



**Generation Interconnection
System Impact Study Report
for
Queue Project AF1-296
Garden Plain 138 kV
37.3 MW Capacity / 212.1 MW Energy**

March 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 ComEd.

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.

3 General

The Interconnection Customer (IC) has proposed a wind generating facility located in Whiteside County, Illinois. The installed facilities will have a total capability of 212.1 MW with 37.3 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is September 15, 2022. This study does not imply a TO commitment to this in-service date.

Queue Number	AF1-296
Project Name	GARDEN PLAIN 138 KV
State	Illinois
County	Whiteside
Transmission Owner	ComEd
MFO	212.1
MWE	212.1
MWC	37.3
Fuel	Wind
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

Queue Position AF1-296, a 212.1 MW wind-farm, proposes to interconnect with the ComEd transmission system by connecting to 138kV bus at TSS 132 Garden Plain.

5 Cost Summary

The AG1-478 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$13,000,000
Allocation towards System Network Upgrade Costs (PJM Identified - Summer Peak)*	\$15,020,000
Allocation towards System Network Upgrade Costs (PJM Identified - Light Load)*	\$7,518,000
Allocation towards System Network Upgrade Costs (TO Identified)*	\$0
Total Costs	\$35,538,000

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

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 table below:

Description	Total Cost
Attachment Facilities	\$1,000,000
Total Direct Connection Facility Costs	\$12,000,000
Total Non-Direct Connection Facility Costs	\$0
Total Physical Interconnection Costs	\$13,000,000

6.1 Attachment Facilities

The AF1-296 generator lead will interconnect to 138 kV bus at TSS 132 Garden Plain (see details in Direct Connection section below). The required Attachment Facilities are one 138 kV line MOD, one dead-end structure and one set of revenue-metering as shown in the one-line diagram (See Attachment 1).

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
Installation of one 138 kV line MOD, one dead-end structure and one set of revenue metering (see notes below on cost estimate)	\$1,000,000
Total Attachment Facility Costs	\$1,000,000

6.2 Direct Connection Network Upgrades

In order to accommodate interconnection of AF1-296, TSS 132 Garden Plain would need to be expanded to create a 138kV bus position

The scope of work includes installation of four 138 kV circuit breakers and reconfiguration of bus connections at TSS 132 Garden Plain, as shown in the one-line diagram below.

The Interconnection Customer is responsible for constructing all the facilities on the Interconnection Customer side of the Point of Interconnection (POI).

ComEd would design, engineer and install four 138 kV circuit breakers and reconfigure 138kV bus at TSS 132 Garden Plain. The preliminary cost estimate for Direct Connection Network Upgrade is given in the following tables.

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
Installation of four 138kV circuit breakers to reconfigure TSS 132 Garden Plain	\$12,000,000
Total Direct Connection Facility Costs	\$12,000,000

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
None	\$0
Total Non-Direct Connection Facility Costs	\$0

Notes on Cost Estimate:

- 1) These estimates are Order-of-Magnitude estimates of the costs that ComEd would bill to the customer for this interconnection. These estimates are based on a one-line electrical diagram of the project and the information provided by the Interconnection Customer.
- 2) There were no site visits performed for these estimates. There may be costs related to specific site related issues that are not identified in these estimates. The site reviews will be performed during the Facilities Study or during detailed engineering.
- 3) These estimates are not a guarantee of the maximum amount payable by the Interconnection Customer and the actual costs of ComEd's work may differ significantly from these estimates. Interconnection Customer will be responsible for paying actual costs of ComEd's work in accordance with Sections 212.1 and 217 of the PJM Open Access Transmission Tariff.
- 4) The Interconnection Customer is responsible for all engineering, procurement, testing and construction of all equipment on the Interconnection Customer's side of the POI.
- 5) These cost estimates do not include cost of acquiring right-of-way for the transmission line and purchasing any additional land, if needed, for the line terminations. The need and cost for acquiring property and associated legal costs will be investigation during Facilities Study for this project.

7 Schedule

Based on the scope of work for the interconnection facilities, it is expected to take a minimum of **24 months** after the signing of an Interconnection Construction Service Agreement (or "Interconnection Agreement" if non-FERC) and construction kickoff call to complete the installation of the physical connection work. This assumes that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined interconnection work, and that all system outages will be allowed when requested.

The schedule for any required Network Impact Reinforcements will be more clearly identified in future study phases. The estimated time to complete each of the required reinforcements is identified in the "System Reinforcements" section of the report.

8 Transmission Owner Analysis

See Section 6

9 Interconnection Customer Requirements

ComEd interconnection requirements can be found at <https://www.pjm.com/planning/design-engineering/to-tech-standards/private-comed.aspx>

To the extent that these Applicable Technical Requirements and Standards may conflict with the terms and conditions of the Tariff, the Tariff shall control.

ComEd distribution line drops to move customer cranes and heavy equipment is not part of PJM process. The customer should directly contact ComEd New Business Group to arrange for line drops, if needed.

10 Revenue Metering and SCADA Requirements

10.1 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.

10.2 Meteorological Data Reporting Requirements

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

- Wind speed (meters/second) - (Required)
- Wind direction (decimal degrees from true north) - (Required)
- Ambient air temperature (Fahrenheit) - (Required)

- Air Pressure (Hectopascals) - (Required)
- Humidity (Percent) (Accepted, not required)

10.3 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/>

11 Summer Peak Analysis

The Queue Project AF1-296 was evaluated as a 212.1 MW (Capacity 37.3 MW) injection at TSS 132 Garden Plain substation in the ComEd area. Project AF1-296 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-296 was studied with a commercial probability of 100%. Potential network impacts were as follows:

11.1 Generation Deliverability

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

None

11.2 Multiple Facility Contingency

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

None

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	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC/DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
1	LFFB	COMED_P4_006-45-BT7-8__	CE - CE	BYRON ; B-CHERRY VA; B 345 kV line	270 678	270 694	1	AC	112.48	114.16	LDR	1441	25.97	1
2	LFFB	COMED_P4_937-45-BT1-2__	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	119.6	122.77	LDR	1656	51.72	2
3	LFFB	COMED_P4_155-45-BT6-7__	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	119.14	122.26	LDR	1656	50.48	

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
4	LFFB	COMED_P4_937-45-BT1-4__	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	118.65	121.82	LDR	1656	51.73	
5	LFFB	COMED_P4_937-45-BT1-2__	CE - CE	AF1-012 TAP-ELECT JCT; B 345 kV line	943 410	270 730	1	AC	124.38	127.53	LDR	1656	51.72	3
6	LFFB	COMED_P4_937-45-BT1-4__	CE - CE	AF1-012 TAP-ELECT JCT; B 345 kV line	943 410	270 730	1	AC	123.42	126.58	LDR	1656	51.73	
7	LFFB	AEP_P4_#3128_05E UGENE 345_A2	MISO AMIL - AEP	J1180 TAP-05SULLIVAN 345 kV line	956 820	247 712	1	AC	152.79	153.7	ER	1466	17.5	4

11.4 Steady-State Voltage Requirements

None

11.5 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	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT
8	N-1	COMED_P1-2_345-L0626__B-R-B	CE - CE	CHERRY VA; B-GARDEN PR; R 345 kV line	270 694	270 759	1	AC	118.5	119.73	ER	1479	21.94
9	Non	Non	CE - CE	CHERRY VA; B-GARDEN PR; R 345 kV line	270 694	270 759	1	AC	104.83	105.9	NR	1201	15.74
10	Non	Non	CE - CE	CHERRY VA; B-GARDEN PR; R 345 kV line	270 694	270 759	1	AC	104.83	105.9	NR	1201	15.74

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC/D C	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT
11	Non	Non	CE - CE	ELECT JCT; B- LOMBARD ; B 345 kV line	270 730	270 812	1	AC	107.29	108.15	NR	1201	12.13
12	Non	Non	CE - CE	ELECT JCT; B- LOMBARD ; B 345 kV line	270 730	270 812	1	AC	107.29	108.15	NR	1201	12.13
13	N-1	COMED_P1-2_345-L0626__B-R-B	CE - CE	GARDEN PR; R- SILVER LK; R 345 kV line	270 759	270 883	1	AC	120.73	121.99	ER	1479	21.94
14	Non	Non	CE - CE	GARDEN PR; R- SILVER LK; R 345 kV line	270 759	270 883	1	AC	110.78	111.89	NR	1201	15.74
15	Non	Non	CE - CE	GARDEN PR; R- SILVER LK; R 345 kV line	270 759	270 883	1	AC	110.78	111.89	NR	1201	15.74
16	N-1	COMED_P1-2_345-L11613AB-S	CE - CE	GOODING S ;4B- GOODING S ;3B 345 kV line	270 770	270 766	1	AC	102.07	103.15	ER	1802	20.14
17	N-1	COMED_P1-2_345-L15501__B-R-B	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	118.59	121.75	ER	1656	51.73
18	Non	Non	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	101	103.38	NR	1334	37.51
19	Non	Non	CE - CE	NELSON ; B-AF1-012 TAP 345 kV line	270 828	943 410	1	AC	101	103.38	NR	1334	37.51
20	N-1	COMED_P1-2_345-L15502__B-R-B	CE - CE	LEE CO EC;BP- BYRON ; B 345 kV line	274 768	270 678	1	AC	98.31	101.17	ER	1726	56.2
21	N-1	COMED_P1-2_138-L13219__X-R	CE - CE	AD2-214 TAP-ESS H71 ;BT 138 kV line	937 530	272 512	1	AC	19.43	131.26	ER	182	212.1
22	N-1	COMED_P1-2_345-L15501__B-R-B	CE - CE	AF1-012 TAP- ELECT JCT; B 345 kV line	943 410	270 730	1	AC	123.36	126.51	ER	1656	51.73

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC/D C	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT
23	Non	Non	CE - CE	AF1-012 TAP-ELECT JCT; B 345 kV line	943 410	270 730	1	AC	109.59	111.96	NR	1334	37.51
24	Non	Non	CE - CE	AF1-012 TAP-ELECT JCT; B 345 kV line	943 410	270 730	1	AC	109.59	111.96	NR	1334	37.51
25	N-1	AEP_P1-2_#286	MISO AMIL - AEP	J1180 TAP-05SULLIVAN 345 kV line	956 820	247 712	1	AC	143.83	144.74	NR	1466	17.7
26	Non	Non	MISO AMIL - AEP	J1180 TAP-05SULLIVAN 345 kV line	956 820	247 712	1	AC	137.51	138.36	NR	1334	14.77
27	Non	Non	MISO AMIL - AEP	J1180 TAP-05SULLIVAN 345 kV line	956 820	247 712	1	AC	137.51	138.36	NR	1334	14.77

11.6 System Reinforcements

Facility	Upgrade Description	Cost	Cost Allocated to AF1-296	Upgrade Number																																
Byron – Cherry Valley 345 kV Ckt. 1	Project ID: N6824 Description: To alleviate the Byron – Cherry Valley 345 kV line 10621 overload: Mitigate sag on the line and replace a 345kV circuit breaker at Cherry Valley. Cost: \$12.2 M. Time Estimate: 24 Months. Upon completion of the upgrade the ratings will be 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD). Type: FAC Cost: \$12,200,000 Time Estimate: 24 Months Ratings: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)	\$12,200,000	\$3,910,000	N6824																																
	<table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost \$ (12.2M)</th></tr><tr><td>AF1-280</td><td>55.12</td><td>67.97%</td><td>\$8.29</td></tr><tr><td>AF1-296</td><td>25.97</td><td>32.03%</td><td>\$3.91</td></tr></table>				Queue	MW Contribution	Cost %	Cost \$ (12.2M)	AF1-280	55.12	67.97%	\$8.29	AF1-296	25.97	32.03%	\$3.91																				
	Queue				MW Contribution	Cost %	Cost \$ (12.2M)																													
	AF1-280				55.12	67.97%	\$8.29																													
	AF1-296				25.97	32.03%	\$3.91																													
Nelson ; B – AF1-012 TAP 345 kV Ckt. 1	Project ID: n6639.1 Description: Replace station conductor at TSS111 EJ, replace MOD. Relay upgrades, re-conductor part of the line. A preliminary estimate for the upgrade is \$22.3M, with an estimated construction timeline of 36 months. New ratings will be 1683/2068/2172/2308 (SN/SLTE/SSTE/SLD) Type: FAC Cost: \$22,300,000 Time Estimate: 36 Months Ratings: 1683/2068/2172/2308 (SN/SLTE/SSTE/SLD)	\$22,300,000	\$4,000,000	N6639.1																																
	<table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$22.3M)</th></tr><tr><td>AE1-114</td><td>20.7</td><td>7.19%</td><td>\$1.60</td></tr><tr><td>J982</td><td>20.8</td><td>7.22%</td><td>\$1.61</td></tr><tr><td>J1084</td><td>31.7</td><td>11.01%</td><td>\$2.45</td></tr><tr><td>J1181</td><td>19.2</td><td>6.67%</td><td>\$1.49</td></tr><tr><td>AF1-012</td><td>75.21</td><td>26.11%</td><td>\$5.82</td></tr><tr><td>AF1-280</td><td>68.73</td><td>23.86%</td><td>\$5.32</td></tr><tr><td>AF1-296</td><td>51.7</td><td>17.95%</td><td>\$4.00</td></tr></table>				Queue	MW Contribution	Cost %	Cost (\$22.3M)	AE1-114	20.7	7.19%	\$1.60	J982	20.8	7.22%	\$1.61	J1084	31.7	11.01%	\$2.45	J1181	19.2	6.67%	\$1.49	AF1-012	75.21	26.11%	\$5.82	AF1-280	68.73	23.86%	\$5.32	AF1-296	51.7	17.95%	\$4.00
	Queue				MW Contribution	Cost %	Cost (\$22.3M)																													
	AE1-114				20.7	7.19%	\$1.60																													
	J982				20.8	7.22%	\$1.61																													
	J1084				31.7	11.01%	\$2.45																													
	J1181				19.2	6.67%	\$1.49																													
	AF1-012				75.21	26.11%	\$5.82																													
	AF1-280				68.73	23.86%	\$5.32																													
	AF1-296				51.7	17.95%	\$4.00																													

Facility	Upgrade Description	Cost	Cost Allocated to AF1-296	Upgrade Number																																
AF1-012 TAP – ELECT JCT; B Ckt. 1	Project ID: n6639.2 Description: Perform sag mitigation on a portion of the line section along with re-conductor on a different section, upgrade station conductor at both line terminals, replace both line motor operated disconnect witches and line current transformers, upgrade line relay schemes at both terminals as well. A preliminary estimate for the upgrade is \$10.5 M with an estimated construction timeline of 36 months. N6639.2 Type: FAC Cost: \$10,500,000 Time Estimate: 36 Months Ratings: N/A	\$10,500,000	\$1,880,000	N6639.2																																
	<table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$10.5M)</th></tr><tr><td>AE1-114</td><td>20.7</td><td>7.19%</td><td>\$0.75</td></tr><tr><td>J982</td><td>20.8</td><td>7.22%</td><td>\$0.76</td></tr><tr><td>J1084</td><td>31.7</td><td>11.01%</td><td>\$1.16</td></tr><tr><td>J1181</td><td>19.2</td><td>6.67%</td><td>\$0.70</td></tr><tr><td>AF1-012</td><td>75.21</td><td>26.11%</td><td>\$2.74</td></tr><tr><td>AF1-280</td><td>68.73</td><td>23.86%</td><td>\$2.51</td></tr><tr><td>AF1-296</td><td>51.7</td><td>17.95%</td><td>\$1.88</td></tr></table>				Queue	MW Contribution	Cost %	Cost (\$10.5M)	AE1-114	20.7	7.19%	\$0.75	J982	20.8	7.22%	\$0.76	J1084	31.7	11.01%	\$1.16	J1181	19.2	6.67%	\$0.70	AF1-012	75.21	26.11%	\$2.74	AF1-280	68.73	23.86%	\$2.51	AF1-296	51.7	17.95%	\$1.88
	Queue				MW Contribution	Cost %	Cost (\$10.5M)																													
	AE1-114				20.7	7.19%	\$0.75																													
	J982				20.8	7.22%	\$0.76																													
	J1084				31.7	11.01%	\$1.16																													
	J1181				19.2	6.67%	\$0.70																													
	AF1-012				75.21	26.11%	\$2.74																													
	AF1-280				68.73	23.86%	\$2.51																													
	AF1-296				51.7	17.95%	\$1.88																													

Facility	Upgrade Description	Cost	Cost Allocated to AF1-296	Upgrade Number												
J1180 TAP – Sullivan 345 kV Ckt. 1	Project ID: MISO Upgrade Description: MISO Recommended Upgrade: Upgrade is to build a second parallel Breed – Casey 345 kV line. \$60-74M (AMIL owns approximately 97% of the line, estimate for entire line of about 28 miles). Time estimate is 5 years for obtaining permits and line construction. Type: FAC Cost: \$78M Time Estimate: 5 Years Ratings: N/A <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$78M)</th></tr><tr><td>AF1-088</td><td>256.85</td><td>93.62%</td><td>\$73.025</td></tr><tr><td>AF1-296</td><td>17.5</td><td>6.38%</td><td>\$4.975</td></tr></table>	Queue	MW Contribution	Cost %	Cost (\$78M)	AF1-088	256.85	93.62%	\$73.025	AF1-296	17.5	6.38%	\$4.975	\$82,000,000	\$5,230,000	N7204
	Queue	MW Contribution	Cost %	Cost (\$78M)												
	AF1-088	256.85	93.62%	\$73.025												
	AF1-296	17.5	6.38%	\$4.975												
	Project ID: n7204 Description: AEP cost estimate for about 0.9 miles of the line and adding two breakers to accommodate the new line is \$4M. PJM Network Upgrade N7204. Type: FAC Cost: \$4,000,000 Time Estimate: 5 Years Ratings: N/A <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$4M)</th></tr><tr><td>AF1-088</td><td>256.85</td><td>93.62%</td><td>\$3.745</td></tr><tr><td>AF1-296</td><td>17.5</td><td>6.38%</td><td>\$0.255</td></tr></table>	Queue	MW Contribution	Cost %	Cost (\$4M)	AF1-088	256.85	93.62%	\$3.745	AF1-296	17.5	6.38%	\$0.255			
Queue	MW Contribution	Cost %	Cost (\$4M)													
AF1-088	256.85	93.62%	\$3.745													
AF1-296	17.5	6.38%	\$0.255													
Total Cost		\$127,000,000	\$15,020,000													

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.

11.7 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".

11.7.1 Index 1

(CE - CE) The BYRON ; B-CHERRY VA; B 345 kV line (from bus 270678 to bus 270694 ckt 1) loads from 112.48% to 114.16% (AC power flow) of its load dump rating (1441 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_006-45-BT7-8_'. This project contributes approximately 25.97 MW to the thermal violation.

CONTINGENCY 'COMED_P4_006-45-BT7-8_'

TRIP BRANCH FROM BUS 270678 TO BUS 930480 CKT 1 / BYRON ; B 345 AB1-089 TAP 345

TRIP BRANCH FROM BUS 270678 TO BUS 270679 CKT 1 / BYRON ; B 345 BYRON ; R 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
937531	AD2-214 C	5.46
937532	AD2-214 E	3.64
939051	AE1-134 1	2.34
939061	AE1-134 2	2.34
943411	AF1-012 C	16.88
943412	AF1-012 E	11.25
943803	AF1-048 BAT	7.79
943922	AF1-060 BAT	1.24
946151	AF1-280 C 01	37.9
946152	AF1-280 E 01	17.43
946161	AF1-281 C	0.83
946162	AF1-281 E	4.7
946321	AF1-296 C 01	4.57
946322	AF1-296 E 01	21.4
LTF	BLUEG	0.31
274656	BYRON ;1U	106.61
LTF	CBM-S1	3.31
LTF	CBM-S2	0.2
LTF	CBM-W2	7.01
274859	EASYR;U1 E	30.08
274860	EASYR;U2 E	30.08
LTF	G-007	0.32
LTF	GIBSON	0.02
955971	J1084	19.5
956411	J1131	10.5
954901	J963	0.85
274760	LEE CO EC;1U	4.53
274761	LEE CO EC;2U	4.53
274763	LEE CO EC;4U	4.48
274764	LEE CO EC;5U	4.54
274765	LEE CO EC;6U	4.54
274766	LEE CO EC;7U	4.47

274767	LEE CO EC;8U	4.47
LTF	MADISON	1.2
LTF	MEC	6.39
LTF	NY	0.18
293516	O-009 E1	10.23
293517	O-009 E2	5.2
293518	O-009 E3	5.72
293715	O-029 E	10.94
293716	O-029 E	6.
293717	O-029 E	5.51
LTF	O-066	2.08
LTF	TRIMBLE	0.11
LTF	TVA	0.72
276172	Z1-108 BAT	1.77
919581	AA2-030	30.15
920273	AA2-123 BAT	2.91

11.7.2 Index 2

(CE - CE) The NELSON ; B-AF1-012 TAP 345 kV line (from bus 270828 to bus 943410 ckt 1) loads from 119.6% to 122.77% (AC power flow) of its load dump rating (1656 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_937-45-BT1-2_'. This project contributes approximately 51.72 MW to the thermal violation.

CONTINGENCY 'COMED_P4_937-45-BT1-2_'

TRIP BRANCH FROM BUS 946160 TO BUS 274768 CKT 1 / AF1-281 TAP 345 LEECO;BP 345

TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934051	AD1-031 C 01	3.19
934052	AD1-031 E 01	5.2
934431	AD1-067 C	0.09
934432	AD1-067 E	0.36
934701	AD1-098 C 01	5.04
934702	AD1-098 E 01	3.68
937001	AD2-134 C	1.7
937002	AD2-134 E	6.8
937311	AD2-172 C	1.58
937312	AD2-172 E	2.18
937531	AD2-214 C	10.76

937532	AD2-214 E	7.17
938861	AE1-114 C 01	4.98
938862	AE1-114 E 01	16.99
939051	AE1-134 1	4.19
939061	AE1-134 2	4.19
940501	AE2-035 C	1.58
940502	AE2-035 E	2.18
943921	AF1-060	0.78
946151	AF1-280 C 01	47.1
946152	AF1-280 E 01	21.66
946161	AF1-281 C	1.03
946162	AF1-281 E	5.84
946321	AF1-296 C 01	9.1
946322	AF1-296 E 01	42.62
946501	AF1-314 C	2.81
946502	AF1-314 E	13.15
946541	AF1-318 C 01	3.72
946542	AF1-318 E 01	17.4
274877	BISHOP HL;1U	0.44
274878	BISHOP HL;2U	0.44
294401	BSHIL;1U E	9.64
294410	BSHIL;2U E	9.64
274848	CAMPGROVE;RU	0.59
LTF	CBM-S1	13.79
LTF	CBM-S2	4.24
LTF	CBM-W1	48.68
LTF	CBM-W2	22.48
274699	CORDOVA ;1C	7.31
274701	CORDOVA ;1S	8.23
274700	CORDOVA ;2C	7.31
LTF	CPL	0.35
LTF	G-007	0.15
290051	GSG-6; E	6.88
950401	J041 C	1.63
950402	J041 E	6.53
955221	J1000	3.97
955661	J1050 C	2.75
955662	J1050 E	14.87
955871	J1072	11.57
955971	J1084	31.41
956411	J1131	16.83
956431	J1135	4.03
956761	J1174	12.6
956771	J1175 C	1.97
956772	J1175 E	10.64
956831	J1181 C	2.98
956832	J1181 E	16.15
951031	J344 C	3.02

951032	J344 E	9.07
950181	J407 C	3.
950182	J407 E	12.02
950471	J438 C	3.35
950472	J438 E	13.39
950501	J449 C	3.23
950502	J449 E	12.91
950522	J455 E	21.39
951221	J475 C	3.69
951222	J475 E	14.78
951301	J495 C	3.46
951302	J495 E	10.38
951351	J500 C	6.75
951352	J500 E	27.01
951381	J504	5.75
951421	J514	3.44
951441	J523 C	2.2
951442	J523 E	1.46
951451	J524 C	4.47
951452	J524 E	2.98
951501	J529 C	3.42
951502	J529 E	13.69
951511	J530 C	5.47
951512	J530 E	21.87
951541	J534 C	3.53
951542	J534 E	14.13
951551	J535 C	3.
951552	J535 E	12.
951821	J541 C	4.4
951822	J541 E	23.78
951841	J555 C	2.02
951842	J555 E	10.91
952191	J583 C	2.13
952192	J583 E	11.53
952211	J590 C	1.
952212	J590 E	5.42
952021	J614 C	0.75
952022	J614 E	4.04
953082	J836 E	14.25
954702	J844 E	14.05
954131	J877	17.82
954301	J898 C	1.12
954302	J898 E	6.06
954901	J963	1.4
954931	J967 C	1.81
954932	J967 E	9.77
955061	J982 C	3.2
955062	J982 E	17.33

990901	L-005 E	12.98
LTF	LGEE	0.12
LTF	MADISON	14.58
LTF	MEC	18.27
274715	NELSON EC;1C	10.6
274716	NELSON EC;1S	7.74
274717	NELSON EC;2C	10.68
274718	NELSON EC;2S	7.8
LTF	NY	0.09
293513	O-009 C1	0.94
293514	O-009 C2	0.48
293515	O-009 C3	0.53
293516	O-009 E1	20.47
293517	O-009 E2	10.4
293518	O-009 E3	11.45
276156	O-029 C	0.51
276157	O-029 C	0.55
276158	O-029 C	1.
293715	O-029 E	21.88
293716	O-029 E	12.
293717	O-029 E	11.03
293771	O-035 E	5.9
LTF	O-066	0.95
294763	P-046 E	6.02
274662	QUAD CITI;1U	41.6
274663	QUAD CITI;2U	41.68
295111	SUBLETTE E	1.79
LTF	TVA	2.72
276160	W4-084	0.16
295109	WESTBROOK E	3.68
916211	Z1-072 E	4.47
916221	Z1-073 E	3.55
919221	AA1-146	9.89
919581	AA2-030	53.98
925302	AB2-191 E	0.91
925581	AC1-033 C	1.58
925582	AC1-033 E	10.57
927201	AC1-214 C 01	1.89
927202	AC1-214 E 01	6.02

11.7.3 Index 3

(CE - CE) The AF1-012 TAP-ELECT JCT; B 345 kV line (from bus 943410 to bus 270730 ckt 1) loads from 124.38% to 127.53% (AC power flow) of its load dump rating (1656 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_937-45-BT1-2_'. This project contributes approximately 51.72 MW to the thermal violation.

CONTINGENCY 'COMED_P4_937-45-BT1-2_'

TRIP BRANCH FROM BUS 946160 TO BUS 274768 CKT 1 / AF1-281 TAP 345 LEECO;BP 345

TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934051	AD1-031 C 01	3.19
934052	AD1-031 E 01	5.2
934431	AD1-067 C	0.09
934432	AD1-067 E	0.36
934701	AD1-098 C 01	5.04
934702	AD1-098 E 01	3.68
937001	AD2-134 C	1.7
937002	AD2-134 E	6.8
937311	AD2-172 C	1.58
937312	AD2-172 E	2.18
937531	AD2-214 C	10.76
937532	AD2-214 E	7.17
938861	AE1-114 C 01	4.98
938862	AE1-114 E 01	16.99
939051	AE1-134 1	4.19
939061	AE1-134 2	4.19
940501	AE2-035 C	1.58
940502	AE2-035 E	2.18
943411	AF1-012 C	45.13
943412	AF1-012 E	30.09
943921	AF1-060	0.78
946151	AF1-280 C 01	47.1
946152	AF1-280 E 01	21.66
946161	AF1-281 C	1.03
946162	AF1-281 E	5.84
946321	AF1-296 C 01	9.1
946322	AF1-296 E 01	42.62
946501	AF1-314 C	2.81
946502	AF1-314 E	13.15
946541	AF1-318 C 01	3.72
946542	AF1-318 E 01	17.4
274877	BISHOP HL;1U	0.44
274878	BISHOP HL;2U	0.44
294401	BSHIL;1U E	9.64
294410	BSHIL;2U E	9.64
274848	CAMPGROVE;RU	0.59
LTF	CBM-S1	13.79
LTF	CBM-S2	4.24

<i>LTF</i>	<i>CBM-W1</i>	<i>48.68</i>
<i>LTF</i>	<i>CBM-W2</i>	<i>22.48</i>
<i>274699</i>	<i>CORDOVA ;1C</i>	<i>7.31</i>
<i>274701</i>	<i>CORDOVA ;1S</i>	<i>8.23</i>
<i>274700</i>	<i>CORDOVA ;2C</i>	<i>7.31</i>
<i>LTF</i>	<i>CPL</i>	<i>0.35</i>
<i>LTF</i>	<i>G-007</i>	<i>0.15</i>
<i>290051</i>	<i>GSG-6; E</i>	<i>6.88</i>
<i>950401</i>	<i>J041 C</i>	<i>1.63</i>
<i>950402</i>	<i>J041 E</i>	<i>6.53</i>
<i>955221</i>	<i>J1000</i>	<i>3.97</i>
<i>955661</i>	<i>J1050 C</i>	<i>2.75</i>
<i>955662</i>	<i>J1050 E</i>	<i>14.87</i>
<i>955871</i>	<i>J1072</i>	<i>11.57</i>
<i>955971</i>	<i>J1084</i>	<i>31.41</i>
<i>956411</i>	<i>J1131</i>	<i>16.83</i>
<i>956421</i>	<i>J1132</i>	<i>3.32</i>
<i>956431</i>	<i>J1135</i>	<i>4.03</i>
<i>956761</i>	<i>J1174</i>	<i>12.6</i>
<i>956771</i>	<i>J1175 C</i>	<i>1.97</i>
<i>956772</i>	<i>J1175 E</i>	<i>10.64</i>
<i>956831</i>	<i>J1181 C</i>	<i>2.98</i>
<i>956832</i>	<i>J1181 E</i>	<i>16.15</i>
<i>951031</i>	<i>J344 C</i>	<i>3.02</i>
<i>951032</i>	<i>J344 E</i>	<i>9.07</i>
<i>950181</i>	<i>J407 C</i>	<i>3.</i>
<i>950182</i>	<i>J407 E</i>	<i>12.02</i>
<i>950471</i>	<i>J438 C</i>	<i>3.35</i>
<i>950472</i>	<i>J438 E</i>	<i>13.39</i>
<i>950501</i>	<i>J449 C</i>	<i>3.23</i>
<i>950502</i>	<i>J449 E</i>	<i>12.91</i>
<i>950522</i>	<i>J455 E</i>	<i>21.39</i>
<i>951221</i>	<i>J475 C</i>	<i>3.69</i>
<i>951222</i>	<i>J475 E</i>	<i>14.78</i>
<i>951301</i>	<i>J495 C</i>	<i>3.46</i>
<i>951302</i>	<i>J495 E</i>	<i>10.38</i>
<i>951351</i>	<i>J500 C</i>	<i>6.75</i>
<i>951352</i>	<i>J500 E</i>	<i>27.01</i>
<i>951381</i>	<i>J504</i>	<i>5.75</i>
<i>951421</i>	<i>J514</i>	<i>3.44</i>
<i>951441</i>	<i>J523 C</i>	<i>2.2</i>
<i>951442</i>	<i>J523 E</i>	<i>1.46</i>
<i>951451</i>	<i>J524 C</i>	<i>4.47</i>
<i>951452</i>	<i>J524 E</i>	<i>2.98</i>
<i>951501</i>	<i>J529 C</i>	<i>3.42</i>
<i>951502</i>	<i>J529 E</i>	<i>13.69</i>
<i>951511</i>	<i>J530 C</i>	<i>5.47</i>
<i>951512</i>	<i>J530 E</i>	<i>21.87</i>

951541	J534 C	3.53
951542	J534 E	14.13
951551	J535 C	3.
951552	J535 E	12.
951821	J541 C	4.4
951822	J541 E	23.78
951841	J555 C	2.02
951842	J555 E	10.91
952191	J583 C	2.13
952192	J583 E	11.53
952211	J590 C	1.
952212	J590 E	5.42
952021	J614 C	0.75
952022	J614 E	4.04
953082	J836 E	14.25
954702	J844 E	14.05
954131	J877	17.82
954301	J898 C	1.12
954302	J898 E	6.06
954901	J963	1.4
954931	J967 C	1.81
954932	J967 E	9.77
955061	J982 C	3.2
955062	J982 E	17.33
990901	L-005 E	12.98
LTF	LGEE	0.12
LTF	MADISON	14.58
LTF	MEC	18.27
274715	NELSON EC;1C	10.6
274716	NELSON EC;1S	7.74
274717	NELSON EC;2C	10.68
274718	NELSON EC;2S	7.8
LTF	NY	0.09
293513	O-009 C1	0.94
293514	O-009 C2	0.48
293515	O-009 C3	0.53
293516	O-009 E1	20.47
293517	O-009 E2	10.4
293518	O-009 E3	11.45
276156	O-029 C	0.51
276157	O-029 C	0.55
276158	O-029 C	1.
293715	O-029 E	21.88
293716	O-029 E	12.
293717	O-029 E	11.03
293771	O-035 E	5.9
LTF	O-066	0.95
294763	P-046 E	6.02

274662	QUAD CITI;1U	41.6
274663	QUAD CITI;2U	41.68
295111	SUBLETTE E	1.79
LTF	TVA	2.72
276160	W4-084	0.16
295109	WESTBROOK E	3.68
916211	Z1-072 E	4.47
916221	Z1-073 E	3.55
919221	AA1-146	9.89
919581	AA2-030	53.98
925302	AB2-191 E	0.91
925581	AC1-033 C	1.58
925582	AC1-033 E	10.57
927201	AC1-214 C 01	1.89
927202	AC1-214 E 01	6.02

11.7.4 Index 4

(MISO AMIL - AEP) The J1180 TAP-05SULLIVAN 345 kV line (from bus 956820 to bus 247712 ckt 1) loads from 152.79% to 153.7% (AC power flow) of its emergency rating (1466 MVA) for the line fault with failed breaker contingency outage of 'AEP_P4_#3128_05EUGENE 345_A2'. This project contributes approximately 17.5 MW to the thermal violation.

CONTINGENCY 'AEP_P4_#3128_05EUGENE 345_A2'

OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1 / 243221 05EUGENE 345 249504 08CAYSUB
345 1

OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885
7BUNSONVILLE 345 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
932881	AC2-115 1	1.31
932891	AC2-115 2	1.31
932921	AC2-116	0.46
933911	AD1-013 C	0.98
933912	AD1-013 E	1.57
933931	AD1-016 C	0.47
933932	AD1-016 E	0.76
934051	AD1-031 C 01	2.32
934052	AD1-031 E 01	3.79
934101	AD1-039 1	3.49
934431	AD1-067 C	0.07
934432	AD1-067 E	0.3
934701	AD1-098 C 01	3.75
934702	AD1-098 E 01	2.74
934871	AD1-116 C	0.47
934872	AD1-116 E	0.77
934971	AD1-129 C	0.48
934972	AD1-129 E	0.32
935001	AD1-133 C 01	14.43
935002	AD1-133 E 01	9.62
935141	AD1-148	7.42
936291	AD2-038 C 01	1.85
936292	AD2-038 E 01	8.67
936511	AD2-066 C 01	4.79
936512	AD2-066 E 01	3.19
936771	AD2-100 C	22.48
936772	AD2-100 E	14.99

936791	AD2-102 C	8.
936792	AD2-102 E	5.33
936971	AD2-131 C	1.48
936972	AD2-131 E	7.44
937001	AD2-134 C	1.4
937002	AD2-134 E	5.58
937211	AD2-159 C	4.89
937212	AD2-159 E	22.89
937311	AD2-172 C	1.43
937312	AD2-172 E	1.97
937531	AD2-214 C	3.25
937532	AD2-214 E	2.17
938851	AE1-113 C	4.53
938852	AE1-113 E	16.05
938861	AE1-114 C 01	2.39
938862	AE1-114 E 01	8.14
939051	AE1-134 1	0.91
939061	AE1-134 2	0.91
939321	AE1-163 C 01	3.44
939322	AE1-163 E 01	21.11
939401	AE1-172 C 01	3.49
939402	AE1-172 E 01	16.36
939741	AE1-205 C 01	8.56
939742	AE1-205 E 01	11.82
940101	AE1-252 C 01	7.01
940102	AE1-252 E 01	4.67
940501	AE2-035 C	1.43
940502	AE2-035 E	1.97
941131	AE2-107 C	3.36
941132	AE2-107 E	2.24
941343	AE2-130 BAT	31.79
941731	AE2-173 01	5.1
942111	AE2-223 C	1.99
942112	AE2-223 E	13.3
942421	AE2-255 C 01	1.71
942422	AE2-255 E 01	5.14
942481	AE2-261 C	31.08
942482	AE2-261 E	20.72
942602	AE2-276 BAT	14.
942651	AE2-281 C 01	0.49
942652	AE2-281 E 01	3.02
942991	AE2-321 C	4.15
942992	AE2-321 E	2.04
943411	AF1-012 C	7.55
943412	AF1-012 E	5.03
943801	AF1-048 C	1.94
943802	AF1-048 E	1.29
943921	AF1-060	0.7

944202	AF1-088 FTWR	280.08
944221	AF1-090 C 01	6.81
944222	AF1-090 E 01	31.9
945871	AF1-252 01	12.08
945881	AF1-253 01	8.36
946151	AF1-280 C 01	9.92
946152	AF1-280 E 01	4.56
946161	AF1-281 C	0.22
946162	AF1-281 E	1.23
946321	AF1-296 C 01	3.08
946322	AF1-296 E 01	14.42
946501	AF1-314 C	2.54
946502	AF1-314 E	11.88
946541	AF1-318 C 01	4.54
946542	AF1-318 E 01	21.26
946661	AF1-330 C	1.01
946662	AF1-330 E	0.22
946671	AF1-331	1.27
LTF	BLUEG	2.69
294401	BSHIL;1U E	6.98
294410	BSHIL;2U E	6.98
274890	CAYUG;1U E	10.37
274891	CAYUG;2U E	10.37
LTF	CBM-S1	37.05
LTF	CBM-S2	8.69
LTF	CBM-W1	63.46
LTF	CBM-W2	70.63
LTF	CPL	0.6
274859	EASYR;U1 E	6.86
274860	EASYR;U2 E	6.86
LTF	G-007	0.76
274880	GENERATOR;	1.09
290051	GSG-6; E	5.64
956451	J1139	21.99
954761	J468 C	5.21
954762	J468 E	29.53
953401	J811	17.75
953641	J813	39.53
953651	J815	11.38
953881	J848 C	5.15
953882	J848 E	27.86
954411	J912	14.04
954681	J949 C	32.79
955131	J991	40.72
274650	KINCAID ;1U	17.45
274651	KINCAID ;2U	17.44
990901	L-005 E	10.82
290108	LEEDK;1U E	12.46

<i>LTF</i>	<i>MADISON</i>	<i>25.01</i>
<i>LTF</i>	<i>MEC</i>	<i>15.78</i>
<i>LTF</i>	<i>NY</i>	<i>0.44</i>
<i>293516</i>	<i>O-009 E1</i>	<i>6.38</i>
<i>293517</i>	<i>O-009 E2</i>	<i>3.24</i>
<i>293518</i>	<i>O-009 E3</i>	<i>3.57</i>
<i>293715</i>	<i>O-029 E</i>	<i>6.82</i>
<i>293716</i>	<i>O-029 E</i>	<i>3.74</i>
<i>293717</i>	<i>O-029 E</i>	<i>3.44</i>
<i>293771</i>	<i>O-035 E</i>	<i>5.13</i>
<i>LTF</i>	<i>O-066</i>	<i>4.95</i>
<i>293644</i>	<i>O22 E1</i>	<i>4.99</i>
<i>293645</i>	<i>O22 E2</i>	<i>9.69</i>
<i>290021</i>	<i>O50 E</i>	<i>10.97</i>
<i>294763</i>	<i>P-046 E</i>	<i>5.44</i>
<i>290261</i>	<i>S-027 E</i>	<i>20.38</i>
<i>290265</i>	<i>S-028 E</i>	<i>20.38</i>
<i>295111</i>	<i>SUBLETTE E</i>	<i>1.47</i>
<i>LTF</i>	<i>TRIMBLE</i>	<i>1.</i>
<i>LTF</i>	<i>TVA</i>	<i>7.81</i>
<i>274853</i>	<i>TWINGROVE;U1</i>	<i>0.93</i>
<i>274854</i>	<i>TWINGROVE;U2</i>	<i>0.93</i>
<i>274830</i>	<i>U3-021 1</i>	<i>3.18</i>
<i>274831</i>	<i>U3-021 2</i>	<i>3.18</i>
<i>276153</i>	<i>W2-048 E</i>	<i>9.46</i>
<i>274882</i>	<i>W4-005 E</i>	<i>39.44</i>
<i>LTF</i>	<i>WEC</i>	<i>2.02</i>
<i>295109</i>	<i>WESTBROOK E</i>	<i>3.02</i>
<i>909052</i>	<i>X2-022 E</i>	<i>28.46</i>
<i>916211</i>	<i>Z1-072 E</i>	<i>3.88</i>
<i>916221</i>	<i>Z1-073 E</i>	<i>2.91</i>
<i>917501</i>	<i>Z2-087 C</i>	<i>0.49</i>
<i>917502</i>	<i>Z2-087 E</i>	<i>17.73</i>
<i>918052</i>	<i>AA1-018 E OP</i>	<i>8.06</i>
<i>919581</i>	<i>AA2-030</i>	<i>11.73</i>
<i>920272</i>	<i>AA2-123 E</i>	<i>1.23</i>
<i>930481</i>	<i>AB1-089</i>	<i>35.72</i>
<i>930741</i>	<i>AB1-122 101</i>	<i>35.62</i>
<i>924041</i>	<i>AB2-047 C 01</i>	<i>3.31</i>
<i>924042</i>	<i>AB2-047 E 01</i>	<i>22.16</i>
<i>924261</i>	<i>AB2-070 C 01</i>	<i>3.82</i>
<i>924262</i>	<i>AB2-070 E 01</i>	<i>25.59</i>
<i>924471</i>	<i>AB2-096</i>	<i>22.1</i>
<i>925302</i>	<i>AB2-191 E</i>	<i>0.75</i>
<i>925581</i>	<i>AC1-033 C</i>	<i>1.14</i>
<i>925582</i>	<i>AC1-033 E</i>	<i>7.65</i>
<i>925771</i>	<i>AC1-053 C</i>	<i>3.86</i>
<i>925772</i>	<i>AC1-053 E</i>	<i>25.83</i>

927511	AC1-113 1	0.66
927521	AC1-113 2	0.66
926431	AC1-114	1.31
926821	AC1-168 C 01	0.83
926822	AC1-168 E 01	5.55
926841	AC1-171 C 01	1.04
926842	AC1-171 E 01	6.95
927201	AC1-214 C 01	1.65
927202	AC1-214 E 01	5.24

11.8 Contingency Descriptions

Contingency Name	Contingency Definition
AEP_P1-2_#286	CONTINGENCY 'AEP_P1-2_#286' OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1 END
AEP_P4_#3128_05EUGENE 345_A2	CONTINGENCY 'AEP_P4_#3128_05EUGENE 345_A2' OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1 / 243221 05EUGENE 345 249504 08CAYSUB 345 1 OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885 7BUNSONVILLE 345 1 END
COMED_P1-2_138-L13219_X-R	CONTINGENCY 'COMED_P1-2_138-L13219_X-R' TRIP BRANCH FROM BUS 271543 TO BUS 631033 CKT 1 / GARDE; 138 ALBANY 6 138 END
COMED_P1-2_345-L0626__B-R-B	CONTINGENCY 'COMED_P1-2_345-L0626__B-R-B' TRIP BRANCH FROM BUS 930480 TO BUS 270916 CKT 1 / AB1-089 TAP 345 WAYNE ; B 345 END
COMED_P1-2_345-L11613AB-S	CONTINGENCY 'COMED_P1-2_345-L11613AB-S' TRIP BRANCH FROM BUS 270666 TO BUS 270664 CKT 1 / B ISL;BT 345 B ISL; B 345 TRIP BRANCH FROM BUS 270666 TO BUS 270926 CKT 1 / B ISL;BT 345 WILTO; B 345 TRIP BRANCH FROM BUS 270770 TO BUS 270666 CKT 1 / GOODI;4B 345 B ISL;BT 345 END
COMED_P1-2_345-L15501_B-R-B	CONTINGENCY 'COMED_P1-2_345-L15501_B-R-B' TRIP BRANCH FROM BUS 946160 TO BUS 274768 CKT 1 / AF1-281 TAP 345 LEECO;BP 345 END
COMED_P1-2_345-L15502_B-R-B	CONTINGENCY 'COMED_P1-2_345-L15502_B-R-B' TRIP BRANCH FROM BUS 943410 TO BUS 270730 CKT 1 / AF1-012 TAP 345 ELEC JUNC; B 345 END

Contingency Name	Contingency Definition
COMED_P4_006-45-BT7-8__	CONTINGENCY 'COMED_P4_006-45-BT7-8__' TRIP BRANCH FROM BUS 270678 TO BUS 930480 CKT 1 / BYRON ; B 345 AB1-089 TAP 345 TRIP BRANCH FROM BUS 270678 TO BUS 270679 CKT 1 / BYRON ; B 345 BYRON ; R 345 END
COMED_P4_155-45-BT6-7__	CONTINGENCY 'COMED_P4_155-45-BT6-7__' TRIP BRANCH FROM BUS 275204 TO BUS 270828 CKT 1 / NELSO;4M 138 NELSO; B 345 TRIP BRANCH FROM BUS 275204 TO BUS 272094 CKT 1 / NELSO;4M 138 NELSO; B 138 TRIP BRANCH FROM BUS 275204 TO BUS 275304 CKT 1 / NELSO;4M 138 NELSO;4C 34.5 TRIP BRANCH FROM BUS 270828 TO BUS 946160 CKT 1 / NELSO; B 345 AF1-281 TAP 345 END
COMED_P4_937-45-BT1-2__	CONTINGENCY 'COMED_P4_937-45-BT1-2__' TRIP BRANCH FROM BUS 946160 TO BUS 274768 CKT 1 / AF1-281 TAP 345 LEECO;BP 345 TRIP BRANCH FROM BUS 274768 TO BUS 270678 CKT 1 / LEECO;BP 345 BYRON; B 345 END

Contingency Name	Contingency Definition
COMED_P4_937-45-BT1-4__	CONTINGENCY 'COMED_P4_937-45-BT1-4__'
	TRIP BRANCH FROM BUS 946160 TO BUS 274768 CKT 1 / AF1-281 TAP 345 LEECO;BP 345
	TRIP BRANCH FROM BUS 271421 TO BUS 274450 CKT 1 / EASYR; B 138 EASYR;1 34.5
	TRIP BRANCH FROM BUS 271421 TO BUS 274451 CKT 1 / EASYR; B 138 EASYR;2 34.5
	TRIP BRANCH FROM BUS 272528 TO BUS 271421 CKT 1 / S DIX; B 138 EASYR; B 138
	TRIP BRANCH FROM BUS 274420 TO BUS 274857 CKT 1 / EASYR;1H 34.5 EASYR;U1 0.69
	TRIP BRANCH FROM BUS 274421 TO BUS 274858 CKT 1 / EASYR;2H 34.5 EASYR;U2 0.69
	TRIP BRANCH FROM BUS 274450 TO BUS 274420 CKT 1 / EASYR;1 34.5 EASYR;1H 34.5
	TRIP BRANCH FROM BUS 274451 TO BUS 274421 CKT 1 / EASYR;2 34.5 EASYR;2H 34.5
	TRIP BRANCH FROM BUS 274768 TO BUS 272528 CKT 1 / LEECO;BP 345 S DIX; B 138
	REMOVE UNIT W1 FROM BUS 274857 / EASYR;U1 0.69
	REMOVE UNIT W2 FROM BUS 274858 / EASYR;U2 0.69
	END

12 Light Load Analysis

The Queue Project AF1-296 was evaluated as a 212.1 MW (Capacity 212.1 MW) injection at TSS 132 Garden Plain substation in the ComEd area. Project AF1-296 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-296 was studied with a commercial probability of 100%. Potential network impacts were as follows:

12.1 Light Load Deliverability

(Single or N-1 contingencies)

None

12.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies)

None

12.3 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	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
1	N-1	AEP_P1-2_#7441	AEP - AEP	05ALLEN - 05RPMO NE 345 kV line	243 211	242 933	1	DC	143.06	144.44	NR	897	11.2	1
2	LFFB	AEP_P4_#7445_05MARYSV 765_B	AEP - AEP	05ALLEN - 05RPMO NE 345 kV line	243 211	242 933	1	AC	119.75	120.8	ER	897	11.1	
3	N-1	COMED_P1-2_695_B2	MISO NIPS - AEP	17STILL WELL-05DUMO NT 345 kV line	255 113	243 219	1	DC	136.19	137.72	NR	1409	20.46	2
4	LFFB	COMED_P4_023-65-BT4-5__	MISO NIPS - AEP	17STILL WELL-05DUMO NT 345 kV line	255 113	243 219	1	DC	134	135.35	ER	1409	20.46	
5	Non	Non	CE - AEP	WILTON ; - 05DUMO NT 765 kV line	270 644	243 206	1	AC	164.86	169.57	NR	3555	39.32	3

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
6	DCTL	COMED_P7_345-L94507_B-S+_345-L97008_R-S	CE - AEP	WILTON ;- 05DUMO NT 765 kV line	270 644	243 206	1	DC	116.22	117.29	ER	4105	45.67	
7	DCTL	COMED_P7_641	CE - AEP	WILTON ;- 05DUMO NT 765 kV line	270 644	243 206	1	DC	109.56	110.6	ER	4105	44.53	
8	N-1	COMED_P1-2_345-L94507_B-S	CE - AEP	WILTON ;- 05DUMO NT 765 kV line	270 644	243 206	1	DC	104.84	105.83	NR	4105	41.93	
9		COMED_P1-2_345-L6608__R-S	CE - AEP	WILTON ;- 05DUMO NT 765 kV line	270 644	243 206	1	DC	101.99	102.98	NR	4105	42.34	
10	LFFB	COMED_P4_023-65-BT2-3__	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	DC	132.98	134.46	LDR	1399	17.89	4
11	LFFB	COMED_P4_112-65-BT4-5__	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	DC	132.55	134.02	LDR	1399	17.85	
12	LFFB	COMED_P4_112-65-BT3-4__	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	DC	132.53	134	LDR	1399	17.85	
13	LFFB	COMED_P4_023-65-BT4-5__	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	DC	132.44	133.91	LDR	1399	17.83	
14	N-1	COMED_P1-2_695_B2	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	DC	132.41	133.77	ER	1399	17.83	

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
15	Non	Non	CE - CE	E FRANKF O; B- CRETE EC ;BP 345 kV line	270 728	274 750	1	AC	111.34	112.66	NR	1091	11.35	
16	N-1	COMED_P1-2_695_B2	CE - AEP	GREENA CRE; T-05OLIVE 345 kV line	270 771	243 229	1	DC	118.86	120.27	NR	971	11.53	5
17	LFFB	COMED_P4_023-65-BT4-5__	CE - AEP	GREENA CRE; T-05OLIVE 345 kV line	270 771	243 229	1	AC	105.36	106.37	ER	971	11.53	
18	LFFB	COMED_P4_112-65-BT5-6__	CE - CE	WILTON ; B- WILTON ;3M 345 kV line	270 926	275 232	1	DC	157.23	158.6	LDR	1379	21.34	6
19	LFFB	COMED_P4_112-65-BT2-3__	CE - CE	WILTON ; R- WILTON ;4M 345 kV line	270 927	275 233	1	DC	161.34	162.79	LDR	1379	21.79	7
20	N-1	COMED_P1-2_765-L11216__S	CE - CE	WILTON ; R- WILTON ;4M 345 kV line	270 927	275 233	1	DC	101.13	102.33	ER	1379	14.07	
21	N-1	COMED_P1-2_695_B2	CE - MISO NIPS	CRETE EC ;BP-17STJOH N 345 kV line	274 750	255 112	1	DC	155.77	156.92	ER	1557	17.83	8
22	LFFB	COMED_P4_023-65-BT2-3__	CE - MISO NIPS	CRETE EC ;BP-17STJOH N 345 kV line	274 750	255 112	1	DC	152.53	153.52	ER	1557	17.89	
23	LFFB	COMED_P4_112-65-BT4-5__	CE - MISO NIPS	CRETE EC ;BP-17STJOH N 345 kV line	274 750	255 112	1	DC	152.15	153.13	ER	1557	17.85	
24	N-1	COMED_P1-2_695_B2	CE - AEP	UNIV PK N;RP-05OLIVE 345 kV line	274 804	243 229	1	DC	139.16	140.81	NR	971	14.09	9

ID	Type	CONT NAME	Affected Area	Facility Description	From BUS#	TO BUS#	CKT ID	AC DC	PRE PROJECT LOADING %	POST PROJECT LOADING %	Rating Type	Rating MVA	MW IMPACT	Flowgate Appendix
25	LFFB	COMED_P4_112-65-BT4-5__	CE - AEP	UNIV PK N;RP-05OLIVE 345 kV line	274 804	243 229	1	AC	126.61	128.09	ER	971	14.1	
26	LFFB	COMED_P4_112-65-BT3-4__	CE - AEP	UNIV PK N;RP-05OLIVE 345 kV line	274 804	243 229	1	AC	126.61	128.09	ER	971	14.1	
27	LFFB	COMED_P4_112-65-BT5-6__	CE - CE	WILTON ; 765/345 kV transformer	275 232	270 644	1	DC	155.57	157.41	LDR	1379	21.34	10
38	LFFB	COMED_P4_112-65-BT2-3__	CE - CE	WILTON ; 765/345 kV transformer	275 233	270 644	1	DC	159.8	161.67	LDR	1379	21.79	11

12.4 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.

Not Applicable

12.5 System Reinforcements

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number												
05ALLEN-05RPMONE 345 kV Ckt. 1	Project ID: N6740.1 Description: A sag study will be required on ACSR/PE~ 1275 ~ 54/19, conductor section 3, 12.25 miles of line. Cost of sag study is \$49 K. New SE rating of conductor section 3 after sag study: 1301 MVA SE. New expected SE rating of line to be 971 MVA. If the sag study concludes a complete Rebuild/Reconductor is required, the estimated cost is \$24.5 million. Type: FAC Cost: \$49,000 Time Estimate: N/A Ratings: 971/1301 MVA SE (see description) Notes: Since the cost of this upgrade is less than \$5M, based on PJM cost allocation criteria, AF1-296 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.) AF1-296 could receive cost allocation. Although AF1-296 may not presently have cost responsibility for this upgrade, AF1-296 may need this upgrade in-service to be deliverable to the PJM system. If AF1-296 comes into service prior to completion of the upgrade, AF1-296 will need an interim study.	\$24,549,000	\$3,910,000	N6740.1												
	Project ID: N6740.2 Description: Rebuild/Reconductor the ACSR/PE~ 1275 ~ 54/19, 12.25 miles conductor section 3. Cost estimate is \$24.5 M. Time estimate is 24-36 months. New expected SE rating is 1375 MVA SE. Type: FAC Cost: \$24,500,000 Time Estimate: 24-36 Months Ratings: 1375 MVA SE <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$24.5M)</th></tr><tr><td>AF1-200</td><td>121.4</td><td>82.92%</td><td>20.316</td></tr><tr><td>AF1-202</td><td>13.8</td><td>9.43%</td><td>2.309</td></tr><tr><td>AF1-296</td><td>11.2</td><td>7.65%</td><td>1.874</td></tr></table>				Queue	MW Contribution	Cost %	Cost (\$24.5M)	AF1-200	121.4	82.92%	20.316	AF1-202	13.8	9.43%	2.309
Queue	MW Contribution	Cost %	Cost (\$24.5M)													
AF1-200	121.4	82.92%	20.316													
AF1-202	13.8	9.43%	2.309													
AF1-296	11.2	7.65%	1.874													

17STILLWELL- 05DUMONT 345 kV Ckt. 1	Project ID: N4058 Description: Sag mitigation work will include the replacement of tower 20 with a custom steel pole, replacement of tower 24 with a custom H-frame and the removal of swing angle brackets on 2 structures, the estimated cost is \$1.613 million. New SE rating: 1718 MVA. Type: FAC Cost: \$1,613,000 Time Estimate: N/A Ratings: 1718 MVA SE Project ID: N4790 Description: Upgrade Dumont 2500A wave trap. New AEP-end ratings: 1740/1790 MVA (SN/SE) Cost - \$200K. Type: FAC Cost: \$200,000 Time Estimate: N/A Ratings: New AEP-end ratings: 1740/1790 MVA (SN/SE) Project ID: N5769.1 Description: An Engineering study will need to be conducted to determine if the Dumont CT Thermal Limit settings can be adjusted to mitigate the overload. Estimated Cost: \$25,000. New relay package will be required if the settings cannot be adjusted (Estimated Cost: \$600,000). New AEP ratings: 1409/1868 MVA SN/SE. Type: FAC Cost: \$600,000 Time Estimate: N/A Ratings: 1409/1868 MVA SN/SE Notes: Since the cost of all three above upgrades is less than \$5M, based on PJM cost allocation criteria, AF1-296 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.) AF1-296 could receive cost allocation. Although AF1-296 may not presently have cost responsibility for this upgrade, AF1-296 may need this upgrade in-service to be deliverable to the PJM system. If AF1-296 comes into service prior to completion of the upgrade, AF1-296 will need an interim study. Project ID: N5769.2 Description: Replace two Dumont 3000A Non-Oil breakers. Estimated cost: \$2.0 M. Type: FAC Cost: \$2,000,000 Time Estimate: N/A Ratings: New AEP ratings: 1409/1888 MVA SN/SE <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$2M)</th></tr><tr><td>AF1-200</td><td>241.8</td><td>92.20 %</td><td>\$1.8440</td></tr><tr><td>AF1-296</td><td>20.5</td><td>7.80%</td><td>\$0.1560</td></tr></table>	Queue	MW Contribution	Cost %	Cost (\$2M)	AF1-200	241.8	92.20 %	\$1.8440	AF1-296	20.5	7.80%	\$0.1560	\$2,413,000	\$0	N4058 N4790 N5769.1 N5769.2 N5769.4
	Queue	MW Contribution	Cost %	Cost (\$2M)												
	AF1-200	241.8	92.20 %	\$1.8440												
	AF1-296	20.5	7.80%	\$0.1560												

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number												
	Project ID: N5769.4 Description: The existing 2-954 45/7 (Rail) ACSR has SN/SE ratings of 1409/1888 MVA if no clearance issues are identified. This conductor is the maximum the present structure class was intended to carry. It may be possible to install larger or higher-tensioned conductor without rebuilding the entire line, but detailed mechanical loading analysis will be required to determine if (or how many of) the existing structures could be re-used. Cost estimate is \$17.2 M assuming a complete wreck and rebuild of the AEP owned portion of the line. Using 2-954 ACSS, the new conductor rating will be 2650 MVA for both SN and SE. New overall AEP end line ratings after upgrade: S/N: 1740 MVA S/E: 2034 MVA. 24-36 months. Type: FAC Cost: \$17,200,000 Time Estimate: N/A Ratings: 1740/2034 MVA SN/SE <table><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$17.2M)</th></tr><tr><td>AF1-200</td><td>241.8</td><td>92.20 %</td><td>\$15.86</td></tr><tr><td>AF1-296</td><td>20.5</td><td>7.80%</td><td>\$1.34</td></tr></table>	Queue	MW Contribution	Cost %	Cost (\$17.2M)	AF1-200	241.8	92.20 %	\$15.86	AF1-296	20.5	7.80%	\$1.34			
Queue	MW Contribution	Cost %	Cost (\$17.2M)													
AF1-200	241.8	92.20 %	\$15.86													
AF1-296	20.5	7.80%	\$1.34													

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number												
WILTON ;- 05DUMONT 765 kV Ckt. 1	Project ID: N6860 Description: Relay group review of the 765kV Bus Tie 3-4 Circuit Breaker Current Transformer settings. A possible upgrade of the relay scheme may be required. Cost: \$1,000,000. Time Estimate: 18 Months. Upon completion of this upgrade the ratings will be 4142/4460/5331/6368 MVA (SN/SLTE/SSTE/SLD) Type: FAC Cost: \$1,000,000 Time Estimate: 18 Months Ratings: 4142/4460/5331/6368 MVA (SN/SLTE/SSTE/SLD) <table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$1M)</th></tr><tr><td>AF1-200</td><td>579.2</td><td>92.69 %</td><td>0.9269</td></tr><tr><td>AF1-296</td><td>45.7</td><td>7.31%</td><td>0.0731</td></tr></table>	Queue	MW contribution	Cost %	Cost (\$1M)	AF1-200	579.2	92.69 %	0.9269	AF1-296	45.7	7.31%	0.0731	\$3,000,000	\$731,219	N6860 N6600
	Queue	MW contribution	Cost %	Cost (\$1M)												
AF1-200	579.2	92.69 %	0.9269													
AF1-296	45.7	7.31%	0.0731													
Project ID: N6600 Description: Replace Dumont Circuit Breaker B1 [Breaker (3000A) Non-oil - Dumont]. \$3M. (18 months). New SE rating to be 5001 MVA. Type: FAC Cost: \$3,000,000 Time Estimate: 18 Months Ratings: 5001 MVA SE <table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$3M)</th></tr><tr><td>AF1-200</td><td>579.2</td><td>92.69 %</td><td>2.781</td></tr><tr><td>AF1-296</td><td>45.7</td><td>7.31%</td><td>0.2191</td></tr></table> Note: Non contingent overload may be attributed to voltage collapse, further analysis required during Facility Study.	Queue	MW contribution	Cost %	Cost (\$3M)	AF1-200	579.2	92.69 %	2.781	AF1-296	45.7	7.31%	0.2191				
Queue	MW contribution	Cost %	Cost (\$3M)													
AF1-200	579.2	92.69 %	2.781													
AF1-296	45.7	7.31%	0.2191													

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number																				
E FRANKFO; B-CRETE EC ;BP 345 kV Ckt. 1	Project ID: N5917 Description: Reconductor the line at a preliminary estimate of \$13.8M with a preliminary construction timeline of 24-30 months. Upon completion of the upgrades the rating swill be 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD). Type: FAC Cost: \$13,800,000 Time Estimate: 24-30 Months Ratings: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD)	\$19,000,000	\$1,011,000	N5917 N7960																				
	<table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$13.8M)</th></tr><tr><td>AE1-198</td><td>27.00</td><td>7.74%</td><td>1.068</td></tr><tr><td>J974</td><td>16.30</td><td>4.67%</td><td>0.645</td></tr><tr><td>AF1-200</td><td>287.78</td><td>82.47 %</td><td>11.380</td></tr><tr><td>AF1-296</td><td>17.89</td><td>5.13%</td><td>0.707</td></tr></table>				Queue	MW contribution	Cost %	Cost (\$13.8M)	AE1-198	27.00	7.74%	1.068	J974	16.30	4.67%	0.645	AF1-200	287.78	82.47 %	11.380	AF1-296	17.89	5.13%	0.707
	Queue				MW contribution	Cost %	Cost (\$13.8M)																	
	AE1-198				27.00	7.74%	1.068																	
	J974				16.30	4.67%	0.645																	
	AF1-200				287.78	82.47 %	11.380																	
	AF1-296				17.89	5.13%	0.707																	
	Project ID: N7960 Description Replace 1-345kV Circuit Breaker, station conductor at both terminals. A preliminary estimate for the upgrade is \$5.2M. A preliminary construction timeline is 30 months. Upon completion of the upgrade the ratings will be 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD). Type: FAC Cost: \$5,200,000 Time Estimate: 30 Months Ratings: 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD).																							
	<table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$5.2M)</th></tr><tr><td>AF1-200</td><td>287.8</td><td>94.15%</td><td>4.896</td></tr><tr><td>AF1-296</td><td>17.89</td><td>5.85%</td><td>0.304</td></tr></table>				Queue	MW contribution	Cost %	Cost (\$5.2M)	AF1-200	287.8	94.15%	4.896	AF1-296	17.89	5.85%	0.304								
	Queue				MW contribution	Cost %	Cost (\$5.2M)																	
AF1-200	287.8	94.15%	4.896																					
AF1-296	17.89	5.85%	0.304																					

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number																
GREENACRE; T-05OLIVE 345 kV Ckt. 1	Project ID: N6288 Description A preliminary estimate for sag mitigation is \$13.9M with an estimated construction timeline of 30 months. New ratings will be 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD) Type: FAC Cost: \$13,900,000 Time Estimate: 30 Months Ratings: 1091/1399/1483/1674 MVA (SN/SLTE/SSTE/SLD) <table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$5.2M)</th></tr><tr><td>J1058</td><td>29.02</td><td>16.31 %</td><td>2.27</td></tr><tr><td>AF1-200</td><td>137.35</td><td>77.21 %</td><td>10.73</td></tr><tr><td>AF1-296</td><td>11.53</td><td>6.48%</td><td>0.90</td></tr></table>	Queue	MW contribution	Cost %	Cost (\$5.2M)	J1058	29.02	16.31 %	2.27	AF1-200	137.35	77.21 %	10.73	AF1-296	11.53	6.48%	0.90	\$14,062,560	\$900,000	N6288 N5913
	Queue	MW contribution	Cost %	Cost (\$5.2M)																
J1058	29.02	16.31 %	2.27																	
AF1-200	137.35	77.21 %	10.73																	
AF1-296	11.53	6.48%	0.90																	
Project ID: N5913 Description Upgrade is a sag study will be required for the entire 40.64 miles of ACSR/PE ~ 1414 ~ 62/19 Conductor section 1 to determine if the line can be operated above its emergency rating 971 MVA. Estimated study cost: \$162,560. If deemed necessary to rebuild the entire 40.64 miles of the section of the line, Estimated Cost: \$81,280,000. New expected SE rating is 1318 MVA. Type: FAC Cost: \$162,560 Time Estimate: 30 Months Ratings: 1318 MVA SE Notes: Since the cost of this upgrade is less than \$5M, based on PJM cost allocation criteria, AF1-296 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.) AF1-296 could receive cost allocation. Although AF1-296 may not presently have cost responsibility for this upgrade, Queue Project AF1-296 may need this upgrade in-service to be deliverable to the PJM system. If AF1-296 comes into service prior to completion of the upgrade, AF1-296 will need an interim study.																				

WILTON ; B- WILTON ;3M 345 kV Ckt. 1 & WILTON ; R- WILTON ;4M 345 kV Ckt. 1 & WILTON ; 765/345 kV Xfrmr Ckt. 1	Project ID: n5145 Description: Build out the Wilton 765kV bus thereby allowing for 765kV L11216 (currently on Bus 6) to be relocated to Bus 8. Along with this line relocation, installation of 2-765kV BT CB's (6-8 & 8-2). Type: CON Cost: \$12,000,000 Time Estimate: 40 Months Ratings: N/A																																																																																																															
	<table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$12M)</th></tr><tr><td>AD1-100</td><td>116.8</td><td>9.72%</td><td>\$1.167</td></tr><tr><td>AD2-047</td><td>26.4</td><td>2.20%</td><td>\$0.264</td></tr><tr><td>AD2-066</td><td>17.7</td><td>1.47%</td><td>\$0.177</td></tr><tr><td>AD2-102</td><td>29.7</td><td>2.47%</td><td>\$0.296</td></tr><tr><td>AD2-134</td><td>16.2</td><td>1.35%</td><td>\$0.162</td></tr><tr><td>AD2-159</td><td>16.6</td><td>1.38%</td><td>\$0.166</td></tr><tr><td>AD2-194</td><td>19.6</td><td>1.63%</td><td>\$0.196</td></tr><tr><td>AE1-113</td><td>45.7</td><td>3.80%</td><td>\$0.456</td></tr><tr><td>AE1-114</td><td>21.8</td><td>1.81%</td><td>\$0.218</td></tr><tr><td>AE1-163</td><td>53.1</td><td>4.42%</td><td>\$0.530</td></tr><tr><td>AE1-166</td><td>28.6</td><td>2.38%</td><td>\$0.286</td></tr><tr><td>AE1-172</td><td>47.1</td><td>3.92%</td><td>\$0.470</td></tr><tr><td>AE1-193</td><td>45.8</td><td>3.81%</td><td>\$0.458</td></tr><tr><td>AE1-194</td><td>45.8</td><td>3.81%</td><td>\$0.458</td></tr><tr><td>AE1-195</td><td>45.8</td><td>3.81%</td><td>\$0.458</td></tr><tr><td>AE1-205</td><td>30.4</td><td>2.53%</td><td>\$0.303</td></tr><tr><td>AE1-252</td><td>27.0</td><td>2.25%</td><td>\$0.270</td></tr><tr><td>AE2-107</td><td>15.2</td><td>1.26%</td><td>\$0.151</td></tr><tr><td>AE2-152</td><td>28.5</td><td>2.37%</td><td>\$0.284</td></tr><tr><td>AE2-153</td><td>35.1</td><td>2.92%</td><td>\$0.351</td></tr><tr><td>AE2-223</td><td>22.6</td><td>1.88%</td><td>\$0.226</td></tr><tr><td>AE2-255</td><td>15.1</td><td>1.26%</td><td>\$0.151</td></tr><tr><td>AE2-321</td><td>15.2</td><td>1.27%</td><td>\$0.152</td></tr><tr><td>AE2-341</td><td>23.8</td><td>1.98%</td><td>\$0.237</td></tr><tr><td>J974</td><td>17.9</td><td>1.49%</td><td>\$0.179</td></tr><tr><td>AF1-030</td><td>15.8</td><td>1.31%</td><td>\$0.158</td></tr></table>	Queue	MW contribution	Cost %	Cost (\$12M)	AD1-100	116.8	9.72%	\$1.167	AD2-047	26.4	2.20%	\$0.264	AD2-066	17.7	1.47%	\$0.177	AD2-102	29.7	2.47%	\$0.296	AD2-134	16.2	1.35%	\$0.162	AD2-159	16.6	1.38%	\$0.166	AD2-194	19.6	1.63%	\$0.196	AE1-113	45.7	3.80%	\$0.456	AE1-114	21.8	1.81%	\$0.218	AE1-163	53.1	4.42%	\$0.530	AE1-166	28.6	2.38%	\$0.286	AE1-172	47.1	3.92%	\$0.470	AE1-193	45.8	3.81%	\$0.458	AE1-194	45.8	3.81%	\$0.458	AE1-195	45.8	3.81%	\$0.458	AE1-205	30.4	2.53%	\$0.303	AE1-252	27.0	2.25%	\$0.270	AE2-107	15.2	1.26%	\$0.151	AE2-152	28.5	2.37%	\$0.284	AE2-153	35.1	2.92%	\$0.351	AE2-223	22.6	1.88%	\$0.226	AE2-255	15.1	1.26%	\$0.151	AE2-321	15.2	1.27%	\$0.152	AE2-341	23.8	1.98%	\$0.237	J974	17.9	1.49%	\$0.179	AF1-030	15.8	1.31%	\$0.158	\$12,000,000	\$218,000	N5145
	Queue	MW contribution	Cost %	Cost (\$12M)																																																																																																												
	AD1-100	116.8	9.72%	\$1.167																																																																																																												
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	AD2-194	19.6	1.63%	\$0.196																																																																																																												
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	AE2-107	15.2	1.26%	\$0.151																																																																																																												
	AE2-152	28.5	2.37%	\$0.284																																																																																																												
	AE2-153	35.1	2.92%	\$0.351																																																																																																												
	AE2-223	22.6	1.88%	\$0.226																																																																																																												
	AE2-255	15.1	1.26%	\$0.151																																																																																																												
	AE2-321	15.2	1.27%	\$0.152																																																																																																												
	AE2-341	23.8	1.98%	\$0.237																																																																																																												
	J974	17.9	1.49%	\$0.179																																																																																																												
AF1-030	15.8	1.31%	\$0.158																																																																																																													

Facility	Upgrade Description				Cost	Cost Allocated to AG1-296	Upgrade Number
	AF1-156	26.2	2.18%	\$0.262			
	AF1-200	330.2	27.48%	\$3.297			
	AF1-296	21.8	1.81%	\$0.218			

Crete – St John 345 kV Ckt 1	ComEd Reinforcement: Project ID: n5253 Description: The upgrade will be to Reconductor the line. A preliminary estimate for this upgrade is \$14.9M with a preliminary construction timeline of 30-36 months. The estimate provided does not consider potential tower upgrades. This cost component will be determined during the Facilities Study phase. Upon completion of this upgrade, the new will be a minimum of 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD). Type: FAC Cost: \$14,900,000 Time Estimate: 30-36 Months Ratings: 1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD) <table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$14.9M)</th></tr><tr><td>AE1-193</td><td>251.82</td><td>18.77%</td><td>\$2.7961</td></tr><tr><td>AE1-194</td><td>251.82</td><td>18.77%</td><td>\$2.7961</td></tr><tr><td>AE1-195</td><td>249.95</td><td>18.63%</td><td>\$2.7753</td></tr><tr><td>AE1-198</td><td>178.46</td><td>13.30%</td><td>\$1.9815</td></tr><tr><td>AE1-252</td><td>17.69</td><td>1.32%</td><td>\$0.1964</td></tr><tr><td>J974</td><td>16.24</td><td>1.21%</td><td>\$0.1803</td></tr><tr><td>AE2-152</td><td>20.40</td><td>1.52%</td><td>\$0.2265</td></tr><tr><td>AE2-153</td><td>27.51</td><td>2.05%</td><td>\$0.3055</td></tr><tr><td>AE2-341</td><td>19.64</td><td>1.46%</td><td>\$0.2181</td></tr><tr><td>AF1-156</td><td>20.48</td><td>1.53%</td><td>\$0.2274</td></tr><tr><td>AF1-200</td><td>270.09</td><td>20.13%</td><td>\$2.9989</td></tr><tr><td>AF1-296</td><td>17.83</td><td>1.33%</td><td>\$0.1980</td></tr></table> Project ID: n6629 Description: Replace a 345kV circuit breaker and associated equipment at Crete. A preliminary estimate for this upgrade is \$6.0 M with a preliminary construction timeline of 30 month. Upon completion of this upgrade the new ratings will be 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD). Type: FAC Cost: \$6,000,000 Time Estimate: 30 Months Ratings: 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD) Notes: This facility was purchased and is now owned by NEXTERA. NEXTERA will evaluate this violation in the Facility Study phase. <table><tr><th>Queue</th><th>MW contribution</th><th>Cost %</th><th>Cost (\$6M)</th></tr><tr><td>AE1-195</td><td>248.03</td><td>29.66%</td><td>\$1.779</td></tr><tr><td>AE1-198</td><td>178.46</td><td>21.34%</td><td>\$1.280</td></tr></table>	Queue	MW contribution	Cost %	Cost (\$14.9M)	AE1-193	251.82	18.77%	\$2.7961	AE1-194	251.82	18.77%	\$2.7961	AE1-195	249.95	18.63%	\$2.7753	AE1-198	178.46	13.30%	\$1.9815	AE1-252	17.69	1.32%	\$0.1964	J974	16.24	1.21%	\$0.1803	AE2-152	20.40	1.52%	\$0.2265	AE2-153	27.51	2.05%	\$0.3055	AE2-341	19.64	1.46%	\$0.2181	AF1-156	20.48	1.53%	\$0.2274	AF1-200	270.09	20.13%	\$2.9989	AF1-296	17.83	1.33%	\$0.1980	Queue	MW contribution	Cost %	Cost (\$6M)	AE1-195	248.03	29.66%	\$1.779	AE1-198	178.46	21.34%	\$1.280	\$29,900,000	\$326,000	N5253 N6629 N6629.1
	Queue	MW contribution	Cost %	Cost (\$14.9M)																																																																
AE1-193	251.82	18.77%	\$2.7961																																																																	
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AE2-153	27.51	2.05%	\$0.3055																																																																	
AE2-341	19.64	1.46%	\$0.2181																																																																	
AF1-156	20.48	1.53%	\$0.2274																																																																	
AF1-200	270.09	20.13%	\$2.9989																																																																	
AF1-296	17.83	1.33%	\$0.1980																																																																	
Queue	MW contribution	Cost %	Cost (\$6M)																																																																	
AE1-195	248.03	29.66%	\$1.779																																																																	
AE1-198	178.46	21.34%	\$1.280																																																																	

AE1-252	17.69	2.12%	\$0.127
J974	16.24	1.94%	\$0.117
AE2-152	20.40	2.44%	\$0.146
AE2-153	27.51	3.29%	\$0.197
AE2-341	19.64	2.35%	\$0.141
AF1-156	20.48	2.45%	\$0.147
AF1-200	270.09	32.29%	\$1.938
AF1-296	17.83	2.13%	\$0.128

Project ID: n6629.1

Description: Replacing 2-345kV circuit breakers. A preliminary estimate for this additional upgrade is \$6M. The construction timeline of 24 months will be absorbed by the prior construction timeline of 30 months. Upon completion the ratings will be 2033/2348/2714/3229 MVA (SN/SLTE/SSTE/SLD).

Type: FAC

Cost: \$6,000,000

Time Estimate: 24-30 Months

Ratings: 2033/2348/2714/3229 MVA (SN/SLTE/SSTE/SLD)

Queue	MW contribution	Cost %	Cost (\$6M)
AE1-195	48.56	10.25%	0.62
AE1-198	177.82	37.54%	2.25
AE1-252	17.51	3.80%	0.23
AF1-200	212	46.04%	2.76
AF1-296	17.83	3.87%	0.23

MISO Reinforcement:

Project ID: Reinforcement #1

Description: MISO-End upgrade: Upgrade St John substation conductor drop and switch (\$1M).
New MISO end SE rating will be 1900 MVA.

Type: FAC

Cost: \$1,000,000

Time Estimate: N/A

Ratings: 1900 MVA (SE)

Project ID: Reinforcement #2

Description: Additional MISO-end upgrades (if needed): Upgrade switch to 4000 A and upgrade substation conductor drop to bundled 1590 AL (\$2M)

New MISO-end ratings to be 1961/2390 MVA SN/SE.

Type: FAC

Cost: \$2,000,000

Time Estimate: N/A

Ratings: 1961/2390 MVA SN/SE

Notes:

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number																				
	Per PJM cost allocation rules, both MISO reinforcement cost is driven by previous AE1 queue. AF1-296 presently does not receive cost allocation for this MISO upgrade. This may change with future re-tools as projects withdraw.																							
UNIV PK N;RP-05OLIVE 345 kV Ckt. 1	<u>AEP Upgrade:</u> <u>Project ID:</u> n4057 <u>Description:</u> To increase SE rating: AEP: a sag check will be required for the ACSR/PE ~ 1414 ~ 62/19 ~ Conductor Section 1 to determine if the line section can be operated above its emergency rating of 971 MVA. The results could prove that no additional upgrades are necessary, that some upgrades on the circuit are necessary, or that the entire 40.61 mile section of line would need to be rebuilt. <u>Estimated Cost:</u> \$162,440 (2016 dollars). If deemed necessary to rebuild the entire 40.61 miles of the section of the line, Estimated Cost: \$81,220,000. Schedule: (1) Sag Study: 6 to 12 months. (2) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. <u>Type:</u> FAC <u>Cost:</u> \$162,440 <u>Time Estimate:</u> 6-12 / 24-36 Months <u>Ratings:</u> 971/1304 MVA SN/SE	\$5,337,440	\$422,000	N4057 N6690 N6281																				
	<u>Project ID:</u> n6690 <u>Description:</u> Replace 5 Jumpers (Substation conductor 2156 ACSR 84/19 STD at Olive station), Estimated cost: \$175,000 <u>Type:</u> FAC <u>Cost:</u> \$175,000 <u>Notes:</u> Since the cost of the two AEP upgrades is less than \$5M, based on PJM cost allocation criteria, AF1-296 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.) AF1-296 could receive cost allocation. Although AF1-296 may not presently have cost responsibility for this upgrade, AF1-296 may need this upgrade in-service to be deliverable to the PJM system. If AF1-296 comes into service prior to completion of the upgrade, AF1-296 will need an interim study.																							
	<u>Project ID:</u> n6281 <u>Description:</u> ComEd upgrade is to mitigate sag on line. Preliminary estimate is \$5M with an estimated constructed timeline of 24 months. Upon completion of the work the line ratings will be: 1334/1334/1391/1532 MVA (SN/SLTE/SSTE/SLD). <u>Type:</u> FAC <u>Cost:</u> \$5,000,000																							
	<table><thead><tr><th>Queue</th><th>MW Contribution</th><th>Cost %</th><th>Cost (\$5M)</th></tr></thead><tbody><tr><td>AE2-153</td><td>0.12</td><td>0.07%</td><td>0.004</td></tr><tr><td>AE2-341</td><td>15.42</td><td>9.23%</td><td>0.462</td></tr><tr><td>AF1-200</td><td>137.35</td><td>82.26%</td><td>4.113</td></tr><tr><td>AF1-296</td><td>14.09</td><td>8.44%</td><td>0.422</td></tr></tbody></table>				Queue	MW Contribution	Cost %	Cost (\$5M)	AE2-153	0.12	0.07%	0.004	AE2-341	15.42	9.23%	0.462	AF1-200	137.35	82.26%	4.113	AF1-296	14.09	8.44%	0.422
	Queue				MW Contribution	Cost %	Cost (\$5M)																	
AE2-153	0.12	0.07%	0.004																					
AE2-341	15.42	9.23%	0.462																					
AF1-200	137.35	82.26%	4.113																					
AF1-296	14.09	8.44%	0.422																					

Facility	Upgrade Description	Cost	Cost Allocated to AG1-296	Upgrade Number
	Total Cost	\$110,262,000	\$7,518,219	

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.

12.6 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".

12.6.1 Index 1

(AEP - AEP) The 05ALLEN-05RPMONE 345 kV line (from bus 243211 to bus 242933 ckt 1) loads from 143.06% to 144.44% (**DC power flow**) of its normal rating (897 MVA) for the single line contingency outage of 'AEP_P1-2_#7441'. This project contributes approximately 11.2 MW to the thermal violation.

CONTINGENCY 'AEP_P1-2_#7441'

OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS
765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
247536	05BLUFF P WF	0.63
243859	05FR-11G C	0.53
243862	05FR-12G C	0.52
247901	05FR-12G E	2.08
243864	05FR-21G C	0.56
247902	05FR-21G E	2.22
243866	05FR-22G C	0.53
243870	05FR-3G C	1.08
247904	05FR-3G E	4.3
243873	05FR-4G C	0.83
247905	05FR-4G E	3.37
243795	05HDWTR1G C	0.66
247963	05HDWTR1G E	4.4
246909	05MDL-1G C	1.12
247906	05MDL-1G E	4.49
246910	05MDL-2G C	0.56
247907	05MDL-2G E	2.25
246976	05MDL-3G C	0.57
247912	05MDL-3G E	2.25
246979	05MDL-4G C	0.55
247913	05MDL-4G E	2.25
246953	05TIMB G C	1.11
247911	05TIMB G E	4.46
246991	05WLD G1 C	0.34
247255	05WLD G2 C	0.36
247958	05WLD G2 E	4.7
933281	AC2-140 C	3.14
933282	AC2-140 E	0.17
933591	AC2-176 C 01	0.25
933592	AC2-176 E 01	3.23
934431	AD1-067 C	0.06
934432	AD1-067 E	0.26
934721	AD1-100 C	8.9

934722	AD1-100 E	41.51
935141	AD1-148	2.43
936291	AD2-038 C 01	1.5
936292	AD2-038 E 01	7.02
936371	AD2-047 C 01	2.04
936372	AD2-047 E 01	9.95
936722	AD2-091 BAT	6.78
936752	AD2-096 BAT	3.1
936971	AD2-131 C	0.48
936972	AD2-131 E	2.43
937001	AD2-134 C	1.23
937002	AD2-134 E	4.91
937211	AD2-159 C	1.65
937212	AD2-159 E	7.73
938851	AE1-113 C	3.76
938852	AE1-113 E	13.33
938861	AE1-114 C 01	1.89
938862	AE1-114 E 01	6.43
939321	AE1-163 C 01	2.78
939322	AE1-163 E 01	17.09
939401	AE1-172 C 01	2.56
939402	AE1-172 E 01	12.
939631	AE1-193 C	4.03
939632	AE1-193 E	26.98
939641	AE1-194 C	4.03
939642	AE1-194 E	26.98
939651	AE1-195 C	4.03
939652	AE1-195 E	26.98
939681	AE1-198 C	< 0.01
939682	AE1-198 E	6.9
939781	AE1-209 C 01	0.75
939782	AE1-209 E 01	5.02
939791	AE1-210 C 01	0.75
939792	AE1-210 E 01	5.02
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	10.7
940752	AE2-062 E	0.07
941561	AE2-153 C 01	2.11
941562	AE2-153 E 01	9.86
941571	AE2-154 C	1.83
941572	AE2-154 E	12.24
941691	AE2-169	2.63
941721	AE2-172	2.9
941731	AE2-173 01	3.41
942042	AE2-216 BAT	7.46
942111	AE2-223 C	1.07
942112	AE2-223 E	7.13
942421	AE2-255 C 01	1.42

942422	AE2-255 E 01	4.27
942651	AE2-281 C 01	0.4
942652	AE2-281 E 01	2.44
943021	AE2-325 C	2.65
943022	AE2-325 E	1.76
943781	AF1-046 C	3.46
943782	AF1-046 E	2.31
943791	AF1-047 C	1.24
943792	AF1-047 E	0.82
943801	AF1-048 C	2.23
943802	AF1-048 E	1.49
943921	AF1-060	0.72
944221	AF1-090 C 01	1.6
944222	AF1-090 E 01	7.49
944241	AF1-092 C 01	< 0.01
944242	AF1-092 E 01	12.58
944831	AF1-148 C 01	< 0.01
944832	AF1-148 E 01	15.89
944931	AF1-158 C 01	< 0.01
944932	AF1-158 E 01	12.5
944961	AF1-161 C	2.11
944962	AF1-161 E	2.11
945111	AF1-176 C 01	4.36
945112	AF1-176 E 01	6.53
945351	AF1-200 FTIR	121.29
945371	AF1-202 C 01	2.32
945372	AF1-202 E 01	11.34
945391	AF1-204 C 01	2.89
945392	AF1-204 E 01	8.68
945421	AF1-207 C	1.95
945422	AF1-207 E	8.37
945871	AF1-252 01	3.55
945881	AF1-253 01	2.46
946161	AF1-281 C	0.21
946162	AF1-281 E	1.17
946203	AF1-285 BAT	2.49
946321	AF1-296 C 01	1.97
946322	AF1-296 E 01	9.23
946501	AF1-314 C	2.08
946502	AF1-314 E	9.75
946541	AF1-318 C 01	2.89
946542	AF1-318 E 01	13.54
274857	BIG SKY ;U1	0.66
274858	BIG SKY ;U2	0.66
274877	BISHOP HL;1U	0.54
274878	BISHOP HL;2U	0.54
294401	BSHIL;1U E	2.16
294410	BSHIL;2U E	2.16

274848	CAMPGROVE;RU	0.81
274890	CAYUG;1U E	3.37
274891	CAYUG;2U E	3.37
274863	CAYUGA RI;1U	0.84
274864	CAYUGA RI;2U	0.84
274849	CRESCENT;1U	0.26
274859	EASYR;U1 E	2.64
274860	EASYR;U2 E	2.64
274856	ECOGROVE ;U1	0.56
274871	GR RIDGE ;2U	1.12
274847	GR RIDGE ;BU	0.88
274855	GSG-6 ;RU	0.62
290051	GSG-6; E	2.48
275149	KELLYCK ;1E	4.19
274888	KELLYCK ;1U	1.05
990901	L-005 E	3.22
274872	LEE DEKAL;1U	1.37
290108	LEEDK;1U E	5.7
274850	MENDOTA H;RU	0.15
274879	MINONK ;1U	1.14
293061	N-015 E	3.53
293513	O-009 C1	0.56
293514	O-009 C2	0.28
293515	O-009 C3	0.31
293516	O-009 E1	2.23
293517	O-009 E2	1.13
293518	O-009 E3	1.25
276156	O-029 C	0.3
276157	O-029 C	0.33
276158	O-029 C	0.6
293715	O-029 E	2.38
293716	O-029 E	1.31
293717	O-029 E	1.2
293771	O-035 E	1.61
293644	O22 E1	2.36
293645	O22 E2	4.59
290021	O50 E	4.55
294392	P-010 E	4.48
294763	P-046 E	2.23
274881	PILOT HIL;1E	4.19
274887	PILOT HIL;1U	1.05
274851	PROVIDENC;RU	0.4
290261	S-027 E	4.11
290265	S-028 E	4.11
247929	S-071 E	2.52
295110	SUBLETTE C	0.09
247556	T-127 C	0.56
247943	T-127 E	2.25

247521	T-131 C	1.29
247925	T-131 E	5.16
274861	TOP CROP ;1U	0.59
274862	TOP CROP ;2U	1.15
274853	TWINGROVE;U1	1.03
274854	TWINGROVE;U2	1.03
247543	V3-007 C	0.66
274882	W4-005 E	5.66
295108	WESTBROOK C	0.2
917501	Z2-087 C	0.71
917502	Z2-087 E	4.74
918051	AA1-018 C OP	0.56
930041	AB1-006 C	0.73
930042	AB1-006 E	4.89
924041	AB2-047 C 01	1.78
924042	AB2-047 E 01	11.88
924261	AB2-070 C 01	1.3
924262	AB2-070 E 01	8.71
925301	AB2-191	0.24
925581	AC1-033 C	0.71
925582	AC1-033 E	4.74
925771	AC1-053 C	1.3
925772	AC1-053 E	8.69
926821	AC1-168 C 01	0.56
926822	AC1-168 E 01	3.79
926841	AC1-171 C 01	0.55
926842	AC1-171 E 01	3.65
926861	AC1-173 C	0.43
926862	AC1-173 E	2.9
927201	AC1-214 C 01	1.03
927202	AC1-214 E 01	3.28

12.6.2 Index 2

MISO NIPS - AEP) The 17STILLWELL-05DUMONT 345 kV line (from bus 255113 to bus 243219 ckt 1) loads from 136.19% to 137.72% (**DC power flow**) of its normal rating (1409 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 20.46 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO;
765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
-------------------	-----------------	--------------------------

934431	AD1-067 C	0.12
934432	AD1-067 E	0.51
934721	AD1-100 C	18.
934722	AD1-100 E	83.98
935141	AD1-148	3.42
936291	AD2-038 C 01	2.9
936292	AD2-038 E 01	13.59
936371	AD2-047 C 01	4.36
936372	AD2-047 E 01	21.3
936971	AD2-131 C	0.61
936972	AD2-131 E	3.08
937001	AD2-134 C	2.39
937002	AD2-134 E	9.56
937211	AD2-159 C	2.37
937212	AD2-159 E	11.09
938851	AE1-113 C	7.33
938852	AE1-113 E	25.99
938861	AE1-114 C 01	3.61
938862	AE1-114 E 01	12.3
939321	AE1-163 C 01	5.39
939322	AE1-163 E 01	33.1
939401	AE1-172 C 01	4.84
939402	AE1-172 E 01	22.7
939631	AE1-193 C	8.33
939632	AE1-193 E	55.77
939641	AE1-194 C	8.33
939642	AE1-194 E	55.77
939651	AE1-195 C	8.33
939652	AE1-195 E	55.77
939681	AE1-198 C	< 0.01
939682	AE1-198 E	14.26
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	20.25
940752	AE2-062 E	0.15
941561	AE2-153 C 01	4.37
941562	AE2-153 E 01	20.46
941731	AE2-173 01	5.93
942111	AE2-223 C	1.85
942112	AE2-223 E	12.39
942421	AE2-255 C 01	2.78
942422	AE2-255 E 01	8.33
942651	AE2-281 C 01	0.77
942652	AE2-281 E 01	4.73
943801	AF1-048 C	4.39
943802	AF1-048 E	2.93
943921	AF1-060	1.39
944221	AF1-090 C 01	1.88
944222	AF1-090 E 01	8.82

945351	AF1-200 FTIR	241.81
945871	AF1-252 O1	4.17
945881	AF1-253 O1	2.89
946161	AF1-281 C	0.39
946162	AF1-281 E	2.22
946321	AF1-296 C O1	3.6
946322	AF1-296 E O1	16.86
946501	AF1-314 C	4.01
946502	AF1-314 E	18.79
946541	AF1-318 C O1	5.28
946542	AF1-318 E O1	24.74
274857	BIG SKY ;U1	1.26
274858	BIG SKY ;U2	1.26
274877	BISHOP HL;1U	0.98
274878	BISHOP HL;2U	0.98
294401	BSHIL;1U E	3.92
294410	BSHIL;2U E	3.92
274848	CAMPGROVE;RU	1.45
274890	CAYUG;1U E	6.19
274891	CAYUG;2U E	6.19
274863	CAYUGA RI;1U	1.55
274864	CAYUGA RI;2U	1.55
274849	CRESCENT;1U	0.48
274859	EASYR;U1 E	5.03
274860	EASYR;U2 E	5.03
274856	ECOGROVE ;U1	1.07
274871	GR RIDGE ;2U	2.23
274847	GR RIDGE ;BU	1.76
274855	GSG-6 ;RU	1.21
290051	GSG-6; E	4.82
275149	KELLYCK ;1E	8.97
274888	KELLYCK ;1U	2.24
990901	L-005 E	5.81
274872	LEE DEKAL;1U	2.68
290108	LEEDK;1U E	11.16
274850	MENDOTA H;RU	0.29
274879	MINONK ;1U	2.22
293061	N-015 E	7.03
293513	O-009 C1	1.04
293514	O-009 C2	0.53
293515	O-009 C3	0.58
293516	O-009 E1	4.16
293517	O-009 E2	2.12
293518	O-009 E3	2.33
276156	O-029 C	0.56
276157	O-029 C	0.61
276158	O-029 C	1.11
293715	O-029 E	4.45

293716	O-029 E	2.44
293717	O-029 E	2.24
293771	O-035 E	2.92
293644	O22 E1	4.77
293645	O22 E2	9.26
290021	O50 E	8.87
294392	P-010 E	8.92
294763	P-046 E	4.29
274881	PILOT HIL;1E	8.97
274887	PILOT HIL;1U	2.24
274851	PROVIDENC;RU	0.73
290261	S-027 E	6.45
290265	S-028 E	6.45
295110	SUBLETTE C	0.17
274861	TOP CROP ;1U	1.19
274862	TOP CROP ;2U	2.32
274853	TWINGROVE;U1	1.61
274854	TWINGROVE;U2	1.61
274882	W4-005 E	8.13
295108	WESTBROOK C	0.4
917501	Z2-087 C	1.23
917502	Z2-087 E	8.24
918051	AA1-018 C OP	1.12
924041	AB2-047 C 01	3.09
924042	AB2-047 E 01	20.65
924261	AB2-070 C 01	1.86
924262	AB2-070 E 01	12.44
925301	AB2-191	0.46
925581	AC1-033 C	1.29
925582	AC1-033 E	8.61
925771	AC1-053 C	1.84
925772	AC1-053 E	12.35
926821	AC1-168 C 01	1.05
926822	AC1-168 E 01	7.04
926841	AC1-171 C 01	0.95
926842	AC1-171 E 01	6.35
927201	AC1-214 C 01	1.88
927202	AC1-214 E 01	5.98

12.6.3 Index 3

(CE - AEP) The WILTON ; -05DUMONT 765 kV line (from bus 270644 to bus 243206 ckt 1) loads from 164.86% to 169.57% (AC power flow) of its normal rating (3555 MVA) for non-contingency condition. This project contributes approximately 39.32 MW to the thermal violation.

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.24
934432	AD1-067 E	1.01
934721	AD1-100 C	34.24
934722	AD1-100 E	159.77
935141	AD1-148	6.43
936291	AD2-038 C 01	5.18
936292	AD2-038 E 01	24.25
936371	AD2-047 C 01	7.11
936372	AD2-047 E 01	34.7
936971	AD2-131 C	1.13
936972	AD2-131 E	5.7
937001	AD2-134 C	4.73
937002	AD2-134 E	18.88
937211	AD2-159 C	4.48
937212	AD2-159 E	20.99
938851	AE1-113 C	13.37
938852	AE1-113 E	47.4
938861	AE1-114 C 01	7.
938862	AE1-114 E 01	23.87
939321	AE1-163 C 01	9.62
939322	AE1-163 E 01	59.07
939401	AE1-172 C 01	9.47
939402	AE1-172 E 01	44.45
939631	AE1-193 C	9.36
939632	AE1-193 E	62.66
939641	AE1-194 C	9.36
939642	AE1-194 E	62.66
939651	AE1-195 C	9.36
939652	AE1-195 E	62.66
939681	AE1-198 C	< 0.01
939682	AE1-198 E	16.03
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	39.65
940752	AE2-062 E	0.27
941561	AE2-153 C 01	7.61
941562	AE2-153 E 01	35.64
941731	AE2-173 01	11.55
942111	AE2-223 C	3.6
942112	AE2-223 E	24.12
942421	AE2-255 C 01	5.06
942422	AE2-255 E 01	15.19
942651	AE2-281 C 01	1.37
942652	AE2-281 E 01	8.44
943801	AF1-048 C	8.53
943802	AF1-048 E	5.69

943921	AF1-060	2.7
944221	AF1-090 C 01	3.46
944222	AF1-090 E 01	16.19
945351	AF1-200 FTIR	551.32
945871	AF1-252 01	7.66
945881	AF1-253 01	5.3
946161	AF1-281 C	0.76
946162	AF1-281 E	4.3
946321	AF1-296 C 01	6.92
946322	AF1-296 E 01	32.4
946501	AF1-314 C	7.78
946502	AF1-314 E	36.44
946541	AF1-318 C 01	9.97
946542	AF1-318 E 01	46.66
274857	BIG SKY ;U1	2.44
274858	BIG SKY ;U2	2.44
274877	BISHOP HL;1U	1.86
274878	BISHOP HL;2U	1.86
294401	BSHIL;1U E	7.42
294410	BSHIL;2U E	7.42
274848	CAMPGROVE;RU	2.74
274890	CAYUG;1U E	12.09
274891	CAYUG;2U E	12.09
274863	CAYUGA RI;1U	3.02
274864	CAYUGA RI;2U	3.02
274849	CRESCENT ;1U	0.91
274859	EASYR;U1 E	9.75
274860	EASYR;U2 E	9.75
274856	ECOGROVE ;U1	2.08
274871	GR RIDGE ;2U	4.38
274847	GR RIDGE ;BU	3.45
274855	GSG-6 ;RU	2.38
290051	GSG-6; E	9.53
275149	KELLYCK ;1E	14.6
274888	KELLYCK ;1U	3.65
990901	L-005 E	10.96
274872	LEE DEKAL;1U	5.32
290108	LEEDK;1U E	22.16
274850	MENDOTA H;RU	0.57
274879	MINONK ;1U	4.04
293061	N-015 E	13.8
293513	O-009 C1	2.
293514	O-009 C2	1.02
293515	O-009 C3	1.12
293516	O-009 E1	8.02
293517	O-009 E2	4.07
293518	O-009 E3	4.49
276156	O-029 C	1.09

276157	O-029 C	1.17
276158	O-029 C	2.14
293715	O-029 E	8.58
293716	O-029 E	4.7
293717	O-029 E	4.32
293771	O-035 E	5.53
293644	O22 E1	8.15
293645	O22 E2	15.82
290021	O50 E	16.17
294392	P-010 E	17.53
294763	P-046 E	8.33
274881	PILOT HIL;1E	14.6
274887	PILOT HIL;1U	3.65
274851	PROVIDENC;RU	1.38
290261	S-027 E	12.37
290265	S-028 E	12.37
295110	SUBLETTE C	0.34
274861	TOP CROP ;1U	2.04
274862	TOP CROP ;2U	3.95
274853	TWINGROVE;U1	3.09
274854	TWINGROVE;U2	3.09
274882	W4-005 E	15.38
295108	WESTBROOK C	0.78
917501	Z2-087 C	2.4
917502	Z2-087 E	16.05
918051	AA1-018 C OP	1.96
924041	AB2-047 C 01	6.01
924042	AB2-047 E 01	40.2
924261	AB2-070 C 01	3.51
924262	AB2-070 E 01	23.48
925301	AB2-191	0.91
925581	AC1-033 C	2.44
925582	AC1-033 E	16.31
925771	AC1-053 C	3.48
925772	AC1-053 E	23.28
926821	AC1-168 C 01	1.99
926822	AC1-168 E 01	13.38
926841	AC1-171 C 01	1.78
926842	AC1-171 E 01	11.86
927201	AC1-214 C 01	3.56
927202	AC1-214 E 01	11.3

12.6.4 Index 4

(CE - CE) The E FRANKFO; B-CRETE EC ;BP 345 kV line (from bus 270728 to bus 274750 ckt 1) loads from 132.98% to 134.46% (**DC power flow**) of its load dump rating (1399 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_023-65-BT2-3_'. This project contributes approximately 17.89 MW to the thermal violation.

CONTINGENCY 'COMED_P4_023-65-BT2-3_'

TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765

TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.11
934432	AD1-067 E	0.45
934721	AD1-100 C	15.33
934722	AD1-100 E	71.56
935141	AD1-148	2.73
936291	AD2-038 C 01	2.49
936292	AD2-038 E 01	11.67
936371	AD2-047 C 01	3.19
936372	AD2-047 E 01	15.59
936971	AD2-131 C	0.48
936972	AD2-131 E	2.41
937001	AD2-134 C	2.11
937002	AD2-134 E	8.42
937211	AD2-159 C	1.9
937212	AD2-159 E	8.9
938851	AE1-113 C	6.57
938852	AE1-113 E	23.3
938861	AE1-114 C 01	3.18
938862	AE1-114 E 01	10.84
939321	AE1-163 C 01	4.62
939322	AE1-163 E 01	28.41
939401	AE1-172 C 01	4.04
939402	AE1-172 E 01	18.94
939683	AE1-198 BAT	44.92
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	16.9
940752	AE2-062 E	0.14
941561	AE2-153 C 01	3.78
941562	AE2-153 E 01	17.7

941731	AE2-173 01	4.94
942111	AE2-223 C	1.54
942112	AE2-223 E	10.31
942421	AE2-255 C 01	2.49
942422	AE2-255 E 01	7.47
942651	AE2-281 C 01	0.66
942652	AE2-281 E 01	4.06
943801	AF1-048 C	3.89
943802	AF1-048 E	2.59
943921	AF1-060	1.23
944221	AF1-090 C 01	0.23
944222	AF1-090 E 01	1.07
945351	AF1-200 FTIR	215.4
945871	AF1-252 01	3.21
945881	AF1-253 01	2.22
946161	AF1-281 C	0.34
946162	AF1-281 E	1.95
946321	AF1-296 C 01	3.15
946322	AF1-296 E 01	14.75
946501	AF1-314 C	3.54
946502	AF1-314 E	16.57
946541	AF1-318 C 01	4.6
946542	AF1-318 E 01	21.54
274857	BIG SKY ;U1	1.11
274858	BIG SKY ;U2	1.11
274877	BISHOP HL;1U	0.86
274878	BISHOP HL;2U	0.86
294401	BSHIL;1U E	3.42
294410	BSHIL;2U E	3.42
274848	CAMPGROVE;RU	1.27
274890	CAYUG;1U E	5.16
274891	CAYUG;2U E	5.16
274863	CAYUGA RI;1U	1.29
274864	CAYUGA RI;2U	1.29
274849	CRESCENT ;1U	0.42
274859	EASYR;U1 E	4.43
274860	EASYR;U2 E	4.43
274856	ECOGROVE ;U1	0.95
274871	GR RIDGE ;2U	2.02
274847	GR RIDGE ;BU	1.59
274855	GSG-6 ;RU	1.06
290051	GSG-6; E	4.25
956141	J1101	1.44
953201	J715 C	1.03
953202	J715 E	5.56
954702	J844 E	8.4
954511	J926 C	0.84
954512	J926 E	4.56

954741	J928 C	0.87
954742	J928 E	4.73
954981	J974 C	2.43
954982	J974 E	13.16
275149	KELLYCK ;1E	6.56
274888	KELLYCK ;1U	1.64
990901	L-005 E	5.06
274872	LEE DEKAL;1U	2.36
290108	LEEDK;1U E	9.84
274850	MENDOTA H;RU	0.25
274879	MINONK ;1U	1.99
293061	N-015 E	6.37
293513	O-009 C1	0.91
293514	O-009 C2	0.46
293515	O-009 C3	0.51
293516	O-009 E1	3.65
293517	O-009 E2	1.86
293518	O-009 E3	2.04
276156	O-029 C	0.49
276157	O-029 C	0.53
276158	O-029 C	0.98
293715	O-029 E	3.91
293716	O-029 E	2.14
293717	O-029 E	1.97
293771	O-035 E	2.55
293644	O22 E1	4.75
293645	O22 E2	9.22
290021	O50 E	7.95
294392	P-010 E	8.09
294763	P-046 E	3.79
274881	PILOT HIL;1E	6.56
274887	PILOT HIL;1U	1.64
274851	PROVIDENC;RU	0.64
295110	SUBLETTE C	0.15
295111	SUBLETTE E	1.11
274861	TOP CROP ;1U	1.19
274862	TOP CROP ;2U	2.3
295108	WESTBROOK C	0.35
295109	WESTBROOK E	2.26
916211	Z1-072 E	3.87
916221	Z1-073 E	4.39
276168	Z1-106 E1	1.29
276167	Z1-106 E2	1.29
276169	Z1-107 E	2.46
276170	Z1-108 E	2.54
918051	AA1-018 C OP	0.93
918052	AA1-018 E OP	6.2
920272	AA2-123 E	2.49

924041	AB2-047 C 01	2.57
924042	AB2-047 E 01	17.18
924261	AB2-070 C 01	1.49
924262	AB2-070 E 01	9.97
925301	AB2-191	0.41
925302	AB2-191 E	1.13
925581	AC1-033 C	1.12
925582	AC1-033 E	7.52
925771	AC1-053 C	1.48
925772	AC1-053 E	9.88
926821	AC1-168 C 01	0.92
926822	AC1-168 E 01	6.18
926841	AC1-171 C 01	0.82
926842	AC1-171 E 01	5.49
927201	AC1-214 C 01	1.64
927202	AC1-214 E 01	5.22

12.6.5 Index 5

(CE - AEP) The GREENACRE; T-05OLIVE 345 kV line (from bus 270771 to bus 243229 ckt 1) loads from 118.86% to 120.27% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 11.53 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO;
765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.07
934432	AD1-067 E	0.29
934721	AD1-100 C	10.15
934722	AD1-100 E	47.39
936291	AD2-038 C 01	1.63
936292	AD2-038 E 01	7.62
936371	AD2-047 C 01	2.37
936372	AD2-047 E 01	11.57
937001	AD2-134 C	1.36
937002	AD2-134 E	5.42
938851	AE1-113 C	4.18
938852	AE1-113 E	14.82
938861	AE1-114 C 01	2.04
938862	AE1-114 E 01	6.97
939321	AE1-163 C 01	3.02
939322	AE1-163 E 01	18.57
939401	AE1-172 C 01	2.7
939402	AE1-172 E 01	12.67
939631	AE1-193 C	8.66
939632	AE1-193 E	57.94
939641	AE1-194 C	8.66
939642	AE1-194 E	57.94
939651	AE1-195 C	8.66
939652	AE1-195 E	57.94
939681	AE1-198 C	< 0.01
939682	AE1-198 E	14.82
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	11.31
940752	AE2-062 E	0.09
941561	AE2-153 C 01	2.48
941562	AE2-153 E 01	11.6

941731	AE2-173 01	3.29
942111	AE2-223 C	1.03
942112	AE2-223 E	6.86
942421	AE2-255 C 01	1.58
942422	AE2-255 E 01	4.75
942651	AE2-281 C 01	0.43
942652	AE2-281 E 01	2.65
943801	AF1-048 C	2.49
943802	AF1-048 E	1.66
943921	AF1-060	0.79
945351	AF1-200 FTIR	137.35
946161	AF1-281 C	0.22
946162	AF1-281 E	1.25
946321	AF1-296 C 01	2.03
946322	AF1-296 E 01	9.5
946501	AF1-314 C	2.27
946502	AF1-314 E	10.64
946541	AF1-318 C 01	2.97
946542	AF1-318 E 01	13.91
274857	BIG SKY ;U1	0.71
274858	BIG SKY ;U2	0.71
274877	BISHOP HL;1U	0.55
274878	BISHOP HL;2U	0.55
294401	BSHIL;1U E	2.21
294410	BSHIL;2U E	2.21
274848	CAMPGROVE;RU	0.82
274890	CAYUG;1U E	3.45
274891	CAYUG;2U E	3.45
274863	CAYUGA RI;1U	0.86
274864	CAYUGA RI;2U	0.86
274849	CRESCENT ;1U	0.27
274859	EASYR;U1 E	2.85
274860	EASYR;U2 E	2.85
274856	ECOGROVE ;U1	0.61
274871	GR RIDGE ;2U	1.28
274847	GR RIDGE ;BU	1.
274855	GSG-6 ;RU	0.68
290051	GSG-6; E	2.73
275149	KELLYCK ;1E	4.87
274888	KELLYCK ;1U	1.22
990901	L-005 E	3.26
274872	LEE DEKAL;1U	1.52
290108	LEEDK;1U E	6.33
274850	MENDOTA H;RU	0.16
274879	MINONK ;1U	1.26
293061	N-015 E	4.02
293513	O-009 C1	0.59
293514	O-009 C2	0.3

293515	O-009 C3	0.33
293516	O-009 E1	2.35
293517	O-009 E2	1.19
293518	O-009 E3	1.32
276156	O-029 C	0.32
276157	O-029 C	0.34
276158	O-029 C	0.63
293715	O-029 E	2.51
293716	O-029 E	1.38
293717	O-029 E	1.27
293771	O-035 E	1.65
293644	O22 E1	2.83
293645	O22 E2	5.5
290021	O50 E	5.06
294392	P-010 E	5.1
294763	P-046 E	2.43
274881	PILOT HIL;1E	4.87
274887	PILOT HIL;1U	1.22
274851	PROVIDENC;RU	0.41
290261	S-027 E	3.52
290265	S-028 E	3.52
295110	SUBLETTE C	0.1
274861	TOP CROP ;1U	0.71
274862	TOP CROP ;2U	1.37
274853	TWINGROVE;U1	0.88
274854	TWINGROVE;U2	0.88
295108	WESTBROOK C	0.22
917501	Z2-087 C	0.68
917502	Z2-087 E	4.56
918051	AA1-018 C OP	0.62
924041	AB2-047 C 01	1.71
924042	AB2-047 E 01	11.43
925301	AB2-191	0.26
925581	AC1-033 C	0.72
925582	AC1-033 E	4.85
926821	AC1-168 C 01	0.59
926822	AC1-168 E 01	3.97
926841	AC1-171 C 01	0.53
926842	AC1-171 E 01	3.55
927201	AC1-214 C 01	1.06
927202	AC1-214 E 01	3.36

12.6.6 Index 6

(CE - CE) The WILTON ; B-WILTON ;3M 345 kV line (from bus 270926 to bus 275232 ckt 1) loads from 157.23% to 158.6% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6_'. This project contributes approximately 21.34 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6_'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765
 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345
 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33
 END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.13
934432	AD1-067 E	0.53
934721	AD1-100 C	23.02
934722	AD1-100 E	107.42
936291	AD2-038 C 01	3.03
936292	AD2-038 E 01	14.19
936371	AD2-047 C 01	4.47
936372	AD2-047 E 01	21.84
937001	AD2-134 C	2.49
937002	AD2-134 E	9.92
937211	AD2-159 C	2.73
937212	AD2-159 E	12.77
938851	AE1-113 C	7.61
938852	AE1-113 E	26.99
938861	AE1-114 C 01	3.75
938862	AE1-114 E 01	12.79
939321	AE1-163 C 01	5.63
939322	AE1-163 E 01	34.55
939401	AE1-172 C 01	6.28
939402	AE1-172 E 01	29.48
939631	AE1-193 C	5.89
939632	AE1-193 E	39.4
939641	AE1-194 C	5.89
939642	AE1-194 E	39.4
939651	AE1-195 C	5.89
939652	AE1-195 E	39.4
939681	AE1-198 C	< 0.01
939682	AE1-198 E	10.08
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	26.3
940752	AE2-062 E	0.16
941561	AE2-153 C 01	4.74
941562	AE2-153 E 01	22.17
941731	AE2-173 01	7.13

942111	AE2-223 C	2.22
942112	AE2-223 E	14.88
942421	AE2-255 C 01	2.88
942422	AE2-255 E 01	8.65
942651	AE2-281 C 01	0.8
942652	AE2-281 E 01	4.94
943801	AF1-048 C	4.55
943802	AF1-048 E	3.03
943921	AF1-060	1.44
945351	AF1-200 FTIR	253.09
946161	AF1-281 C	0.41
946162	AF1-281 E	2.3
946321	AF1-296 C 01	3.76
946322	AF1-296 E 01	17.58
946501	AF1-314 C	4.17
946502	AF1-314 E	19.5
946541	AF1-318 C 01	5.6
946542	AF1-318 E 01	26.23
274857	BIG SKY ;U1	1.31
274858	BIG SKY ;U2	1.31
274877	BISHOP HL;1U	1.03
274878	BISHOP HL;2U	1.03
294401	BSHIL;1U E	4.14
294410	BSHIL;2U E	4.14
274848	CAMPGROVE;RU	1.53
274890	CAYUG;1U E	7.84
274891	CAYUG;2U E	7.84
274863	CAYUGA RI;1U	1.96
274864	CAYUGA RI;2U	1.96
274849	CRESCENT ;1U	0.51
274859	EASYR;U1 E	5.23
274860	EASYR;U2 E	5.23
274856	ECOGROVE ;U1	1.11
274871	GR RIDGE ;2U	2.4
274847	GR RIDGE ;BU	1.89
274855	GSG-6 ;RU	1.25
290051	GSG-6; E	5.01
275149	KELLYCK ;1E	9.19
274888	KELLYCK ;1U	2.3
990901	L-005 E	6.14
274872	LEE DEKAL;1U	2.78
290108	LEEDK;1U E	11.59
274850	MENDOTA H;RU	0.3
274879	MINONK ;1U	2.3
293061	N-015 E	7.57
293513	O-009 C1	1.09
293514	O-009 C2	0.55
293515	O-009 C3	0.61

293516	O-009 E1	4.35
293517	O-009 E2	2.21
293518	O-009 E3	2.43
276156	O-029 C	0.59
276157	O-029 C	0.64
276158	O-029 C	1.16
293715	O-029 E	4.65
293716	O-029 E	2.55
293717	O-029 E	2.34
293771	O-035 E	3.09
293644	O22 E1	4.87
293645	O22 E2	9.46
290021	O50 E	9.21
294392	P-010 E	9.62
294763	P-046 E	4.46
274881	PILOT HIL;1E	9.19
274887	PILOT HIL;1U	2.3
274851	PROVIDENC;RU	0.77
290261	S-027 E	7.58
290265	S-028 E	7.58
295110	SUBLETTE C	0.18
295111	SUBLETTE E	1.3
274861	TOP CROP ;1U	1.22
274862	TOP CROP ;2U	2.37
274853	TWINGROVE;U1	1.9
274854	TWINGROVE;U2	1.9
274882	W4-005 E	9.35
295108	WESTBROOK C	0.41
295109	WESTBROOK E	2.67
916211	Z1-072 E	4.69
916221	Z1-073 E	5.18
276168	Z1-106 E1	1.51
276167	Z1-106 E2	1.51
276169	Z1-107 E	3.08
276170	Z1-108 E	2.96
917501	Z2-087 C	1.48
917502	Z2-087 E	9.9
918051	AA1-018 C OP	1.17
918052	AA1-018 E OP	7.81
920272	AA2-123 E	2.91
924041	AB2-047 C O1	3.71
924042	AB2-047 E O1	24.8
924261	AB2-070 C O1	2.13
924262	AB2-070 E O1	14.24
925301	AB2-191	0.48
925302	AB2-191 E	1.33
925581	AC1-033 C	1.36
925582	AC1-033 E	9.09

925771	AC1-053 C	2.11
925772	AC1-053 E	14.1
926821	AC1-168 C 01	1.11
926822	AC1-168 E 01	7.48
926841	AC1-171 C 01	1.01
926842	AC1-171 E 01	6.75
927201	AC1-214 C 01	1.99
927202	AC1-214 E 01	6.32

12.6.7 Index 7

(CE - CE) The WILTON ; R-WILTON ;4M 345 kV line (from bus 270927 to bus 275233 ckt 1) loads from 161.34% to 162.79% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 21.79 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345

TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.13
934432	AD1-067 E	0.54
934721	AD1-100 C	23.48
934722	AD1-100 E	109.56
935141	AD1-148	3.97
936291	AD2-038 C 01	3.1
936292	AD2-038 E 01	14.5
936371	AD2-047 C 01	4.57
936372	AD2-047 E 01	22.3
937001	AD2-134 C	2.54
937002	AD2-134 E	10.13
937211	AD2-159 C	2.78
937212	AD2-159 E	13.03
938851	AE1-113 C	7.77
938852	AE1-113 E	27.57
938861	AE1-114 C 01	3.83
938862	AE1-114 E 01	13.06
939321	AE1-163 C 01	5.75
939322	AE1-163 E 01	35.3
939401	AE1-172 C 01	6.41
939402	AE1-172 E 01	30.07
939631	AE1-193 C	6.01
939632	AE1-193 E	40.24
939641	AE1-194 C	6.01
939642	AE1-194 E	40.24
939651	AE1-195 C	6.01
939652	AE1-195 E	40.24
939681	AE1-198 C	< 0.01
939682	AE1-198 E	10.29

940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	26.82
940752	AE2-062 E	0.16
941561	AE2-153 C 01	4.83
941562	AE2-153 E 01	22.63
941731	AE2-173 01	7.27
942111	AE2-223 C	2.27
942112	AE2-223 E	15.18
942421	AE2-255 C 01	2.95
942422	AE2-255 E 01	8.84
942651	AE2-281 C 01	0.82
942652	AE2-281 E 01	5.04
943801	AF1-048 C	4.65
943802	AF1-048 E	3.1
943921	AF1-060	1.47
945351	AF1-200 FTIR	258.45
946161	AF1-281 C	0.42
946162	AF1-281 E	2.35
946321	AF1-296 C 01	3.84
946322	AF1-296 E 01	17.96
946501	AF1-314 C	4.25
946502	AF1-314 E	19.92
946541	AF1-318 C 01	5.72
946542	AF1-318 E 01	26.78
274857	BIG SKY ;U1	1.33
274858	BIG SKY ;U2	1.33
274877	BISHOP HL;1U	1.06
274878	BISHOP HL;2U	1.06
294401	BSHIL;1U E	4.22
294410	BSHIL;2U E	4.22
274848	CAMPGROVE;RU	1.57
274890	CAYUG;1U E	7.99
274891	CAYUG;2U E	7.99
274863	CAYUGA RI;1U	2.
274864	CAYUGA RI;2U	2.
274849	CRESCENT ;1U	0.52
274859	EASYR;U1 E	5.34
274860	EASYR;U2 E	5.34
274856	ECOGROVE ;U1	1.14
274871	GR RIDGE ;2U	2.46
274847	GR RIDGE ;BU	1.93
274855	GSG-6 ;RU	1.28
290051	GSG-6; E	5.11
275149	KELLYCK ;1E	9.38
274888	KELLYCK ;1U	2.35
990901	L-005 E	6.27
274872	LEE DEKAL;1U	2.84
290108	LEEDK;1U E	11.83

274850	MENDOTA H;RU	0.3
274879	MINONK ;1U	2.35
293061	N-015 E	7.73
293513	O-009 C1	1.11
293514	O-009 C2	0.56
293515	O-009 C3	0.62
293516	O-009 E1	4.44
293517	O-009 E2	2.26
293518	O-009 E3	2.48
276156	O-029 C	0.6
276157	O-029 C	0.65
276158	O-029 C	1.19
293715	O-029 E	4.75
293716	O-029 E	2.6
293717	O-029 E	2.39
293771	O-035 E	3.16
293644	O22 E1	4.98
293645	O22 E2	9.66
290021	O50 E	9.4
294392	P-010 E	9.82
294763	P-046 E	4.55
274881	PILOT HIL;1E	9.38
274887	PILOT HIL;1U	2.35
274851	PROVIDENC;RU	0.79
290261	S-027 E	7.74
290265	S-028 E	7.74
295110	SUBLETTE C	0.18
295111	SUBLETTE E	1.33
274861	TOP CROP ;1U	1.24
274862	TOP CROP ;2U	2.42
274853	TWINGROVE;U1	1.93
274854	TWINGROVE;U2	1.93
276153	W2-048 E	2.53
274882	W4-005 E	9.55
295108	WESTBROOK C	0.42
295109	WESTBROOK E	2.73
909052	X2-022 E	7.6
916211	Z1-072 E	4.79
916221	Z1-073 E	5.29
276168	Z1-106 E1	1.54
276167	Z1-106 E2	1.54
276169	Z1-107 E	3.15
276170	Z1-108 E	3.03
917501	Z2-087 C	1.51
917502	Z2-087 E	10.1
918051	AA1-018 C OP	1.19
918052	AA1-018 E OP	7.98
920272	AA2-123 E	2.97

924041	AB2-047 C 01	3.78
924042	AB2-047 E 01	25.31
924261	AB2-070 C 01	2.17
924262	AB2-070 E 01	14.53
925301	AB2-191	0.49
925302	AB2-191 E	1.36
925581	AC1-033 C	1.39
925582	AC1-033 E	9.28
925771	AC1-053 C	2.15
925772	AC1-053 E	14.39
926821	AC1-168 C 01	1.14
926822	AC1-168 E 01	7.64
926841	AC1-171 C 01	1.03
926842	AC1-171 E 01	6.89
927201	AC1-214 C 01	2.03
927202	AC1-214 E 01	6.46

12.6.8 Index 8

(CE - MISO NIPS) The CRETE EC ;BP-17STJOHN 345 kV line (from bus 274750 to bus 255112 ckt 1) loads from 155.77% to 156.92% (**DC power flow**) of its emergency rating (1557 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 17.83 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO;
765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.11
934432	AD1-067 E	0.45
934721	AD1-100 C	15.36
934722	AD1-100 E	71.69
935141	AD1-148	2.74
936291	AD2-038 C 01	2.49
936292	AD2-038 E 01	11.67
936371	AD2-047 C 01	3.19
936372	AD2-047 E 01	15.59
936971	AD2-131 C	0.48
936972	AD2-131 E	2.42
937001	AD2-134 C	2.1
937002	AD2-134 E	8.37
937211	AD2-159 C	1.9
937212	AD2-159 E	8.91
938851	AE1-113 C	6.57
938852	AE1-113 E	23.29
938861	AE1-114 C 01	3.16
938862	AE1-114 E 01	10.79
939321	AE1-163 C 01	4.63
939322	AE1-163 E 01	28.42
939401	AE1-172 C 01	4.05
939402	AE1-172 E 01	18.99
939631	AE1-193 C	25.76
939632	AE1-193 E	172.36
939641	AE1-194 C	25.76
939642	AE1-194 E	172.36
939651	AE1-195 C	25.76
939652	AE1-195 E	172.36
939681	AE1-198 C	< 0.01
939682	AE1-198 E	44.08
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	16.94

940752	AE2-062 E	0.14
941561	AE2-153 C 01	3.78
941562	AE2-153 E 01	17.68
941731	AE2-173 01	4.95
942111	AE2-223 C	1.54
942112	AE2-223 E	10.33
942421	AE2-255 C 01	2.49
942422	AE2-255 E 01	7.46
942651	AE2-281 C 01	0.66
942652	AE2-281 E 01	4.06
943801	AF1-048 C	3.87
943802	AF1-048 E	2.58
943921	AF1-060	1.22
944221	AF1-090 C 01	1.45
944222	AF1-090 E 01	6.79
945351	AF1-200 FTIR	212.
945871	AF1-252 01	3.21
945881	AF1-253 01	2.22
946161	AF1-281 C	0.34
946162	AF1-281 E	1.94
946321	AF1-296 C 01	3.14
946322	AF1-296 E 01	14.69
946501	AF1-314 C	3.52
946502	AF1-314 E	16.49
946541	AF1-318 C 01	4.59
946542	AF1-318 E 01	21.5
274857	BIG SKY ;U1	1.1
274858	BIG SKY ;U2	1.1
274877	BISHOP HL;1U	0.85
274878	BISHOP HL;2U	0.85
294401	BSHIL;1U E	3.42
294410	BSHIL;2U E	3.42
274848	CAMPGROVE;RU	1.26
274890	CAYUG;1U E	5.17
274891	CAYUG;2U E	5.17
274863	CAYUGA RI;1U	1.29
274864	CAYUGA RI;2U	1.29
274849	CRESCENT ;1U	0.42
274859	EASYR;U1 E	4.41
274860	EASYR;U2 E	4.41
274856	ECOGROVE ;U1	0.94
274871	GR RIDGE ;2U	2.01
274847	GR RIDGE ;BU	1.58
274855	GSG-6 ;RU	1.06
290051	GSG-6; E	4.23
275149	KELLYCK ;1E	6.56
274888	KELLYCK ;1U	1.64
990901	L-005 E	5.05

274872	LEE DEKAL;1U	2.35
290108	LEEDK;1U E	9.78
274850	MENDOTA H;RU	0.25
274879	MINONK ;1U	1.99
293061	N-015 E	6.34
293513	O-009 C1	0.91
293514	O-009 C2	0.46
293515	O-009 C3	0.51
293516	O-009 E1	3.64
293517	O-009 E2	1.85
293518	O-009 E3	2.04
276156	O-029 C	0.49
276157	O-029 C	0.53
276158	O-029 C	0.97
293715	O-029 E	3.89
293716	O-029 E	2.13
293717	O-029 E	1.96
293771	O-035 E	2.55
293644	O22 E1	4.75
293645	O22 E2	9.22
290021	O50 E	7.95
294392	P-010 E	8.05
294763	P-046 E	3.77
274881	PILOT HIL;1E	6.56
274887	PILOT HIL;1U	1.64
274851	PROVIDENC;RU	0.64
290261	S-027 E	5.28
290265	S-028 E	5.28
295110	SUBLETTE C	0.15
274861	TOP CROP ;1U	1.19
274862	TOP CROP ;2U	2.31
274853	TWINGROVE;U1	1.32
274854	TWINGROVE;U2	1.32
274882	W4-005 E	6.53
295108	WESTBROOK C	0.35
917501	Z2-087 C	1.03
917502	Z2-087 E	6.87
918051	AA1-018 C OP	0.93
924041	AB2-047 C 01	2.57
924042	AB2-047 E 01	17.22
924261	AB2-070 C 01	1.49
924262	AB2-070 E 01	9.98
925301	AB2-191	0.41
925581	AC1-033 C	1.12
925582	AC1-033 E	7.5
925771	AC1-053 C	1.48
925772	AC1-053 E	9.9
926821	AC1-168 C 01	0.92

926822	<i>AC1-168 E 01</i>	<i>6.17</i>
926841	<i>AC1-171 C 01</i>	<i>0.82</i>
926842	<i>AC1-171 E 01</i>	<i>5.49</i>
927201	<i>AC1-214 C 01</i>	<i>1.64</i>
927202	<i>AC1-214 E 01</i>	<i>5.2</i>

12.6.9 Index 9

(CE - AEP) The UNIV PK N;RP-05OLIVE 345 kV line (from bus 274804 to bus 243229 ckt 1) loads from 139.16% to 140.81% (**DC power flow**) of its normal rating (971 MVA) for the single line contingency outage of 'COMED_P1-2_695_B2'. This project contributes approximately 14.09 MW to the thermal violation.

CONTINGENCY 'COMED_P1-2_695_B2'

OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO;
765 1

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.08
934432	AD1-067 E	0.35
934721	AD1-100 C	12.32
934722	AD1-100 E	57.51
935141	AD1-148	2.21
936291	AD2-038 C 01	2.1
936292	AD2-038 E 01	9.85
936371	AD2-047 C 01	2.86
936372	AD2-047 E 01	13.98
937001	AD2-134 C	1.66
937002	AD2-134 E	6.64
937211	AD2-159 C	1.54
937212	AD2-159 E	7.2
938851	AE1-113 C	5.08
938852	AE1-113 E	18.03
938861	AE1-114 C 01	2.5
938862	AE1-114 E 01	8.53
939321	AE1-163 C 01	3.9
939322	AE1-163 E 01	23.98
939401	AE1-172 C 01	3.27
939402	AE1-172 E 01	15.32
939631	AE1-193 C	3.14
939632	AE1-193 E	21.03
939641	AE1-194 C	3.14
939642	AE1-194 E	21.03
939651	AE1-195 C	3.14
939652	AE1-195 E	21.03
939681	AE1-198 C	< 0.01
939682	AE1-198 E	5.38
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	13.67
940752	AE2-062 E	0.1
941561	AE2-153 C 01	3.04

941562	AE2-153 E 01	14.21
941731	AE2-173 01	3.99
942111	AE2-223 C	1.24
942112	AE2-223 E	8.32
942421	AE2-255 C 01	1.93
942422	AE2-255 E 01	5.78
942651	AE2-281 C 01	0.56
942652	AE2-281 E 01	3.43
943801	AF1-048 C	3.06
943802	AF1-048 E	2.04
943921	AF1-060	0.96
945351	AF1-200 FTIR	168.42
946161	AF1-281 C	0.27
946162	AF1-281 E	1.53
946321	AF1-296 C 01	2.48
946322	AF1-296 E 01	11.61
946501	AF1-314 C	2.79
946502	AF1-314 E	13.04
946541	AF1-318 C 01	3.65
946542	AF1-318 E 01	17.08
274857	BIG SKY ;U1	0.87
274858	BIG SKY ;U2	0.87
274877	BISHOP HL;1U	0.68
274878	BISHOP HL;2U	0.68
294401	BSHIL;1U E	2.7
294410	BSHIL;2U E	2.7
274848	CAMPGROVE;RU	1.
274890	CAYUG;1U E	4.17
274891	CAYUG;2U E	4.17
274863	CAYUGA RI;1U	1.04
274864	CAYUGA RI;2U	1.04
274849	CRESCENT ;1U	0.33
274859	EASYR;U1 E	3.49
274860	EASYR;U2 E	3.49
274856	ECOGROVE ;U1	0.75
274871	GR RIDGE ;2U	1.58
274847	GR RIDGE ;BU	1.25
274855	GSG-6 ;RU	0.84
290051	GSG-6; E	3.35
275149	KELLYCK ;1E	5.88
274888	KELLYCK ;1U	1.47
990901	L-005 E	3.99
274872	LEE DEKAL;1U	1.86
290108	LEEDK;1U E	7.76
274850	MENDOTA H;RU	0.2
274879	MINONK ;1U	1.54
293061	N-015 E	4.99
293513	O-009 C1	0.72

293514	O-009 C2	0.36
293515	O-009 C3	0.4
293516	O-009 E1	2.88
293517	O-009 E2	1.46
293518	O-009 E3	1.61
276156	O-029 C	0.39
276157	O-029 C	0.42
276158	O-029 C	0.77
293715	O-029 E	3.08
293716	O-029 E	1.69
293717	O-029 E	1.55
293771	O-035 E	2.02
293644	O22 E1	3.11
293645	O22 E2	6.04
290021	O50 E	6.15
294392	P-010 E	6.34
294763	P-046 E	2.98
274881	PILOT HIL;1E	5.88
274887	PILOT HIL;1U	1.47
274851	PROVIDENC;RU	0.5
290261	S-027 E	4.26
290265	S-028 E	4.26
295110	SUBLETTE C	0.12
274861	TOP CROP ;1U	0.78
274862	TOP CROP ;2U	1.51
274853	TWINGROVE;U1	1.06
274854	TWINGROVE;U2	1.06
274882	W4-005 E	5.27
295108	WESTBROOK C	0.27
917501	Z2-087 C	0.83
917502	Z2-087 E	5.54
918051	AA1-018 C OP	0.84
924041	AB2-047 C 01	2.07
924042	AB2-047 E 01	13.87
924261	AB2-070 C 01	1.2
924262	AB2-070 E 01	8.06
925301	AB2-191	0.32
925581	AC1-033 C	0.89
925582	AC1-033 E	5.93
925771	AC1-053 C	1.19
925772	AC1-053 E	7.99
926821	AC1-168 C 01	0.73
926822	AC1-168 E 01	4.88
926841	AC1-171 C 01	0.65
926842	AC1-171 E 01	4.33
927201	AC1-214 C 01	1.3
927202	AC1-214 E 01	4.12

12.6.10 Index 10

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275232 to bus 270644 ckt 1) loads from 155.57% to 157.41% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT5-6_'. This project contributes approximately 21.34 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT5-6_'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765

TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345

TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.13
934432	AD1-067 E	0.53
934721	AD1-100 C	23.02
934722	AD1-100 E	107.42
936291	AD2-038 C 01	3.03
936292	AD2-038 E 01	14.19
936371	AD2-047 C 01	4.47
936372	AD2-047 E 01	21.84
937001	AD2-134 C	2.49
937002	AD2-134 E	9.92
937211	AD2-159 C	2.73
937212	AD2-159 E	12.77
938851	AE1-113 C	7.61
938852	AE1-113 E	26.99
938861	AE1-114 C 01	3.75
938862	AE1-114 E 01	12.79
939321	AE1-163 C 01	5.63
939322	AE1-163 E 01	34.55
939401	AE1-172 C 01	6.28
939402	AE1-172 E 01	29.48
939631	AE1-193 C	5.89
939632	AE1-193 E	39.4
939641	AE1-194 C	5.89
939642	AE1-194 E	39.4
939651	AE1-195 C	5.89
939652	AE1-195 E	39.4
939681	AE1-198 C	< 0.01

939682	AE1-198 E	10.08
940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	26.3
940752	AE2-062 E	0.16
941561	AE2-153 C 01	4.74
941562	AE2-153 E 01	22.17
941731	AE2-173 01	7.13
942111	AE2-223 C	2.22
942112	AE2-223 E	14.88
942421	AE2-255 C 01	2.88
942422	AE2-255 E 01	8.65
942651	AE2-281 C 01	0.8
942652	AE2-281 E 01	4.94
943801	AF1-048 C	4.55
943802	AF1-048 E	3.03
943921	AF1-060	1.44
945351	AF1-200 FTIR	253.09
946161	AF1-281 C	0.41
946162	AF1-281 E	2.3
946321	AF1-296 C 01	3.76
946322	AF1-296 E 01	17.58
946501	AF1-314 C	4.17
946502	AF1-314 E	19.5
946541	AF1-318 C 01	5.6
946542	AF1-318 E 01	26.23
274857	BIG SKY ;U1	1.31
274858	BIG SKY ;U2	1.31
274877	BISHOP HL;1U	1.03
274878	BISHOP HL;2U	1.03
294401	BSHIL;1U E	4.14
294410	BSHIL;2U E	4.14
274848	CAMPGROVE;RU	1.53
274890	CAYUG;1U E	7.84
274891	CAYUG;2U E	7.84
274863	CAYUGA RI;1U	1.96
274864	CAYUGA RI;2U	1.96
274849	CRESCENT ;1U	0.51
274859	EASYR;U1 E	5.23
274860	EASYR;U2 E	5.23
274856	ECOGROVE ;U1	1.11
274871	GR RIDGE ;2U	2.4
274847	GR RIDGE ;BU	1.89
274855	GSG-6 ;RU	1.25
290051	GSG-6; E	5.01
275149	KELLYCK ;1E	9.19
274888	KELLYCK ;1U	2.3
990901	L-005 E	6.14
274872	LEE DEKAL;1U	2.78

290108	LEEDK;1U E	11.59
274850	MENDOTA H;RU	0.3
274879	MINONK ;1U	2.3
293061	N-015 E	7.57
293513	O-009 C1	1.09
293514	O-009 C2	0.55
293515	O-009 C3	0.61
293516	O-009 E1	4.35
293517	O-009 E2	2.21
293518	O-009 E3	2.43
276156	O-029 C	0.59
276157	O-029 C	0.64
276158	O-029 C	1.16
293715	O-029 E	4.65
293716	O-029 E	2.55
293717	O-029 E	2.34
293771	O-035 E	3.09
293644	O22 E1	4.87
293645	O22 E2	9.46
290021	O50 E	9.21
294392	P-010 E	9.62
294763	P-046 E	4.46
274881	PILOT HIL;1E	9.19
274887	PILOT HIL;1U	2.3
274851	PROVIDENC;RU	0.77
290261	S-027 E	7.58
290265	S-028 E	7.58
295110	SUBLETTE C	0.18
295111	SUBLETTE E	1.3
274861	TOP CROP ;1U	1.22
274862	TOP CROP ;2U	2.37
274853	TWINGROVE;U1	1.9
274854	TWINGROVE;U2	1.9
274882	W4-005 E	9.35
295108	WESTBROOK C	0.41
295109	WESTBROOK E	2.67
916211	Z1-072 E	4.69
916221	Z1-073 E	5.18
276168	Z1-106 E1	1.51
276167	Z1-106 E2	1.51
276169	Z1-107 E	3.08
276170	Z1-108 E	2.96
917501	Z2-087 C	1.48
917502	Z2-087 E	9.9
918051	AA1-018 C OP	1.17
918052	AA1-018 E OP	7.81
920272	AA2-123 E	2.91
924041	AB2-047 C 01	3.71

924042	AB2-047 E 01	24.8
924261	AB2-070 C 01	2.13
924262	AB2-070 E 01	14.24
925301	AB2-191	0.48
925302	AB2-191 E	1.33
925581	AC1-033 C	1.36
925582	AC1-033 E	9.09
925771	AC1-053 C	2.11
925772	AC1-053 E	14.1
926821	AC1-168 C 01	1.11
926822	AC1-168 E 01	7.48
926841	AC1-171 C 01	1.01
926842	AC1-171 E 01	6.75
927201	AC1-214 C 01	1.99
927202	AC1-214 E 01	6.32

12.6.11 Index 11

(CE - CE) The WILTON ; 765/345 kV transformer (from bus 275233 to bus 270644 ckt 1) loads from 159.8% to 161.67% (**DC power flow**) of its load dump rating (1379 MVA) for the line fault with failed breaker contingency outage of 'COMED_P4_112-65-BT2-3__'. This project contributes approximately 21.79 MW to the thermal violation.

CONTINGENCY 'COMED_P4_112-65-BT2-3__'

TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765

TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345

TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33

END

<i>Bus Number</i>	<i>Bus Name</i>	<i>Full Contribution</i>
934431	AD1-067 C	0.13
934432	AD1-067 E	0.54
934721	AD1-100 C	23.48
934722	AD1-100 E	109.56
935141	AD1-148	3.97
936291	AD2-038 C 01	3.1
936292	AD2-038 E 01	14.5
936371	AD2-047 C 01	4.57
936372	AD2-047 E 01	22.3
937001	AD2-134 C	2.54
937002	AD2-134 E	10.13
937211	AD2-159 C	2.78
937212	AD2-159 E	13.03
938851	AE1-113 C	7.77
938852	AE1-113 E	27.57
938861	AE1-114 C 01	3.83
938862	AE1-114 E 01	13.06
939321	AE1-163 C 01	5.75
939322	AE1-163 E 01	35.3
939401	AE1-172 C 01	6.41
939402	AE1-172 E 01	30.07
939631	AE1-193 C	6.01
939632	AE1-193 E	40.24
939641	AE1-194 C	6.01
939642	AE1-194 E	40.24
939651	AE1-195 C	6.01
939652	AE1-195 E	40.24
939681	AE1-198 C	< 0.01
939682	AE1-198 E	10.29

940101	AE1-252 C 01	< 0.01
940102	AE1-252 E 01	26.82
940752	AE2-062 E	0.16
941561	AE2-153 C 01	4.83
941562	AE2-153 E 01	22.63
941731	AE2-173 01	7.27
942111	AE2-223 C	2.27
942112	AE2-223 E	15.18
942421	AE2-255 C 01	2.95
942422	AE2-255 E 01	8.84
942651	AE2-281 C 01	0.82
942652	AE2-281 E 01	5.04
943801	AF1-048 C	4.65
943802	AF1-048 E	3.1
943921	AF1-060	1.47
945351	AF1-200 FTIR	258.45
946161	AF1-281 C	0.42
946162	AF1-281 E	2.35
946321	AF1-296 C 01	3.84
946322	AF1-296 E 01	17.96
946501	AF1-314 C	4.25
946502	AF1-314 E	19.92
946541	AF1-318 C 01	5.72
946542	AF1-318 E 01	26.78
274857	BIG SKY ;U1	1.33
274858	BIG SKY ;U2	1.33
274877	BISHOP HL;1U	1.06
274878	BISHOP HL;2U	1.06
294401	BSHIL;1U E	4.22
294410	BSHIL;2U E	4.22
274848	CAMPGROVE;RU	1.57
274890	CAYUG;1U E	7.99
274891	CAYUG;2U E	7.99
274863	CAYUGA RI;1U	2.
274864	CAYUGA RI;2U	2.
274849	CRESCENT ;1U	0.52
274859	EASYR;U1 E	5.34
274860	EASYR;U2 E	5.34
274856	ECOGROVE ;U1	1.14
274871	GR RIDGE ;2U	2.46
274847	GR RIDGE ;BU	1.93
274855	GSG-6 ;RU	1.28
290051	GSG-6; E	5.11
275149	KELLYCK ;1E	9.38
274888	KELLYCK ;1U	2.35
990901	L-005 E	6.27
274872	LEE DEKAL;1U	2.84
290108	LEEDK;1U E	11.83

274850	MENDOTA H;RU	0.3
274879	MINONK ;1U	2.35
293061	N-015 E	7.73
293513	O-009 C1	1.11
293514	O-009 C2	0.56
293515	O-009 C3	0.62
293516	O-009 E1	4.44
293517	O-009 E2	2.26
293518	O-009 E3	2.48
276156	O-029 C	0.6
276157	O-029 C	0.65
276158	O-029 C	1.19
293715	O-029 E	4.75
293716	O-029 E	2.6
293717	O-029 E	2.39
293771	O-035 E	3.16
293644	O22 E1	4.98
293645	O22 E2	9.66
290021	O50 E	9.4
294392	P-010 E	9.82
294763	P-046 E	4.55
274881	PILOT HIL;1E	9.38
274887	PILOT HIL;1U	2.35
274851	PROVIDENC;RU	0.79
290261	S-027 E	7.74
290265	S-028 E	7.74
295110	SUBLETTE C	0.18
295111	SUBLETTE E	1.33
274861	TOP CROP ;1U	1.24
274862	TOP CROP ;2U	2.42
274853	TWINGROVE;U1	1.93
274854	TWINGROVE;U2	1.93
276153	W2-048 E	2.53
274882	W4-005 E	9.55
295108	WESTBROOK C	0.42
295109	WESTBROOK E	2.73
909052	X2-022 E	7.6
916211	Z1-072 E	4.79
916221	Z1-073 E	5.29
276168	Z1-106 E1	1.54
276167	Z1-106 E2	1.54
276169	Z1-107 E	3.15
276170	Z1-108 E	3.03
917501	Z2-087 C	1.51
917502	Z2-087 E	10.1
918051	AA1-018 C OP	1.19
918052	AA1-018 E OP	7.98
920272	AA2-123 E	2.97

924041	AB2-047 C 01	3.78
924042	AB2-047 E 01	25.31
924261	AB2-070 C 01	2.17
924262	AB2-070 E 01	14.53
925301	AB2-191	0.49
925302	AB2-191 E	1.36
925581	AC1-033 C	1.39
925582	AC1-033 E	9.28
925771	AC1-053 C	2.15
925772	AC1-053 E	14.39
926821	AC1-168 C 01	1.14
926822	AC1-168 E 01	7.64
926841	AC1-171 C 01	1.03
926842	AC1-171 E 01	6.89
927201	AC1-214 C 01	2.03
927202	AC1-214 E 01	6.46

12.7 Contingency Descriptions

Contingency Name	Contingency Definition
AEP_P1-2_#7441	CONTINGENCY 'AEP_P1-2_#7441' OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1 END
AEP_P4_#7445_05MARYSV 765_B	CONTINGENCY 'AEP_P4_#7445_05MARYSV 765_B' OPEN BRANCH FROM BUS 242922 TO BUS 242928 CKT 1 / 242922 05FTLCK 765 242928 05MARYSV 765 1 OPEN BRANCH FROM BUS 242928 TO BUS 246999 CKT 1 / 242928 05MARYSV 765 246999 05SORENS 765 1 END
COMED_P1-2_345-L6608__R-S	CONTINGENCY 'COMED_P1-2_345-L6608__R-S' TRIP BRANCH FROM BUS 270729 TO BUS 274804 CKT 1 / E FRA; R 345 UPNOR;RP 345 END
COMED_P1-2_345-L94507_B-S	CONTINGENCY 'COMED_P1-2_345-L94507_B-S' TRIP BRANCH FROM BUS 274750 TO BUS 255112 CKT 1 / CRETE;BP 345 17STJOHN 345 END
COMED_P1-2_695_B2	CONTINGENCY 'COMED_P1-2_695_B2' OPEN BRANCH FROM BUS 243206 TO BUS 270644 CKT 1 / 243206 05DUMONT 765 270644 WILTO; 765 1 END
COMED_P1-2_765-L11216__S	CONTINGENCY 'COMED_P1-2_765-L11216__S' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 END
COMED_P4_023-65-BT2-3__	CONTINGENCY 'COMED_P4_023-65-BT2-3__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 270607 TO BUS 270630 CKT 1 / COLLI; 765 PLANO; 765 END

Contingency Name	Contingency Definition
COMED_P4_023-65-BT4-5__	CONTINGENCY 'COMED_P4_023-65-BT4-5__' TRIP BRANCH FROM BUS 275168 TO BUS 270607 CKT 1 / COLLI;2M 345 COLLI; 765 TRIP BRANCH FROM BUS 275168 TO BUS 270697 CKT 1 / COLLI;2M 345 COLLI; R 345 TRIP BRANCH FROM BUS 275168 TO BUS 275268 CKT 1 / COLLI;2M 345 COLLI;2C 33 TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 END
COMED_P4_112-65-BT2-3__	CONTINGENCY 'COMED_P4_112-65-BT2-3__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33 END
COMED_P4_112-65-BT3-4__	CONTINGENCY 'COMED_P4_112-65-BT3-4__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 275232 TO BUS 270644 CKT 1 / WILTO;3M 345 WILTO; 765 TRIP BRANCH FROM BUS 275232 TO BUS 270926 CKT 1 / WILTO;3M 345 WILTO; B 345 TRIP BRANCH FROM BUS 275232 TO BUS 275332 CKT 1 / WILTO;3M 345 WILTO;3C 33 END
COMED_P4_112-65-BT4-5__	CONTINGENCY 'COMED_P4_112-65-BT4-5__' TRIP BRANCH FROM BUS 270644 TO BUS 243206 CKT 1 / WILTO; 765 05DUMONT 765 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33 END

Contingency Name	Contingency Definition
COMED_P4_112-65-BT5-6__	CONTINGENCY 'COMED_P4_112-65-BT5-6__' TRIP BRANCH FROM BUS 270644 TO BUS 270607 CKT 1 / WILTO; 765 COLLI; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270644 CKT 1 / WILTO;4M 345 WILTO; 765 TRIP BRANCH FROM BUS 275233 TO BUS 270927 CKT 1 / WILTO;4M 345 WILTO; R 345 TRIP BRANCH FROM BUS 275233 TO BUS 275333 CKT 1 / WILTO;4M 345 WILTO;4C 33 END
COMED_P7_345-L94507_B-S+_345-L97008_R-S	CONTINGENCY 'COMED_P7_345-L94507_B-S+_345-L97008_R-S' TRIP BRANCH FROM BUS 274750 TO BUS 255112 CKT 1 / CRETE;BP 345 17STJOHN 345 TRIP BRANCH FROM BUS 274804 TO BUS 243229 CKT 1 / UPNOR;RP 345 05OLIVE 345 END
COMED_P7_641	CONTINGENCY 'COMED_P7_641' OPEN BRANCH FROM BUS 243229 TO BUS 270771 CKT 1 / 243229 05OLIVE 345 270771 GREENACRE; T 345 1 OPEN BRANCH FROM BUS 243229 TO BUS 274804 CKT 1 / 243229 05OLIVE 345 274804 UNIV PK N;RP 345 1 END

13 Short Circuit Analysis

The following Breakers are overdutied:

None

13.1 System Reinforcements - Short Circuit

None

14 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.

15 Affected Systems

15.1 MISO

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

16 Attachment 1: One Line Diagram

AF1-296
PRIMARY POI

