Generation Interconnection

Revised

System Impact Study Report

for

Queue Project AF2-355

WEST GERRARD-J.K. SMITH 345 NKV

135 MW Capacity / 225 MW Energy

July 2022

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact 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 System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. 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 System Impact Study is performed.

The System Impact 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.

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.

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

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Madison County, Kentucky. The installed facilities will have a total capability of 225 MW with 135 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is July 01, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF2-355
Project Name	WEST GERRARD-J.K. SMITH 345 NKV
State	Kentucky
County	Madison
Transmission Owner	EKPC
MFO	225
MWE	225
MWC	135
Fuel	Solar
Basecase Study Year	2023

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

4 Point of Interconnection

AF2-355 will interconnect with the EKPC on transmission system tapping the West Gerrard to J.K. Smith 345 kV line.

5 Cost Summary

The AF2-355 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	$10,340,000
Total System Network Upgrade Costs (Summer Peak)	$37,035,065
Total Costs	**$47,375,065**

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

The estimates provided in this report are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

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

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement

completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

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

6.1 Attachment Facilities

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

Description	Total Cost
Install necessary equipment (a 345 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panels) at the new Madison County substation to accept the IC generator lead line/bus (Estimated time to implement is 24 months)	$1,215,000
Total Attachment Facility Costs	**$1,215,000**

6.2 Direct Connection Cost Estimates

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 345 kV switching station ("Madison County") to facilitate connection of the IC solar generation project to the existing JK Smith-West Garrard 345 kV line (Estimated time to implement is 24 months)	$7,725,000
Total Direct Connection Facility Costs	**$7,725,000**

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 JK Smith-West Garrard 345 kV line into the new Madison County switching station (Estimated time to implement is 24 months)	$1,100,000
Modify relays and/or settings at JK Smith substation for the existing line to the new Madison County switching station (Estimated time to implement is 9 months)	$45,000
Modify relays and/or settings at West Garrard substation for the existing line to the new Madison County switching station (Estimated time to implement is 9 months)	$45,000
Install fiber-optic connections from the JK Smith-West Garrard OPGW into the new Madison County switching station (Estimated time to implement is 6 months)	$210,000
Total Non-Direct Connection Facility Costs	**$1,400,000**

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 Analysis

The Queue Project AF2-355 was evaluated as a 225.0 MW (Capacity 135.0 MW) injection tapping the West Gerrard to J.K. Smith 345 kV line in the EKPC area. Project AF2-355 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF2-355 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

9.1 Generation Deliverability

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

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
161290732	342541	4AVON	138.0	EKPC	342631	4PARIS T	138.0	EKPC	1	EKPC_P1-2_SPUR-NCLA345-A	single	220.0	99.03	103.59	AC	10.31

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
98902241	342838	7SPURLOCK	345.0	EKPC	249581	08MELDAL	345.0	DEO&K	1	EKPC_P2-3_SPUR N39-1474	bus	1421.0	97.52	100.42	AC	48.36
98902408	342838	7SPURLOCK	345.0	EKPC	249581	08MELDAL	345.0	DEO&K	1	DAY_P4_L34553-1	breaker	1421.0	97.46	100.35	AC	48.24
98902409	342838	7SPURLOCK	345.0	EKPC	249581	08MELDAL	345.0	DEO&K	1	EKPC_P4-2_SPUR N39-1474	breaker	1421.0	97.52	100.42	AC	48.36

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
100782127	250054	08LONGBR	138.0	DEO&K	250077	08MTZION	138.0	DEO&K	1	DAY_P734541 34553	tower	284.0	140.62	144.88	AC	15.46
100782128	250077	08MTZION	138.0	DEO&K	249991	08BUFTN1	138.0	DEO&K	1	DAY_P734541 34553	tower	298.0	129.86	133.92	AC	15.46
98902582	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#363	single	1451.0	128.34	129.38	DC	15.13
98902583	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#10136	single	1451.0	125.06	126.23	AC	15.19
98902586	324010	7TRIMBL REAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	Base Case	single	1134.0	113.13	114.52	AC	15.23
101996203	342541	4AVON	138.0	EKPC	342631	4PARIS T	138.0	EKPC	1	EKPC_P2-4_SPUR N39-150T-A	bus	220.0	121.19	127.69	AC	17.18

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
161290461	342541	4AVON	138.0	EKPC	342631	4PARIST	138.0	EKPC	1	EKPC_P4-6_SPUR N39-150T-A	breaker	220.0	121.19	127.69	AC	17.18
98902963	342559	4BOONE CO	138.0	EKPC	250054	08LONGBR	138.0	DEO&K	1	DAY_P734541 34553	tower	284.0	147.65	151.92	AC	15.46
98902191	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-2_C1 SILVER GROVE 345 BUS	bus	1532.0	148.13	151.19	AC	54.37
98902308	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-3_C2 816_SILVERGROVE	breaker	1532.0	148.31	151.38	AC	54.42
98902309	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P2-3_C2 1493_RED BANK	breaker	1532.0	148.25	151.31	AC	54.37
98902525	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	Base Case	single	1240.0	139.37	141.88	AC	30.65
98902526	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	single	1532.0	131.48	133.65	AC	32.62
98902969	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER	tower	1532.0	148.06	151.13	AC	54.37

9.4 Steady-State Voltage Requirements

To be determined

9.5 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
98902579	324010	7TRIMBLREAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	AEP_P1-2_#363	operation	1451.0	133.68	135.46	AC	25.22
98902585	324010	7TRIMBLREAC	345.0	LGEE	248000	06CLIFTY	345.0	OVEC	1	Base Case	operation	1134.0	119.3	121.59	AC	25.38
161290730	342541	4AVON	138.0	EKPC	342631	4PARIST	138.0	EKPC	1	EKPC_P1-2_SPUR-NCLA345-A	operation	220.0	117.12	123.61	AC	17.19
98902522	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	Base Case	operation	1240.0	154.4	157.86	AC	51.08
98902523	342838	7SPURLOCK	345.0	EKPC	253077	09STUART	345.0	DAY	1	DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	operation	1532.0	148.13	151.19	AC	54.37

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
98902670	342838	7SPURLOCK	345.0	EKPC	249581	08MELDAL	345.0	DEO&K	1	DAY-P1-STU SPUR	operation	1421.0	97.44	100.33	AC	48.24
100298650	958170	AF2-111 TAP	345.0	EKPC	342838	7SPURLOCK	345.0	EKPC	1	AEP_P1-2_#1027	operation	1151.0	99.83	104.91	AC	71.31
100298654	958170	AF2-111 TAP	345.0	EKPC	342838	7SPURLOCK	345.0	EKPC	1	Base Case	operation	1056.0	97.52	102.88	AC	68.89

9.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-355	Upgrade Number
98902963	6	4BOONE CO 138.0 kV - 08LONGBR 138.0 kV Ckt 1	**Line is 100% owned by EKPC.** **No DEOK upgrade required.** **EKPC** **N6463.1: Increase MOT of Boone-Longbranch 138kV line section 954 MCM conductor to 275F (~2.25 miles). New SE rating to be 296 MVA.** **Project Type : FAC** **Cost : $ 200,000** **Time Estimate : 6 Months** **EKPC** **N6463.2: Upgrade bus and jumpers associated with Boone 138 kV bus using 2-500 MCM 37 CU conductor or equivalent. New SE rating to be 354 MVA.** **Project Type : FAC** **Cost : $ 20,000** **Time Estimate : 6 Months** **EKPC** **N6463.3: Replace the 954 MCM ACSR line conductor on the Boone County-Longbranch 138 kV line with 954 MCM ACSS conductor (2.3 miles). New SE rating to be 361 MVA.** **Project Type : FAC** **Cost : $ 2,590,000** **Time Estimate : 14 Months** **EKPC** **N6463.4: Replace he 1200A disconnect switches N15-813 and N15-815 at the Boone County substation with 1600A equipment and replace the 750 MCM copper substation jumpers at the Boone County substation with bundled 500 MCM copper or equivalent equipment. New SE rating to be 364 MVA.** **Project Type : FAC** **Cost : $ 215,000** **Time Estimate : 9 Months** **EKPC** **N6463.5: Replace the 750 MCM copper substation bus and jumpers at the Long branch substation with bundled 500 MCM copper or equivalent equipment. New SE rating to be 424 MVA.** **Project Type : FAC** **Cost : $ 190,000** **Time Estimate : 9 Months** The upgrades N6463.1 through N6463.5 are driven in a prior queue cycle. Since the cost of these upgrades are less than $5M, based on PJM cost	$200,000 + $20,000 + $2,590,000 + $215,000 + $190,000 + $50,000	$0 + $0 + $0 + $0 + $0 + $50,000	N6463.1 N6463.2 N6463.3 N6463.4 N6463.5 N6463.6

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-355	Upgrade Number
			allocation criteria, AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **EKPC** **N6463.6: Change the current transformer setting at Boone County substation associated with circuit breaker N15-814 from 1200A to 1600A. Change the Zone 3 relay setting at Boone County substation associated with the line protection to at least 456 MVA LTE rating. Upgrade the limiting relay at Boone County substation. New SE rating to be 398/443 MVA.** **Project Type : FAC** **Cost : $ 50,000** **Time Estimate : 9 Months** **This AF2-355 is the driver for this project.**			

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-355	Upgrade Number
161290732,101996203,161290461	1	**4AVON 138.0 kV - 4PARIS T 138.0 kV Ckt 1**	**EKPC** **N6783: Increase the maximum operating temperature of the 636 MCM ACSR conductor in the Avon-Paris Tap 138 kV line section to 293 degrees F (6.9 miles). New expected SE rating 280 MVA** **Project Type : FAC** **Cost : $ 625,000** **Time Estimate : 8 Months** A prior queue cycle is driving the need for N6783. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **EKPC** **N6783.1: Rebuild the Avon-Paris Tap 138 kV line section (6.89 miles) using 954 MCM ACSR. New expected SE rating is at least 281 MVA.** **Project Type : FAC** **Cost : $ 9,600,000** **Time Estimate : 15 Months** **This AF2-355 is the driver for this project.**	$625,000 + $9,600,000	$0 + $9,600,000	N6783 N6783.1
98902583,98902582,98902586	5	**7TRIMBL REAC 345.0 kV - 06CLIFTY 345.0 kV Ckt 1**	**OVEC/LG&E:** **A potential constraint was identified by PJM on the Trimble – Clifty 345 kV line (LG&E/OVEC tie line).The upgrade (LG&E) on the Trimble – Clifty 345 kV line, if determined to be a constraint by LG&E, is to reconductor the line with a high temperature conductor and upgrade necessary terminal equipment to achieve ratings of 2610/2610 MVA SN/SE.** **Project Type : FAC** **Cost : $ 17,400,000** **Time Estimate : 18 Months** **LG&E End:** **An LG&E affected system study may be required (LG&E should be consulted to determine if they need to evaluate these MISO queue projects for LG&E impacts) to determine if the MISO queue project**	$17,400,000	$17,400,000	TBD

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF2-355</th><th>Upgrade Number</th></tr>
<tr><td></td><td></td><td></td><td>causes any impacts on the LG&E system, including the Trimble-Clifty LG&E-OVEC tie line.</td><td></td><td></td><td></td></tr>
<tr><td>100782127</td><td>3</td><td>08LONGBR 138.0 kV - 08MTZION 138.0 kV Ckt 1</td><td><u>EKPC</u>
N6460.1: Increase the EKPC-owned 3.7 miles of conductor MOT to 275 degrees F. New expected EKPC ratings to be 297/344 MVA SN/SE.
Project Type : FAC
Cost : $ 400,000
Time Estimate : 22 Months

A prior queue cycle is driving the need for N6460.1. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study.

<u>DEOK</u>
N6460.2: Rebuild the Duke owned portion of the line & Replace switch at Mt. Zion. New expected DEOK ratings to be 480.0/480.0/480.0
Project Type : FAC
Cost : $ 3,228,008
Time Estimate : 30 Months

The cost allocation is as follows:
<table><tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($3.228M)</th></tr><tr><td>AF2-111</td><td>26.64</td><td>38.93%</td><td>1.257</td></tr><tr><td>AF2-348</td><td>26.33</td><td>38.48%</td><td>1.242</td></tr><tr><td>AF2-355</td><td>15.46</td><td>22.59%</td><td>0.729</td></tr></table>
<u>EKPC</u>
N6460.3: Rebuild the EKPC portion of the Longbranch-Mt. Zion 138 kV line section using 954 MCM ACSS conductor (3.7 miles). Ratings : 310.0/364.0/383.0
Project Type : FAC
Cost : $ 4,360,000
Time Estimate : 22 Months

The cost allocation is as follows:</td><td>$400,000
+
$3,228,008
+
$4,360,000</td><td>$0
+
$729,000
+
$985,000</td><td>N6460.1
N6460.2
N6460.3</td></tr>
</table>

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF2-355</th><th>Upgrade Number</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($4.360 M)</th></tr>
<tr><td>AF2-111</td><td>26.64</td><td>38.93%</td><td>1.697</td></tr>
<tr><td>AF2-348</td><td>26.33</td><td>38.48%</td><td>1.678</td></tr>
<tr><td>AF2-355</td><td>15.46</td><td>22.59%</td><td>0.985</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>98902309,98902191,98902969,98902525,98902308,98902526</td><td>7</td><td>7SPURLOCK 345.0 kV - 09STUART 345.0 kV Ckt 1</td><td>
<u>EKPC</u>
N5780: Reconductor Stuart-Spurlock line with twin bundle 1033 Curlew ACCR conductor. New Expected Ratings: Rate A: 1339 MVA Rate B: 1556 MVA
Project Type : FAC
Cost : $ 17,100,000
Time Estimate : 18 Months

The cost allocation table is below:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>Cost ($17.1M)</th></tr>
<tr><td>AE1-144</td><td>48.19</td><td>5.95%</td><td>$1,017,633</td></tr>
<tr><td>AE2-038</td><td>32.12</td><td>3.97%</td><td>$678,281</td></tr>
<tr><td>AE2-138</td><td>84.73</td><td>10.46%</td><td>$1,789,253</td></tr>
<tr><td>AE2-210</td><td>29.33</td><td>3.62%</td><td>$619,365</td></tr>
<tr><td>AE2-275</td><td>21.24</td><td>2.62%</td><td>$448,527</td></tr>
<tr><td>AE2-308</td><td>35.33</td><td>4.36%</td><td>$746,067</td></tr>
<tr><td>AF1-127</td><td>25.84</td><td>3.19%</td><td>$545,666</td></tr>
<tr><td>AF1-233</td><td>94.25</td><td>11.64%</td><td>$1,990,287</td></tr>
<tr><td>AF1-251</td><td>72.21</td><td>8.92%</td><td>$1,524,866</td></tr>
<tr><td>AF1-256</td><td>33.74</td><td>4.17%</td><td>$712,491</td></tr>
<tr><td>AF2-111</td><td>121.05</td><td>14.95%</td><td>$2,556,226</td></tr>
<tr><td>AF2-260</td><td>7.59</td><td>0.94%</td><td>$160,279</td></tr>
<tr><td>AF2-306</td><td>7.05</td><td>0.87%</td><td>$148,876</td></tr>
<tr><td>AF2-307</td><td>17.92</td><td>2.21%</td><td>$378,419</td></tr>
<tr><td>AF2-309</td><td>6.25</td><td>0.77%</td><td>$131,982</td></tr>
<tr><td>AF2-348</td><td>118.56</td><td>14.64%</td><td>$2,503,644</td></tr>
<tr><td>AF2-355</td><td>54.37</td><td>6.71%</td><td>$1,148,137</td></tr>
</table>

<u>EKPC</u>
N5780.1: Replace Stuart substation riser conductor with 2500AAC (parallel). New Expected Ratings: Rate A: 1561 MVA Rate B: 1800 MVA
Project Type : FAC
Cost : $ 100,000
Time Estimate : 12 Months

A prior queue cycle is driving the need for N5780.1. AF2-355 currently does not receive cost allocation
</td><td>$17,000,000
+
$100,000
+
$250,000
+
$150,000
+
$170,000
+
$30,000,000</td><td>$1,148,137
+
$0
+
$0
+
$0
+
$0
+
$4,337,000</td><td>N5780
N5780.1
N5780.2
B2879.2
N5780.3
N5780.4
N5780.5</td></tr>
</table>

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-355	Upgrade Number
			towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **DAYTON** **N5780.2: Reconductor Stuart substation conductor with twin bundle 1033 Curlew ACCR conductor. New ratings 1852/2062 MVA.** **Project Type : FAC** **Cost : $ 250,000** **Time Estimate : 12 Months** A prior queue cycle is driving the need for N5780.2. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **EKPC:** **B2879.2: Reconductor EKPC's portion of the Spurlock-Stuart 345kV line with 954 ACSS. EKPC end ratings are S/N: 1792 MVA, S/E: 1792 MVA.** **Project Type : FAC** **Cost : $ 0** **Time Estimate : 0 Months** A prior queue cycle is driving the need for B2879.2. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study.			

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF2-355	Upgrade Number
			EKPC **N5780.3: Replace the 1500A interconnection metering CTs with 2000A equipment. New expected ratings to be 1821/1877 MVA SN/SE.** **Project Type : FAC** **Cost : $ 150,000** **Time Estimate : 9 Months** A prior queue cycle is driving the need for N5780.3. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **EKPC** **N5780.4: Replace the 3000A wave trap with 3600A equipment. New expected ratings to be 1868/1951 MVA SN/SE.** **Project Type : FAC** **Cost : $ 170,000** **Time Estimate : 9 Months** A prior queue cycle is driving the need for N5780.4. AF2-355 currently does not receive cost allocation towards this upgrade. As changes to the PJM queue process occur (such as prior queued projects withdrawing from the queue, reducing in size, etc.) AF2-355 could receive cost allocation. Although Queue Project AF2-355 may not presently have cost responsibility for this upgrade, Queue Project AF2-355 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AF2-355 comes into service prior to completion of the upgrade, Queue Project AF2-355 will need an interim study. **EKPC** **N5780.5: Construct a new 345 kV circuit between the EKPC Spurlock and DP&L Stuart substations (circuit length approximately 8.5 miles)** **Project Type : CON** **Cost : $ 30,000,000** **Time Estimate : 48 Months** The cost allocation table is below:			

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF2-355</th><th>Upgrade Number</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>Cost($30M)</th></tr>
<tr><td>AF1-256</td><td>33.74</td><td>8.97%</td><td>$2.691</td></tr>
<tr><td>AF2-090</td><td>9.63</td><td>2.56%</td><td>$0.768</td></tr>
<tr><td>AF2-111</td><td>121.03</td><td>32.18%</td><td>$9.654</td></tr>
<tr><td>AF2-260</td><td>7.59</td><td>2.02%</td><td>$0.605</td></tr>
<tr><td>AF2-306</td><td>7.05</td><td>1.87%</td><td>$0.562</td></tr>
<tr><td>AF2-307</td><td>17.9</td><td>4.76%</td><td>$1.428</td></tr>
<tr><td>AF2-309</td><td>6.25</td><td>1.66%</td><td>$0.499</td></tr>
<tr><td>AF2-348</td><td>118.56</td><td>31.52%</td><td>$9.457</td></tr>
<tr><td>AF2-355</td><td>54.37</td><td>14.46%</td><td>$4.337</td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>98902241,98902408,98902409</td><td>2</td><td>7SPURLOCK 345.0 kV - 08MELDAL 345.0 kV Ckt 1</td><td><u>EKPC</u>
N8069: Increase the maximum operating temperature of the 954 MCM ACSR conductor in the Spurlock-Meldahl Dam 345 kV line section to 275 degrees F (3.81 miles) 1313/1509 MVA SN/SE. DEOK portion limit is 1509 MVA.
Project Type : FAC
Cost : $ 1,500,000
Time Estimate : 24 Months

This AF2-355 is the driver for this project.</td><td>$1,500,000</td><td>$1,500,000</td><td>N8069</td></tr>
<tr><td>100782128</td><td>4</td><td>08MTZION 138.0 kV - 08BUFTN1 138.0 kV Ckt 1</td><td><u>DEOK</u>
N8066: Rebuild the line & replace meter at Buffington. New expected ratings to be 309/349 MVA SN/SE.
Project Type : FAC
Cost : $ 5,264,470
Time Estimate : 30 Months

The cost allocation is as follows:
<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($5.264 M)</th></tr>
<tr><td>AF2-111</td><td>26.64</td><td>36.24%</td><td>1.908</td></tr>
<tr><td>AF2-307</td><td>5.09</td><td>6.92%</td><td>0.364</td></tr>
<tr><td>AF2-348</td><td>26.3</td><td>35.81%</td><td>1.885</td></tr>
<tr><td>AF2-355</td><td>15.5</td><td>21.03%</td><td>1.107</td></tr>
</table>

N8066.1: Replace two switches at Mt. Zion. New expected ratings to be 394/394 MVA SN/SE.
Project Type : FAC
Cost : $ 360,956
Time Estimate : 30 Months</td><td>$5,264,470
+
$360,956
+
$102,928</td><td>$1,107,000
+
$76,000
+
$102,928</td><td>N8066
N8066.1
N8066.2</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td></td>
<td>The cost allocation is as follows:

<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>$ cost ($0.360956 M)</th></tr>
<tr><td>AF2-111</td><td>26.6</td><td>36.23%</td><td>0.131</td></tr>
<tr><td>AF2-307</td><td>5.1</td><td>6.92%</td><td>0.025</td></tr>
<tr><td>AF2-348</td><td>26.3</td><td>35.77%</td><td>0.129</td></tr>
<tr><td>AF2-355</td><td>15.5</td><td>21.08%</td><td>0.076</td></tr>
</table>

<u>DEOK</u>
N8066.2: Replace bus conductor at Buffington. New expected ratings to be 406/454 MVA SN/SE.
Project Type : FAC
Cost : $ 102,928
Time Estimate : 30 Months

This AF2-355 is the driver for this project.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TOTAL COST</td>
<td>$89,801,788</td>
<td>$37,035,065</td>
<td></td>
</tr>
</table>

Note : For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

9.7 Flow Gate Details

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".

9.7.1 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
161290461	342541	4AVON	EKPC	342631	4PARIS T	EKPC	1	EKPC_P4-6_SPUR N39-150T-A	breaker	220.0	121.19	127.69	AC	17.18

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
941411	AE2-138 C	22.8614	50/50	22.8614
941412	AE2-138 E	8.4556	50/50	8.4556
941981	AE2-210 C O1	7.8774	50/50	7.8774
941982	AE2-210 E O1	2.9631	50/50	2.9631
942591	AE2-275 C O1	4.5267	Adder	5.33
942592	AE2-275 E O1	1.7027	Adder	2.0
942891	AE2-308 C O1	8.4898	Adder	9.99
942892	AE2-308 E O1	3.0872	Adder	3.63
943111	AE2-339 C	5.0379	50/50	5.0379
943112	AE2-339 E	2.4813	50/50	2.4813
944621	AF1-127 C O1	7.1218	50/50	7.1218
944622	AF1-127 E O1	3.5078	50/50	3.5078
945861	AF1-251 C	16.6795	50/50	16.6795
945862	AF1-251 E	11.1197	50/50	11.1197
958171	AF2-111 C O1	17.0535	50/50	17.0535
958172	AF2-111 E O1	11.3690	50/50	11.3690
960571	AF2-348 C	17.0535	50/50	17.0535
960572	AF2-348 E	11.3690	50/50	11.3690
960641	AF2-355 C O1	8.7612	Adder	10.31
960642	AF2-355 E O1	5.8408	Adder	6.87
WEC	WEC	0.0387	Confirmed LTF	0.0387
LGEE	LGEE	0.6504	Confirmed LTF	0.6504
CPLE	CPLE	0.2606	Confirmed LTF	0.2606
CBM-W2	CBM-W2	4.7420	Confirmed LTF	4.7420
NY	NY	0.0182	Confirmed LTF	0.0182
TVA	TVA	1.3076	Confirmed LTF	1.3076
O-066	O-066	0.1075	Confirmed LTF	0.1075
CBM-S2	CBM-S2	2.9536	Confirmed LTF	2.9536
CBM-S1	CBM-S1	8.2814	Confirmed LTF	8.2814
G-007	G-007	0.0156	Confirmed LTF	0.0156
MADISON	MADISON	2.2962	Confirmed LTF	2.2962
MEC	MEC	0.4799	Confirmed LTF	0.4799
CBM-W1	CBM-W1	1.1759	Confirmed LTF	1.1759

9.7.2 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
98902409	342838	7SPURLOCK	EKPC	249581	08MELDAL	DEO&K	1	EKPC_P4-2_SPUR N39-1474	breaker	1421.0	97.52	100.42	AC	48.36

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342918	1JKCT 1G	4.4713	50/50	4.4713
342921	1JKCT 2G	3.2585	50/50	3.2585
342924	1JKCT 3G	4.4713	50/50	4.4713
342939	1JKCT 9G	3.2971	50/50	3.2971
342942	1JKCT 10G	3.2971	50/50	3.2971
342957	1SPURLK1G	22.7957	50/50	22.7957
342960	1SPURLK2G	45.3625	50/50	45.3625
342963	1SPURLK3G	23.8375	50/50	23.8375
342966	1SPURLK4G	23.8375	50/50	23.8375
925981	**AC1-074 C O1 (Suspended)**	**13.5873**	**50/50**	**13.5873**
925982	**AC1-074 E O1 (Suspended)**	**5.8231**	**50/50**	**5.8231**
926101	AC1-089 C O1	3.7631	Adder	4.43
926102	AC1-089 E O1	6.1398	Adder	7.22
932551	**AC2-075 C (Suspended)**	**3.2270**	**50/50**	**3.2270**
932552	**AC2-075 E (Suspended)**	**1.6256**	**50/50**	**1.6256**
936381	AD2-048 C	10.9950	50/50	10.9950
936382	AD2-048 E	5.4858	50/50	5.4858
936571	**AD2-072 C O1 (Suspended)**	**7.0184**	**Adder**	**8.26**
936572	**AD2-072 E O1 (Suspended)**	**3.4412**	**Adder**	**4.05**
939131	AE1-143 C	5.1672	Adder	6.08
939132	AE1-143 E	2.5595	Adder	3.01
939141	AE1-144 C O1	29.6307	50/50	29.6307
939142	AE1-144 E O1	14.7045	50/50	14.7045
940531	AE2-038 C O1	19.7661	50/50	19.7661
940532	AE2-038 E O1	9.7907	50/50	9.7907
941411	AE2-138 C	57.7656	50/50	57.7656
941412	AE2-138 E	21.3654	50/50	21.3654
941981	AE2-210 C O1	19.9045	50/50	19.9045
941982	AE2-210 E O1	7.4870	50/50	7.4870
942411	AE2-254 C O1	3.6409	Adder	4.28
942412	AE2-254 E O1	2.4273	Adder	2.86
942591	AE2-275 C O1	12.0024	Adder	14.12
942592	AE2-275 E O1	4.5147	Adder	5.31
942891	AE2-308 C O1	20.0735	Adder	23.62
942892	AE2-308 E O1	7.2995	Adder	8.59
943111	AE2-339 C	6.6475	50/50	6.6475
943112	AE2-339 E	3.2741	50/50	3.2741
943701	AF1-038 C	2.6356	Adder	3.1
943702	AF1-038 E	1.7571	Adder	2.07
944151	AF1-083 C O1	2.3913	Adder	2.81
944152	AF1-083 E O1	1.5942	Adder	1.88
944511	AF1-116 C	5.7950	Adder	6.82
944512	AF1-116 E	3.8634	Adder	4.55
944621	AF1-127 C O1	15.7579	50/50	15.7579
944622	AF1-127 E O1	7.7613	50/50	7.7613
945681	AF1-233 C	56.8741	50/50	56.8741
945682	AF1-233 E	28.0972	50/50	28.0972

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
945861	AF1-251 C	39.5234	50/50	39.5234
945862	AF1-251 E	26.3490	50/50	26.3490
945911	AF1-256 C	18.2510	50/50	18.2510
945912	AF1-256 E	12.1674	50/50	12.1674
958171	AF2-111 C O1	68.2020	50/50	68.2020
958172	AF2-111 E O1	45.4680	50/50	45.4680
960151	AF2-306	6.3427	50/50	6.3427
960161	AF2-307 C	9.6604	50/50	9.6604
960162	AF2-307 E	6.4403	50/50	6.4403
960571	AF2-348 C	66.7320	50/50	66.7320
960572	AF2-348 E	44.4880	50/50	44.4880
960641	AF2-355 C O1	24.6655	Adder	29.02
960642	AF2-355 E O1	16.4437	Adder	19.35
LGEE	LGEE	2.8474	Confirmed LTF	2.8474
CPLE	CPLE	0.8170	Confirmed LTF	0.8170
CBM-W2	CBM-W2	13.2842	Confirmed LTF	13.2842
NY	NY	0.1139	Confirmed LTF	0.1139
TVA	TVA	4.0432	Confirmed LTF	4.0432
O-066	O-066	0.9811	Confirmed LTF	0.9811
CBM-S2	CBM-S2	9.2942	Confirmed LTF	9.2942
CBM-S1	CBM-S1	27.9286	Confirmed LTF	27.9286
G-007	G-007	0.1487	Confirmed LTF	0.1487
MADISON	MADISON	12.6726	Confirmed LTF	12.6726
MEC	MEC	0.9979	Confirmed LTF	0.9979

9.7.3 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
100782127	250054	08LONGBR	DEO&K	250077	08MTZION	DEO&K	1	DAY_P734541 34553	tower	284.0	140.62	144.88	AC	15.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342957	1SPURLK1G	6.4392	50/50	6.4392
342960	1SPURLK2G	10.1120	50/50	10.1120
342963	1SPURLK3G	5.3137	50/50	5.3137
342966	1SPURLK4G	5.3137	50/50	5.3137
925981	**AC1-074 C O1 (Suspended)**	**9.2602**	**50/50**	**9.2602**
925982	**AC1-074 E O1 (Suspended)**	**3.9686**	**50/50**	**3.9686**
932551	**AC2-075 C (Suspended)**	**2.1993**	**50/50**	**2.1993**
932552	**AC2-075 E (Suspended)**	**1.1079**	**50/50**	**1.1079**
936381	AD2-048 C	6.0766	50/50	6.0766
936382	AD2-048 E	3.0318	50/50	3.0318
936571	**AD2-072 C O1 (Suspended)**	**2.9503**	**Adder**	**3.47**
936572	**AD2-072 E O1 (Suspended)**	**1.4466**	**Adder**	**1.7**
939141	AE1-144 C O1	8.7955	50/50	8.7955
939142	AE1-144 E O1	4.3649	50/50	4.3649
940531	AE2-038 C O1	5.8673	50/50	5.8673
940532	AE2-038 E O1	2.9063	50/50	2.9063
941411	AE2-138 C	14.2454	Adder	16.76
941412	AE2-138 E	5.2689	Adder	6.2
941981	AE2-210 C O1	4.9086	Adder	5.77
941982	AE2-210 E O1	1.8464	Adder	2.17
942411	AE2-254 C O1	1.4112	Adder	1.66
942412	AE2-254 E O1	0.9408	Adder	1.11
942591	AE2-275 C O1	4.0292	Adder	4.74
942592	AE2-275 E O1	1.5156	Adder	1.78
942891	AE2-308 C O1	6.9321	Adder	8.16
942892	AE2-308 E O1	2.5208	Adder	2.97
943111	AE2-339 C	2.1017	Adder	2.47
943112	AE2-339 E	1.0352	Adder	1.22
944621	AF1-127 C O1	4.0562	Adder	4.77
944622	AF1-127 E O1	1.9978	Adder	2.35
945681	AF1-233 C	16.6082	50/50	16.6082
945682	AF1-233 E	8.2048	50/50	8.2048
945861	AF1-251 C	9.9454	Adder	11.7
945862	AF1-251 E	6.6303	Adder	7.8
945911	AF1-256 C	5.3208	50/50	5.3208
945912	AF1-256 E	3.5472	50/50	3.5472
958171	AF2-111 C O1	15.9870	50/50	15.9870
958172	AF2-111 E O1	10.6580	50/50	10.6580
960151	AF2-306	1.7039	Adder	2.0
960161	AF2-307 C	2.5952	Adder	3.05
960162	AF2-307 E	1.7301	Adder	2.04
960571	AF2-348 C	15.7965	50/50	15.7965
960572	AF2-348 E	10.5310	50/50	10.5310
960641	AF2-355 C O1	7.8845	Adder	9.28
960642	AF2-355 E O1	5.2563	Adder	6.18
WEC	WEC	0.0369	Confirmed LTF	0.0369
LGEE	LGEE	1.7104	Confirmed LTF	1.7104
CPLE	CPLE	0.2844	Confirmed LTF	0.2844

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-W2	CBM-W2	6.3227	Confirmed LTF	6.3227
NY	NY	0.0653	Confirmed LTF	0.0653
TVA	TVA	1.6254	Confirmed LTF	1.6254
O-066	O-066	0.6317	Confirmed LTF	0.6317
CBM-S2	CBM-S2	3.3524	Confirmed LTF	3.3524
CBM-S1	CBM-S1	12.7970	Confirmed LTF	12.7970
G-007	G-007	0.0957	Confirmed LTF	0.0957
MADISON	MADISON	3.7760	Confirmed LTF	3.7760
MEC	MEC	0.5784	Confirmed LTF	0.5784
CBM-W1	CBM-W1	0.8632	Confirmed LTF	0.8632

9.7.4 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
100782128	250077	08MTZION	DEO&K	249991	08BUFTN1	DEO&K	1	DAY_P734541 34553	tower	298.0	129.86	133.92	AC	15.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342957	1SPURLK1G	6.4392	50/50	6.4392
342960	1SPURLK2G	10.1120	50/50	10.1120
342963	1SPURLK3G	5.3137	50/50	5.3137
342966	1SPURLK4G	5.3137	50/50	5.3137
925981	**AC1-074 C O1 (Suspended)**	**9.2602**	**50/50**	**9.2602**
925982	**AC1-074 E O1 (Suspended)**	**3.9686**	**50/50**	**3.9686**
932551	**AC2-075 C (Suspended)**	**2.1993**	**50/50**	**2.1993**
932552	**AC2-075 E (Suspended)**	**1.1079**	**50/50**	**1.1079**
936381	AD2-048 C	6.0766	50/50	6.0766
936382	AD2-048 E	3.0318	50/50	3.0318
936571	**AD2-072 C O1 (Suspended)**	**2.9503**	**Adder**	**3.47**
936572	**AD2-072 E O1 (Suspended)**	**1.4466**	**Adder**	**1.7**
939141	AE1-144 C O1	8.7955	50/50	8.7955
939142	AE1-144 E O1	4.3649	50/50	4.3649
940531	AE2-038 C O1	5.8673	50/50	5.8673
940532	AE2-038 E O1	2.9063	50/50	2.9063
941411	AE2-138 C	14.2454	Adder	16.76
941412	AE2-138 E	5.2689	Adder	6.2
941981	AE2-210 C O1	4.9086	Adder	5.77
941982	AE2-210 E O1	1.8464	Adder	2.17
942411	AE2-254 C O1	1.4112	Adder	1.66
942412	AE2-254 E O1	0.9408	Adder	1.11
942591	AE2-275 C O1	4.0292	Adder	4.74
942592	AE2-275 E O1	1.5156	Adder	1.78
942891	AE2-308 C O1	6.9321	Adder	8.16
942892	AE2-308 E O1	2.5208	Adder	2.97
943111	AE2-339 C	2.1017	Adder	2.47
943112	AE2-339 E	1.0352	Adder	1.22
944621	AF1-127 C O1	4.0562	Adder	4.77
944622	AF1-127 E O1	1.9978	Adder	2.35
945681	AF1-233 C	16.6082	50/50	16.6082
945682	AF1-233 E	8.2048	50/50	8.2048
945861	AF1-251 C	9.9454	Adder	11.7
945862	AF1-251 E	6.6303	Adder	7.8
945911	AF1-256 C	5.3208	50/50	5.3208
945912	AF1-256 E	3.5472	50/50	3.5472
958171	AF2-111 C O1	15.9870	50/50	15.9870
958172	AF2-111 E O1	10.6580	50/50	10.6580
960151	AF2-306	1.7039	Adder	2.0
960161	AF2-307 C	2.5952	Adder	3.05
960162	AF2-307 E	1.7301	Adder	2.04
960571	AF2-348 C	15.7965	50/50	15.7965
960572	AF2-348 E	10.5310	50/50	10.5310
960641	AF2-355 C O1	7.8845	Adder	9.28
960642	AF2-355 E O1	5.2563	Adder	6.18
WEC	WEC	0.0369	Confirmed LTF	0.0369
LGEE	LGEE	1.7104	Confirmed LTF	1.7104
CPLE	CPLE	0.2844	Confirmed LTF	0.2844

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-W2	CBM-W2	6.3227	Confirmed LTF	6.3227
NY	NY	0.0653	Confirmed LTF	0.0653
TVA	TVA	1.6254	Confirmed LTF	1.6254
O-066	O-066	0.6317	Confirmed LTF	0.6317
CBM-S2	CBM-S2	3.3524	Confirmed LTF	3.3524
CBM-S1	CBM-S1	12.7970	Confirmed LTF	12.7970
G-007	G-007	0.0957	Confirmed LTF	0.0957
MADISON	MADISON	3.7760	Confirmed LTF	3.7760
MEC	MEC	0.5784	Confirmed LTF	0.5784
CBM-W1	CBM-W1	0.8632	Confirmed LTF	0.8632

9.7.5 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
98902582	324010	7TRIMBL REAC	LGEE	248000	06CLIFTY	OVEC	1	AEP_P1-2_#363	single	1451.0	128.34	129.38	DC	15.13

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243442	05RKG1	14.6758	80/20	14.6758
243443	05RKG2	14.4534	80/20	14.4534
342900	1COOPER1 G	2.4476	80/20	2.4476
342903	1COOPER2 G	4.7463	80/20	4.7463
342918	1JKCT 1G	1.9111	80/20	1.9111
342921	1JKCT 2G	1.3927	80/20	1.3927
342924	1JKCT 3G	1.9111	80/20	1.9111
342927	1JKCT 4G	1.2683	80/20	1.2683
342930	1JKCT 5G	1.2613	80/20	1.2613
342933	1JKCT 6G	1.2683	80/20	1.2683
342936	1JKCT 7G	1.2683	80/20	1.2683
342939	1JKCT 9G	1.3039	80/20	1.3039
342942	1JKCT 10G	1.3039	80/20	1.3039
342945	1LAUREL 1G	1.3811	80/20	1.3811
925981	**AC1-074 C O1 (Suspended)**	**3.9900**	**80/20**	**3.9900**
930461	AB1-087	35.1175	80/20	35.1175
930471	AB1-088	35.1175	80/20	35.1175
932551	**AC2-075 C (Suspended)**	**0.9476**	**80/20**	**0.9476**
933441	AC2-157 C	4.8526	80/20	4.8526
936381	AD2-048 C	3.4339	80/20	3.4339
936571	**AD2-072 C O1 (Suspended)**	**10.1227**	**80/20**	**10.1227**
939131	AE1-143 C	9.5786	80/20	9.5786
940041	AE1-246 C O1	11.9581	80/20	11.9581
940831	AE2-071 C	3.0330	80/20	3.0330
941341	AE2-130 C	30.6192	80/20	30.6192
941411	AE2-138 C	15.1574	80/20	15.1574
941981	AE2-210 C O1	5.2228	80/20	5.2228
942411	AE2-254 C O1	4.0305	80/20	4.0305
942591	AE2-275 C O1	6.8186	80/20	6.8186
942601	AE2-276	3.1925	80/20	3.1925
942891	AE2-308 C O1	11.5159	80/20	11.5159
943111	AE2-339 C	2.5645	80/20	2.5645
943701	AF1-038 C	4.6616	80/20	4.6616
943821	AF1-050 C	5.4155	80/20	5.4155
944151	AF1-083 C O1	4.9817	80/20	4.9817
944201	AF1-088 FTIR	63.8500	80/20	63.8500
944511	AF1-116 C	10.7424	80/20	10.7424
944621	AF1-127 C O1	4.4365	80/20	4.4365
945381	AF1-203 C	1.7332	80/20	1.7332
945861	AF1-251 C	10.7250	80/20	10.7250
952811	J759	9.7041	PJM External (MISO)	9.7041
952821	J762	29.9340	PJM External (MISO)	29.9340
952861	J783 C	9.2998	PJM External (MISO)	9.2998
953611	J800	14.0125	PJM External (MISO)	14.0125
953931	J856	9.4096	PJM External (MISO)	9.4096
955451	J1027	13.7235	PJM External (MISO)	13.7235
955461	J1028	15.2070	PJM External (MISO)	15.2070
955891	J1074	22.9880	PJM External (MISO)	22.9880
956911	J1189	0.4454	PJM External (MISO)	0.4454
957141	AF2-008 FTIR	31.9250	80/20	31.9250
957961	AF2-090 C	16.4651	80/20	16.4651

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
959691	AF2-260 C	10.8486	80/20	10.8486
960151	AF2-306	1.6770	80/20	1.6770
960161	AF2-307 C	2.5542	80/20	2.5542
960171	AF2-308	5.8142	80/20	5.8142
960181	AF2-309 C	8.7213	80/20	8.7213
960641	AF2-355 C O1	15.1321	80/20	15.1321
960741	AF2-365 C O1	4.7391	80/20	4.7391
961001	AF2-391 C O1	15.6154	80/20	15.6154
WEC	WEC	0.6659	Confirmed LTF	0.6659
LGEE	LGEE	18.1448	Confirmed LTF	18.1448
CPLE	CPLE	1.2039	Confirmed LTF	1.2039
CBM-W2	CBM-W2	56.2571	Confirmed LTF	56.2571
NY	NY	0.2704	Confirmed LTF	0.2704
TVA	TVA	9.5228	Confirmed LTF	9.5228
CBM-S2	CBM-S2	14.8026	Confirmed LTF	14.8026
CBM-S1	CBM-S1	97.4688	Confirmed LTF	97.4688
MADISON	MADISON	12.3359	Confirmed LTF	12.3359
MEC	MEC	6.1033	Confirmed LTF	6.1033
CBM-W1	CBM-W1	20.4163	Confirmed LTF	20.4163

9.7.6 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
98902963	342559	4BOONE CO	EKPC	250054	08LONGBR	DEO&K	1	DAY_P734541 34553	tower	284.0	147.65	151.92	AC	15.46

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
342957	1SPURLK1G	6.4392	50/50	6.4392
342960	1SPURLK2G	10.1120	50/50	10.1120
342963	1SPURLK3G	5.3137	50/50	5.3137
342966	1SPURLK4G	5.3137	50/50	5.3137
925981	**AC1-074 C O1 (Suspended)**	**9.2602**	**50/50**	**9.2602**
925982	**AC1-074 E O1 (Suspended)**	**3.9686**	**50/50**	**3.9686**
932551	**AC2-075 C (Suspended)**	**2.1993**	**50/50**	**2.1993**
932552	**AC2-075 E (Suspended)**	**1.1079**	**50/50**	**1.1079**
936381	AD2-048 C	6.0766	50/50	6.0766
936382	AD2-048 E	3.0318	50/50	3.0318
936571	**AD2-072 C O1 (Suspended)**	**2.9503**	**Adder**	**3.47**
936572	**AD2-072 E O1 (Suspended)**	**1.4466**	**Adder**	**1.7**
939141	AE1-144 C O1	8.7955	50/50	8.7955
939142	AE1-144 E O1	4.3649	50/50	4.3649
940531	AE2-038 C O1	5.8673	50/50	5.8673
940532	AE2-038 E O1	2.9063	50/50	2.9063
941411	AE2-138 C	14.2454	Adder	16.76
941412	AE2-138 E	5.2689	Adder	6.2
941981	AE2-210 C O1	4.9086	Adder	5.77
941982	AE2-210 E O1	1.8464	Adder	2.17
942411	AE2-254 C O1	1.4112	Adder	1.66
942412	AE2-254 E O1	0.9408	Adder	1.11
942591	AE2-275 C O1	4.0292	Adder	4.74
942592	AE2-275 E O1	1.5156	Adder	1.78
942891	AE2-308 C O1	6.9321	Adder	8.16
942892	AE2-308 E O1	2.5208	Adder	2.97
943111	AE2-339 C	2.1017	Adder	2.47
943112	AE2-339 E	1.0352	Adder	1.22
944621	AF1-127 C O1	4.0562	Adder	4.77
944622	AF1-127 E O1	1.9978	Adder	2.35
945681	AF1-233 C	16.6082	50/50	16.6082
945682	AF1-233 E	8.2048	50/50	8.2048
945861	AF1-251 C	9.9454	Adder	11.7
945862	AF1-251 E	6.6303	Adder	7.8
945911	AF1-256 C	5.3208	50/50	5.3208
945912	AF1-256 E	3.5472	50/50	3.5472
958171	AF2-111 C O1	15.9870	50/50	15.9870
958172	AF2-111 E O1	10.6580	50/50	10.6580
960151	AF2-306	1.7039	Adder	2.0
960161	AF2-307 C	2.5952	Adder	3.05
960162	AF2-307 E	1.7301	Adder	2.04
960571	AF2-348 C	15.7965	50/50	15.7965
960572	AF2-348 E	10.5310	50/50	10.5310
960641	AF2-355 C O1	7.8845	Adder	9.28
960642	AF2-355 E O1	5.2563	Adder	6.18
WEC	WEC	0.0369	Confirmed LTF	0.0369
LGEE	LGEE	1.7104	Confirmed LTF	1.7104
CPLE	CPLE	0.2844	Confirmed LTF	0.2844

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
CBM-W2	CBM-W2	6.3227	Confirmed LTF	6.3227
NY	NY	0.0653	Confirmed LTF	0.0653
TVA	TVA	1.6254	Confirmed LTF	1.6254
O-066	O-066	0.6317	Confirmed LTF	0.6317
CBM-S2	CBM-S2	3.3524	Confirmed LTF	3.3524
CBM-S1	CBM-S1	12.7970	Confirmed LTF	12.7970
G-007	G-007	0.0957	Confirmed LTF	0.0957
MADISON	MADISON	3.7760	Confirmed LTF	3.7760
MEC	MEC	0.5784	Confirmed LTF	0.5784
CBM-W1	CBM-W1	0.8632	Confirmed LTF	0.8632

9.7.7 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
98902969	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER	tower	1532.0	148.06	151.13	AC	54.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
251968	08ZIMRHP	49.1100	50/50	49.1100
251969	08ZIMRLP	26.8936	50/50	26.8936
251970	08MELDL1	2.4872	50/50	2.4872
251971	08MELDL2	2.4872	50/50	2.4872
251972	08MELDL3	2.4939	50/50	2.4939
342942	1JKCT 10G	3.6588	50/50	3.6588
342957	1SPURLK1G	25.2360	50/50	25.2360
342960	1SPURLK2G	48.0149	50/50	48.0149
342963	1SPURLK3G	25.2313	50/50	25.2313
342966	1SPURLK4G	25.2313	50/50	25.2313
925921	AC1-068 C	-3.5275	Adder	-4.15
925931	AC1-069 C	-3.5275	Adder	-4.15
925981	AC1-074 C O1 (Suspended)	15.7310	50/50	15.7310
925982	AC1-074 E O1 (Suspended)	6.7418	50/50	6.7418
926791	AC1-165 C	-3.4860	Adder	-4.1
926801	AC1-166 C	-3.4860	Adder	-4.1
926951	AC1-182	1.1693	50/50	1.1693
932551	AC2-075 C (Suspended)	3.7361	50/50	3.7361
932552	AC2-075 E (Suspended)	1.8821	50/50	1.8821
935031	AD1-136 C (Suspended)	-0.7821	Adder	-0.92
936381	AD2-048 C	10.8074	Adder	12.71
936382	AD2-048 E	5.3921	Adder	6.34
936571	AD2-072 C O1 (Suspended)	8.5425	Adder	10.05
936572	AD2-072 E O1 (Suspended)	4.1885	Adder	4.93
939131	AE1-143 C	6.3983	Adder	7.53
939132	AE1-143 E	3.1693	Adder	3.73
939141	AE1-144 C O1	32.8876	50/50	32.8876
939142	AE1-144 E O1	16.3208	50/50	16.3208
940531	AE2-038 C O1	21.9387	50/50	21.9387
940532	AE2-038 E O1	10.8669	50/50	10.8669
941411	AE2-138 C	63.1825	50/50	63.1825
941412	AE2-138 E	23.3689	50/50	23.3689
941981	AE2-210 C O1	21.7710	50/50	21.7710
941982	AE2-210 E O1	8.1891	50/50	8.1891
942411	AE2-254 C O1	4.2917	Adder	5.05
942412	AE2-254 E O1	2.8611	Adder	3.37
942591	AE2-275 C O1	13.5039	Adder	15.89
942592	AE2-275 E O1	5.0795	Adder	5.98
942891	AE2-308 C O1	22.6326	Adder	26.63
942892	AE2-308 E O1	8.2300	Adder	9.68
943111	AE2-339 C	7.4515	50/50	7.4515
943112	AE2-339 E	3.6701	50/50	3.6701
943701	AF1-038 C	3.2136	Adder	3.78
943702	AF1-038 E	2.1424	Adder	2.52
943772	AF1-045 BAT	4.6771	Merchant Transmission	4.6771
943821	AF1-050 C	2.8562	Adder	3.36

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943822	AF1-050 E	1.9041	Adder	2.24
944151	AF1-083 C O1	3.0011	Adder	3.53
944152	AF1-083 E O1	2.0007	Adder	2.35
944511	AF1-116 C	7.1757	Adder	8.44
944512	AF1-116 E	4.7838	Adder	5.63
944621	AF1-127 C O1	17.3021	50/50	17.3021
944622	AF1-127 E O1	8.5219	50/50	8.5219
945681	AF1-233 C	63.0592	50/50	63.0592
945682	AF1-233 E	31.1528	50/50	31.1528
945861	AF1-251 C	43.3079	50/50	43.3079
945862	AF1-251 E	28.8719	50/50	28.8719
945911	AF1-256 C	20.2344	50/50	20.2344
945912	AF1-256 E	13.4896	50/50	13.4896
957961	AF2-090 C	5.4759	Adder	6.44
957962	AF2-090 E	2.7082	Adder	3.19
958171	AF2-111 C O1	72.6165	50/50	72.6165
958172	AF2-111 E O1	48.4110	50/50	48.4110
959691	AF2-260 C	4.0203	Adder	4.73
959692	AF2-260 E	2.4273	Adder	2.86
960151	AF2-306	5.9953	Adder	7.05
960161	AF2-307 C	9.1313	Adder	10.74
960162	AF2-307 E	6.0875	Adder	7.16
960171	AF2-308	2.1241	Adder	2.5
960181	AF2-309 C	3.1862	Adder	3.75
960182	AF2-309 E	2.1241	Adder	2.5
960571	AF2-348 C	71.1375	50/50	71.1375
960572	AF2-348 E	47.4250	50/50	47.4250
960641	AF2-355 C O1	27.7305	Adder	32.62
960642	AF2-355 E O1	18.4870	Adder	21.75
961001	AF2-391 C O1	5.4633	Adder	6.43
961002	AF2-391 E O1	3.6422	Adder	4.28
WEC	WEC	0.3726	Confirmed LTF	0.3726
LGEE	LGEE	4.6667	Confirmed LTF	4.6667
CPLE	CPLE	0.4842	Confirmed LTF	0.4842
CBM-W2	CBM-W2	24.7338	Confirmed LTF	24.7338
NY	NY	0.7499	Confirmed LTF	0.7499
TVA	TVA	5.2542	Confirmed LTF	5.2542
O-066	O-066	8.7293	Confirmed LTF	8.7293
CBM-S2	CBM-S2	7.6123	Confirmed LTF	7.6123
CBM-S1	CBM-S1	38.9705	Confirmed LTF	38.9705
G-007	G-007	1.3468	Confirmed LTF	1.3468
MADISON	MADISON	3.2579	Confirmed LTF	3.2579
MEC	MEC	2.9873	Confirmed LTF	2.9873
CBM-W1	CBM-W1	10.1331	Confirmed LTF	10.1331

9.8 Queue Dependencies

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

Queue Number	Project Name	Status
AB1-087	Sullivan 345kV #1	Active
AB1-088	Sullivan 345kV #2	Active
AC1-068	Atlanta 69kV I	Engineering and Procurement
AC1-069	Atlanta 69kV II	Engineering and Procurement
AC1-074	Jacksonville-Renaker 138kV I	Suspended
AC1-089	Hillsboro-Wildcat 138kV	Engineering and Procurement
AC1-165	Atlanta 69kV III	Engineering and Procurement
AC1-166	Atlanta 69kV IV	Engineering and Procurement
AC1-182	W.H. Zimmer Station 345kV	In Service
AC2-075	Jacksonville-Renaker 138 kV	Suspended
AC2-157	Sullivan 345 kV	Active
AD1-136	South Bethel-Brown 69 kV	Suspended
AD2-048	Cynthia-Headquarters 69 kV	Engineering and Procurement
AD2-072	Van Arsdell-Mercer Industrial 69kV	Suspended
AE1-143	Marion County 161 kV	Engineering and Procurement
AE1-144	Goddard-Plumville 138 kV	Active
AE1-246	Barren County-Summer Shade 161 kV	Active
AE2-038	Goddard-Plumsville 138 kV II	Active
AE2-071	Patton Rd-Summer Shade 69 kV	Active
AE2-130	Rockport 765 kV	Active
AE2-138	Avon-North Clark 345 kV	Active
AE2-210	Avon-North Clark 345 kV	Active
AE2-254	Garrard County-Tommy-Gooch 69 kV	Engineering and Procurement
AE2-275	JK Smith-Fawkes 138 kV	Active
AE2-276	Sullivan 345kV	Active
AE2-308	Three Forks-Dale 138 kV	Active
AE2-339	Avon 138 kV	Active
AF1-038	Sewellton Jct-Webbs Crossroads 69 kV	Active
AF1-045	Cedarville-Ford 138 kV	Active
AF1-050	Summer Shade - Green County 161 kV	Active
AF1-083	Green County-Saloma 161 kV	Active
AF1-088	Sullivan 345 kV	Active
AF1-116	Marion County 161 kV	Active
AF1-127	Avon 345 kV	Active
AF1-203	Patton Rd-Summer Shade 69 kV	Active
AF1-233	Flemingsburg 138 kV	Active
AF1-251	Avon-North Clark 345 kV	Active
AF1-256	Flemingsburg-Spurlock 138 kV	Active
AF2-008	Sullivan 345 kV	Active
AF2-090	Central Hardin 138 kV	Active
AF2-111	North Clark-Spurlock 345 kV	Active
AF2-260	Stephensburg-Central Hardin 69 kV	Active
AF2-306	Hope-Blevins Valley Tap 69 kV	Active
AF2-307	Hope-Blevins Valley Tap 69 kV	Active
AF2-308	Central Hardin-Stephensburg 69 kV	Active
AF2-309	Central Hardin-Stephensburg 69 kV	Active
AF2-348	North Clark-Spurlock 345 kV	Active
AF2-355	West Gerrard-J.K. Smith 345 nkV	Active
AF2-365	Munfordville KU Tap-Horse Cave Jct. 69 kV	Active
AF2-391	Central Hardin 69 kV	Active
J1027	MISO	MISO

Queue Number	Project Name	Status
J1028	MISO	MISO
J1074	MISO	MISO
J1189	MISO	MISO
J759	MISO	MISO
J762	MISO	MISO
J783	MISO	MISO
J800	MISO	MISO
J856	MISO	MISO

9.9 Contingency Descriptions

Contingency Name	Contingency Definition
Base Case	
DEOK_P2-3_C2 1493_RED BANK	CONTINGENCY 'DEOK_P2-3_C2 1493_RED BANK' OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249571 TO BUS 250092 CKT 1 / 249571 08REDBK1 345 250092 08REDBK1 138 1 END
EKPC_P4-6_SPUR N39-150T-A	CONTINGENCY 'EKPC_P4-6_SPUR N39-150T-A' /* SPURLOCK OPEN BUS 342960 /* 1SPURLK2G DROPS GEN OPEN BRANCH FROM BUS 958170 TO BUS 342838 CKT 1 /* 958170 AF2-111 TAP 345.00 342838 7SPURLOCK 345.00 END
DAY-P1-STU SPUR	CONTINGENCY 'DAY-P1-STU SPUR' DISCONNECT BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* STU SPUR END
DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER	CONTINGENCY 'DEOK_P7-1_C5 CIRCUIT1883&4545REDBANKSILGRVZIMMER' OPEN BRANCH FROM BUS 249989 TO BUS 250080 CKT 1 / 249989 08BKJ246 138 250080 08NWTWN2 138 1 OPEN BRANCH FROM BUS 250079 TO BUS 250080 CKT Z1 / 250079 08NWTWN1 138 250080 08NWTWN2 138 Z1 OPEN BRANCH FROM BUS 250079 TO BUS 250092 CKT 1 / 250079 08NWTWN1 138 250092 08REDBK1 138 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 END
DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*	CONTINGENCY 'DEOK_P1-3_B3 SILVER GROVE 345/138 TB23*' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 END
AEP_P1-2_#1027	CONTINGENCY 'AEP_P1-2_#1027' OPEN BRANCH FROM BUS 248000 TO BUS 324010 CKT 1 / 248000 06CLIFTY 345 324010 7TRIMBL REAC 345 1 OPEN BRANCH FROM BUS 324010 TO BUS 324114 CKT 1 / 324010 7TRIMBL REAC 345 324114 7TRIMBLE CO 345 1 END
EKPC_P2-4_SPUR N39-150T-A	CONTINGENCY 'EKPC_P2-4_SPUR N39-150T-A' /* SPURLOCK OPEN BUS 342960 /* 1SPURLK2G OPEN BRANCH FROM BUS 958170 TO BUS 342838 CKT 1 /* 958170 AF2-111 TAP 345.00 342838 7SPURLOCK 345.00 END
DAY_P734541 34553	CONTINGENCY 'DAY_P734541 34553' OPEN BRANCH FROM BUS 249581 TO BUS 342838 CKT 1 /* 249581 08MELDAL 345.00 342838 7SPURLOCK 345.00 OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 END

Contingency Name	Contingency Definition
AEP_P1-2_#10136	CONTINGENCY 'AEP_P1-2_#10136' OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 OPEN BRANCH FROM BUS 243209 TO BUS 243443 CKT 2 / 243209 05ROCKPT 765 243443 05RKG2 26.0 2 REMOVE UNIT 2H FROM BUS 243443 / 243443 05RKG2 26.0 REMOVE UNIT 2L FROM BUS 243443 / 243443 05RKG2 26.0 END
EKPC_P2-3_SPUR N39-1474	CONTINGENCY 'EKPC_P2-3_SPUR N39-1474' /* SPURLOCK OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 OPEN BRANCH FROM BUS 342664 TO BUS 342838 CKT 2 /* 342664 4SPURLOCK 138.00 342838 7SPURLOCK 345.00 END
AEP_P1-2_#363	CONTINGENCY 'AEP_P1-2_#363' OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1 END
DAY_P4_L34553-1	CONTINGENCY 'DAY_P4_L34553-1' OPEN LINE FROM BUS 253077 TO BUS 342838 CKT 1 /* 09STUART 345 - 7SPURLK 345 OPEN LINE FROM BUS 253077 TO BUS 253076 CKT 1 /* 09STUART 345 - 09STUART 138 END
EKPC_P4-2_SPUR N39-1474	CONTINGENCY 'EKPC_P4-2_SPUR N39-1474' /* SPURLOCK OPEN BRANCH FROM BUS 253077 TO BUS 342838 CKT 1 /* 253077 09STUART 345.00 342838 7SPURLOCK 345.00 OPEN BRANCH FROM BUS 342664 TO BUS 342838 CKT 2 /* 342664 4SPURLOCK 138.00 342838 7SPURLOCK 345.00 END
DEOK_P2-3_C2 816_SILVERGROVE	CONTINGENCY 'DEOK_P2-3_C2 816_SILVERGROVE' OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249988 TO BUS 250097 CKT 1 / 249988 08BKJ135 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250042 TO BUS 250097 CKT 1 / 250042 08HANDS1 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250052 TO BUS 250097 CKT 1 / 250052 08KYUNIV 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 250053 TO BUS 250097 CKT 1 / 250053 08LAFARG 138 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 END
EKPC_P1-2_SPUR-NCLA345-A	CONTINGENCY 'EKPC_P1-2_SPUR-NCLA345-A' /* SPURLOCK- AF2-111 TAP OPEN BRANCH FROM BUS 958170 TO BUS 342838 CKT 1 /* 958170 AF2-111 TAP 345.00 342838 7SPURLOCK 345.00 END
DEOK_P2-2_C1 SILVER GROVE 345 BUS	CONTINGENCY 'DEOK_P2-2_C1 SILVER GROVE 345 BUS' OPEN BRANCH FROM BUS 249573 TO BUS 249577 CKT 1 / 249573 08SGROVE 345 249577 08ZIMER 345 1 OPEN BRANCH FROM BUS 249573 TO BUS 250097 CKT 1 / 249573 08SGROVE 345 250097 08SGROVE 138 1 OPEN BRANCH FROM BUS 249571 TO BUS 249573 CKT 1 / 249571 08REDBK1 345 249573 08SGROVE 345 1 END

10 Light Load Analysis

Not applicable.

11 Short Circuit Analysis

The following Breakers are overdutied:

None.

12 Stability and Reactive Power

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

To be determined in the Facilities Study Phase.

13 Affected Systems

13.1 TVA

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

13.2 Duke Energy Progress

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

13.3 MISO

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

13.4 LG&E

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

14 Attachment 1: One Line Diagram

AF2-355 Conceptual Single-Line Diagram of Interconnection Facilities