#363_1682	operation	1451.0	113.32	114.47	DC	16.71
169416787	341287	2CENT HARDIN	69.0	EKPC	341713	2KARGLE	69.0	EKPC	1	Base Case	operation	89.0	161.96	174.14	DC	10.84
169416965	341287	2CENT HARDIN	69.0	EKPC	342568	4CENT HARDIN	138.0	EKPC	1	EKPC_P1-2_C HAR-KU ETN69	operation	175.0	89.25	102.17	DC	22.61
169416898	341533	2GLENDALE	69.0	EKPC	341632	2HODGENVILLE	69.0	EKPC	1	Base Case	operation	53.0	82.91	158.63	DC	40.13
169416782	341713	2KARGLE	69.0	EKPC	324519	2ETOWN KU	69.0	LGEE	1	Base Case	operation	68.0	188.45	204.38	DC	10.84
169416842	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	EXT_B-138-115	operation	39.0	134.74	157.26	DC	8.78
169416844	342307	2STEPHENSBRG	69.0	EKPC	342403	2UPTON T	69.0	EKPC	1	Base Case	operation	35.0	102.07	125.95	DC	8.36
169417031	342403	2UPTON T	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EXT_B-138-115	operation	54.0	92.31	108.58	DC	8.78
169416941	342568	4CENT HARDIN	138.0	EKPC	324261	4HARDIN CO	138.0	LGEE	1	EKPC_P1-2_C HAR-KU ETN69	operation	265.0	114.14	120.61	DC	17.15
174676774	960170	AF2-308 TAP	69.0	EKPC	966220	AG1-491 TAP	69.0	EKPC	1	Base Case	operation	89.0	124.23	152.58	DC	25.24
174676655	966220	AG1-491 TAP	69.0	EKPC	341287	2CENT HARDIN	69.0	EKPC	1	Base Case	operation	89.0	124.11	152.47	DC	25.24

11.5 Flow Gate Details - Secondary POI

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

11.5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765718	341533	2GLENDALE	EKPC	341632	2HODGENVILLE	EKPC	1	EKPC_P2-2_BONNIE 138/69	bus	66.0	75.62	137.27	DC	40.69

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	9.5010	50/50	9.5010
959692	AF2-260 E	4.7505	50/50	4.7505
960171	AF2-308	3.9253	50/50	3.9253
960181	AF2-309 C	5.8880	50/50	5.8880
960182	AF2-309 E	3.9253	50/50	3.9253
960741	AF2-365 C O1	1.4874	Adder	1.75
960742	AF2-365 E O1	0.9916	Adder	1.17
964571	AG1-320 C O2	27.1945	50/50	27.1945
964572	AG1-320 E O2	13.4980	50/50	13.4980
966221	AG1-491 C O2	1.8351	Adder	4.07
966222	AG1-491 E O2	1.2234	Adder	2.72
WEC	WEC	0.0170	Confirmed LTF	0.0170
CPLE	CPLE	0.0082	Confirmed LTF	0.0082
CBM-W2	CBM-W2	1.0394	Confirmed LTF	1.0394
NY	NY	0.0028	Confirmed LTF	0.0028
TVA	TVA	0.1526	Confirmed LTF	0.1526
O-066	O-066	0.0336	Confirmed LTF	0.0336
SIGE	SIGE	0.0297	Confirmed LTF	0.0297
CBM-S2	CBM-S2	0.2088	Confirmed LTF	0.2088
CBM-S1	CBM-S1	0.0281	Confirmed LTF	0.0281
G-007	G-007	0.0052	Confirmed LTF	0.0052
MEC	MEC	0.1239	Confirmed LTF	0.1239
BLUEG	BLUEG	0.0382	Confirmed LTF	0.0382
TRIMBLE	TRIMBLE	0.0150	Confirmed LTF	0.0150
LAGN	LAGN	0.1768	Confirmed LTF	0.1768
CBM-W1	CBM-W1	0.6589	Confirmed LTF	0.6589

11.5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
165344051	342307	2STEPHENSBRG	EKPC	324509	2EASTVIEW	LGEE	1	EKPC_P2-2_KU HODG 69	bus	45.0	81.42	114.95	DC	15.09

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	8.9058	50/50	8.9058
959692	AF2-260 E	4.4529	50/50	4.4529
960171	AF2-308	3.7537	50/50	3.7537
960181	AF2-309 C	5.6305	50/50	5.6305
960182	AF2-309 E	3.7537	50/50	3.7537
961001	AF2-391 C O1	3.7522	Adder	4.41
961002	AF2-391 E O1	2.5014	Adder	2.94
964571	AG1-320 C O2	10.0837	50/50	10.0837
964572	AG1-320 E O2	5.0051	50/50	5.0051
966221	AG1-491 C O2	1.8896	Adder	4.19
966222	AG1-491 E O2	1.2598	Adder	2.8
LGEE	LGEE	0.1596	Confirmed LTF	0.1596
G-007A	G-007A	0.0024	Confirmed LTF	0.0024
VFT	VFT	0.0064	Confirmed LTF	0.0064
CALDERWOOD	CALDERWOOD	0.0621	Confirmed LTF	0.0621
PRAIRIE	PRAIRIE	0.4701	Confirmed LTF	0.4701
CHEOAH	CHEOAH	0.0616	Confirmed LTF	0.0616
CBM-N	CBM-N	0.0012	Confirmed LTF	0.0012
COTTONWOOD	COTTONWOOD	0.4158	Confirmed LTF	0.4158
HAMLET	HAMLET	0.0358	Confirmed LTF	0.0358
GIBSON	GIBSON	0.0497	Confirmed LTF	0.0497
CATAWBA	CATAWBA	0.0245	Confirmed LTF	0.0245

11.5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765741	342403	2UPTON T	EKPC	341161	2BONNIV EK	EKPC	1	EKPC_P2-2_KU HODG 69	bus	54.0	79.95	109.1	DC	15.74

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	9.2736	50/50	9.2736
959692	AF2-260 E	4.6368	50/50	4.6368
960171	AF2-308	3.9046	50/50	3.9046
960181	AF2-309 C	5.8569	50/50	5.8569
960182	AF2-309 E	3.9046	50/50	3.9046
961001	AF2-391 C O1	3.8550	Adder	4.54
961002	AF2-391 E O1	2.5700	Adder	3.02
964571	AG1-320 C O2	10.5189	50/50	10.5189
964572	AG1-320 E O2	5.2210	50/50	5.2210
966221	AG1-491 C O2	4.3474	50/50	4.3474
966222	AG1-491 E O2	2.8983	50/50	2.8983
WEC	WEC	0.0050	Confirmed LTF	0.0050
LGEE	LGEE	0.1338	Confirmed LTF	0.1338
CALDERWOOD	CALDERWOOD	0.1029	Confirmed LTF	0.1029
NY	NY	0.0044	Confirmed LTF	0.0044
PRAIRIE	PRAIRIE	0.1369	Confirmed LTF	0.1369
O-066	O-066	0.0740	Confirmed LTF	0.0740
SIGE	SIGE	0.0265	Confirmed LTF	0.0265
CHEOAH	CHEOAH	0.1016	Confirmed LTF	0.1016
COTTONWOOD	COTTONWOOD	0.3318	Confirmed LTF	0.3318
G-007	G-007	0.0116	Confirmed LTF	0.0116
HAMLET	HAMLET	0.0520	Confirmed LTF	0.0520
CATAWBA	CATAWBA	0.0357	Confirmed LTF	0.0357
CBM-W1	CBM-W1	0.1542	Confirmed LTF	0.1542

11.5.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765713	959690	AF2-260 TAP	EKPC	960170	AF2-308 TAP	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	70.97	123.19	DC	51.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	41.8206	50/50	41.8206
959692	AF2-260 E	20.9103	50/50	20.9103
960172	AF2-308 BAT	7.6580	50/50	7.6580
960741	AF2-365 C O1	3.4533	50/50	3.4533
960742	AF2-365 E O1	2.3022	50/50	2.3022
961003	AF2-391 BAT	14.9160	50/50	14.9160
962473	AG1-096 BAT	0.7557	Merchant Transmission	0.7557
964571	AG1-320 C O2	34.1968	50/50	34.1968
964572	AG1-320 E O2	16.9736	50/50	16.9736
966031	AG1-472 C O2	1.8657	Adder	4.14
966032	AG1-472 E O2	1.2438	Adder	2.76
WEC	WEC	0.0110	Confirmed LTF	0.0110
CPLE	CPLE	0.0908	Confirmed LTF	0.0908
G-007A	G-007A	0.0240	Confirmed LTF	0.0240
VFT	VFT	0.0645	Confirmed LTF	0.0645
CBM-W2	CBM-W2	2.1683	Confirmed LTF	2.1683
TVA	TVA	0.6412	Confirmed LTF	0.6412
CBM-S2	CBM-S2	1.8374	Confirmed LTF	1.8374
CBM-S1	CBM-S1	0.1102	Confirmed LTF	0.1102
CBM-N	CBM-N	0.0108	Confirmed LTF	0.0108
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0426	Confirmed LTF	0.0426
BLUEG	BLUEG	0.9496	Confirmed LTF	0.9496
TRIMBLE	TRIMBLE	0.2660	Confirmed LTF	0.2660
LAGN	LAGN	0.6247	Confirmed LTF	0.6247
CBM-W1	CBM-W1	0.4907	Confirmed LTF	0.4907

11.5.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765661	341287	2CENT HARDIN	EKPC	341713	2KARGLE	EKPC	1	EKPC_P2-2_HARD-CHARD 138	bus	98.0	253.59	269.37	DC	15.47

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
952821	J762	14.3260	PJM External (MISO)	14.3260
957961	AF2-090 C	31.5295	50/50	31.5295
957962	AF2-090 E	15.5934	50/50	15.5934
959691	AF2-260 C	25.1352	50/50	25.1352
959692	AF2-260 E	12.5676	50/50	12.5676
960171	AF2-308	12.5731	50/50	12.5731
960181	AF2-309 C	18.8597	50/50	18.8597
960182	AF2-309 E	12.5731	50/50	12.5731
960741	AF2-365 C O1	1.5657	Adder	1.84
960742	AF2-365 E O1	1.0438	Adder	1.23
961001	AF2-391 C O1	43.3087	50/50	43.3087
961002	AF2-391 E O1	28.8725	50/50	28.8725
962473	AG1-096 BAT	3.4180	50/50	3.4180
964571	AG1-320 C O2	10.3369	50/50	10.3369
964572	AG1-320 E O2	5.1307	50/50	5.1307
966221	AG1-491 C O2	21.8698	50/50	21.8698
966222	AG1-491 E O2	14.5799	50/50	14.5799
WEC	WEC	0.0482	Confirmed LTF	0.0482
CPLE	CPLE	0.0949	Confirmed LTF	0.0949
CBM-W2	CBM-W2	4.3546	Confirmed LTF	4.3546
NY	NY	0.0044	Confirmed LTF	0.0044
TVA	TVA	0.8820	Confirmed LTF	0.8820
O-066	O-066	0.0336	Confirmed LTF	0.0336
SIGE	SIGE	0.1227	Confirmed LTF	0.1227
CBM-S2	CBM-S2	2.0045	Confirmed LTF	2.0045
CBM-S1	CBM-S1	0.1436	Confirmed LTF	0.1436
G-007	G-007	0.0052	Confirmed LTF	0.0052
MEC	MEC	0.4497	Confirmed LTF	0.4497
BLUEG	BLUEG	1.3402	Confirmed LTF	1.3402
TRIMBLE	TRIMBLE	0.3740	Confirmed LTF	0.3740
LAGN	LAGN	0.9118	Confirmed LTF	0.9118
CBM-W1	CBM-W1	1.8787	Confirmed LTF	1.8787

11.5.6 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
173866192	341713	2KARGLE	EKPC	324519	2ETOWN KU	LGEE	1	EKPC_P2-4_CHARD W124-91T	breaker	86.0	293.65	319.51	DC	22.24

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
957961	AF2-090 C	56.5506	50/50	56.5506
957962	AF2-090 E	27.9679	50/50	27.9679
959691	AF2-260 C	32.5698	50/50	32.5698
959692	AF2-260 E	16.2849	50/50	16.2849
960171	AF2-308	16.2411	50/50	16.2411
960181	AF2-309 C	24.3617	50/50	24.3617
960182	AF2-309 E	16.2411	50/50	16.2411
960741	AF2-365 C O1	2.1568	Adder	2.54
960742	AF2-365 E O1	1.4379	Adder	1.69
961001	AF2-391 C O1	55.3212	50/50	55.3212
961002	AF2-391 E O1	36.8808	50/50	36.8808
962473	AG1-096 BAT	0.9413	Merchant Transmission	0.9413
964571	AG1-320 C O2	14.8640	50/50	14.8640
964572	AG1-320 E O2	7.3777	50/50	7.3777
966031	AG1-472 C O2	1.3891	Adder	3.08
966032	AG1-472 E O2	0.9261	Adder	2.06
966221	AG1-491 C O2	28.0791	50/50	28.0791
966222	AG1-491 E O2	18.7194	50/50	18.7194
WEC	WEC	0.0085	Confirmed LTF	0.0085
CPLE	CPLE	0.0778	Confirmed LTF	0.0778
G-007A	G-007A	0.0216	Confirmed LTF	0.0216
VFT	VFT	0.0581	Confirmed LTF	0.0581
CBM-W2	CBM-W2	1.8099	Confirmed LTF	1.8099
TVA	TVA	0.5432	Confirmed LTF	0.5432
CBM-S2	CBM-S2	1.5660	Confirmed LTF	1.5660
CBM-S1	CBM-S1	0.0923	Confirmed LTF	0.0923
CBM-N	CBM-N	0.0096	Confirmed LTF	0.0096
MEC	MEC	0.1684	Confirmed LTF	0.1684
GIBSON	GIBSON	0.0388	Confirmed LTF	0.0388
BLUEG	BLUEG	0.8489	Confirmed LTF	0.8489
TRIMBLE	TRIMBLE	0.2365	Confirmed LTF	0.2365
LAGN	LAGN	0.5250	Confirmed LTF	0.5250
CBM-W1	CBM-W1	0.3785	Confirmed LTF	0.3785

11.5.7 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
166765670	342307	2STEPHENSBRG	EKPC	342403	2UPTON T	EKPC	1	EKPC_P2-2_KU HODG 69	bus	39.0	117.88	158.24	DC	15.74

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	9.2736	50/50	9.2736
959692	AF2-260 E	4.6368	50/50	4.6368
960171	AF2-308	3.9046	50/50	3.9046
960181	AF2-309 C	5.8569	50/50	5.8569
960182	AF2-309 E	3.9046	50/50	3.9046
961001	AF2-391 C O1	3.8550	Adder	4.54
961002	AF2-391 E O1	2.5700	Adder	3.02
964571	AG1-320 C O2	10.5189	50/50	10.5189
964572	AG1-320 E O2	5.2210	50/50	5.2210
966221	AG1-491 C O2	4.3474	50/50	4.3474
966222	AG1-491 E O2	2.8983	50/50	2.8983
WEC	WEC	0.0050	Confirmed LTF	0.0050
LGEE	LGEE	0.1338	Confirmed LTF	0.1338
CALDERWOOD	CALDERWOOD	0.1029	Confirmed LTF	0.1029
NY	NY	0.0044	Confirmed LTF	0.0044
PRAIRIE	PRAIRIE	0.1369	Confirmed LTF	0.1369
O-066	O-066	0.0740	Confirmed LTF	0.0740
SIGE	SIGE	0.0265	Confirmed LTF	0.0265
CHEOAH	CHEOAH	0.1016	Confirmed LTF	0.1016
COTTONWOOD	COTTONWOOD	0.3318	Confirmed LTF	0.3318
G-007	G-007	0.0116	Confirmed LTF	0.0116
HAMLET	HAMLET	0.0520	Confirmed LTF	0.0520
CATAWBA	CATAWBA	0.0357	Confirmed LTF	0.0357
CBM-W1	CBM-W1	0.1542	Confirmed LTF	0.1542

11.5.8 Index 8

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
172310740	960170	AF2-308 TAP	EKPC	966220	AG1-491 TAP	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	135.71	187.92	DC	51.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	41.8206	50/50	41.8206
959692	AF2-260 E	20.9103	50/50	20.9103
960171	AF2-308	20.3420	50/50	20.3420
960181	AF2-309 C	30.5130	50/50	30.5130
960182	AF2-309 E	20.3420	50/50	20.3420
960741	AF2-365 C O1	3.4533	50/50	3.4533
960742	AF2-365 E O1	2.3022	50/50	2.3022
961003	AF2-391 BAT	14.9160	50/50	14.9160
962473	AG1-096 BAT	0.7557	Merchant Transmission	0.7557
964571	AG1-320 C O2	34.1968	50/50	34.1968
964572	AG1-320 E O2	16.9736	50/50	16.9736
966031	AG1-472 C O2	1.8657	Adder	4.14
966032	AG1-472 E O2	1.2438	Adder	2.76
WEC	WEC	0.0110	Confirmed LTF	0.0110
CPLE	CPLE	0.0908	Confirmed LTF	0.0908
G-007A	G-007A	0.0240	Confirmed LTF	0.0240
VFT	VFT	0.0645	Confirmed LTF	0.0645
CBM-W2	CBM-W2	2.1683	Confirmed LTF	2.1683
TVA	TVA	0.6412	Confirmed LTF	0.6412
CBM-S2	CBM-S2	1.8374	Confirmed LTF	1.8374
CBM-S1	CBM-S1	0.1102	Confirmed LTF	0.1102
CBM-N	CBM-N	0.0108	Confirmed LTF	0.0108
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0426	Confirmed LTF	0.0426
BLUEG	BLUEG	0.9496	Confirmed LTF	0.9496
TRIMBLE	TRIMBLE	0.2660	Confirmed LTF	0.2660
LAGN	LAGN	0.6247	Confirmed LTF	0.6247
CBM-W1	CBM-W1	0.4907	Confirmed LTF	0.4907

11.5.9 Index 9

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
172310736	966220	AG1-491 TAP	EKPC	341287	2CENT HARDIN	EKPC	1	EKPC_P2-2_KU HODG 69	bus	98.0	134.83	187.05	DC	51.17

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	41.8206	50/50	41.8206
959692	AF2-260 E	20.9103	50/50	20.9103
960171	AF2-308	20.3420	50/50	20.3420
960181	AF2-309 C	30.5130	50/50	30.5130
960182	AF2-309 E	20.3420	50/50	20.3420
960741	AF2-365 C O1	3.4533	50/50	3.4533
960742	AF2-365 E O1	2.3022	50/50	2.3022
961003	AF2-391 BAT	14.9160	50/50	14.9160
964571	AG1-320 C O2	34.1968	50/50	34.1968
964572	AG1-320 E O2	16.9736	50/50	16.9736
966031	AG1-472 C O2	1.8657	Adder	4.14
966032	AG1-472 E O2	1.2438	Adder	2.76
966221	AG1-491 C O2	33.4580	50/50	33.4580
966222	AG1-491 E O2	22.3054	50/50	22.3054
WEC	WEC	0.0110	Confirmed LTF	0.0110
CPLE	CPLE	0.0908	Confirmed LTF	0.0908
G-007A	G-007A	0.0240	Confirmed LTF	0.0240
VFT	VFT	0.0645	Confirmed LTF	0.0645
CBM-W2	CBM-W2	2.1683	Confirmed LTF	2.1683
TVA	TVA	0.6412	Confirmed LTF	0.6412
CBM-S2	CBM-S2	1.8374	Confirmed LTF	1.8374
CBM-S1	CBM-S1	0.1102	Confirmed LTF	0.1102
CBM-N	CBM-N	0.0108	Confirmed LTF	0.0108
MEC	MEC	0.2050	Confirmed LTF	0.2050
GIBSON	GIBSON	0.0426	Confirmed LTF	0.0426
BLUEG	BLUEG	0.9496	Confirmed LTF	0.9496
TRIMBLE	TRIMBLE	0.2660	Confirmed LTF	0.2660
LAGN	LAGN	0.6247	Confirmed LTF	0.6247
CBM-W1	CBM-W1	0.4907	Confirmed LTF	0.4907

11.6 Contingency Descriptions - Secondary POI

Contingency Name	Contingency Definition
EKPC_P2-2_HARD-CHARD 138	CONTINGENCY 'EKPC_P2-2_HARD-CHARD 138' /* KU HARDIN - CENTRAL HARDIN 138 TIE OPEN BRANCH FROM BUS 324261 TO BUS 342568 CKT 1 /* 324261 4HARDN 138.00 342568 4CENT HARDIN138.00 END
EKPC_P2-4_CHARD W124-91T	CONTINGENCY 'EKPC_P2-4_CHARD W124-91T' / 148 OPEN BRANCH FROM BUS 324047 TO BUS 342568 CKT 1 / 324047 4BLACKBRANCH 138 342568 4CENT HARDIN 138 1 OPEN BRANCH FROM BUS 324047 TO BUS 324260 CKT 1 / 324047 4BLACKBRANCH 138 324260 4HARDINSBURG 138 1 OPEN BRANCH FROM BUS 324261 TO BUS 342568 CKT 1 / 324261 4HARDIN CO 138 342568 4CENT HARDIN 138 1 END
AEP_P5_#11280_05ROCK_05ROCK	CONTINGENCY 'AEP_P5_#11280_05ROCK_05ROCK' / 186 OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 OPEN BRANCH FROM BUS 243209 TO BUS 247133 CKT Z7 / 243209 05ROCKPT 765 247133 05ROCKP WRK1 765 Z7 OPEN BRANCH FROM BUS 243209 TO BUS 247135 CKT Z8 / 243209 05ROCKPT 765 247135 05ROCKP WRK2 765 Z8 OPEN BRANCH FROM BUS 243209 TO BUS 966530 CKT 1 / 243209 05ROCKPT 765 966530 AG1-522 TAP 765 1 OPEN BRANCH FROM BUS 247133 TO BUS 243239 CKT 7 / 247133 05ROCKP WRK1 765 243239 05ROCKP WRK1 138 7 OPEN BRANCH FROM BUS 247135 TO BUS 243240 CKT 8 / 247135 05ROCKP WRK2 765 243240 05ROCKP WRK2 138 8 OPEN BRANCH FROM BUS 243209 TO BUS 243442 CKT 1 / 243209 05ROCKPT 765 243442 05RKG1 26.0 1 OPEN BRANCH FROM BUS 243209 TO BUS 243443 CKT 2 / 243209 05ROCKPT 765 243443 05RKG2 26.0 2 OPEN BRANCH FROM BUS 243239 TO BUS 243785 CKT 1 / 243239 05ROCKP WRK1 138 243785 05AKSTL 138 1 OPEN BRANCH FROM BUS 243240 TO BUS 243785 CKT 1 / 243240 05ROCKP WRK2 138 243785 05AKSTL 138 1 END

Contingency Name	Contingency Definition
AEP_P7-1_#11028	CONTINGENCY 'AEP_P7-1_#11028' OPEN BRANCH FROM BUS 243215 TO BUS 270139 CKT 1 / 243215 05COOK 345 270139 AA2-116_TAP2 345 1 OPEN BRANCH FROM BUS 270139 TO BUS 243224 CKT 1 / 270139 AA2-116_TAP2 345 243224 05KENZIE 345 1 OPEN BRANCH FROM BUS 243215 TO BUS 270138 CKT 1 / 243215 05COOK 345 270138 AA2-116_TAP1 345 1 OPEN BRANCH FROM BUS 247006 TO BUS 270138 CKT 1 / 247006 05KENZIE_BP 345 270138 AA2-116_TAP1 345 1 OPEN BRANCH FROM BUS 243220 TO BUS 247006 CKT 1 / 243220 05E.ELKHART 345 247006 05KENZIE_BP 345 1 END
EKPC_P4-5_BULL W84-1024	CONTINGENCY 'EKPC_P4-5_BULL W84-1024' / 130 OPEN BRANCH FROM BUS 326975 TO BUS 342700 CKT 1 / 326975 5CEDAR GRV 161 342700 5BULLITT CO 161 1 OPEN BRANCH FROM BUS 326998 TO BUS 342700 CKT 1 / 326998 5BULLITT TAP 161 342700 5BULLITT CO 161 1 OPEN BRANCH FROM BUS 342700 TO BUS 342766 CKT 1 / 342700 5BULLITT CO 161 342766 5LITTLE MT T 161 1 OPEN BRANCH FROM BUS 342700 TO BUS 341215 CKT 1 / 342700 5BULLITT CO 161 341215 2BULLITT CO 69.0 1 OPEN BRANCH FROM BUS 326998 TO BUS 361788 CKT 1 / 326998 5BULLITT TAP 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1 OPEN BRANCH FROM BUS 360334 TO BUS 361788 CKT 1 / 360334 5SUMMER SHAD 161 361788 5SUM SHAD TP 161 1 END
AEP_P1-2_#363_1682	CONTINGENCY 'AEP_P1-2_#363_1682' / 873 OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 END
DEOK_P2-2_1448_ZIMMER	CONTINGENCY 'DEOK_P2-2_1448_ZIMMER' OPEN BUS 251969 OPEN BUS 251968 OPEN BUS 249580 END
EKPC_P2-3_GREEN W45-1014	CONTINGENCY 'EKPC_P2-3_GREEN W45-1014' / 21 OPEN BRANCH FROM BUS 342733 TO BUS 943820 CKT 1 / 342733 5GREEN CO 161 943820 AF1-050 TAP 161 1 OPEN BRANCH FROM BUS 342733 TO BUS 964890 CKT 1 / 342733 5GREEN CO 161 964890 AG1-353 TAP 161 1 OPEN BRANCH FROM BUS 342733 TO BUS 341563 CKT 1 / 342733 5GREEN CO 161 341563 2GREEN CO 69.0 1 OPEN BRANCH FROM BUS 342817 TO BUS 944150 CKT 1 / 342817 5TAYLOR CO J 161 944150 AF1-083 TAP 161 1 END

Contingency Name	Contingency Definition
EKPC_P7-1_COOP 161 DBL 1	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 1' /* RUSSELL CO - COOPER 161 & COOPER - PULASKI 161 OPEN BRANCH FROM BUS 342793 TO BUS 342796 CKT 1 /* 342793 5RUSSEL CO 161.00 342796 5RUSSEL CO J161.00 OPEN BRANCH FROM BUS 342796 TO BUS 360448 CKT 1 /* 342796 5RUSSEL CO J161.00 360448 5WOLF CRK HP161.00 OPEN BRANCH FROM BUS 342751 TO BUS 342796 CKT 1 /* 342751 5JAMESTOWN T161.00 342796 5RUSSEL CO J161.00 OPEN BRANCH FROM BUS 342748 TO BUS 342751 CKT 1 /* 342748 5JAMESTOWN 161.00 342751 5JAMESTOWN T161.00 OPEN BRANCH FROM BUS 342745 TO BUS 342751 CKT 1 /* 342745 5JABEZ T 161.00 342751 5JAMESTOWN T161.00 OPEN BRANCH FROM BUS 342742 TO BUS 342745 CKT 1 /* 342742 5JABEZ 161.00 342745 5JABEZ T 161.00 OPEN BRANCH FROM BUS 342745 TO BUS 342799 CKT 1 /* 342745 5JABEZ T 161.00 342799 5S OAKHILL 161.00 OPEN BRANCH FROM BUS 342715 TO BUS 342799 CKT 1 /* 342715 5COOPER1 161.00 342799 5S OAKHILL 161.00 OPEN BRANCH FROM BUS 342715 TO BUS 342790 CKT 1 /* 342715 5COOPER1 161.00 342790 5PULASK CO J161.00 OPEN BRANCH FROM BUS 342787 TO BUS 342790 CKT 1 /* 342787 5PULASK CO 161.00 342790 5PULASK CO J161.00 OPEN BRANCH FROM BUS 342115 TO BUS 342787 CKT 1 /* 342115 2PULASK CO 69.000 342787 5PULASK CO 161.00 OPEN BRANCH FROM BUS 342760 TO BUS 342790 CKT 1 /* 342760 5LIBERTY J 161.00 342790 5PULASK CO J161.00 END
EKPC_P2-2_BONNIE 138/69	CONTINGENCY 'EKPC_P2-2_BONNIE 138/69' /* KU BONNIEVILLE 138/69 TIE OPEN BUS 324213 /* 4BONNIE END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1	CONTINGENCY 'EXT_324308 4SHREWSBURY 138 324800 4MERE TVA 138 1' / 32 OPEN BRANCH FROM BUS 324308 TO BUS 324800 CKT 1 / 324308 4SHREWSBURY 138 324800 4MERE TVA 138 1 END
EKPC_P1-2_C HAR-KU ETN69	CONTINGENCY 'EKPC_P1-2_C HAR-KU ETN69' / 125 OPEN BRANCH FROM BUS 341287 TO BUS 341713 CKT 1 / 341287 2CENT HARDIN 69.0 341713 2KARGLE 69.0 1 OPEN BRANCH FROM BUS 324519 TO BUS 341713 CKT 1 / 324519 2ETOWN KU 69.0 341713 2KARGLE 69.0 1 END

Contingency Name	Contingency Definition
EKPC_P2-2_NELSON 138/69	CONTINGENCY 'EKPC_P2-2_NELSON 138/69' /* KU NELSON CO 138/69 TIE OPEN BUS 324288 /* 4NELSON_1 END
EKPC_P7-1_BULL 161 DBL	CONTINGENCY 'EKPC_P7-1_BULL 161 DBL' /* BULLITT - BLUE LICK 161 & BULLITT - SUMMERSHADE 161 OPEN BUS 326975 /* 326975 5CEDAR GRV 161.00 OPEN BUS 361788 /* 361788 5SUM SHAD TP161.00 END
Base Case	
EXT_324244 4ETOWN 138 324261 4HARDIN CO 138 1	CONTINGENCY 'EXT_324244 4ETOWN 138 324261 4HARDIN CO 138 1' / 72 OPEN BRANCH FROM BUS 324244 TO BUS 324261 CKT 1 / 324244 4ETOWN 138 324261 4HARDIN CO 138 1 END
EXT_B-138-115	CONTINGENCY 'EXT_B-138-115' / 58 OPEN BRANCH FROM BUS 324272 TO BUS 324308 CKT 1 / 324272 4LEITCHFIELD 138 324308 4SHREWSBURY 138 1 OPEN BRANCH FROM BUS 324291 TO BUS 324308 CKT 1 / 324291 4OHIO COUNTY 138 324308 4SHREWSBURY 138 1 OPEN BRANCH FROM BUS 324308 TO BUS 324800 CKT 1 / 324308 4SHREWSBURY 138 324800 4MERE TVA 138 1 END
DEOK_P7_4512EBTANNERS4516TERMINALEB	CONTINGENCY 'DEOK_P7_4512EBTANNERS4516TERMINALEB' OPEN BUS 249565 END
EKPC_P2-2_KU HODG 69	CONTINGENCY 'EKPC_P2-2_KU HODG 69' /* KU HODGENVILLE 69 TIE OPEN BUS 341632 /* 2HODGENVILLE END

12 Affected Systems

12.1 TVA

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

12.2 Duke Energy Progress

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

12.3 MISO

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

12.4 LG&E

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