# Generation Interconnection

# Feasibility Study Report

# for

# Queue Project AG1-341

# SUMMER SHADE 161 KV

# 63.6 MW Capacity / 106 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.

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.

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; Storage generating facility located in Metcalfe County, Kentucky. The installed facilities will have a total capability of 106 MW with 63.6 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is June 15, 2023. This study does not imply a TO commitment to this in-service date.

| Queue Number | AG1-341 |
|---|---|
| Project Name | SUMMER SHADE 161 KV |
| State | Kentucky |
| County | Metcalfe |
| Transmission Owner | EKPC |
| MFO | 106 |
| MWE | 106 |
| MWC | 63.6 |
| Fuel | Solar; Storage |
| 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

AG1-341 will interconnect with the EKPC transmission system along one of the following Points of Interconnection:

Primary POI: Summer Shade 161 kV substation.

Secondary POI: Summer Shade 69 kV substation.

## 5 Cost Summary

The AG1-341 project will be responsible for the following costs:

| Description | Total Cost |
|---|---|
| **Total Physical Interconnection Costs** | [redacted] |
| **Total System Network Upgrade Costs** | [redacted] |
| **Total Costs** | [redacted] |

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. The costs do not included CIAC Tax Gross-up.

| Description | Total Cost |
|---|---|
| Install necessary equipment (a 161 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 existing Summer Shade substation, to accept the IC generator lead line/bus (Estimated time to implement is 12 months) | [redacted] |
| **Total Attachment Facility Costs** | [redacted] |

## 6.2 Direct Connection Cost Estimate

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

| Description | Total Cost |
|---|---|
| None. | [redacted] |
| **Total Direct Connection Facility Costs** | [redacted] |

## 6.3 Non-Direct Connection Cost Estimate

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

| Description | Total Cost |
|---|---|
| None. | [redacted] |
| **Total Non-Direct Connection Facility Costs** | [redacted] |

## 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 AG1-341 was evaluated as a 106.0 MW (Capacity 63.6 MW) injection at the Summer Shade 161 kV substation in the EKPC area. Project AG1-341 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-341 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)

None

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **16535546 3** | 34228 7 | 2SOMERSE T KU | 69.0 | EKPC | 32453 1 | 2FERGUSO N SO | 69.0 | LGEE | 1 | EKPC_P7 -1_COOP 161 DBL 2 | towe r | 105.0 | 107.61 | 111.23 | DC | 8.43 |
| **16535521 2** | 34271 8 | 5COOPER2 | 161. 0 | EKPC | 32414 1 | 5ELIHU | 161. 0 | LGEE | 1 | EKPC_P2 - 2_LAURE L CO 161 | bus | 277.0 | 110.21 | 114.65 | DC | 12.31 |
| **16535547 8** | 34271 8 | 5COOPER2 | 161. 0 | EKPC | 32414 1 | 5ELIHU | 161. 0 | LGEE | 1 | EKPC_P7 - 1_LAURL 161 DBL | towe r | 277.0 | 110.47 | 114.91 | DC | 12.29 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **16454440 2** | 32401 0 | 7TRIMBL REAC | 345. 0 | LGEE | 24800 0 | 06CLIFT Y | 345. 0 | OVEC | 1 | AEP_P1- 2_#363_16 82 | operatio n | 1451. 0 | 114.47 | 115.56 | DC | 15.71 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **169425646** | 342718 | 5COOPER 2 | 161.0 | EKPC | 324141 | 5ELIHU | 161.0 | LGEE | 1 | EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00 | operation | 277.0 | 110.16 | 114.61 | DC | 12.33 |
| **169425591** | 342733 | 5GREEN CO | 161.0 | EKPC | 341563 | 2GREEN CO | 69.0 | EKPC | 1 | EKPC_P1-2_GRE-TAY-MAR161-C | operation | 90.0 | 99.49 | 102.4 | DC | 5.81 |
| **169425761** | 342757 | 5LAUREL DAM | 161.0 | EKPC | 342754 | 5LAUREL CO | 161.0 | EKPC | 1 | EXT_B-69-25 | operation | 200.0 | 99.52 | 100.99 | DC | 6.49 |

## 9.5 System Reinforcements - Summer Peak Load Flow - Primary POI

| ID | Idx | Facility | Upgrade Description | Cost |
|---|---|---|---|---|
| 165355463 | 1 | 2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1 | **EKPC**<br>**r0077 (2242) : LGEE violation (non PJM area). EKPC emergency rating is 152 MVA.**<br>**Project Type : FAC**<br>**Cost : $0**<br>**Time Estimate : 0.0 Months**<br><br>**LGEE**<br>**NonPJMArea (2250) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.**<br>**Project Type : FAC**<br>**Cost : $0**<br>**Time Estimate : 0.0 Months** | $0 |
| 165355478,165355212 | 2 | 5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1 | **EKPC**<br>**r0076 (2241) : Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles)**<br>**Project Type : FAC**<br>**Cost : $660,000**<br>**Time Estimate : 9.0 Months**<br><br>**LGEE**<br>**NonPJMArea (2250) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.**<br>**Project Type : FAC**<br>**Cost : $0**<br>**Time Estimate : 0.0 Months** | $660,000 |
| | | | **TOTAL COST** | **$660,000** |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **165355463** | 342287 | 2SOMERSET KU | EKPC | 324531 | 2FERGUSON SO | LGEE | 1 | EKPC_P7-1_COOP 161 DBL 2 | tower | 105.0 | 107.61 | 111.23 | DC | 8.43 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **342900** | 1COOPER1 G | 4.9218 | 50/50 | 4.9218 |
| **342903** | 1COOPER2 G | 9.5458 | 50/50 | 9.5458 |
| **939131** | AE1-143 C | 5.4221 | Adder | 6.38 |
| **939132** | AE1-143 E | 2.6857 | Adder | 3.16 |
| **940045** | AE1-246 C | 5.4632 | Adder | 6.43 |
| **940046** | AE1-246 E | 2.6305 | Adder | 3.09 |
| **940831** | AE2-071 C | 1.6233 | Adder | 1.91 |
| **940832** | AE2-071 E | 1.0822 | Adder | 1.27 |
| **943701** | AF1-038 C | 8.3977 | 50/50 | 8.3977 |
| **943702** | AF1-038 E | 5.5985 | 50/50 | 5.5985 |
| **943821** | AF1-050 C | 2.5575 | Adder | 3.01 |
| **943822** | AF1-050 E | 1.7050 | Adder | 2.01 |
| **944151** | AF1-083 C O1 | 2.5256 | Adder | 2.97 |
| **944152** | AF1-083 E O1 | 1.6837 | Adder | 1.98 |
| **944511** | AF1-116 C | 6.0808 | Adder | 7.15 |
| **944512** | AF1-116 E | 4.0539 | Adder | 4.77 |
| **945381** | AF1-203 C | 0.9276 | Adder | 1.09 |
| **945382** | AF1-203 E | 0.6184 | Adder | 0.73 |
| **960741** | AF2-365 C O1 | 1.5231 | Adder | 1.79 |
| **960742** | AF2-365 E O1 | 1.0154 | Adder | 1.19 |
| **962221** | AG1-067 C O1 | 0.9274 | Adder | 2.06 |
| **962222** | AG1-067 E O1 | 0.4936 | Adder | 1.1 |
| **962241** | AG1-070 C O1 | 1.2361 | Adder | 2.74 |
| **962242** | AG1-070 E O1 | 0.2472 | Adder | 0.55 |
| **962251** | AG1-071 C O1 | 1.4833 | Adder | 3.29 |
| **962252** | AG1-071 E O1 | 0.3296 | Adder | 0.73 |
| **964781** | AG1-341 C O1 | 2.2790 | Adder | 5.06 |
| **964782** | AG1-341 E O1 | 1.5193 | Adder | 3.37 |
| **964891** | AG1-353 C | 2.3239 | Adder | 5.16 |
| **964892** | AG1-353 E | 1.5493 | Adder | 3.44 |
| **964901** | AG1-354 C | 3.2939 | Adder | 7.31 |
| **964902** | AG1-354 E | 2.1959 | Adder | 4.87 |
| **965401** | AG1-405 C | 10.6088 | 50/50 | 10.6088 |
| **965402** | AG1-405 E | 7.0726 | 50/50 | 7.0726 |
| **965411** | AG1-406 | 6.8244 | 50/50 | 6.8244 |
| **966021** | AG1-471 C O1 | 5.1635 | 50/50 | 5.1635 |
| **966022** | AG1-471 E O1 | 3.4423 | 50/50 | 3.4423 |
| **966031** | AG1-472 C | 1.5310 | Adder | 3.4 |
| **966032** | AG1-472 E | 1.0207 | Adder | 2.27 |
| **966191** | AG1-488 C O1 | 1.8353 | Adder | 4.07 |
| **966192** | AG1-488 E O1 | 1.2236 | Adder | 2.72 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **WEC** | WEC | 0.0652 | Confirmed LTF | 0.0652 |
| **CPLE** | CPLE | 0.0628 | Confirmed LTF | 0.0628 |
| **LGE-0012019** | LGE-0012019 | 5.0017 | LTF | 5.0017 |
| **CBM-W2** | CBM-W2 | 5.1878 | Confirmed LTF | 5.1878 |
| **NY** | NY | 0.0426 | Confirmed LTF | 0.0426 |
| **TVA** | TVA | 1.3454 | Confirmed LTF | 1.3454 |
| **O-066** | O-066 | 0.5048 | Confirmed LTF | 0.5048 |
| **SIGE** | SIGE | 0.0489 | Confirmed LTF | 0.0489 |
| **CBM-S2** | CBM-S2 | 1.7957 | Confirmed LTF | 1.7957 |
| **CBM-S1** | CBM-S1 | 0.2983 | Confirmed LTF | 0.2983 |
| **G-007** | G-007 | 0.0788 | Confirmed LTF | 0.0788 |
| **MEC** | MEC | 0.5848 | Confirmed LTF | 0.5848 |
| **LAGN** | LAGN | 1.2705 | Confirmed LTF | 1.2705 |
| **CBM-W1** | CBM-W1 | 2.5797 | Confirmed LTF | 2.5797 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **165355478** | 342718 | 5COOPER2 | EKPC | 324141 | 5ELIHU | LGEE | 1 | EKPC_P7-1_LAURL 161 DBL | tower | 277.0 | 110.47 | 114.91 | DC | 12.29 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **342442** | 2W GLASGOW | 0.0165 | 50/50 | 0.0165 |
| **342900** | 1COOPER1 G | 10.1486 | 50/50 | 10.1486 |
| **342903** | 1COOPER2 G | 19.7433 | 50/50 | 19.7433 |
| **342945** | 1LAUREL 1G | 6.1423 | 50/50 | 6.1423 |
| **939131** | AE1-143 C | 9.9773 | 50/50 | 9.9773 |
| **939132** | AE1-143 E | 4.9420 | 50/50 | 4.9420 |
| **940045** | AE1-246 C | 9.3685 | 50/50 | 9.3685 |
| **940046** | AE1-246 E | 4.5107 | 50/50 | 4.5107 |
| **940831** | AE2-071 C | 2.5509 | 50/50 | 2.5509 |
| **940832** | AE2-071 E | 1.7006 | 50/50 | 1.7006 |
| **942411** | AE2-254 C O1 | 1.3451 | Adder | 1.58 |
| **942412** | AE2-254 E O1 | 0.8967 | Adder | 1.05 |
| **943701** | AF1-038 C | 6.6586 | 50/50 | 6.6586 |
| **943702** | AF1-038 E | 4.4390 | 50/50 | 4.4390 |
| **943821** | AF1-050 C | 4.5025 | 50/50 | 4.5025 |
| **943822** | AF1-050 E | 3.0017 | 50/50 | 3.0017 |
| **944151** | AF1-083 C O1 | 4.5583 | 50/50 | 4.5583 |
| **944152** | AF1-083 E O1 | 3.0389 | 50/50 | 3.0389 |
| **944511** | AF1-116 C | 11.1895 | 50/50 | 11.1895 |
| **944512** | AF1-116 E | 7.4597 | 50/50 | 7.4597 |
| **945381** | AF1-203 C | 1.4576 | 50/50 | 1.4576 |
| **945382** | AF1-203 E | 0.9718 | 50/50 | 0.9718 |
| **960741** | AF2-365 C O1 | 2.2040 | Adder | 2.59 |
| **960742** | AF2-365 E O1 | 1.4693 | Adder | 1.73 |
| **962221** | AG1-067 C O1 | 2.8138 | 50/50 | 2.8138 |
| **962222** | AG1-067 E O1 | 1.4977 | 50/50 | 1.4977 |
| **962241** | AG1-070 C O1 | 3.8850 | 50/50 | 3.8850 |
| **962242** | AG1-070 E O1 | 0.7770 | 50/50 | 0.7770 |
| **962251** | AG1-071 C O1 | 4.6620 | 50/50 | 4.6620 |
| **962252** | AG1-071 E O1 | 1.0360 | 50/50 | 1.0360 |
| **964781** | AG1-341 C O1 | 7.3763 | 50/50 | 7.3763 |
| **964782** | AG1-341 E O1 | 4.9176 | 50/50 | 4.9176 |
| **964891** | AG1-353 C | 7.8586 | 50/50 | 7.8586 |
| **964892** | AG1-353 E | 5.2391 | 50/50 | 5.2391 |
| **964901** | AG1-354 C | 10.7820 | 50/50 | 10.7820 |
| **964902** | AG1-354 E | 7.1880 | 50/50 | 7.1880 |
| **965401** | AG1-405 C | 3.9234 | 50/50 | 3.9234 |
| **965402** | AG1-405 E | 2.6156 | 50/50 | 2.6156 |
| **965411** | AG1-406 | 2.5238 | 50/50 | 2.5238 |
| **966021** | AG1-471 C O1 | 7.2990 | 50/50 | 7.2990 |
| **966022** | AG1-471 E O1 | 4.8660 | 50/50 | 4.8660 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **966031** | AG1-472 C | 4.8624 | 50/50 | 4.8624 |
| **966032** | AG1-472 E | 3.2416 | 50/50 | 3.2416 |
| **966191** | AG1-488 C O1 | 6.3433 | 50/50 | 6.3433 |
| **966192** | AG1-488 E O1 | 4.2288 | 50/50 | 4.2288 |
| **WEC** | WEC | 0.0787 | Confirmed LTF | 0.0787 |
| **CPLE** | CPLE | 0.0874 | Confirmed LTF | 0.0874 |
| **LGE-0012019** | LGE-0012019 | 7.7561 | LTF | 7.7561 |
| **CBM-W2** | CBM-W2 | 7.4368 | Confirmed LTF | 7.4368 |
| **NY** | NY | 0.0868 | Confirmed LTF | 0.0868 |
| **TVA** | TVA | 2.0090 | Confirmed LTF | 2.0090 |
| **O-066** | O-066 | 1.0364 | Confirmed LTF | 1.0364 |
| **SIGE** | SIGE | 0.0700 | Confirmed LTF | 0.0700 |
| **CBM-S2** | CBM-S2 | 2.6726 | Confirmed LTF | 2.6726 |
| **CBM-S1** | CBM-S1 | 0.4378 | Confirmed LTF | 0.4378 |
| **G-007** | G-007 | 0.1617 | Confirmed LTF | 0.1617 |
| **MEC** | MEC | 0.7945 | Confirmed LTF | 0.7945 |
| **LAGN** | LAGN | 1.8725 | Confirmed LTF | 1.8725 |
| **CBM-W1** | CBM-W1 | 3.0283 | Confirmed LTF | 3.0283 |

## 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 |
|---|---|---|
| **AE1-143** | Marion County 161 kV | Engineering and Procurement |
| **AE1-246** | Barren County-Summer Shade 161 kV | Active |
| **AE2-071** | Patton Rd-Summer Shade 69 kV | Active |
| **AE2-254** | Garrard County-Tommy-Gooch 69 kV | Active |
| **AF1-038** | Sewellton Jct-Webbs Crossroads 69 kV | Active |
| **AF1-050** | Summer Shade - Green County 161 kV | Active |
| **AF1-083** | Green County-Saloma 161 kV | Active |
| **AF1-116** | Marion County 161 kV | Active |
| **AF1-203** | Patton Rd-Summer Shade 69 kV | Active |
| **AF2-365** | Munfordville KU Tap-Horse Cave Jct. 69 kV | Active |
| **AG1-067** | Temple Hill 69 kV | Active |
| **AG1-070** | Bon Ayr 69 kV | Active |
| **AG1-071** | Bon Ayr 69 kV | Active |
| **AG1-341** | Summer Shade 161 kV | Active |
| **AG1-353** | Greene County-Marion County 161 kV | Active |
| **AG1-354** | Summershade-Green County 161 kV | Active |
| **AG1-405** | Walnut Grove-Asahi 69 kV | Active |
| **AG1-406** | Walnut Grove-Asahi 69 kV | Active |
| **AG1-471** | Up Church-Wayne County 69 kV | Active |
| **AG1-472** | Seymour-Cave City 69 kV | Active |
| **AG1-488** | Marion IP 161 kV | Active |

## 9.8 Contingency Descriptions - Primary POI

| Contingency Name | Contingency Definition |
|---|---|
| **EKPC_P2-2_LAUREL CO 161** | CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS<br>OPEN BUS 342754 /* 5LAUREL CO<br>END |
| **AEP_P1-2_#363_1682** | CONTINGENCY 'AEP_P1-2_#363_1682'<br>OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1<br>END |
| **EXT_B-69-25** | CONTINGENCY 'EXT_B-69-25' / 2360<br>OPEN BRANCH FROM BUS 324130 TO BUS 324141 CKT 1 / 324130 5ALCALDE 161 324141 5ELIHU 161 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 / 324141 5ELIHU 161 342718 5COOPER2 161 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 1 / 324141 5ELIHU 161 324514 2ELIHU 69.0 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 2 / 324141 5ELIHU 161 324514 2ELIHU 69.0 2<br>END |
| **EKPC_P7-1_COOP 161 DBL 2** | CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161<br>OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00<br>OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00<br>END |
| **EKPC_P7-1_LAURL 161 DBL** | CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161<br>OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00<br>OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00<br>OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00<br>END |
| **EKPC_P1-2_GRE-TAY-MAR161-C** | CONTINGENCY 'EKPC_P1-2_GRE-TAY-MAR161-C' /* GREEN CO - KU TAYLOR CO - MARION CO<br>OPEN BRANCH FROM BUS 964890 TO BUS 342817 CKT 1 /* 964890 AG1-353 TAP 161.00 342817 5TAYLOR CO J161.00<br>OPEN BRANCH FROM BUS 944150 TO BUS 342817 CKT 1 /* 944150 AF1-083 TAP 161.00 342817 5TAYLOR CO J161.00<br>END |

| Contingency Name | Contingency Definition |
|---|---|
| **EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00** | CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00'<br>OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /*5LAUREL CO 161.005LAUREL DAM 161.00<br>END |

## 10 Short Circuit Analysis - Primary POI

The following Breakers are overdutied:

None.

## 11 Summer Peak - Load Flow Analysis - Secondary POI

The Queue Project AG1-341 was evaluated as a 106.0 MW (Capacity 63.6 MW) injection at the Summer Shade 69 kV substation in the EKPC area. Project AG1-341 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-341 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)

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **169425890** | 342322 | 2SUMM SHADE | 69.0 | EKPC | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 1 | EKPC_P2-1_5GREEN CO 161.00 TO 5SUMM SHADE 161.00-C | single | 46.0 | 88.04 | 101.79 | DC | 6.32 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **166775396** | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 341728 | 2KNOB LICK | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 83.08 | 126.74 | DC | 20.08 |
| **173873898** | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 341728 | 2KNOB LICK | 69.0 | EKPC | 1 | EKPC_P2-3_GREEN W45-1014 | breaker | 46.0 | 95.3 | 103.91 | DC | 8.79 |
| **172320174** | 341728 | 2KNOB LICK | 69.0 | EKPC | 341854 | 2MCKINNY T | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 72.86 | 116.52 | DC | 20.08 |
| **172320217** | 342161 | 2ROSEVILLE T | 69.0 | EKPC | 342049 | 2PATTON RD J | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #1 | bus | 43.0 | 46.62 | 103.07 | DC | 24.27 |
| **166775338** | 342322 | 2SUMM SHADE | 69.0 | EKPC | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 98.94 | 142.61 | DC | 20.08 |
| **166775339** | 342322 | 2SUMM SHADE | 69.0 | EKPC | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 1 | EKPC_P2-2_GREEN CO 161 | bus | 46.0 | 98.27 | 107.48 | DC | 9.4 |
| **172320220** | 962220 | AG1-067 TAP | 69.0 | EKPC | 342334 | 2TEMPLE HILL | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #1 | bus | 54.0 | 57.49 | 102.45 | DC | 24.27 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **166775240** | 341059 | 2BARRENCO | 69.0 | EKPC | 341651 | 2HORSECAVE J | 69.0 | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 90.0 | 109.96 | 114.91 | DC | 9.88 |
| **173873816** | 341059 | 2BARRENCO | 69.0 | EKPC | 341651 | 2HORSECAVE J | 69.0 | EKPC | 1 | EKPC_P2-3_SSHADS11-1044 | breaker | 90.0 | 112.52 | 117.6 | DC | 10.14 |
| **165355463** | 342287 | 2SOMERSET KU | 69.0 | EKPC | 324531 | 2FERGUSON SO | 69.0 | LGEE | 1 | EKPC_P7-1_COOP 161 DBL 2 | tower | 105.0 | 107.6 | 111.81 | DC | 9.79 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 173873799 | 342322 | 2SUMM SHADE | 69.0 | EKPC | 341431 | 2EDM-JBGAL J | 69.0 | EKPC | 1 | EKPC_P2-3_GREEN W45-1014 | breaker | 46.0 | 111.17 | 119.78 | DC | 8.79 |
| 165355212 | 342718 | 5COOPER 2 | 161.0 | EKPC | 324141 | 5ELIHU | 161.0 | LGEE | 1 | EKPC_P2-2_LAUREL CO 161 | bus | 277.0 | 110.2 | 114.91 | DC | 13.04 |
| 165355478 | 342718 | 5COOPER 2 | 161.0 | EKPC | 324141 | 5ELIHU | 161.0 | LGEE | 1 | EKPC_P7-1_LAURL 161 DBL | tower | 277.0 | 110.46 | 115.17 | DC | 13.02 |
| 174061401 | 342718 | 5COOPER 2 | 161.0 | EKPC | 324141 | 5ELIHU | 161.0 | LGEE | 1 | EKPC_P4-5_LAURL S50-1024 | breaker | 277.0 | 110.46 | 115.17 | DC | 13.02 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 164544402 | 324010 | 7TRIMBL REAC | 345.0 | LGEE | 248000 | 06CLIFTY | 345.0 | OVEC | 1 | AEP_P1-2_#363_1682 | operation | 1451.0 | 114.47 | 115.53 | DC | 15.38 |
| 169425718 | 341059 | 2BARRENCO | 69.0 | EKPC | 341651 | 2HORSECAVE J | 69.0 | EKPC | 1 | EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00 | operation | 90.0 | 101.53 | 104.61 | DC | 6.16 |
| 169425646 | 342718 | 5COOPER2 | 161.0 | EKPC | 324141 | 5ELIHU | 161.0 | LGEE | 1 | EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00 | operation | 277.0 | 110.15 | 114.87 | DC | 13.07 |
| 169425761 | 342757 | 5LAUREL DAM | 161.0 | EKPC | 342754 | 5LAUREL CO | 161.0 | EKPC | 1 | EXT_B-69-25 | operation | 200.0 | 99.51 | 101.12 | DC | 7.11 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **166775338** | 342322 | 2SUMM SHADE | EKPC | 341431 | 2EDM-JBGAL J | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 98.94 | 142.61 | DC | 20.08 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **939131** | AE1-143 C | -2.9768 | Adder | -3.5 |
| **940045** | AE1-246 C | 4.1723 | Adder | 4.91 |
| **940046** | AE1-246 E | 2.0089 | Adder | 2.36 |
| **940831** | AE2-071 C | 3.7991 | 50/50 | 3.7991 |
| **940832** | AE2-071 E | 2.5327 | 50/50 | 2.5327 |
| **945381** | AF1-203 C | 2.1709 | 50/50 | 2.1709 |
| **945382** | AF1-203 E | 1.4473 | 50/50 | 1.4473 |
| **962221** | AG1-067 C O2 | 3.2791 | 50/50 | 3.2791 |
| **962222** | AG1-067 E O2 | 1.7453 | 50/50 | 1.7453 |
| **962241** | AG1-070 C O2 | 1.2145 | Adder | 2.7 |
| **962242** | AG1-070 E O2 | 0.2429 | Adder | 0.54 |
| **962251** | AG1-071 C O2 | 1.4574 | Adder | 3.24 |
| **962252** | AG1-071 E O2 | 0.3239 | Adder | 0.72 |
| **964781** | AG1-341 C O2 | 12.0509 | 50/50 | 12.0509 |
| **964782** | AG1-341 E O2 | 8.0340 | 50/50 | 8.0340 |
| **WEC** | WEC | 0.0082 | Confirmed LTF | 0.0082 |
| **CPLE** | CPLE | 0.0648 | Confirmed LTF | 0.0648 |
| **G-007A** | G-007A | 0.0192 | Confirmed LTF | 0.0192 |
| **VFT** | VFT | 0.0516 | Confirmed LTF | 0.0516 |
| **CBM-W2** | CBM-W2 | 1.3619 | Confirmed LTF | 1.3619 |
| **TVA** | TVA | 0.4424 | Confirmed LTF | 0.4424 |
| **CBM-S2** | CBM-S2 | 1.3154 | Confirmed LTF | 1.3154 |
| **CBM-S1** | CBM-S1 | 0.0840 | Confirmed LTF | 0.0840 |
| **CBM-N** | CBM-N | 0.0084 | Confirmed LTF | 0.0084 |
| **MEC** | MEC | 0.1287 | Confirmed LTF | 0.1287 |
| **GIBSON** | GIBSON | 0.0278 | Confirmed LTF | 0.0278 |
| **BLUEG** | BLUEG | 0.2396 | Confirmed LTF | 0.2396 |
| **TRIMBLE** | TRIMBLE | 0.0762 | Confirmed LTF | 0.0762 |
| **LAGN** | LAGN | 0.4183 | Confirmed LTF | 0.4183 |
| **CBM-W1** | CBM-W1 | 0.3505 | Confirmed LTF | 0.3505 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **166775396** | 341431 | 2EDM-JBGAL J | EKPC | 341728 | 2KNOB LICK | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 83.08 | 126.74 | DC | 20.08 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **939131** | AE1-143 C | -2.9768 | Adder | -3.5 |
| **940045** | AE1-246 C | 4.1723 | Adder | 4.91 |
| **940046** | AE1-246 E | 2.0089 | Adder | 2.36 |
| **940831** | AE2-071 C | 3.7991 | 50/50 | 3.7991 |
| **940832** | AE2-071 E | 2.5327 | 50/50 | 2.5327 |
| **945381** | AF1-203 C | 2.1709 | 50/50 | 2.1709 |
| **945382** | AF1-203 E | 1.4473 | 50/50 | 1.4473 |
| **962221** | AG1-067 C O2 | 3.2791 | 50/50 | 3.2791 |
| **962222** | AG1-067 E O2 | 1.7453 | 50/50 | 1.7453 |
| **962241** | AG1-070 C O2 | 1.2145 | Adder | 2.7 |
| **962242** | AG1-070 E O2 | 0.2429 | Adder | 0.54 |
| **962251** | AG1-071 C O2 | 1.4574 | Adder | 3.24 |
| **962252** | AG1-071 E O2 | 0.3239 | Adder | 0.72 |
| **964781** | AG1-341 C O2 | 12.0509 | 50/50 | 12.0509 |
| **964782** | AG1-341 E O2 | 8.0340 | 50/50 | 8.0340 |
| **WEC** | WEC | 0.0082 | Confirmed LTF | 0.0082 |
| **CPLE** | CPLE | 0.0648 | Confirmed LTF | 0.0648 |
| **G-007A** | G-007A | 0.0192 | Confirmed LTF | 0.0192 |
| **VFT** | VFT | 0.0516 | Confirmed LTF | 0.0516 |
| **CBM-W2** | CBM-W2 | 1.3619 | Confirmed LTF | 1.3619 |
| **TVA** | TVA | 0.4424 | Confirmed LTF | 0.4424 |
| **CBM-S2** | CBM-S2 | 1.3154 | Confirmed LTF | 1.3154 |
| **CBM-S1** | CBM-S1 | 0.0840 | Confirmed LTF | 0.0840 |
| **CBM-N** | CBM-N | 0.0084 | Confirmed LTF | 0.0084 |
| **MEC** | MEC | 0.1287 | Confirmed LTF | 0.1287 |
| **GIBSON** | GIBSON | 0.0278 | Confirmed LTF | 0.0278 |
| **BLUEG** | BLUEG | 0.2396 | Confirmed LTF | 0.2396 |
| **TRIMBLE** | TRIMBLE | 0.0762 | Confirmed LTF | 0.0762 |
| **LAGN** | LAGN | 0.4183 | Confirmed LTF | 0.4183 |
| **CBM-W1** | CBM-W1 | 0.3505 | Confirmed LTF | 0.3505 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **172320174** | 341728 | 2KNOB LICK | EKPC | 341854 | 2MCKINNY T | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #2 | bus | 46.0 | 72.86 | 116.52 | DC | 20.08 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **939131** | AE1-143 C | -2.9768 | Adder | -3.5 |
| **940045** | AE1-246 C | 4.1723 | Adder | 4.91 |
| **940046** | AE1-246 E | 2.0089 | Adder | 2.36 |
| **940831** | AE2-071 C | 3.7991 | 50/50 | 3.7991 |
| **940832** | AE2-071 E | 2.5327 | 50/50 | 2.5327 |
| **945381** | AF1-203 C | 2.1709 | 50/50 | 2.1709 |
| **945382** | AF1-203 E | 1.4473 | 50/50 | 1.4473 |
| **962221** | AG1-067 C O2 | 3.2791 | 50/50 | 3.2791 |
| **962222** | AG1-067 E O2 | 1.7453 | 50/50 | 1.7453 |
| **962241** | AG1-070 C O2 | 1.2145 | Adder | 2.7 |
| **962242** | AG1-070 E O2 | 0.2429 | Adder | 0.54 |
| **962251** | AG1-071 C O2 | 1.4574 | Adder | 3.24 |
| **962252** | AG1-071 E O2 | 0.3239 | Adder | 0.72 |
| **964781** | AG1-341 C O2 | 12.0509 | 50/50 | 12.0509 |
| **964782** | AG1-341 E O2 | 8.0340 | 50/50 | 8.0340 |
| **WEC** | WEC | 0.0082 | Confirmed LTF | 0.0082 |
| **CPLE** | CPLE | 0.0648 | Confirmed LTF | 0.0648 |
| **G-007A** | G-007A | 0.0192 | Confirmed LTF | 0.0192 |
| **VFT** | VFT | 0.0516 | Confirmed LTF | 0.0516 |
| **CBM-W2** | CBM-W2 | 1.3619 | Confirmed LTF | 1.3619 |
| **TVA** | TVA | 0.4424 | Confirmed LTF | 0.4424 |
| **CBM-S2** | CBM-S2 | 1.3154 | Confirmed LTF | 1.3154 |
| **CBM-S1** | CBM-S1 | 0.0840 | Confirmed LTF | 0.0840 |
| **CBM-N** | CBM-N | 0.0084 | Confirmed LTF | 0.0084 |
| **MEC** | MEC | 0.1287 | Confirmed LTF | 0.1287 |
| **GIBSON** | GIBSON | 0.0278 | Confirmed LTF | 0.0278 |
| **BLUEG** | BLUEG | 0.2396 | Confirmed LTF | 0.2396 |
| **TRIMBLE** | TRIMBLE | 0.0762 | Confirmed LTF | 0.0762 |
| **LAGN** | LAGN | 0.4183 | Confirmed LTF | 0.4183 |
| **CBM-W1** | CBM-W1 | 0.3505 | Confirmed LTF | 0.3505 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **172320217** | 342161 | 2ROSEVILLE T | EKPC | 342049 | 2PATTON RD J | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #1 | bus | 43.0 | 46.62 | 103.07 | DC | 24.27 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **940831** | AE2-071 C | 4.1005 | 50/50 | 4.1005 |
| **940832** | AE2-071 E | 2.7336 | 50/50 | 2.7336 |
| **945381** | AF1-203 C | 2.3431 | 50/50 | 2.3431 |
| **945382** | AF1-203 E | 1.5621 | 50/50 | 1.5621 |
| **962221** | AG1-067 C O2 | 18.5110 | 50/50 | 18.5110 |
| **962222** | AG1-067 E O2 | 9.8526 | 50/50 | 9.8526 |
| **964781** | AG1-341 C O2 | 14.5644 | 50/50 | 14.5644 |
| **964782** | AG1-341 E O2 | 9.7096 | 50/50 | 9.7096 |
| **LGEE** | LGEE | 0.0113 | Confirmed LTF | 0.0113 |
| **G-007A** | G-007A | 0.0048 | Confirmed LTF | 0.0048 |
| **VFT** | VFT | 0.0129 | Confirmed LTF | 0.0129 |
| **CALDERWOOD** | CALDERWOOD | 0.0065 | Confirmed LTF | 0.0065 |
| **PRAIRIE** | PRAIRIE | 0.2247 | Confirmed LTF | 0.2247 |
| **CHEOAH** | CHEOAH | 0.0065 | Confirmed LTF | 0.0065 |
| **CBM-N** | CBM-N | 0.0024 | Confirmed LTF | 0.0024 |
| **COTTONWOOD** | COTTONWOOD | 0.2100 | Confirmed LTF | 0.2100 |
| **HAMLET** | HAMLET | 0.0098 | Confirmed LTF | 0.0098 |
| **GIBSON** | GIBSON | 0.0251 | Confirmed LTF | 0.0251 |
| **BLUEG** | BLUEG | 0.0208 | Confirmed LTF | 0.0208 |
| **TRIMBLE** | TRIMBLE | 0.0028 | Confirmed LTF | 0.0028 |
| **CATAWBA** | CATAWBA | 0.0067 | Confirmed LTF | 0.0067 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **172320220** | 962220 | AG1-067 TAP | EKPC | 342334 | 2TEMPLE HILL | EKPC | 1 | EKPC_P2-2_SUMMSHADE 161 #1 | bus | 54.0 | 57.49 | 102.45 | DC | 24.27 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **940831** | AE2-071 C | 4.1005 | 50/50 | 4.1005 |
| **940832** | AE2-071 E | 2.7336 | 50/50 | 2.7336 |
| **945381** | AF1-203 C | 2.3431 | 50/50 | 2.3431 |
| **945382** | AF1-203 E | 1.5621 | 50/50 | 1.5621 |
| **962221** | AG1-067 C O2 | 18.5110 | 50/50 | 18.5110 |
| **962222** | AG1-067 E O2 | 9.8526 | 50/50 | 9.8526 |
| **964781** | AG1-341 C O2 | 14.5644 | 50/50 | 14.5644 |
| **964782** | AG1-341 E O2 | 9.7096 | 50/50 | 9.7096 |
| **LGEE** | LGEE | 0.0113 | Confirmed LTF | 0.0113 |
| **G-007A** | G-007A | 0.0048 | Confirmed LTF | 0.0048 |
| **VFT** | VFT | 0.0129 | Confirmed LTF | 0.0129 |
| **CALDERWOOD** | CALDERWOOD | 0.0065 | Confirmed LTF | 0.0065 |
| **PRAIRIE** | PRAIRIE | 0.2247 | Confirmed LTF | 0.2247 |
| **CHEOAH** | CHEOAH | 0.0065 | Confirmed LTF | 0.0065 |
| **CBM-N** | CBM-N | 0.0024 | Confirmed LTF | 0.0024 |
| **COTTONWOOD** | COTTONWOOD | 0.2100 | Confirmed LTF | 0.2100 |
| **HAMLET** | HAMLET | 0.0098 | Confirmed LTF | 0.0098 |
| **GIBSON** | GIBSON | 0.0251 | Confirmed LTF | 0.0251 |
| **BLUEG** | BLUEG | 0.0208 | Confirmed LTF | 0.0208 |
| **TRIMBLE** | TRIMBLE | 0.0028 | Confirmed LTF | 0.0028 |
| **CATAWBA** | CATAWBA | 0.0067 | Confirmed LTF | 0.0067 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **173873816** | 341059 | 2BARRENCO | EKPC | 341651 | 2HORSECAVEJ | EKPC | 1 | EKPC_P2-3_SSHADS11-1044 | breaker | 90.0 | 112.52 | 117.6 | DC | 10.14 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **342442** | 2W GLASGOW | 0.0277 | 50/50 | 0.0277 |
| **940045** | AE1-246 C | 25.9783 | 50/50 | 25.9783 |
| **940046** | AE1-246 E | 12.5081 | 50/50 | 12.5081 |
| **940831** | AE2-071 C | 2.1015 | 50/50 | 2.1015 |
| **940832** | AE2-071 E | 1.4010 | 50/50 | 1.4010 |
| **945381** | AF1-203 C | 1.2008 | 50/50 | 1.2008 |
| **945382** | AF1-203 E | 0.8006 | 50/50 | 0.8006 |
| **962221** | AG1-067 C O2 | 3.1057 | 50/50 | 3.1057 |
| **962222** | AG1-067 E O2 | 1.6530 | 50/50 | 1.6530 |
| **962241** | AG1-070 C O2 | 8.5838 | 50/50 | 8.5838 |
| **962242** | AG1-070 E O2 | 1.7168 | 50/50 | 1.7168 |
| **962251** | AG1-071 C O2 | 10.3005 | 50/50 | 10.3005 |
| **962252** | AG1-071 E O2 | 2.2890 | 50/50 | 2.2890 |
| **964781** | AG1-341 C O2 | 2.7405 | Adder | 6.08 |
| **964782** | AG1-341 E O2 | 1.8270 | Adder | 4.06 |
| **CPLE** | CPLE | 0.1024 | Confirmed LTF | 0.1024 |
| **G-007A** | G-007A | 0.0408 | Confirmed LTF | 0.0408 |
| **VFT** | VFT | 0.1096 | Confirmed LTF | 0.1096 |
| **CBM-W2** | CBM-W2 | 1.4426 | Confirmed LTF | 1.4426 |
| **TVA** | TVA | 0.6272 | Confirmed LTF | 0.6272 |
| **CBM-S2** | CBM-S2 | 2.0358 | Confirmed LTF | 2.0358 |
| **CBM-S1** | CBM-S1 | 0.1174 | Confirmed LTF | 0.1174 |
| **CBM-N** | CBM-N | 0.0204 | Confirmed LTF | 0.0204 |
| **MEC** | MEC | 0.1144 | Confirmed LTF | 0.1144 |
| **GIBSON** | GIBSON | 0.1299 | Confirmed LTF | 0.1299 |
| **BLUEG** | BLUEG | 0.5243 | Confirmed LTF | 0.5243 |
| **TRIMBLE** | TRIMBLE | 0.1542 | Confirmed LTF | 0.1542 |
| **LAGN** | LAGN | 0.5688 | Confirmed LTF | 0.5688 |
| **CBM-W1** | CBM-W1 | 0.0140 | Confirmed LTF | 0.0140 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **165355463** | 342287 | 2SOMERSET KU | EKPC | 324531 | 2FERGUSON SO | LGEE | 1 | EKPC_P7-1_COOP 161 DBL 2 | tower | 105.0 | 107.6 | 111.81 | DC | 9.79 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **342900** | 1COOPER1 G | 4.9218 | 50/50 | 4.9218 |
| **342903** | 1COOPER2 G | 9.5458 | 50/50 | 9.5458 |
| **939131** | AE1-143 C | 5.4221 | Adder | 6.38 |
| **939132** | AE1-143 E | 2.6857 | Adder | 3.16 |
| **940045** | AE1-246 C | 5.4632 | Adder | 6.43 |
| **940046** | AE1-246 E | 2.6305 | Adder | 3.09 |
| **940831** | AE2-071 C | 1.6233 | Adder | 1.91 |
| **940832** | AE2-071 E | 1.0822 | Adder | 1.27 |
| **943701** | AF1-038 C | 8.3977 | 50/50 | 8.3977 |
| **943702** | AF1-038 E | 5.5985 | 50/50 | 5.5985 |
| **943821** | AF1-050 C | 2.5575 | Adder | 3.01 |
| **943822** | AF1-050 E | 1.7050 | Adder | 2.01 |
| **944151** | AF1-083 C O1 | 2.5256 | Adder | 2.97 |
| **944152** | AF1-083 E O1 | 1.6837 | Adder | 1.98 |
| **944511** | AF1-116 C | 6.0808 | Adder | 7.15 |
| **944512** | AF1-116 E | 4.0539 | Adder | 4.77 |
| **945381** | AF1-203 C | 0.9276 | Adder | 1.09 |
| **945382** | AF1-203 E | 0.6184 | Adder | 0.73 |
| **960741** | AF2-365 C O1 | 1.5231 | Adder | 1.79 |
| **960742** | AF2-365 E O1 | 1.0154 | Adder | 1.19 |
| **962221** | AG1-067 C O2 | 0.9285 | Adder | 2.06 |
| **962222** | AG1-067 E O2 | 0.4942 | Adder | 1.1 |
| **962241** | AG1-070 C O2 | 1.2324 | Adder | 2.74 |
| **962242** | AG1-070 E O2 | 0.2465 | Adder | 0.55 |
| **962251** | AG1-071 C O2 | 1.4789 | Adder | 3.28 |
| **962252** | AG1-071 E O2 | 0.3286 | Adder | 0.73 |
| **964781** | AG1-341 C O2 | 2.6451 | Adder | 5.87 |
| **964782** | AG1-341 E O2 | 1.7634 | Adder | 3.91 |
| **964891** | AG1-353 C | 2.3239 | Adder | 5.16 |
| **964892** | AG1-353 E | 1.5493 | Adder | 3.44 |
| **964901** | AG1-354 C | 3.2939 | Adder | 7.31 |
| **964902** | AG1-354 E | 2.1959 | Adder | 4.87 |
| **965401** | AG1-405 C | 10.6088 | 50/50 | 10.6088 |
| **965402** | AG1-405 E | 7.0726 | 50/50 | 7.0726 |
| **965411** | AG1-406 | 6.8244 | 50/50 | 6.8244 |
| **966021** | AG1-471 C O2 | 5.2283 | 50/50 | 5.2283 |
| **966022** | AG1-471 E O2 | 3.4855 | 50/50 | 3.4855 |
| **966031** | AG1-472 C O2 | 1.4123 | Adder | 3.13 |
| **966032** | AG1-472 E O2 | 0.9415 | Adder | 2.09 |
| **966191** | AG1-488 C O2 | 1.8800 | Adder | 4.17 |
| **966192** | AG1-488 E O2 | 1.2533 | Adder | 2.78 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **WEC** | WEC | 0.0652 | Confirmed LTF | 0.0652 |
| **CPLE** | CPLE | 0.0628 | Confirmed LTF | 0.0628 |
| **LGE-0012019** | LGE-0012019 | 5.0017 | LTF | 5.0017 |
| **CBM-W2** | CBM-W2 | 5.1878 | Confirmed LTF | 5.1878 |
| **NY** | NY | 0.0426 | Confirmed LTF | 0.0426 |
| **TVA** | TVA | 1.3454 | Confirmed LTF | 1.3454 |
| **O-066** | O-066 | 0.5048 | Confirmed LTF | 0.5048 |
| **SIGE** | SIGE | 0.0489 | Confirmed LTF | 0.0489 |
| **CBM-S2** | CBM-S2 | 1.7957 | Confirmed LTF | 1.7957 |
| **CBM-S1** | CBM-S1 | 0.2983 | Confirmed LTF | 0.2983 |
| **G-007** | G-007 | 0.0788 | Confirmed LTF | 0.0788 |
| **MEC** | MEC | 0.5848 | Confirmed LTF | 0.5848 |
| **LAGN** | LAGN | 1.2705 | Confirmed LTF | 1.2705 |
| **CBM-W1** | CBM-W1 | 2.5797 | Confirmed LTF | 2.5797 |

### 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **174061401** | 342718 | 5COOPER2 | EKPC | 324141 | 5ELIHU | LGEE | 1 | EKPC_P4-5_LAURLS50-1024 | breaker | 277.0 | 110.46 | 115.17 | DC | 13.02 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **342442** | 2W GLASGOW | 0.0165 | 50/50 | 0.0165 |
| **342900** | 1COOPER1 G | 10.1486 | 50/50 | 10.1486 |
| **342903** | 1COOPER2 G | 19.7433 | 50/50 | 19.7433 |
| **342945** | 1LAUREL 1G | 6.1423 | 50/50 | 6.1423 |
| **939131** | AE1-143 C | 9.9773 | 50/50 | 9.9773 |
| **939132** | AE1-143 E | 4.9420 | 50/50 | 4.9420 |
| **940045** | AE1-246 C | 9.3685 | 50/50 | 9.3685 |
| **940046** | AE1-246 E | 4.5107 | 50/50 | 4.5107 |
| **940831** | AE2-071 C | 2.5509 | 50/50 | 2.5509 |
| **940832** | AE2-071 E | 1.7006 | 50/50 | 1.7006 |
| **942411** | AE2-254 C O1 | 1.3451 | Adder | 1.58 |
| **942412** | AE2-254 E O1 | 0.8967 | Adder | 1.05 |
| **943701** | AF1-038 C | 6.6586 | 50/50 | 6.6586 |
| **943702** | AF1-038 E | 4.4390 | 50/50 | 4.4390 |
| **943821** | AF1-050 C | 4.5025 | 50/50 | 4.5025 |
| **943822** | AF1-050 E | 3.0017 | 50/50 | 3.0017 |
| **944151** | AF1-083 C O1 | 4.5583 | 50/50 | 4.5583 |
| **944152** | AF1-083 E O1 | 3.0389 | 50/50 | 3.0389 |
| **944511** | AF1-116 C | 11.1895 | 50/50 | 11.1895 |
| **944512** | AF1-116 E | 7.4597 | 50/50 | 7.4597 |
| **945381** | AF1-203 C | 1.4576 | 50/50 | 1.4576 |
| **945382** | AF1-203 E | 0.9718 | 50/50 | 0.9718 |
| **960741** | AF2-365 C O1 | 2.2040 | Adder | 2.59 |
| **960742** | AF2-365 E O1 | 1.4693 | Adder | 1.73 |
| **962221** | AG1-067 C O2 | 2.8165 | 50/50 | 2.8165 |
| **962222** | AG1-067 E O2 | 1.4991 | 50/50 | 1.4991 |
| **962241** | AG1-070 C O2 | 3.8768 | 50/50 | 3.8768 |
| **962242** | AG1-070 E O2 | 0.7754 | 50/50 | 0.7754 |
| **962251** | AG1-071 C O2 | 4.6521 | 50/50 | 4.6521 |
| **962252** | AG1-071 E O2 | 1.0338 | 50/50 | 1.0338 |
| **964781** | AG1-341 C O2 | 7.8139 | 50/50 | 7.8139 |
| **964782** | AG1-341 E O2 | 5.2093 | 50/50 | 5.2093 |
| **964891** | AG1-353 C | 7.8586 | 50/50 | 7.8586 |
| **964892** | AG1-353 E | 5.2391 | 50/50 | 5.2391 |
| **964901** | AG1-354 C | 10.7820 | 50/50 | 10.7820 |
| **964902** | AG1-354 E | 7.1880 | 50/50 | 7.1880 |
| **965401** | AG1-405 C | 3.9234 | 50/50 | 3.9234 |
| **965402** | AG1-405 E | 2.6156 | 50/50 | 2.6156 |
| **965411** | AG1-406 | 2.5238 | 50/50 | 2.5238 |
| **966021** | AG1-471 C O2 | 7.4002 | 50/50 | 7.4002 |
| **966022** | AG1-471 E O2 | 4.9334 | 50/50 | 4.9334 |

| Bus # | Bus | Gendeliv MW Impact | Type | Full MW Impact |
|---|---|---|---|---|
| **966031** | AG1-472 C O2 | 2.0318 | Adder | 4.51 |
| **966032** | AG1-472 E O2 | 1.3545 | Adder | 3.01 |
| **966191** | AG1-488 C O2 | 6.5272 | 50/50 | 6.5272 |
| **966192** | AG1-488 E O2 | 4.3515 | 50/50 | 4.3515 |
| **WEC** | WEC | 0.0787 | Confirmed LTF | 0.0787 |
| **CPLE** | CPLE | 0.0874 | Confirmed LTF | 0.0874 |
| **LGE-0012019** | LGE-0012019 | 7.7561 | LTF | 7.7561 |
| **CBM-W2** | CBM-W2 | 7.4368 | Confirmed LTF | 7.4368 |
| **NY** | NY | 0.0868 | Confirmed LTF | 0.0868 |
| **TVA** | TVA | 2.0090 | Confirmed LTF | 2.0090 |
| **O-066** | O-066 | 1.0364 | Confirmed LTF | 1.0364 |
| **SIGE** | SIGE | 0.0700 | Confirmed LTF | 0.0700 |
| **CBM-S2** | CBM-S2 | 2.6726 | Confirmed LTF | 2.6726 |
| **CBM-S1** | CBM-S1 | 0.4378 | Confirmed LTF | 0.4378 |
| **G-007** | G-007 | 0.1617 | Confirmed LTF | 0.1617 |
| **MEC** | MEC | 0.7945 | Confirmed LTF | 0.7945 |
| **LAGN** | LAGN | 1.8725 | Confirmed LTF | 1.8725 |
| **CBM-W1** | CBM-W1 | 3.0283 | Confirmed LTF | 3.0283 |

## 11.6 Contingency Descriptions - Secondary POI

| Contingency Name | Contingency Definition |
|---|---|
| **EKPC_P4-5_LAURL S50-1024** | CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' / 608<br>OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1<br>OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 / 342754 5LAUREL CO 161 342781 5PITTSBURG 161 1<br>OPEN BRANCH FROM BUS 342754 TO BUS 341740 CKT 1 / 342754 5LAUREL CO 161 341740 2LAUREL CO 69.0 1<br>OPEN BRANCH FROM BUS 342781 TO BUS 324688 CKT 1 / 342781 5PITTSBURG 161 324688 2PITTSBRG KU 69.0 1<br>OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 / 342781 5PITTSBURG 161 342820 5TYNER 161 1<br>END |
| **EKPC_P2-2_LAUREL CO 161** | CONTINGENCY 'EKPC_P2-2_LAUREL CO 161' /* LAUREL 161 BUS<br>OPEN BUS 342754 /* 5LAUREL CO<br>END |
| **AEP_P1-2_#363_1682** | CONTINGENCY 'AEP_P1-2_#363_1682' / 873<br>OPEN BRANCH FROM BUS 243208 TO BUS 243209 CKT 1 / 243208 05JEFRSO 765 243209 05ROCKPT 765 1<br>END |
| **EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00** | CONTINGENCY 'EKPC_P2-1_5SUMM SHADE 161.00 TO AE1-246 TAP 161.00' / 68<br>OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1<br>END |
| **EKPC_P2-3_GREEN W45-1014** | CONTINGENCY 'EKPC_P2-3_GREEN W45-1014' / 21<br>OPEN BRANCH FROM BUS 342733 TO BUS 943820 CKT 1 / 342733 5GREEN CO 161 943820 AF1-050 TAP 161 1<br>OPEN BRANCH FROM BUS 342733 TO BUS 964890 CKT 1 / 342733 5GREEN CO 161 964890 AG1-353 TAP 161 1<br>OPEN BRANCH FROM BUS 342733 TO BUS 341563 CKT 1 / 342733 5GREEN CO 161 341563 2GREEN CO 69.0 1<br>OPEN BRANCH FROM BUS 342817 TO BUS 944150 CKT 1 / 342817 5TAYLOR CO J 161 944150 AF1-083 TAP 161 1<br>END |
| **EKPC_P7-1_COOP 161 DBL 2** | CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161<br>OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00<br>OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00<br>END |

| Contingency Name | Contingency Definition |
|---|---|
| **EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00** | CONTINGENCY 'EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00' / 563<br>OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 / 342754 5LAUREL CO 161 342757 5LAUREL DAM 161 1<br>END |
| **EKPC_P2-2_GREEN CO 161** | CONTINGENCY 'EKPC_P2-2_GREEN CO 161' /* GREEN 161 BUS<br>OPEN BUS 342733 /* 5GREEN CO<br>END |
| **EKPC_P2-1_5GREEN CO 161.00 TO 5SUMM SHADE 161.00-C** | CONTINGENCY 'EKPC_P2-1_5GREEN CO 161.00 TO 5SUMM SHADE 161.00-C' / 45<br>OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1<br>END |
| **EXT_B-69-25** | CONTINGENCY 'EXT_B-69-25' / 536<br>OPEN BRANCH FROM BUS 324130 TO BUS 324141 CKT 1 / 324130 5ALCALDE 161 324141 5ELIHU 161 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 / 324141 5ELIHU 161 342718 5COOPER2 161 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 1 / 324141 5ELIHU 161 324514 2ELIHU 69.0 1<br>OPEN BRANCH FROM BUS 324141 TO BUS 324514 CKT 2 / 324141 5ELIHU 161 324514 2ELIHU 69.0 2<br>END |
| **EKPC_P2-2_SUMMSHADE 161 #2** | CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #2' /* SUMMERSHADE 161 BUS<br>OPEN BRANCH FROM BUS 964900 TO BUS 342814 CKT 1 /* 964900 AG1-354 TAP 161.00 342814 5SUMM SHADE 161.00<br>OPEN BRANCH FROM BUS 940040 TO BUS 342814 CKT 1<br>OPEN BUS 342814<br>END |
| **EKPC_P2-3_SSHAD S11-1044** | CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044' / 89<br>OPEN BRANCH FROM BUS 342814 TO BUS 940040 CKT 1 / 342814 5SUMM SHADE 161 940040 AE1-246 TAP 161 1<br>OPEN BRANCH FROM BUS 342814 TO BUS 964900 CKT 1 / 342814 5SUMM SHADE 161 964900 AG1-354 TAP 161 1<br>OPEN BRANCH FROM BUS 326998 TO BUS 361788 CKT 1 / 326998 5BULLITT TAP 161 361788 5SUM SHAD TP 161 1<br>OPEN BRANCH FROM BUS 342814 TO BUS 361788 CKT 1 / 342814 5SUMM SHADE 161 361788 5SUM SHAD TP 161 1<br>OPEN BRANCH FROM BUS 360334 TO BUS 361788 CKT 1 / 360334 5SUMMER SHAD 161 361788 5SUM SHAD TP 161 1<br>OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 / 342814 5SUMM SHADE 161 360334 5SUMMER SHAD 161 1<br>OPEN BRANCH FROM BUS 342814 TO BUS 342322 CKT 1 / 342814 5SUMM SHADE 161 342322 2SUMM SHADE 69.0 1<br>END |

| Contingency Name | Contingency Definition |
|---|---|
| **EKPC_P2-2_SUMMSHADE 161 #1** | CONTINGENCY 'EKPC_P2-2_SUMMSHADE 161 #1' /* SUMMERSHADE 161 BUS<br>OPEN BRANCH FROM BUS 342814 TO BUS 360334 CKT 1 /* 342814 5SUMM SHADE 161.00 360334 5SUMMER SHAD161.00<br>OPEN BRANCH FROM BUS 342322 TO BUS 342814 CKT 1 /* 342322 2SUMM SHADE 69.000 342814 5SUMM SHADE 161.00<br>END |
| **EKPC_P7-1_LAURL 161 DBL** | CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161<br>OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00<br>OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00<br>OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00<br>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).

# AG1-341 System Impact Study Report

v2.02 released 2024-10-11 09:33

Summer Shade 161 kV
63.6 MW Capacity / 106.0 MW Energy

## Introduction

This project is eligible for the Expedited Study process per PJM Tariff Part VII, Subpart B, section 304 and will follow the Expedited Study Process rules outlined in PJM Manual 14H, Attachment I.3.4.

Projects in the Expedited Process will receive a retooled System Impact Study report with the Transition Cycle #1 projects (AE1-AG1) removed from the base case model used for their study. This System Impact Study (SIS) report has been prepared for the AG1-341 project using the updated case model. PJM performed reliability analysis for the project based on the serial study approach using the legacy Generator Deliverability Study method outlined in Manual 14B, Attachment C.3 (Revision 51 of M14B). Summer peak and light load load flow analysis was performed. Short circuit and dynamic stability impacts were also analyzed.

The interconnected Transmission Owner (TO) for this project is East Kentucky Power Cooperative, Inc.. The TO has provided their updated TO analysis results on the lower voltage system based on their own criteria.

**This System Impact Study report summarizes both the PJM and TO analysis results for your project.**

Note: This updated SIS report does not include any Physical Interconnection Facilities scope or cost estimates from the TO. As this project is in the Expedited Process, a Facilities Study will be conducted by the TO (and any affected Transmission Owner(s)) for updated Physical Interconnection Facilities and System Reinforcement (Network Upgrade) costs. The Facilities Study will be issued to the Project Developers along with the Generator Interconnection Agreement (GIA) as part of the Expedited Process.

## General

The developer has proposed a Solar; Storage generating facility located in the East Kentucky Power Cooperative, Inc. zone – Metcalfe County, Kentucky. The installed facilities will have a total capability of 106.0 MW with 63.6 MW of this output being recognized by PJM as Capacity.

| Project Information | |
|---|---|
| **New Service Request Number** | **AG1-341** |
| **Project Name** | Summer Shade 161 kV |
| **Developer Name** | Naturgy Candela DevCo LLC |
| **State** | Kentucky |
| **County** | Metcalfe |
| **Transmission Owner** | East Kentucky Power Cooperative, Inc. |
| **MFO** | 106.0 MW |
| **MWE** | 106.0 MW |
| **MWC** | 63.6 MW |
| **Fuel Type** | Solar; Storage |
| **Basecase Study Year** | 2024 |

## Point of Interconnection

AG1-341 will interconnect on the EKPC transmission system at the Summer Shade 161kV substation.

## Transmission Owner Analysis

No violations.

## Summer Peak Analysis

The Project was evaluated as a 106.0 MW (Capacity 63.6 MW) injection in the EKPC area. Project was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Potential Summer peak period network impacts were as follows:

| Summer Peak Analysis | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Area | Facility Description | Contingency Name | Contingency Type | DC\|AC | Initial Loading | Final Loading | Rating (MVA) | Rati Type |
| EKPC/LGEE | 5COOPER2-5ELIHU 161.0 kV Ckt 1 line | EKPC_P2-1_5LAUREL CO 161.00 TO 5LAUREL DAM 161.00 | Single | AC | 97.86 % | 100.6 % | 277.0 | B |
| EKPC/LGEE | 5COOPER2-5ELIHU 161.0 kV Ckt 1 line | EKPC_P4-5_LAURL S50-1024 | Breaker | AC | 111.06 % | 115.58 % | 277.0 | B |
| EKPC/LGEE | 5COOPER2-5ELIHU 161.0 kV Ckt 1 line | EKPC_P4-5_LAURL S50-1014 | Breaker | AC | 110.75 % | 115.27 % | 277.0 | B |
| EKPC/LGEE | 5COOPER2-5ELIHU 161.0 kV Ckt 1 line | EKPC_P2-2_LAUREL CO 161 | Bus | AC | 110.79 % | 115.31 % | 277.0 | B |
| EKPC/LGEE | 2SOMERSET KU-2FERGUSON SO 69.0 kV Ckt 1 line | EKPC_P7-1_COOP 161 DBL 2 | Tower | AC | 114.28 % | 121.2 % | 105.0 | B |
| EKPC | 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | EKPC_P7-1_COOP 161 DBL 2 | Tower | AC | 97.67 % | 102.56 % | 115.0 | B |
| EKPC/LGEE | 5COOPER2-5ELIHU 161.0 kV Ckt 1 line | EKPC_P7-1_LAURL 161 DBL | Tower | AC | 111.12 % | 115.64 % | 277.0 | B |

## Summer 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 an Upgrade 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.

| Summer Potential Congestion due to Local Energy Deliverability | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Area | Facility Description | Contingency Name | Contingency Type | DC\|AC | Initial Loading | Final Loading | Rating (MVA) | Rating Type | MVA to Mitigate | MW Contribu |
| EKPC | 5LAUREL DAM-5LAUREL CO 161.0 kV Ckt 1 line | EXT_B-69-25 | OP | AC | 101.8 % | 104.62 % | 200.0 | B | 209.24 | 6.49 |
| EKPC | 5GREEN CO-2GREEN CO 161.0/69.0 kV Ckt 1 transformer | EKPC_P1-2_GRE-TAY-MAR161-C | OP | AC | 101.16 % | 106.64 % | 90.0 | B | 95.98 | 5.81 |

## Light Load Analysis

The Project was evaluated as a 106.0 MW (Capacity 63.6 MW) injection in the EKPC area. Project was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Potential light load period network impacts were as follows:

*(No impacts were found for this analysis)*

## Light Load Potential Congestion due to Local Energy Deliverability

*(No impacts were found for this analysis)*

## Short Circuit Analysis

PJM Short Circuit Analysis did not identify any new overduty breakers or >3% contribution to previously identified overduty breakers.

## Stability Analysis

Executive Summary
Generator Interconnection Request AG1-341 is for a 106 MW Maximum Facility Output (MFO) solar generating facility, which consists of 39 x 3.15 MVA Sungrow SG-3150U-MV solar inverters. The generating facility will be located in Metcalfe County, Kentucky.
This report describes a dynamic simulation analysis of AG1-341 as part of the overall system impact study.
The load flow scenario for the analysis was based on the RTEP 2024 peak load case, modified to include applicable queue projects. In the load flow the AG1-341 generator is set to a maximum power output of 107.3 MW and 1.05 pu voltage at the generator bus to achieve 106 MW (MFO) and near unity power factor at the POI. Generation within the vicinity (within five buses) of AG1-341 will be dispatched online at maximum output (PMAX).

AG1-341 was tested for compliance with NERC, EKPC, PJM, and other applicable criteria. 223 contingencies were studied, each with a 20 second simulation time period. Studied faults included:

a) Steady-state operation (Category P0);
b) Three-phase faults with normal clearing time on the intact network (Category P1);
c) Single-phase to ground bus faults with normal clearing time (Category P2);
d) Single-phase to ground faults with delayed clearing due to a stuck breaker (Category P4);
e) Single-phase faults placed at 80% of the line with delayed (Zone 2) clearing at line end remote from the fault due to primary communications/relay failure (Category P5);
f) Multiple contingency single phase faults (common structure) (Category P7);

For all simulations, the queue project under study along with the rest of the PJM system were required to maintain synchronism and with all states returning to an acceptable new condition following the disturbance.

For all of the fault contingencies tested on the 2024 peak load case, the following conclusions were made:

a) AG1-341 was able to ride through the faults except for disturbances where protective action trips the generator to clear the fault.
b) AG1-341 post-contingency oscillations were positively damped with a damping margin of at least 3%.
c) Following fault clearing, all bus voltages recover to 0.7 pu within 2.5 seconds (except where protective action isolates that bus).
d) No transmission element tripped, other than those either directly connected or designed to trip as a consequence of that fault.

The system impact study data indicates that the AG1-341 plant would have a +/-59.8 MVAR reactive power capability at the generator terminal, which meets the 0.95 leading and lagging PF requirement at the high side of the main transformer.

The composite short-circuit ratio (CSCR) assessment was performed for inverter-based renewable generation units which are within one (1) substation away of AG1-341. The assessment resulted in a minimum CSCR of 9.22 and 1.28 at the AG1-341 POI and generator terminal, respectively. The assessment resulted in a maximum CSCR of 11.11 and 2.83 at the AG1-341 POI and generator terminal, respectively. A CSCR below 3 is considered weak. Therefore, AG1-341 is connecting to a weak area in the system.

## Reactive Power Analysis

The system impact study data indicates that the AG1-341 plant would have a +/-59.8 MVAR reactive power capability at the generator terminal, which meets the 0.95 leading and lagging PF requirement at the high side of the main transformer.

## Steady-State Voltage Analysis

Steady State Voltage analysis is not required for this project at this time.

## New Service Request Dependencies

The Projects below are listed in one or more dispatch 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 if any earlier projects withdraw. This table is valid for load flow analyses only.

New Service Requests Dependencies

| Project | Project Name | Status |
|---|---|---|
| AE1-143 | Marion County 161 kV | Engineering & Procurement |
| AE2-071 | Patton Rd-Summer Shade 69 kV | In Service |
| AE2-254 | Garrard County-Tommy-Gooch 69 kV | In Service |
| AF1-038 | Sewellton Jct-Webbs Crossroads 69 kV | Engineering & Procurement |
| AF1-050 | Summer Shade - Green County 161 kV | Engineering & Procurement |
| AF1-083 | Green County-Saloma 161 kV | Engineering & Procurement |
| AF1-116 | Marion County 161 kV | Active |
| AF1-203 | Patton Rd-Summer Shade 69 kV | In Service |
| AF2-365 | Munfordville KU Tap-Horse Cave Jct. 69 kV | Active |
| AG1-067 | Temple Hill 69 kV | Active |
| AG1-070 | Bon Ayr 69 kV | Active |
| AG1-071 | Bon Ayr 69 kV | Active |
| AG1-405 | Walnut Grove-Asahi 69 kV | Active |
| AG1-406 | Walnut Grove-Asahi 69 kV | Active |

## Affected Systems

**Midcontinent Independent System Operator (MISO)** **Preliminary Results - No Impacts**

Note that these MISO results are preliminary and subject to change with future analysis.

**New York Independent System Operator (NYISO)** **Not required**

**Tennessee Valley Authority (TVA)** **Preliminary Results - Impacts**

Note that these TVA results are preliminary and subject to change with future analysis.

A TVA affected system study will be required for AG1-341. The AG1-341 customer will be required to sign a TVA affected system study agreement to determine if there are any TVA impacts.

**Louisville Gas & Electric (LG&E)** **Preliminary Results - Impacts**

Note that these LG&E results are preliminary and subject to change with future analysis.

An LG&E affected system study will be required for AG1-341. The AG1-341 customer will be required to sign a LG&E affected system study agreement to determine if there are any LG&E impacts.

**Duke Energy Carolinas (DUKE)** **Not required**

**Duke Energy Progress - East (CPLE)** **Not required**

**Duke Energy Progress - West (CPLW)** **Not required**

## System Reinforcements

The AG1-341 project may be responsible for a contribution to the following estimated System Reinforcement (Network Upgrade) costs as shown below. The Network Upgrades listed below are required to alleviate a reliability criteria violation identified in the Network Impact analysis that PJM has performed for this System Impact Study. **No physical Interconnection Facilities costs are included in this cost table.**

AG1-341 System Reinforcements Cost Allocation

| RTEP ID | Title | MW Impact | Percent Allocation | Allocated Cost ($USD) |
|---|---|---|---|---|
| n8368.2 | Rebuild the Cooper-Elihu 161 kV line section using 795 MCM ACSS conductor (4.2 miles) | 12.3 MW | 33.4% | [redacted] |
| **Grand Total:** | | | | [redacted] |

**Note 1:** PJM Open Access Transmission Tariff (OATT) Part VI, section 217.3A outlines cost allocation rules for the Expedited Process projects. These rules are further clarified in PJM Manual 14A, Attachment B.

**Note 2:** To Project Developers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that if a prior project in the Expedited Process withdraws from the cycle, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although the 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 desires to possibly come into service prior to completion of the system reinforcement, you would need to request an interim deliverability study to determine if all or a portion of your project would be deliverable.

System Reinforcement Details

| RTEP ID | Title | Total Cost | Time Estimate |
|---|---|---|---|
| n8368.2 | Rebuild the Cooper-Elihu 161 kV line section using 795 MCM ACSS conductor (4.2 miles) | [redacted] | 24 to 30 Months |

**Contributor**

**Description:** Rebuild the Cooper-Elihu 161 kV line section using 795 MCM ACSS conductor (4.2 miles)

Flowgates Addressed by this Reinforcement

| Facility | Contingency |
|---|---|
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | (Any) |

New Ratings

| Facility | Rating Set | Rating Type | Rating Value |
|---|---|---|---|
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | (All) | A | 308.0 MVA |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | (All) | B | 373.0 MVA |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | (All) | C | 373.0 MVA |

| Cost Allocation | | | |
|---|---|---|---|
| **Project** | **MW Impact** | **Percent Allocation** | **Allocated Cost ($USD)** |
| AF1-116 | 18.9 MW | 51.2% | [redacted] |
| AG1-071 | 5.7 MW | 15.5% | [redacted] |
| AG1-341 | 12.3 MW | 33.4% | [redacted] |

| System Reinforcement Details | | | |
|---|---|---|---|
| **RTEP ID** | **Title** | **Total Cost** | **Time Estimate** |
| (TBD) | EKPC emergency rating is 143 MVA. | [redacted] | TBD |

**Note:** This reinforcement is fictitious and will not be cost allocated to projects. It is listed for information purposes only.

**Description:** EKPC emergency rating is 143 MVA. LG&E: SE rating is 105 MVA. A LG&E affected system system study will be required to determine if LG&E upgrades are required on this line. Preliminary upgrade, if determined to be required, is to replace terminal equipment at a cost estimate of $897.613 K.

| Flowgates Addressed by this Reinforcement | |
|---|---|
| **Facility** | **Contingency** |
| 2FERGUSON SO-2SOMERSET KU 69.0 kV Ckt 1 line | (Any) |

| New Ratings | | | |
|---|---|---|---|
| **Facility** | **Rating Set** | **Rating Type** | **Rating Value** |
| 2FERGUSON SO-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | A | 143.0 MVA |
| 2FERGUSON SO-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | B | 143.0 MVA |
| 2FERGUSON SO-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | C | 143.0 MVA |

| System Reinforcement Details | | | |
|---|---|---|---|
| **RTEP ID** | **Title** | **Total Cost** | **Time Estimate** |
| (TBD) | Invalid - P7 contingency 69kV not monitored by LGEE | [redacted] | TBD |

**Note:** This reinforcement is fictitious and will not be cost allocated to projects. It is listed for information purposes only.

**Description:** Invalid - P7 contingency 69kV not monitored by LGEE

| Flowgates Addressed by this Reinforcement | |
|---|---|
| **Facility** | **Contingency** |
| 2FERGUSON SO-2SOMERSET KU 69.0 kV Ckt 1 line | (Any) |
| 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | (Any) |

| System Reinforcement Details | | | |
|---|---|---|---|
| **RTEP ID** | **Title** | **Total Cost** | **Time Estimate** |
| n6232 | Replace the 500 MCM copper jumpers at the Somerset substation using 750 MCM copper or equivalent | [redacted] | 6 Months |

**Contingent**

**Note:** Based on PJM cost allocation criteria, AG1-341 currently does not receive cost allocation towards this upgrade. As changes to the PJM process occur (such as other projects withdrawing from the cycle or reducing in size) AG1-341 could receive cost allocation. Although AG1-341 may not presently have cost responsibility for this upgrade, AG1-341 may need this upgrade in-service to be deliverable to the PJM system. If AG1-341 desires to come into service prior to completion of the upgrade, the Project Developer will need to request PJM to perform an interim study to determine if they would be deliverable for all or a portion of their output for each delivery year until the upgrade is complete.

**Description:** Replace the 500 MCM copper jumpers at the Somerset substation using 750 MCM copper or equivalent

| Flowgates Addressed by this Reinforcement | |
|---|---|
| **Facility** | **Contingency** |
| 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | (Any) |

| New Ratings | | | |
|---|---|---|---|
| **Facility** | **Rating Set** | **Rating Type** | **Rating Value** |
| 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | A | 146.0 MVA |
| 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | B | 152.0 MVA |
| 2SOMERSET-2SOMERSET KU 69.0 kV Ckt 1 line | (All) | C | 154.0 MVA |

| System Reinforcement Details | | | |
|---|---|---|---|
| **RTEP ID** | **Title** | **Total Cost** | **Time Estimate** |
| (TBD) | LGE/KU is limiting this facility. EKPC emergency rating is 298 MVA. | [redacted] | TBD |

**Note:** This reinforcement is fictitious and will not be cost allocated to projects. It is listed for information purposes only.

**Description:** LGE/KU is limiting this facility. EKPC emergency rating is 298 MVA.

| Flowgates Addressed by this Reinforcement | |
|---|---|
| **Facility** | **Contingency** |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | (Any) |

| New Ratings | | | |
|---|---|---|---|
| **Facility** | **Rating Set** | **Rating Type** | **Rating Value** |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | SUM | A | 267.0 MVA |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | SUM | B | 298.0 MVA |
| 5ELIHU-5COOPER2 161.0 kV Ckt 1 line | SUM | C | 298.0 MVA |

## Attachments

The one line included in this refreshed System Impact Study report was originally developed prior to the Transition Date. Therefore, not all verbiage on the one line may align with the current Tariff definitions. An updated one line diagram will be provided in the Facilities Study report for the Expedited Process projects.

Download all tables in report