



**Generation Interconnection  
Feasibility Study Report  
for  
Queue Project AF1-314  
LENA 138 KV  
39.5 MW Capacity / 224.22 MW Energy**

January, 2020

## 1 General

The Interconnection Customer (IC) has proposed a wind generating facility to be located in Stephenson County, Illinois. The installed facilities will have a total capability of 224.2 MW with 39.5 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.

<b>Queue Number</b>	<b>AF1-314</b>
<b>Project Name</b>	LENA 138 KV
<b>State</b>	Illinois
<b>County</b>	Stephenson
<b>Transmission Owner</b>	ComEd
<b>MFO</b>	224.2
<b>MWE</b>	224.22
<b>MWC</b>	39.5
<b>Fuel</b>	Wind
<b>Basecase Study Year</b>	2023

### 1.1 Point of Interconnection

Queue Position AF1-314, a 224.2 MW wind farm proposes to interconnect with the ComEd transmission system by tying into the 138kV bus at Lena TSS 180.

### 1.2 Cost Summary

AF1-314 project will be responsible for the following costs associated with the physical interconnection of the project:

Description	Total Cost
Attachment Facilities	\$1,000,000
Direct Connection Network Upgrade	\$30,000,000
Non Direct Connection Network Upgrades	\$4,000,000
<b>Total Costs</b>	<b>\$35,000,000</b>

In addition, the AF1-314 project may be responsible for a contribution to the following costs associated with network upgrades:

Description	Total Cost
System Upgrades	\$125,240,000

Cost allocations for these upgrades will be provided in the System Impact Study Report.

## 2 Transmission Owner Scope of Work

### Attachment Facilities

The AF1-314 generator lead would interconnect to a new 138kV Interconnection Substation (see details in Direct Connection section below). The required Attachment Facilities are one 138kV line MOD, a dead-end structure and revenue metering as shown in the one-line diagram.

### Direct Connection Network Upgrades

The AF1-314 project requested interconnection at TSS 180 Lena. Lena is a distribution substation that has two radial 138 kV lines each feeding a 138/34 kV transformer. In order to allow interconnection of this wind farm, the radial lines to Lena need to be converted into a network lines. Also, ComEd requires 2-line feed to all transmission level generators so that a line can be removed from service for maintenance without impacting the generator.

To meet this requirement, it is proposed to install a new 138kV Interconnection Substation close to Lena and cut-in lines 11902 and 11904. The scope of work includes installation of nine 138kV circuit breakers in a “breaker-and-a-half” bus configuration and cut-in of lines 11902 and 11904, as shown in the one-line diagram below.

The Interconnection Customer (“IC”) is responsible for constructing all of the facilities on the IC side of the Point of Interconnection (“POI”). It is assumed for the purposes of this report that the IC will obtain the site for the Interconnection Substation and right-of-way between the Interconnection Substation and the 138kV transmission lines.

In the event that the IC exercises the option to build the Interconnecting Substation, the IC will be required to construct all interconnection facilities that will be turned over to ComEd in accordance with ComEd published standards and the PJM Tariff.

ComEd would design, engineer and construct the line cut-ins.

### Non-Direct Connection Network Upgrades

Cutting-in 138kV lines 11902 and 11904 into the proposed Interconnection Substation would create 3-terminal lines that would need to be mitigated. L11902 can be mitigated by adding a breaker at Lancaster and cutting the Maryland leg of the line into the bus as a new line. L11904 can be mitigated by interconnecting the generator lead of Eco Grove wind farm into the proposed Interconnection Substation, as shown in the one-line diagram below.

## 3 Attachment Facilities

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

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

#### 4 Direct Connection Cost Estimate

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

For Option to Build Direct Connection cost estimates:

Description	Total Cost
Installation of a new 138kV substation as described above	N/A
Transmission line tie in work (foundations, structures, conductors)	\$ 4,000,000
ComEd oversight and testing	\$ 1,500,000
<b>Total Direct Connection Facility Costs</b>	<b>\$ 4,500,000</b>

For ComEd building the Interconnecting Substation cost estimates:

Description	Total Cost
Installation of a new 138kV substation as described above	\$ 26,000,000
Transmission line tie in work (foundations, structures, conductors)	\$ 4,000,000
<b>Total Direct Connection Facility Costs</b>	<b>\$ 30,000,000</b>

#### 5 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
Installation of 138kV circuit breaker at Lancaster TSS 119	\$3,000,000
Relay/communications/SCADA upgrades at remote ends	\$1,000,000
<b>Total Non-Direct Connection Facility Costs</b>	<b>\$4,000,000</b>

#### 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 IC.
- 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 IC and the actual costs of ComEd's work may differ significantly from these estimates. IC 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 IC is responsible for all engineering, procurement, testing and construction of all equipment on the IC'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 of acquiring property and associated legal costs will be investigated during Facilities Study for this project.

## 6 Schedule

ComEd would take approximately 24-months to construct the substation and transmission line work after the ISA / ICSA are signed.

## 7 Transmission Owner Analysis

See Section 3.

## 8 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.

## 9 Revenue Metering and SCADA Requirements

### 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 Network Impacts

The Queue Project AF1-314 was evaluated as a 224.2 MW (Capacity 39.5 MW) injection tapping the Lena to Lancaster 138 kV line in the ComEd area. Project AF1-314 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-314 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

## Summer Peak Load Flow

### 11 Generation Deliverability

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44514381	270759	GARDEN PR; R	345.0	CE	270883	SILVER LK; R	345.0	CE	1	Base Case	single	1201.0	99.95	100.2	DC	6.62

### 12 Multiple Facility Contingency

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513483	271897	LANCASTER; R	138.0	CE	272240	PECATONIC; B	138.0	CE	1	COMED_P2-2_119_LN-138__6	bus	275.0	42.79	114.79	DC	197.99
44513745	271897	LANCASTER; R	138.0	CE	272240	PECATONIC; B	138.0	CE	1	COMED_P4_119-38-L19414_	breaker	275.0	38.03	119.55	DC	224.2
44513746	271897	LANCASTER; R	138.0	CE	272240	PECATONIC; B	138.0	CE	1	COMED_P4_119-38-L11902_	breaker	275.0	33.95	105.95	DC	197.99
44514812	271897	LANCASTER; R	138.0	CE	272240	PECATONIC; B	138.0	CE	1	COMED_P7_138-L11902GB-R+_138-L19414GR-R-A	tower	275.0	28.03	109.55	DC	224.2
44513497	272240	PECATONIC; B	138.0	CE	272747	WEMPLETO W; R	138.0	CE	1	COMED_P2-2_119_LN-138__6	bus	275.0	39.55	111.55	DC	197.99
44513794	272240	PECATONIC; B	138.0	CE	272747	WEMPLETO W; R	138.0	CE	1	COMED_P4_119-38-L19414_	breaker	275.0	33.23	114.75	DC	224.2
44513795	272240	PECATONIC; B	138.0	CE	272747	WEMPLETO W; R	138.0	CE	1	COMED_P4_119-38-L11902_	breaker	275.0	30.72	102.71	DC	197.99
44514828	272240	PECATONIC; B	138.0	CE	272747	WEMPLETO W; R	138.0	CE	1	COMED_P7_138-L11902GB-R+_138-L19414GR-R-A	tower	275.0	23.19	104.72	DC	224.2

### 13 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC DC	MW IMPACT
44513870	270694	CHERRY VA; B	345.0	CE	270759	GARDEN PR; R	345.0	CE	1	COMED_P4_144-45-BT6-8__	breaker	1479.0	116.38	117.87	DC	47.6
44513842	270770	GOODINGS;4B	345.0	CE	270766	GOODINGS;3B	345.0	CE	1	COMED_P4_116-45-L11614__	breaker	1802.0	120.75	121.21	DC	18.15
44513918	270807	LIBERTYV I; R	345.0	CE	270857	P HTS 117; R	345.0	CE	1	COMED_P4_016-45-BT6-11__	breaker	1479.0	113.44	114.09	DC	21.11
44513933	270847	PLANO ; R	345.0	CE	275208	PLANO ;4M	345.0	CE	1	COMED_P4_167-45-BT8-12__	breaker	1379.0	111.9	112.43	DC	17.16
44513934	270847	PLANO ; R	345.0	CE	275208	PLANO ;4M	345.0	CE	1	COMED_P4_167-45-BT8-9__	breaker	1379.0	111.41	112.0	DC	18.0
44513935	270847	PLANO ; R	345.0	CE	275208	PLANO ;4M	345.0	CE	1	COMED_P4_167-45-BT9-12__	breaker	1379.0	111.34	111.92	DC	18.0
44514781	274817	ZION EC ;RP	345.0	CE	270941	ZION STA ; R	345.0	CE	1	COMED_P7_345-L2221_R-N_+_345-L2222_B-N-A	tower	1367.0	151.69	152.16	DC	14.0
44514782	274817	ZION EC ;RP	345.0	CE	270941	ZION STA ; R	345.0	CE	1	COMED_P7_345-L2221_R-N_+_345-L2222_B-N-B	tower	1367.0	136.88	137.35	DC	14.0
44513936	275208	PLANO ;4M	345.0	CE	270630	PLANO ;	765.0	CE	1	COMED_P4_167-45-BT8-12__	breaker	1379.0	111.9	112.43	DC	17.16
44513937	275208	PLANO ;4M	345.0	CE	270630	PLANO ;	765.0	CE	1	COMED_P4_167-45-BT8-9__	breaker	1379.0	111.41	112.0	DC	18.0
44513938	275208	PLANO ;4M	345.0	CE	270630	PLANO ;	765.0	CE	1	COMED_P4_167-45-BT9-12__	breaker	1379.0	111.34	111.92	DC	18.0
43625850	956820	J1180 TAP	345.0	AMIL	247712	05SULLIVAN	345.0	AEP	1	AEP_P4_#3128_05EUGENE 345_A2	breaker	1466.0	175.75	175.98	DC	15.24

## 14 Potential Congestion due to Local Energy Deliverability

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

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC DC	MW IMPACT
44514454	270694	CHERRY VA; B	345.0	CE	270759	GARDEN PR; R	345.0	CE	1	COMED_P1-2_345-L0626__B-R-B	operation	1479.0	116.22	117.73	DC	48.43
44514376	270759	GARDEN PR; R	345.0	CE	270883	SILVER LK; R	345.0	CE	1	COMED_P1-2_345-L0626__B-R-B	operation	1479.0	121.83	123.3	DC	48.43
44514379	270759	GARDEN PR; R	345.0	CE	270883	SILVER LK; R	345.0	CE	1	Base Case	operation	1201.0	112.1	113.51	DC	37.57
44514464	270770	GOODINGS ;4B	345.0	CE	270766	GOODINGS ;3B	345.0	CE	1	COMED_P1-2_345-L11613AB-S	operation	1802.0	118.23	118.82	DC	23.12

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC DC	MW IMPACT
44514476	270828	NELSON ; B	345.0	CE	943410	AF1-012 TAP	345.0	CE	1	COMED_P1-2_345-L15501_B-R-A	operation	1656.0	120.8	120.9	DC	16.81
44514478	270828	NELSON ; B	345.0	CE	943410	AF1-012 TAP	345.0	CE	1	Base Case	operation	1334.0	102.73	103.54	DC	23.95
44514562	270846	PLANO ; B	345.0	CE	275207	PLANO ;3M	345.0	CE	1	COMED_P1-3_TR94_PLANO_R-S	operation	1379.0	107.77	108.4	DC	22.48
44514247	271398	ELEROY ;BT	138.0	CE	271498	FREEPORT ;BT	138.0	CE	1	Base Case	operation	249.0	69.67	159.71	DC	224.2
44514183	271495	FREEPORT ;SR	138.0	CE	271499	FREEPORT ;RT	138.0	CE	1	COMED_P2-1_119-L11904__	operation	173.0	60.45	190.04	DC	224.2
44514166	271498	FREEPORT ;BT	138.0	CE	271494	FREEPORT ;2R	138.0	CE	1	COMED_P2-1_119-L11904__	operation	173.0	100.27	229.87	DC	224.2
44514404	271498	FREEPORT ;BT	138.0	CE	271897	LANCASTER; R	138.0	CE	1	Base Case	operation	314.0	42.95	114.13	DC	223.5
44514510	271897	LANCASTER; R	138.0	CE	272240	PECATONIC; B	138.0	CE	1	COMED_P1-2_138-L19414GR-R	operation	264.0	58.24	107.58	DC	130.25
44514543	272240	PECATONIC; B	138.0	CE	272747	WEMPLETO W; R	138.0	CE	1	COMED_P1-2_138-L19414GR-R	operation	264.0	53.2	102.54	DC	130.25
44514295	274750	CRETE EC ;BP	345.0	CE	255112	17STJOHN	345.0	NIPS	1	Base Case	operation	1091.0	154.96	155.02	DC	17.27
43626415	274804	UNIV PK N;RP	345.0	CE	243229	05OLIVE	345.0	AEP	1	COMED_P1-2_695_B2	operation	971.0	104.43	104.55	DC	21.43
44514342	274817	ZION EC ;RP	345.0	CE	270941	ZION STA ; R	345.0	CE	1	COMED_P1-2_345-L2221__R-N	operation	1201.0	135.98	136.46	DC	12.45
44514564	275207	PLANO ;3M	345.0	CE	270630	PLANO ;	765.0	CE	1	COMED_P1-3_TR94_PLANO_R-S	operation	1379.0	107.77	108.4	DC	22.48
44514386	943410	AF1-012 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	COMED_P1-2_345-L15501_B-R-A	operation	1656.0	129.71	129.83	DC	16.81
44514388	943410	AF1-012 TAP	345.0	CE	270730	ELECT JCT; B	345.0	CE	1	Base Case	operation	1334.0	116.08	116.86	DC	23.95
45875799	946500	AF1-314 TAP	138.0	CE	271398	ELEROY ;BT	138.0	CE	1	Base Case	operation	249.0	74.97	165.01	DC	224.2
43626159	956820	J1180 TAP	345.0	AMIL	247712	05SULLIVAN	345.0	AEP	1	AEP_P1-2_#286	operation	1466.0	170.9	171.13	DC	15.6

## 15 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
43625850	10	J1180 TAP 345.0 kV - O5SULLIVAN 345.0 kV Ckt 1	<p><u>AEP</u>            AEPI0010a (437) : Reconductor/rebuild 0.82 miles of ACAR ~            1024.5 ~ 30/7 ~ RAIL1 conductor section 5            Project Type : FAC            Cost : \$1,640,000            Time Estimate : 24 - 36 months Months</p> <p>AEPI0010b (438) : Reconductor/rebuild 1 miles of ACAR ~            1024.5 ~ 30/7 ~ RAIL1 conductor section 6            Project Type : FAC            Cost : \$2,000,000            Time Estimate : 24 - 36 months Months</p> <p>AEPI0010c (439) : Replace two sullivan 3000A Wavetrap            Project Type : FAC            Cost : \$400,000            Time Estimate : 12- 18 months Months</p> <p>AEPI0010d (440) : Replace three 2-2000 AAC 91 Str            Project Type : FAC            Cost : \$300,000            Time Estimate : 12- 18 months Months</p> <p>AEPI0010e (441) : Reconductor/rebuild 0.2 miles of ACAR ~            1315.5 ~ 45/7 ~ DIPPER conductor sec 3, 1            Project Type : FAC            Cost : \$400,000            Time Estimate : 24 - 36 months Months</p>	\$4,740,000
44513918	6	LIBERTYVI; R 345.0 kV - P HTS 117; R 345.0 kV Ckt 1	<p><u>CE</u>            CE_NUN_L11723 (1674) : ComEd 345kV L11723 SSTE rating is            1568 MVA. The upgrade will be to replace station conductor            at both terminals and sag mitigation on the line. A            preliminary estimate for this upgrade is \$8.2M with a            estimated construction timeline of 24 months. Upon            completion of the upgrade the ratings will be            1334/1726/1837/2084 MVA (SN/SLTE/SSTE/SLD).            Project Type : FAC            Cost : \$8,200,000            Time Estimate : Months</p>	\$8,200,000
44514781,44514782	8	ZION EC ;RP 345.0 kV - ZION STA ; R 345.0 kV Ckt 1	<p><u>CE</u>            CE_NUN_2223 (1669) : ComEd 345kV L2223 ALDR rating is            1595 MVA. The upgrade will be to reconductor the line and            replace station conductor at Zion substation. A preliminry            estimate for the upgrade is \$5.5M with an estimated            construction timeline of 30 months. Upon completion of the            upgrade the ratings will be 1245/1341/1603/1915/2202 MVA            (SN/SLTE/SSTE/SLD/ALDR).            Project Type : FAC            Cost : \$5,500,000            Time Estimate : 30.0 Months</p>	\$5,500,000

ID	Index	Facility	Upgrade Description	Cost
44513870	4	CHERRY VA; B 345.0 kV - GARDEN PR; R 345.0 kV Ckt 1	<u>CE</u> ce-017 (1904) : L15616 SSTE rating is 1568 MVA. The post contingency flow for this event exceeds the rating therefore an upgrade is required. The upgrade will be to re-conductor a portion of the line, perform sag mitigation on another portion of the line and station conductor upgrade at a line terminal. A preliminary estimate for the upgrades is \$19.4M with a estimated construction time of 30 months. Upon completion the rating will be 1248/1441/1667/1982 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : \$19,400,000 Time Estimate : 30.0 Months	\$19,400,000
44514828,44513795, 44513497,44513794	3	PECATONIC; B 138.0 kV - WEMPLETOW; R 138.0 kV Ckt 1	<u>CE</u> CE_NUN_17121 (1703) : ComEd 138kV L17121 SLD & ALDR ratings are 275 MVA & 316 MVA. The upgrade will be to reconductor the line. A preliminary estimate for the upgrade is \$6.4M. A preliminary construction timeline is 24 months. Upon completion the ratings will be 351/449/459/498 MVA. Project Type : FAC Cost : \$6,400,000 Time Estimate : 24.0 Months	\$6,400,000
44514381	1	GARDEN PR; R 345.0 kV - SILVER LK; R 345.0 kV Ckt 1	<u>CE</u> ce-012a : ComEd 345kV L15616 SN rating is 1201 MVA. The post contingency flow for this event exceeds the rating therefore an upgrade is required. The upgrade will be to re-conductor the line and station bus work. A preliminary estimate for this upgrade is \$45.7M with a estimated construction timeline of 30 months. Upon completion of the upgrade the ratings will be 1248/1441/1667/1982 MVA SN/SLTE/SSTE/SLD. Project Type : FAC Cost : \$45,700,000 Time Estimate : 30.0 Months	\$45,700,000
44513842	5	GOODINGS ;4B 345.0 kV - GOODINGS ;3B 345.0 kV Ckt 1	<u>CE</u> CE_NUN_116BT3-4 (1651) : ComEd 345kV BT3-4 at TSS 116 SSTE rating is 2083 MVA. The upgrade will be to replace the 345kV BT3-4 circuit breaker at TSS 116. A preliminary estimate for the upgrade is \$3M. A preliminary construction timeline id 24 months. Upon completion of the upgrade the ratings will be 1754/2246/2297/2488 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : \$3,000,000 Time Estimate : 24.0 Months	\$3,000,000

ID	Index	Facility	Upgrade Description	Cost
44513937,44513936, 44513938	9	PLANO ;4M 345.0 kV - PLANO ; 765.0 kV Ckt 1	<p><u>CE</u>  CE_NUN_TSS 167-345KV_BT 8-12 (1689) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano (BT CB 8-14) . The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$6M with a estimated construction timeline of 30 months contingent upon line relocation issues.PJM to confirm this proposed solution.  Project Type : FAC  Cost : \$6,000,000  Time Estimate : 30.0 Months</p> <p>CE_NUN_TSS 167-345KV_BT 8-9 (1691) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano,BT CB 8-14 and relocate 345kV L0101 to newly designated 345kV Bus 14 on the Blue Bus. The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$10M with a estimated construction timeline of 30 months contingent upon line relocation issues. PJM to confirm this proposed solution.  Project Type : FAC  Cost : \$10,000,000  Time Estimate : 30.0 Months</p> <p>CE_NUN_TSS 167-345KV_BT 10-12 (1692) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The contingency name should be BT 10-12 rather than BT 9-12.The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano,BT CB 9-10. The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$4M with a estimated construction timeline of 30 months contingent upon line relocation issues. PJM to confirm this proposed solution.  Project Type : FAC  Cost : \$4,000,000  Time Estimate : 30.0 Months</p>	\$20,000,000

ID	Index	Facility	Upgrade Description	Cost
44513935,44513934, 44513933	7	PLANO ; R 345.0 kV - PLANO ;4M 345.0 kV Ckt 1	<p><u>CE</u> CE_NUN_TSS 167-345KV_BT 8-12 (1689) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano (BT CB 8-14) . The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$6M with a estimated construction timeline of 30 months contingent upon line relocation issues.PJM to confirm this proposed solution. Project Type : FAC Cost : \$6,000,000 Time Estimate : 30.0 Months</p> <p>CE_NUN_TSS 167-345KV_BT 8-9 (1691) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano,BT CB 8-14 and relocate 345kV L0101 to newly designated 345kV Bus 14 on the Blue Bus. The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$10M with a estimated construction timeline of 30 months contingent upon line relocation issues. PJM to confirm this proposed solution. Project Type : FAC Cost : \$10,000,000 Time Estimate : 30.0 Months</p> <p>CE_NUN_TSS 167-345KV_BT 10-12 (1692) : ComEd Tr. 94 at TSS 167 Plano SSTE rating is 1469 MVA. The contingency name should be BT 10-12 rather than BT 9-12.The upgrade will be to install a new 345kV bus tie circuit breaker at TSS 167 Plano,BT CB 9-10. The purpose is to reduce the impact of the current contingency impact. There will not be a rating change. A preliminary estimate for the upgrade is \$4M with a estimated construction timeline of 30 months contingent upon line relocation issues. PJM to confirm this proposed solution. Project Type : FAC Cost : \$4,000,000 Time Estimate : 30.0 Months</p>	\$20,000,000
44513483,44513745, 44513746,44514812	2	LANCASTER; R 138.0 kV - PECATONIC; B 138.0 kV Ckt 1	<p><u>CE</u> CE_NUN_17121_1 (1695) : ComEd 138kV L17121 ALDR rating is 316 MVA. The upgrade will be to reconductor the line. A preliminary estimate for the upgrade is \$12.3M with a preliminary construction timeline of 30 months. Upon completion the ratings will be 314/386/393/421 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : \$12,300,000 Time Estimate : 30.0 Months</p> <p>CE_NUN_17121 (1703) : ComEd 138kV L17121 SLD &amp; ALDR ratings are 275 MVA &amp; 316 MVA. The upgrade will be to reconductor the line. A preliminary estimate for the upgrade is \$6.4M. A preliminary construction timeline is 24 months. Upon completion the ratings will be 351/449/459/498 MVA. Project Type : FAC Cost : \$6,400,000 Time Estimate : 24.0 Months</p>	\$12,300,000

ID	Index	Facility	Upgrade Description	Cost
			TOTAL COST	\$125,240,000

## 16 Flow Gate Details

The following indices contain additional information about each flowgate presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

### 16.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44514381	270759	GARDEN PR; R	CE	270883	SILVER LK; R	CE	1	Base Case	single	1201.0	99.95	100.2	DC	6.62

Bus #	Bus	MW Impact
274822	ROCKFORD ;11	3.0652
274823	ROCKFORD ;21	3.1456
274830	U3-021 1	23.1986
274831	U3-021 2	23.1986
276160	W4-084	0.3170
290266	R-018	0.1819
919581	AA2-030	12.1199
924471	AB2-096	161.1015
925161	AB2-173 (Withdrawn : 12/24/2019)	2.1615
926431	AC1-114	4.0002
927511	AC1-113 1	1.6999
927521	AC1-113 2	1.6999
930481	AB1-089	66.8104
932881	AC2-115 1	3.3998
932891	AC2-115 2	3.3998
932921	AC2-116	1.4001
933341	AC2-147 C	0.8036
933911	AD1-013 C	1.0215
934431	AD1-067 C	0.0731
934651	AD1-096 C	1.1101
934701	AD1-098 C O1	3.9004
934971	AD1-129 C	0.8906
936791	AD2-102 C	18.5620
937001	AD2-134 C	1.5210

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
937311	AD2-172 C	2.9913
937531	AD2-214 C	2.7796
938861	AE1-114 C O1	4.0295
939051	AE1-134 1	0.9418
939061	AE1-134 2	0.9418
940501	AE2-035 C	1.5854
941131	AE2-107 C	1.8224
943381	AF1-009 C	0.1788
943391	AF1-010 C	0.6406
943401	AF1-011 C	0.3986
943411	AF1-012 C	3.5411
943921	AF1-060	0.9059
946151	AF1-280 C O1	7.1087
946161	AF1-281 C	0.1557
946321	AF1-296 C O1	1.2440
946501	AF1-314 C	2.9820
946531	AF1-317 C O1	0.6745
946671	AF1-331	0.7031
946681	AF1-332 C	0.6745
950101	J390	64.1698
952431	J760	4.1598
952511	J584 C	0.8135
953111	J807 C	0.9181
953681	J818	10.8144
953691	J819 C	1.1328
953901	J850	15.9850
954001	J864	3.3457
955221	J1000	2.7765
956371	J1127	4.3079
956391	J1129	6.5962
956581	J1154	5.4465
956901	J1188	4.4575
WEC	WEC	0.2904
CBM-W2	CBM-W2	6.1998
NY	NY	0.1913
CBM-W1	CBM-W1	28.5853
TVA	TVA	0.6482
CBM-S2	CBM-S2	0.0231
CBM-S1	CBM-S1	2.8798
TILTON	TILTON	0.0939
MADISON	MADISON	8.1850
MEC	MEC	6.8073
GIBSON	GIBSON	0.0682
BLUEG	BLUEG	0.4045
TRIMBLE	TRIMBLE	0.1380
CATAWBA	CATAWBA	0.0021

## 16.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513745	271897	LANCASTER;	CE	272240	PECATONIC;	CE	1	COMED_P4_119-38-L19414_	breaker	275.0	38.03	119.55	DC	224.2

Bus #	Bus	MW Impact
274856	ECOGROVE ;U1	2.7914
294763	P-046 E	79.9912
937311	AD2-172 C	20.9977
937312	AD2-172 E	28.9968
940501	AE2-035 C	20.9977
940502	AE2-035 E	28.9968
943921	AF1-060	11.9987
946501	AF1-314 C	39.4957
946502	AF1-314 E	184.6997
DUCKCREEK	DUCKCREEK	0.0127
NEWTON	NEWTON	0.0118
FARMERCITY	FARMERCITY	0.0006
NY	NY	0.0061
PRAIRIE	PRAIRIE	0.0284
O-066	O-066	0.0739
COFFEEN	COFFEEN	0.0058
EDWARDS	EDWARDS	0.0039
CHEOAH	CHEOAH	0.0055
TILTON	TILTON	0.0069
G-007	G-007	0.0114
GIBSON	GIBSON	0.0060
CALDERWOOD	CALDERWOOD	0.0055
BLUEG	BLUEG	0.0191
TRIMBLE	TRIMBLE	0.0061
CATAWBA	CATAWBA	0.0039

### 16.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513794	272240	PECATONIC;	CE	272747	WEMPLETOW;	CE	1	COMED_P4_119-38-L19414_	breaker	275.0	33.23	114.75	DC	224.2

Bus #	Bus	MW Impact
274856	ECOGROVE ;U1	2.7914
294763	P-046 E	79.9912
937311	AD2-172 C	20.9977
937312	AD2-172 E	28.9968
940501	AE2-035 C	20.9977
940502	AE2-035 E	28.9968
943921	AF1-060	11.9987

Bus #	Bus	MW Impact
946501	AF1-314 C	39.4957
946502	AF1-314 E	184.6997
DUCKCREEK	DUCKCREEK	0.0127
NEWTON	NEWTON	0.0118
FARMERCITY	FARMERCITY	0.0006
NY	NY	0.0061
PRAIRIE	PRAIRIE	0.0284
O-066	O-066	0.0739
COFFEEN	COFFEEN	0.0058
EDWARDS	EDWARDS	0.0039
CHEOAH	CHEOAH	0.0055
TILTON	TILTON	0.0069
G-007	G-007	0.0114
GIBSON	GIBSON	0.0060
CALDERWOOD	CALDERWOOD	0.0055
BLUEG	BLUEG	0.0191
TRIMBLE	TRIMBLE	0.0061
CATAWBA	CATAWBA	0.0039

## 16.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513870	270694	CHERRY VA; B	CE	270759	GARDEN PR; R	CE	1	COMED_P4_144-45-BT6-8_	breaker	1479.0	116.38	117.87	DC	47.6

Bus #	Bus	MW Impact
274656	BYRON ;1U	41.4378
274657	BYRON ;2U	40.5298
274822	ROCKFORD ;11	3.7754
274823	ROCKFORD ;21	3.8743
274824	ROCKFORD ;12	3.7425
274859	EASYSR;U1 E	14.5428
274860	EASYSR;U2 E	14.5428
276160	W4-084	0.4257
276172	Z1-108 BAT	2.0868
290051	GSG-6; E	7.4386
290108	LEEDK;1U E	14.8121
290266	R-018	0.2232
293516	O-009 E1	7.6184
293517	O-009 E2	3.8696
293518	O-009 E3	4.2615
293715	O-029 E	8.1450
293716	O-029 E	4.4658
293717	O-029 E	4.1045
294763	P-046 E	14.4357
919581	AA2-030	17.1350
925161	AB2-173 (Withdrawn : 12/24/2019)	3.0559

Bus #	Bus	MW Impact
926431	AC1-114	4.9268
927511	AC1-113 1	2.0938
927521	AC1-113 2	2.0938
930481	AB1-089	139.7165
932881	AC2-115 1	4.9266
932891	AC2-115 2	4.9266
932921	AC2-116	1.7244
933341	AC2-147 C	1.0521
933342	AC2-147 E	1.7166
933911	AD1-013 C	1.2962
933912	AD1-013 E	2.0705
934431	AD1-067 C	0.0934
934432	AD1-067 E	0.3927
934651	AD1-096 C	1.3790
934652	AD1-096 E	2.2499
934701	AD1-098 C O1	5.0039
934702	AD1-098 E O1	3.6534
934971	AD1-129 C	1.0959
934972	AD1-129 E	0.7306
936791	AD2-102 C	24.0832
936792	AD2-102 E	16.0555
937001	AD2-134 C	1.9446
937002	AD2-134 E	8.0330
937311	AD2-172 C	3.7894
937312	AD2-172 E	5.2329
937531	AD2-214 C	3.8724
937532	AD2-214 E	2.5816
938861	AE1-114 C O1	5.2043
938862	AE1-114 E O1	17.7559
939051	AE1-134 1	1.3315
939061	AE1-134 2	1.3315
940501	AE2-035 C	2.0084
940502	AE2-035 E	2.7735
941131	AE2-107 C	2.2884
941132	AE2-107 E	1.5256
943381	AF1-009 C	0.2294
943382	AF1-009 E	0.9177
943391	AF1-010 C	0.8859
943392	AF1-010 E	0.5906
943401	AF1-011 C	0.5512
943402	AF1-011 E	0.9253
943411	AF1-012 C	5.0798
943412	AF1-012 E	3.3865
943422	AF1-013 E	1.1471
943921	AF1-060	1.1476
946151	AF1-280 C O1	10.0700
946152	AF1-280 E O1	4.6307
946161	AF1-281 C	0.2205
946162	AF1-281 E	1.2496
946321	AF1-296 C O1	1.7370
946322	AF1-296 E O1	8.1324
946501	AF1-314 C	3.7776

Bus #	Bus	MW Impact
946502	AF1-314 E	17.6660
946531	AF1-317 C O1	0.9676
946671	AF1-331	0.8922
946681	AF1-332 C	0.9676
946682	AF1-332 E	1.4514
950101	J390	83.6714
952431	J760	5.3721
952511	J584 C	1.0645
952512	J584 E	5.7593
953111	J807 C	1.2239
953112	J807 E	6.6214
953681	J818	14.1923
953691	J819 C	1.4986
953692	J819 E	8.1078
953901	J850	21.0825
954001	J864	4.4352
955221	J1000	3.7495
955971	J1084	11.1600
956371	J1127	5.6362
956391	J1129	8.5768
956581	J1154	7.1483
956901	J1188	5.8185
WEC	WEC	0.5314
CBM-W2	CBM-W2	8.5585
NY	NY	0.2688
CBM-W1	CBM-W1	39.8193
TVA	TVA	0.8932
O-066	O-066	3.1450
CBM-S2	CBM-S2	0.0058
CBM-S1	CBM-S1	3.9533
TILTON	TILTON	0.1399
G-007	G-007	0.4857
MADISON	MADISON	11.2936
MEC	MEC	9.4657
GIBSON	GIBSON	0.0988
BLUEG	BLUEG	0.5711
TRIMBLE	TRIMBLE	0.1948
CATAWBA	CATAWBA	0.0046

## 16.5 Index 5

ID	FROM BUS#	FROM BUS AREA	FROM BUS AREA	TO BUS#	TO BUS AREA	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513842	270770	GOODINGS ;4B	CE	270766	GOODINGS ;3B	CE	1	COMED_P4_116-45-L11614_	breaker	1802.0	120.75	121.21	DC	18.15

Bus #	Bus	MW Impact
274730	ELWOOD EC;6P	4.1109

Bus #	Bus	MW Impact
274732	ELWOOD EC;7P	4.1109
274734	ELWOOD EC;8P	4.1109
274736	ELWOOD EC;9P	4.1109
274830	U3-021 1	3.5116
274831	U3-021 2	3.5116
274859	EASYR;U1 E	6.6104
274860	EASYR;U2 E	6.6104
274861	TOP CROP ;1U	0.8105
274862	TOP CROP ;2U	1.5733
276160	W4-084	0.2529
276161	W4-086	0.1241
276167	Z1-106 E2	0.6789
276168	Z1-106 E1	0.6791
276170	Z1-108 E	1.4117
290021	O50 E	20.5455
290051	GSG-6; E	5.7036
290108	LEEDK;1U E	12.8333
293516	O-009 E1	5.6903
293517	O-009 E2	2.8902
293518	O-009 E3	3.1829
293644	O22 E1	23.2266
293645	O22 E2	45.0870
293715	O-029 E	6.0836
293716	O-029 E	3.3355
293717	O-029 E	3.0657
293771	O-035 E	4.0976
294401	BSHIL;1U E	5.7494
294410	BSHIL;2U E	5.7494
294763	P-046 E	5.5053
914321	Y2-103 (Withdrawn : 12/24/2019)	26.2211
915011	Y3-013 1	2.1851
915021	Y3-013 2	2.1851
915031	Y3-013 3	2.1851
918052	AA1-018 E OP	15.5739
919581	AA2-030	10.7854
919621	AA2-039 C	1.4014
919622	AA2-039 E	9.3787
920272	AA2-123 E	1.3969
924471	AB2-096	24.3861
925161	AB2-173 (Withdrawn : 12/24/2019)	1.9235
925581	AC1-033 C	0.9416
925582	AC1-033 E	6.3035
926311	AC1-109 1	0.9948
926321	AC1-109 2	0.9948
926331	AC1-110 1	1.0220
926341	AC1-110 2	1.0220
926351	AC1-111 1	0.3898
926361	AC1-111 2	0.3898
926371	AC1-111 3	0.3898
926381	AC1-111 4	0.3898
926391	AC1-111 5	0.3898
926401	AC1-111 6	0.3898

Bus #	Bus	MW Impact
926431	AC1-114	1.3801
926821	AC1-168 C O1	0.5814
926822	AC1-168 E O1	3.9017
926841	AC1-171 C O1	0.8192
926842	AC1-171 E O1	5.4720
927091	AC1-204 1	93.1157
927101	AC1-204 2	92.6177
927201	AC1-214 C O1	1.3151
927202	AC1-214 E O1	4.1806
927451	AC1-142A 1	3.3015
927461	AC1-142A 2	3.3228
927511	AC1-113 1	0.6900
927521	AC1-113 2	0.6900
930481	AB1-089	38.0685
930741	AB1-122 1O1	55.2825
930751	AB1-122 2O1	76.6604
932881	AC2-115 1	1.3801
932891	AC2-115 2	1.3801
932921	AC2-116	0.4830
933341	AC2-147 C	0.5211
933342	AC2-147 E	0.8502
933431	AC2-156 C O1	0.4334
933432	AC2-156 E O1	0.7071
933911	AD1-013 C	0.9994
933912	AD1-013 E	1.5965
933931	AD1-016 C	0.5308
933932	AD1-016 E	0.8661
934051	AD1-031 C O1	1.9114
934052	AD1-031 E O1	3.1187
934101	AD1-039 1	5.4177
934111	AD1-039 2	7.5127
934431	AD1-067 C	0.0716
934432	AD1-067 E	0.3011
934651	AD1-096 C	0.5221
934652	AD1-096 E	0.8518
934701	AD1-098 C O1	3.7737
934702	AD1-098 E O1	2.7552
934871	AD1-116 C	0.9070
934872	AD1-116 E	1.4798
934971	AD1-129 C	0.5203
934972	AD1-129 E	0.3468
935001	AD1-133 C O1	12.4664
935002	AD1-133 E O1	8.3110
936291	AD2-038 C O1	2.3722
936292	AD2-038 E O1	15.8756
936511	AD2-066 C O1	5.3771
936512	AD2-066 E O1	3.5847
936791	AD2-102 C	8.2681
936792	AD2-102 E	5.5121
937001	AD2-134 C	1.4910
937002	AD2-134 E	6.1594
937311	AD2-172 C	1.4451

Bus #	Bus	MW Impact
937312	AD2-172 E	1.9957
937401	AD2-194 1	10.0133
937411	AD2-194 2	9.9598
937531	AD2-214 C	2.7730
937532	AD2-214 E	1.8487
938511	AE1-070 1	11.7657
938521	AE1-070 2	10.7068
938851	AE1-113 C	8.4750
938852	AE1-113 E	30.0478
938861	AE1-114 C O1	2.3340
938862	AE1-114 E O1	7.9629
939051	AE1-134 1	0.8381
939061	AE1-134 2	0.8381
939321	AE1-163 C O1	5.9609
939322	AE1-163 E O1	36.6173
939683	AE1-198 BAT	26.8833
939732	AE1-204 E (Withdrawn : 11/18/2019)	0.3226
940501	AE2-035 C	0.7659
940502	AE2-035 E	1.0577
941131	AE2-107 C	2.0348
941132	AE2-107 E	1.3565
942421	AE2-255 C O1	3.2102
942422	AE2-255 E O1	9.6307
942651	AE2-281 C O1	0.8516
942652	AE2-281 E O1	5.2310
942883	AE2-307 BAT	7.2855
942991	AE2-321 C	4.6756
942992	AE2-321 E	2.3029
943381	AF1-009 C	0.1730
943382	AF1-009 E	0.6921
943391	AF1-010 C	0.6617
943392	AF1-010 E	0.4411
943401	AF1-011 C	0.4117
943402	AF1-011 E	0.6911
943411	AF1-012 C	3.8504
943412	AF1-012 E	2.5669
943422	AF1-013 E	0.8651
943801	AF1-048 C	1.1584
943802	AF1-048 E	0.7723
943921	AF1-060	0.4377
944041	AF1-072	0.6386
946151	AF1-280 C O1	4.9961
946152	AF1-280 E O1	2.2975
946161	AF1-281 C	0.1094
946162	AF1-281 E	0.6200
946321	AF1-296 C O1	1.3338
946322	AF1-296 E O1	6.2444
946501	AF1-314 C	1.4407
946502	AF1-314 E	6.7372
946531	AF1-317 C O1	0.7334
946541	AF1-318 C O1	1.8329
946542	AF1-318 E O1	8.5821

Bus #	Bus	MW Impact
946661	AF1-330 C	0.6071
946662	AF1-330 E	0.1333
946671	AF1-331	0.6879
946681	AF1-332 C	0.7334
946682	AF1-332 E	1.1001
954981	J974 C	3.4047
954982	J974 E	18.4203
990901	L-005 E	8.8179
WEC	WEC	2.6057
CBM-W2	CBM-W2	15.9869
NY	NY	0.5524
CBM-W1	CBM-W1	38.3431
TVA	TVA	1.3188
O-066	O-066	6.4781
CBM-S1	CBM-S1	5.8021
G-007	G-007	1.0015
MADISON	MADISON	13.7773
MEC	MEC	10.0711
GIBSON	GIBSON	0.0207
BLUEG	BLUEG	0.8836
TRIMBLE	TRIMBLE	0.3066
CATAWBA	CATAWBA	0.0581

## 16.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513918	270807	LIBERTYVI; R	CE	270857	P HTS 117; R	CE	1	COMED_P4_016-45-BT6-11_	breaker	1479.0	113.44	114.09	DC	21.11

Bus #	Bus	MW Impact
274683	WAUKEGAN ;8U	7.0111
274725	ZION EC ;1P	5.3769
274726	ZION EC ;2P	5.3769
274727	ZION EC ;3P	5.3769
274828	WAUKEGAN ;BP	1.9941
274830	U3-021 1	5.6339
274831	U3-021 2	5.6339
274859	EASYR;U1 E	5.9584
274860	EASYR;U2 E	5.9584
276160	W4-084	0.1944
276170	Z1-108 E	2.7850
290051	GSG-6; E	3.8213
293516	O-009 E1	3.5153
293517	O-009 E2	1.7855
293518	O-009 E3	1.9663
293715	O-029 E	3.7582
293716	O-029 E	2.0606

Bus #	Bus	MW Impact
293717	O-029 E	1.8939
294763	P-046 E	6.4022
914321	Y2-103 (Withdrawn : 12/24/2019)	84.0456
915011	Y3-013 1	7.0038
915021	Y3-013 2	7.0038
915031	Y3-013 3	7.0038
919581	AA2-030	7.8535
920272	AA2-123 E	2.1413
924471	AB2-096	46.0285
925161	AB2-173 (Withdrawn : 12/24/2019)	1.4006
926431	AC1-114	1.8052
927511	AC1-113 1	0.9028
927521	AC1-113 2	0.9028
930481	AB1-089	41.5561
932881	AC2-115 1	1.8056
932891	AC2-115 2	1.8056
932921	AC2-116	0.6318
933341	AC2-147 C	0.4742
933342	AC2-147 E	0.7736
933911	AD1-013 C	0.6698
933912	AD1-013 E	1.0700
933931	AD1-016 C	0.8137
933932	AD1-016 E	1.3276
934431	AD1-067 C	0.0480
934432	AD1-067 E	0.2018
934651	AD1-096 C	0.5760
934652	AD1-096 E	0.9397
934701	AD1-098 C O1	2.5498
934702	AD1-098 E O1	1.8617
934971	AD1-129 C	0.7330
934972	AD1-129 E	0.4887
936791	AD2-102 C	11.0527
936792	AD2-102 E	7.3685
937001	AD2-134 C	0.9989
937002	AD2-134 E	4.1266
937311	AD2-172 C	1.6806
937312	AD2-172 E	2.3208
937531	AD2-214 C	1.9119
937532	AD2-214 E	1.2746
938861	AE1-114 C O1	2.3302
938862	AE1-114 E O1	7.9501
939051	AE1-134 1	0.6103
939061	AE1-134 2	0.6103
939732	AE1-204 E (Withdrawn : 11/18/2019)	0.6236
940501	AE2-035 C	0.8907
940502	AE2-035 E	1.2300
942991	AE2-321 C	7.0988
942992	AE2-321 E	3.4964
943381	AF1-009 C	0.1169
943382	AF1-009 E	0.4676
943391	AF1-010 C	0.4088
943392	AF1-010 E	0.2725

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
943401	AF1-011 C	0.2543
943402	AF1-011 E	0.4269
943411	AF1-012 C	2.4768
943412	AF1-012 E	1.6512
943422	AF1-013 E	0.5845
943801	AF1-048 C	1.7588
943802	AF1-048 E	1.1725
943921	AF1-060	0.5090
944041	AF1-072	0.7263
946151	AF1-280 C O1	4.2425
946152	AF1-280 E O1	1.9509
946161	AF1-281 C	0.0929
946162	AF1-281 E	0.5264
946321	AF1-296 C O1	0.9049
946322	AF1-296 E O1	4.2367
946501	AF1-314 C	1.6754
946502	AF1-314 E	7.8348
946531	AF1-317 C O1	0.4718
946661	AF1-330 C	0.9306
946662	AF1-330 E	0.2043
946671	AF1-331	0.4610
946681	AF1-332 C	0.4718
946682	AF1-332 E	0.7076
950101	J390	65.3702
951391	J505	11.4180
952381	J703	13.5248
952391	J704	5.7700
952431	J760	2.3319
952511	J584 C	0.7717
952512	J584 E	4.1753
953111	J807 C	0.8215
953112	J807 E	4.4444
953151	J831	5.3460
953331	J801	3.8310
953491	J947	30.3460
953681	J818	14.5558
953691	J819 C	1.0552
953692	J819 E	5.7090
953701	J821 C	1.2421
953702	J821 E	6.7200
953891	J849	13.2237
953901	J850	23.7875
954001	J864	3.4001
954141	J878	29.2980
954191	J886	17.1135
954511	J926 C	0.8328
954512	J926 E	4.5057
954691	J732	35.7619
954741	J928 C	1.3201
954742	J928 E	7.1418
955091	J986	12.8539
955241	J1002	9.1476

Bus #	Bus	MW Impact
955251	J1003	5.0585
955301	J1009	70.8680
955311	J1010	61.1880
955321	J1011	61.1880
955581	J1042 C	3.6768
955582	J1042 E	20.8352
955601	J1044 C	12.5070
955602	J1044 E	12.5070
955631	J1047	25.0140
955671	J1051	5.9175
955691	J1053	35.9040
955981	J1085 C	3.2072
955982	J1085 E	17.3518
956141	J1101	2.2818
956171	J1104	13.6250
956321	J1121	18.1740
956371	J1127	4.2660
956391	J1129	5.8409
956571	J1153	19.3605
956581	J1154	7.3252
956731	J1171	11.4480
956852	J1183 E	0.1428
956901	J1188	4.4485
WEC	WEC	5.5270
CBM-W2	CBM-W2	6.7322
NY	NY	0.1908
CBM-W1	CBM-W1	66.3405
TVA	TVA	0.7434
O-066	O-066	2.2310
CBM-S2	CBM-S2	0.2081
CBM-S1	CBM-S1	3.3484
TILTON	TILTON	0.1222
G-007	G-007	0.3453
MADISON	MADISON	12.4065
MEC	MEC	7.6749
GIBSON	GIBSON	0.0743
BLUEG	BLUEG	0.4114
TRIMBLE	TRIMBLE	0.1402

## 16.7 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513934	270847	PLANO	CE	275208	PLANO	CE	1	COMED_P4_167-45-BT8-9__	breaker	1379.0	111.41	112.0	DC	18.0

Bus #	Bus	MW Impact
274660	LASCO STA;1U	21.4385

Bus #	Bus	MW Impact
274661	LASCO STA;2U	21.6053
274737	AURORA EC;1P	2.8040
274739	AURORA EC;2P	2.8040
274746	AURORA EC;0P	0.5326
274830	U3-021 1	3.6881
274831	U3-021 2	3.6881
274847	GR RIDGE ;BU	0.4891
274859	EASYR;U1 E	6.2497
274860	EASYR;U2 E	6.2497
274871	GR RIDGE ;2U	0.6211
274881	PILOT HIL;1E	6.6140
275149	KELLYCK ;1E	6.6140
276160	W4-084	0.2338
276161	W4-086	0.0922
276167	Z1-106 E2	0.8548
276168	Z1-106 E1	0.8529
276169	Z1-107 E	1.0353
276170	Z1-108 E	1.5443
290021	O50 E	3.6682
290051	GSG-6; E	6.0946
290108	LEEDK;1U E	14.2273
293061	N-015 E	14.0148
293516	O-009 E1	4.8472
293517	O-009 E2	2.4620
293518	O-009 E3	2.7113
293715	O-029 E	5.1822
293716	O-029 E	2.8413
293717	O-029 E	2.6115
293771	O-035 E	3.0620
294392	P-010 E	17.7988
294401	BSHIL;1U E	4.0888
294410	BSHIL;2U E	4.0888
294763	P-046 E	5.4590
914321	Y2-103 (Withdrawn : 12/24/2019)	25.1991
915011	Y3-013 1	2.0999
915021	Y3-013 2	2.0999
915031	Y3-013 3	2.0999
919581	AA2-030	9.6618
919621	AA2-039 C	0.9967
919622	AA2-039 E	6.6699
920272	AA2-123 E	1.4970
924471	AB2-096	25.6118
925161	AB2-173 (Withdrawn : 12/24/2019)	1.7231
925581	AC1-033 C	0.6697
925582	AC1-033 E	4.4831
926311	AC1-109 1	1.9824
926321	AC1-109 2	1.9824
926331	AC1-110 1	1.1341
926341	AC1-110 2	1.1341
926351	AC1-111 1	0.5872
926361	AC1-111 2	0.5872
926371	AC1-111 3	0.5872

Bus #	Bus	MW Impact
926381	AC1-111 4	0.5872
926391	AC1-111 5	0.5872
926401	AC1-111 6	0.5872
926431	AC1-114	1.4142
926821	AC1-168 C O1	0.6132
926822	AC1-168 E O1	4.1152
927201	AC1-214 C O1	0.9827
927202	AC1-214 E O1	3.1240
927451	AC1-142A 1	1.5382
927461	AC1-142A 2	1.5390
927511	AC1-113 1	0.7071
927521	AC1-113 2	0.7071
930481	AB1-089	40.1208
930501	AB1-091 O1	26.1660
930751	AB1-122 2O1	28.6994
932881	AC2-115 1	1.4142
932891	AC2-115 2	1.4142
932921	AC2-116	0.4950
933341	AC2-147 C	0.4928
933342	AC2-147 E	0.8040
933411	AC2-154 C	0.8976
933412	AC2-154 E	1.4645
933431	AC2-156 C O1	0.5618
933432	AC2-156 E O1	0.9166
933911	AD1-013 C	1.0804
933912	AD1-013 E	1.7259
933931	AD1-016 C	0.5689
933932	AD1-016 E	0.9282
934051	AD1-031 C O1	1.3598
934052	AD1-031 E O1	2.2186
934111	AD1-039 2	2.8125
934431	AD1-067 C	0.0765
934432	AD1-067 E	0.3218
934651	AD1-096 C	0.5186
934652	AD1-096 E	0.8462
934701	AD1-098 C O1	4.0011
934702	AD1-098 E O1	2.9213
934971	AD1-129 C	0.5453
934972	AD1-129 E	0.3635
936371	AD2-047 C O1	1.6063
936372	AD2-047 E O1	7.8423
936461	AD2-060	0.5008
936511	AD2-066 C O1	3.6590
936512	AD2-066 E O1	2.4394
936791	AD2-102 C	8.3314
936792	AD2-102 E	5.5542
937001	AD2-134 C	1.5932
937002	AD2-134 E	6.5816
937311	AD2-172 C	1.4330
937312	AD2-172 E	1.9789
937321	AD2-175 C (Withdrawn : 12/10/2019)	5.8433
937322	AD2-175 E (Withdrawn : 12/10/2019)	3.8955

Bus #	Bus	MW Impact
937531	AD2-214 C	2.3517
937532	AD2-214 E	1.5678
938851	AE1-113 C	2.9711
938852	AE1-113 E	10.5337
938861	AE1-114 C O1	2.2447
938862	AE1-114 E O1	7.6583
939051	AE1-134 1	0.7508
939061	AE1-134 2	0.7508
939351	AE1-166 C O1	2.0247
939352	AE1-166 E O1	1.8690
939732	AE1-204 E (Withdrawn : 11/18/2019)	0.3090
940501	AE2-035 C	0.7595
940502	AE2-035 E	1.0488
940621	AE2-049 C O1	1.7389
940622	AE2-049 E O1	1.1592
940631	AE2-050 C O1	2.9476
940632	AE2-050 E O1	1.9651
940752	AE2-062 E	0.0269
940762	AE2-063 E (Withdrawn : 01/14/2020)	0.0269
941131	AE2-107 C	2.2713
941132	AE2-107 E	1.5142
941551	AE2-152 C O1	2.3362
941552	AE2-152 E O1	1.5575
941561	AE2-153 C O1	2.0582
941562	AE2-153 E O1	9.6361
942421	AE2-255 C O1	1.1254
942422	AE2-255 E O1	3.3762
942881	AE2-307 C O1	5.4040
942882	AE2-307 E O1	1.9651
942911	AE2-310 C O1	1.6885
942912	AE2-310 E O1	0.4536
942991	AE2-321 C	5.0002
942992	AE2-321 E	2.4628
943121	AE2-341 C	7.5009
943122	AE2-341 E	3.6834
943381	AF1-009 C	0.1834
943382	AF1-009 E	0.7338
943391	AF1-010 C	0.5637
943392	AF1-010 E	0.3758
943401	AF1-011 C	0.3507
943402	AF1-011 E	0.5887
943411	AF1-012 C	3.5061
943412	AF1-012 E	2.3374
943422	AF1-013 E	0.9172
943591	AF1-030 C O1	2.6516
943592	AF1-030 E O1	1.3001
943801	AF1-048 C	1.2388
943802	AF1-048 E	0.8259
943921	AF1-060	0.4340
944041	AF1-072	0.7391
944911	AF1-156 C	2.7891
944912	AF1-156 E	1.8594

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
945351	AF1-200 FTIR	700.0603
946151	AF1-280 C O1	4.6493
946152	AF1-280 E O1	2.1380
946161	AF1-281 C	0.1018
946162	AF1-281 E	0.5769
946321	AF1-296 C O1	1.0955
946322	AF1-296 E O1	5.1287
946501	AF1-314 C	1.4286
946502	AF1-314 E	6.6806
946521	AF1-316 C O1	6.1665
946522	AF1-316 E O1	9.2498
946531	AF1-317 C O1	0.6678
946541	AF1-318 C O1	1.4707
946542	AF1-318 E O1	6.8862
946661	AF1-330 C	0.6506
946662	AF1-330 E	0.1428
946671	AF1-331	0.7437
946681	AF1-332 C	0.6678
946682	AF1-332 E	1.0017
950101	J390	37.8659
952431	J760	1.6584
952511	J584 C	0.4781
952512	J584 E	2.5867
953151	J831	2.1168
953491	J947	10.9500
953681	J818	7.8434
953901	J850	12.7400
954141	J878	11.1100
955251	J1003	2.5405
955301	J1009	22.7000
955311	J1010	22.2800
955321	J1011	22.2800
955581	J1042 C	1.6467
955582	J1042 E	9.3313
955601	J1044 C	5.4900
955602	J1044 E	5.4900
955631	J1047	10.9800
955671	J1051	2.6495
955691	J1053	15.8460
956171	J1104	5.3510
956371	J1127	2.5813
956391	J1129	3.5250
956571	J1153	7.8255
956581	J1154	3.9480
956731	J1171	5.1200
956901	J1188	2.6295
990901	L-005 E	5.8619
WEC	WEC	2.4683
CBM-W2	CBM-W2	8.8206
NY	NY	0.6476
CBM-W1	CBM-W1	39.1313
TVA	TVA	0.4592

Bus #	Bus	MW Impact
O-066	O-066	7.6877
CHEOAH	CHEOAH	0.0991
CBM-S1	CBM-S1	1.1672
G-007	G-007	1.1887
MADISON	MADISON	11.4489
MEC	MEC	7.5366
GIBSON	GIBSON	0.1469
CALDERWOOD	CALDERWOOD	0.0929
BLUEG	BLUEG	1.2794
TRIMBLE	TRIMBLE	0.4313
CATAWBA	CATAWBA	0.1900

## 16.8 Index 8

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44514781	274817	ZION EC ;RP	CE	270941	ZION STA ; R	CE	1	COMED_P7_345-L2221_R-N_+345-L2222_B-N-A	tower	1367.0	151.69	152.16	DC	14.0

Bus #	Bus	MW Impact
274725	ZION EC ;1P	9.6634
274726	ZION EC ;2P	9.6634
274727	ZION EC ;3P	9.6634
274830	U3-021 1	2.8424
274831	U3-021 2	2.8424
294763	P-046 E	4.2446
914321	Y2-103 (Withdrawn : 12/24/2019)	151.0488
915011	Y3-013 1	12.5874
915021	Y3-013 2	12.5874
915031	Y3-013 3	12.5874
920272	AA2-123 E	0.8745
924471	AB2-096	19.7391
926431	AC1-114	1.1178
927511	AC1-113 1	0.5591
927521	AC1-113 2	0.5591
932881	AC2-115 1	1.1183
932891	AC2-115 2	1.1183
932921	AC2-116	0.3912
933931	AD1-016 C	0.3323
933932	AD1-016 E	0.5422
934651	AD1-096 C	0.3411
934652	AD1-096 E	0.5565
934971	AD1-129 C	0.3720
934972	AD1-129 E	0.2480
936791	AD2-102 C	8.7710
936792	AD2-102 E	5.8473

Bus #	Bus	MW Impact
937311	AD2-172 C	1.1142
937312	AD2-172 E	1.5387
938861	AE1-114 C O1	1.5187
938862	AE1-114 E O1	5.1814
939733	AE1-204 BAT (Withdrawn : 11/18/2019)	0.4642
940501	AE2-035 C	0.5905
940502	AE2-035 E	0.8155
942991	AE2-321 C	2.9597
942992	AE2-321 E	1.4578
943801	AF1-048 C	0.7333
943802	AF1-048 E	0.4889
943921	AF1-060	0.3374
946501	AF1-314 C	1.1107
946502	AF1-314 E	5.1944
946661	AF1-330 C	0.3800
946662	AF1-330 E	0.0834
950101	J390	70.7967
951391	J505	17.8920
952381	J703	20.7355
952391	J704	8.8384
952431	J760	1.6860
952511	J584 C	0.8098
952512	J584 E	4.3814
953111	J807 C	0.8128
953112	J807 E	4.3973
953151	J831	8.7532
953331	J801	4.8070
953491	J947	52.3600
953681	J818	18.0752
953691	J819 C	1.0811
953692	J819 E	5.8490
953701	J821 C	1.7970
953702	J821 E	9.7224
953891	J849	20.2837
953901	J850	30.3825
953921	J855 C	0.8358
953922	J855 E	4.5222
954001	J864	3.7080
954061	J870	10.7160
954071	J871	5.3580
954141	J878	44.7400
954191	J886	26.8095
954511	J926 C	1.0583
954512	J926 E	5.7255
954691	J732	49.0246
954741	J928 C	2.0246
954742	J928 E	10.9538
955091	J986	18.3291
955241	J1002	12.6750
955251	J1003	6.9290
955301	J1009	132.3200
955311	J1010	101.2520

Bus #	Bus	MW Impact
955321	J1011	101.2520
955501	J1032	2.6735
955581	J1042 C	5.0460
955582	J1042 E	28.5940
955601	J1044 C	17.5030
955602	J1044 E	17.5030
955631	J1047	35.0060
955671	J1051	8.8115
955691	J1053	54.2010
955771	J1061	16.0410
955981	J1085 C	4.4778
955982	J1085 E	24.2262
956051	J1092	6.0720
956141	J1101	3.5746
956171	J1104	22.3230
956321	J1121	26.9880
956371	J1127	4.5564
956391	J1129	5.9358
956571	J1153	31.3890
956581	J1154	9.0938
956731	J1171	17.3320
956811	J1179	15.5010
956852	J1183 E	0.2190
956901	J1188	4.8340
CPL	CPL	0.1005
WEC	WEC	8.8805
CBM-W2	CBM-W2	8.5258
NY	NY	0.0846
CBM-W1	CBM-W1	93.7625
TVA	TVA	1.0612
O-066	O-066	0.9542
CBM-S2	CBM-S2	1.3988
CBM-S1	CBM-S1	5.2142
TILTON	TILTON	0.0340
G-007	G-007	0.1466
MADISON	MADISON	15.2772
MEC	MEC	8.5488
BLUEG	BLUEG	0.0937
TRIMBLE	TRIMBLE	0.0384

## 16.9 Index 9

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
44513937	275208	PLANO	CE	270630	PLANO	CE	1	COMED_P4_167-45-BT8-9__	breaker	1379.0	111.41	112.0	DC	18.0

Bus #	Bus	MW Impact
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Bus #	Bus	MW Impact
274660	LASCO STA;1U	21.4385
274661	LASCO STA;2U	21.6053
274737	AURORA EC;1P	2.8040
274739	AURORA EC;2P	2.8040
274746	AURORA EC;0P	0.5326
274830	U3-021 1	3.6881
274831	U3-021 2	3.6881
274847	GR RIDGE ;BU	0.4891
274859	EASYR;U1 E	6.2497
274860	EASYR;U2 E	6.2497
274871	GR RIDGE ;2U	0.6211
274881	PILOT HIL;1E	6.6140
275149	KELLYCK ;1E	6.6140
276160	W4-084	0.2338
276161	W4-086	0.0922
276167	Z1-106 E2	0.8548
276168	Z1-106 E1	0.8529
276169	Z1-107 E	1.0353
276170	Z1-108 E	1.5443
290021	O50 E	3.6682
290051	GSG-6; E	6.0946
290108	LEEDK;1U E	14.2273
293061	N-015 E	14.0148
293516	O-009 E1	4.8472
293517	O-009 E2	2.4620
293518	O-009 E3	2.7113
293715	O-029 E	5.1822
293716	O-029 E	2.8413
293717	O-029 E	2.6115
293771	O-035 E	3.0620
294392	P-010 E	17.7988
294401	BSHIL;1U E	4.0888
294410	BSHIL;2U E	4.0888
294763	P-046 E	5.4590
914321	Y2-103 (Withdrawn : 12/24/2019)	25.1991
915011	Y3-013 1	2.0999
915021	Y3-013 2	2.0999
915031	Y3-013 3	2.0999
919581	AA2-030	9.6618
919621	AA2-039 C	0.9967
919622	AA2-039 E	6.6699
920272	AA2-123 E	1.4970
924471	AB2-096	25.6118
925161	AB2-173 (Withdrawn : 12/24/2019)	1.7231
925581	AC1-033 C	0.6697
925582	AC1-033 E	4.4831
926311	AC1-109 1	1.9824
926321	AC1-109 2	1.9824
926331	AC1-110 1	1.1341
926341	AC1-110 2	1.1341
926351	AC1-111 1	0.5872
926361	AC1-111 2	0.5872

Bus #	Bus	MW Impact
926371	AC1-111 3	0.5872
926381	AC1-111 4	0.5872
926391	AC1-111 5	0.5872
926401	AC1-111 6	0.5872
926431	AC1-114	1.4142
926821	AC1-168 C O1	0.6132
926822	AC1-168 E O1	4.1152
927201	AC1-214 C O1	0.9827
927202	AC1-214 E O1	3.1240
927451	AC1-142A 1	1.5382
927461	AC1-142A 2	1.5390
927511	AC1-113 1	0.7071
927521	AC1-113 2	0.7071
930481	AB1-089	40.1208
930501	AB1-091 O1	26.1660
930751	AB1-122 2O1	28.6994
932881	AC2-115 1	1.4142
932891	AC2-115 2	1.4142
932921	AC2-116	0.4950
933341	AC2-147 C	0.4928
933342	AC2-147 E	0.8040
933411	AC2-154 C	0.8976
933412	AC2-154 E	1.4645
933431	AC2-156 C O1	0.5618
933432	AC2-156 E O1	0.9166
933911	AD1-013 C	1.0804
933912	AD1-013 E	1.7259
933931	AD1-016 C	0.5689
933932	AD1-016 E	0.9282
934051	AD1-031 C O1	1.3598
934052	AD1-031 E O1	2.2186
934111	AD1-039 2	2.8125
934431	AD1-067 C	0.0765
934432	AD1-067 E	0.3218
934651	AD1-096 C	0.5186
934652	AD1-096 E	0.8462
934701	AD1-098 C O1	4.0011
934702	AD1-098 E O1	2.9213
934971	AD1-129 C	0.5453
934972	AD1-129 E	0.3635
936371	AD2-047 C O1	1.6063
936372	AD2-047 E O1	7.8423
936461	AD2-060	0.5008
936511	AD2-066 C O1	3.6590
936512	AD2-066 E O1	2.4394
936791	AD2-102 C	8.3314
936792	AD2-102 E	5.5542
937001	AD2-134 C	1.5932
937002	AD2-134 E	6.5816
937311	AD2-172 C	1.4330
937312	AD2-172 E	1.9789
937321	AD2-175 C (Withdrawn : 12/10/2019)	5.8433

Bus #	Bus	MW Impact
937322	AD2-175 E (Withdrawn : 12/10/2019)	3.8955
937531	AD2-214 C	2.3517
937532	AD2-214 E	1.5678
938851	AE1-113 C	2.9711
938852	AE1-113 E	10.5337
938861	AE1-114 C O1	2.2447
938862	AE1-114 E O1	7.6583
939051	AE1-134 1	0.7508
939061	AE1-134 2	0.7508
939351	AE1-166 C O1	2.0247
939352	AE1-166 E O1	1.8690
939732	AE1-204 E (Withdrawn : 11/18/2019)	0.3090
940501	AE2-035 C	0.7595
940502	AE2-035 E	1.0488
940621	AE2-049 C O1	1.7389
940622	AE2-049 E O1	1.1592
940631	AE2-050 C O1	2.9476
940632	AE2-050 E O1	1.9651
940752	AE2-062 E	0.0269
940762	AE2-063 E (Withdrawn : 01/14/2020)	0.0269
941131	AE2-107 C	2.2713
941132	AE2-107 E	1.5142
941551	AE2-152 C O1	2.3362
941552	AE2-152 E O1	1.5575
941561	AE2-153 C O1	2.0582
941562	AE2-153 E O1	9.6361
942421	AE2-255 C O1	1.1254
942422	AE2-255 E O1	3.3762
942881	AE2-307 C O1	5.4040
942882	AE2-307 E O1	1.9651
942911	AE2-310 C O1	1.6885
942912	AE2-310 E O1	0.4536
942991	AE2-321 C	5.0002
942992	AE2-321 E	2.4628
943121	AE2-341 C	7.5009
943122	AE2-341 E	3.6834
943381	AF1-009 C	0.1834
943382	AF1-009 E	0.7338
943391	AF1-010 C	0.5637
943392	AF1-010 E	0.3758
943401	AF1-011 C	0.3507
943402	AF1-011 E	0.5887
943411	AF1-012 C	3.5061
943412	AF1-012 E	2.3374
943422	AF1-013 E	0.9172
943591	AF1-030 C O1	2.6516
943592	AF1-030 E O1	1.3001
943801	AF1-048 C	1.2388
943802	AF1-048 E	0.8259
943921	AF1-060	0.4340
944041	AF1-072	0.7391
944911	AF1-156 C	2.7891

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
944912	AF1-156 E	1.8594
945351	AF1-200 FTIR	700.0603
946151	AF1-280 C O1	4.6493
946152	AF1-280 E O1	2.1380
946161	AF1-281 C	0.1018
946162	AF1-281 E	0.5769
946321	AF1-296 C O1	1.0955
946322	AF1-296 E O1	5.1287
946501	AF1-314 C	1.4286
946502	AF1-314 E	6.6806
946521	AF1-316 C O1	6.1665
946522	AF1-316 E O1	9.2498
946531	AF1-317 C O1	0.6678
946541	AF1-318 C O1	1.4707
946542	AF1-318 E O1	6.8862
946661	AF1-330 C	0.6506
946662	AF1-330 E	0.1428
946671	AF1-331	0.7437
946681	AF1-332 C	0.6678
946682	AF1-332 E	1.0017
950101	J390	37.8659
952431	J760	1.6584
952511	J584 C	0.4781
952512	J584 E	2.5867
953151	J831	2.1168
953491	J947	10.9500
953681	J818	7.8434
953901	J850	12.7400
954141	J878	11.1100
955251	J1003	2.5405
955301	J1009	22.7000
955311	J1010	22.2800
955321	J1011	22.2800
955581	J1042 C	1.6467
955582	J1042 E	9.3313
955601	J1044 C	5.4900
955602	J1044 E	5.4900
955631	J1047	10.9800
955671	J1051	2.6495
955691	J1053	15.8460
956171	J1104	5.3510
956371	J1127	2.5813
956391	J1129	3.5250
956571	J1153	7.8255
956581	J1154	3.9480
956731	J1171	5.1200
956901	J1188	2.6295
990901	L-005 E	5.8619
WEC	WEC	2.4683
CBM-W2	CBM-W2	8.8206
NY	NY	0.6476
CBM-W1	CBM-W1	39.1313

Bus #	Bus	MW Impact
TVA	TVA	0.4592
O-066	O-066	7.6877
CHEOAH	CHEOAH	0.0991
CBM-S1	CBM-S1	1.1672
G-007	G-007	1.1887
MADISON	MADISON	11.4489
MEC	MEC	7.5366
GIBSON	GIBSON	0.1469
CALDERWOOD	CALDERWOOD	0.0929
BLUEG	BLUEG	1.2794
TRIMBLE	TRIMBLE	0.4313
CATAWBA	CATAWBA	0.1900

## 16.10 Index 10

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
43625850	956820	J1180 TAP	AMIL	247712	05SULLIVAN	AEP	1	AEP_P4_#3128_05EUGENE 345_A2	breaker	1466.0	175.75	175.98	DC	15.24

Bus #	Bus	MW Impact
274650	KINCAID ;1U	13.2935
274651	KINCAID ;2U	13.2881
274830	U3-021 1	2.7041
274831	U3-021 2	2.7041
274853	TWINGROVE;U1	0.7109
274854	TWINGROVE;U2	0.7109
274859	EASYR;U1 E	5.8271
274860	EASYR;U2 E	5.8271
274880	GENERATOR;	0.9428
274882	W4-005 E	45.2314
274890	CAYUG;1U E	8.8128
274891	CAYUG;2U E	8.8128
276153	W2-048 E	1.9673
276160	W4-084	0.2292
276161	W4-086	0.0932
276167	Z1-106 E2	0.4813
276168	Z1-106 E1	0.4813
276170	Z1-108 E	1.0033
290021	O50 E	9.3214
290051	GSG-6; E	4.7952
290108	LEEDK;1U E	10.5825
290261	S-027 E	20.3734
290265	S-028 E	20.3734
293516	O-009 E1	5.4176
293517	O-009 E2	2.7517
293518	O-009 E3	3.0304
293644	O22 E1	4.2400

Bus #	Bus	MW Impact
293645	O22 E2	8.2305
293715	O-029 E	5.7921
293716	O-029 E	3.1757
293717	O-029 E	2.9188
293771	O-035 E	4.3612
294401	BSHIL;1U E	5.9282
294410	BSHIL;2U E	5.9282
294763	P-046 E	4.6206
909052	X2-022 E	28.4500
914321	<b>Y2-103 (Withdrawn : 12/24/2019)</b>	<b>17.8765</b>
915011	Y3-013 1	1.4897
915021	Y3-013 2	1.4897
915031	Y3-013 3	1.4897
917501	Z2-087 C	0.3697
917502	Z2-087 E	17.7254
918052	AA1-018 E OP	6.8485
919581	AA2-030	9.9647
919621	AA2-039 C	1.4450
919622	AA2-039 E	9.6704
920272	AA2-123 E	1.0482
924041	AB2-047 C O1	3.3108
924042	AB2-047 E O1	22.1567
924261	AB2-070 C O1	3.8233
924262	AB2-070 E O1	25.5867
924471	AB2-096	18.7782
925161	<b>AB2-173 (Withdrawn : 12/24/2019)</b>	<b>1.7771</b>
925581	AC1-033 C	0.9706
925582	AC1-033 E	6.4981
925771	AC1-053 C	3.8589
925772	AC1-053 E	25.8251
926431	AC1-114	1.1147
926821	AC1-168 C O1	0.7027
926822	AC1-168 E O1	4.7157
926841	AC1-171 C O1	1.0402
926842	AC1-171 E O1	6.9481
927201	AC1-214 C O1	1.3997
927202	AC1-214 E O1	4.4496
927511	AC1-113 1	0.5573
927521	AC1-113 2	0.5573
930481	AB1-089	30.3454
930741	AB1-122 1O1	30.2585
930751	AB1-122 2O1	4.9179
932881	AC2-115 1	1.1147
932891	AC2-115 2	1.1147
932921	AC2-116	0.3901
933341	AC2-147 C	0.4607
933342	AC2-147 E	0.7516
933431	AC2-156 C O1	0.3661
933432	AC2-156 E O1	0.5973
933911	AD1-013 C	0.8334
933912	AD1-013 E	1.3313
933931	AD1-016 C	0.3983

Bus #	Bus	MW Impact
933932	AD1-016 E	0.6499
934051	AD1-031 C O1	1.9711
934052	AD1-031 E O1	3.2161
934101	AD1-039 1	2.9653
934111	AD1-039 2	2.7019
934431	AD1-067 C	0.0602
934432	AD1-067 E	0.2532
934651	AD1-096 C	0.4390
934652	AD1-096 E	0.7162
934701	AD1-098 C O1	3.1871
934702	AD1-098 E O1	2.3269
934871	AD1-116 C	0.3988
934872	AD1-116 E	0.6507
934971	AD1-129 C	0.4060
934972	AD1-129 E	0.2707
935001	AD1-133 C O1	12.2568
935002	AD1-133 E O1	8.1712
935141	AD1-148	7.4152
936291	AD2-038 C O1	1.1619
936292	AD2-038 E O1	7.7758
936511	AD2-066 C O1	4.0672
936512	AD2-066 E O1	2.7115
936771	AD2-100 C	22.4746
936772	AD2-100 E	14.9831
936791	AD2-102 C	6.7983
936792	AD2-102 E	4.5322
936971	AD2-131 C	1.4805
936972	AD2-131 E	7.4380
937001	AD2-134 C	1.2535
937002	AD2-134 E	5.1784
937211	AD2-159 C	4.8880
937212	AD2-159 E	22.8845
937311	AD2-172 C	1.2129
937312	AD2-172 E	1.6750
937531	AD2-214 C	2.7616
937532	AD2-214 E	1.8410
938851	AE1-113 C	3.8451
938852	AE1-113 E	13.6326
938861	AE1-114 C O1	2.0270
938862	AE1-114 E O1	6.9158
939051	AE1-134 1	0.7743
939061	AE1-134 2	0.7743
939321	AE1-163 C O1	2.9197
939322	AE1-163 E O1	17.9351
939401	AE1-172 C O1	2.9630
939402	AE1-172 E O1	13.9023
939732	AE1-204 E (Withdrawn : 11/18/2019)	0.2160
939741	AE1-205 C O1	8.5571
939742	AE1-205 E O1	11.8169
940101	AE1-252 C O1	5.9525
940102	AE1-252 E O1	3.9683
940501	AE2-035 C	0.6428

Bus #	Bus	MW Impact
940502	AE2-035 E	0.8877
941131	AE2-107 C	1.6718
941132	AE2-107 E	1.1145
941343	AE2-130 BAT	31.7940
941731	AE2-173 O1	5.0935
942111	AE2-223 C	1.9865
942112	AE2-223 E	13.2940
942421	AE2-255 C O1	1.4565
942422	AE2-255 E O1	4.3694
942481	AE2-261 C	31.0721
942482	AE2-261 E	20.7147
942602	AE2-276 BAT	14.0055
942651	AE2-281 C O1	0.4171
942652	AE2-281 E O1	2.5622
942991	AE2-321 C	3.5229
942992	AE2-321 E	1.7352
943381	AF1-009 C	0.1461
943382	AF1-009 E	0.5845
943391	AF1-010 C	0.6300
943392	AF1-010 E	0.4200
943401	AF1-011 C	0.3920
943402	AF1-011 E	0.6580
943411	AF1-012 C	3.3977
943412	AF1-012 E	2.2652
943422	AF1-013 E	0.7306
943801	AF1-048 C	0.8728
943802	AF1-048 E	0.5819
943921	AF1-060	0.3673
944041	AF1-072	0.4494
944221	AF1-090 C O1	6.8126
944222	AF1-090 E O1	31.8954
945871	AF1-252 O1	12.0769
945881	AF1-253 O1	8.3609
946151	AF1-280 C O1	4.4678
946152	AF1-280 E O1	2.0545
946161	AF1-281 C	0.0978
946162	AF1-281 E	0.5544
946321	AF1-296 C O1	1.3874
946322	AF1-296 E O1	6.4955
946501	AF1-314 C	1.2092
946502	AF1-314 E	5.6546
946531	AF1-317 C O1	0.6472
946541	AF1-318 C O1	2.0448
946542	AF1-318 E O1	9.5743
946661	AF1-330 C	0.4556
946662	AF1-330 E	0.1000
946671	AF1-331	0.5737
946681	AF1-332 C	0.6472
946682	AF1-332 E	0.9708
951741	J474 C	1.9020
951742	J474 E	10.2905
952251	J641	9.9834

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
952271	J644	9.2422
952651	J756 C	2.2026
952652	J756 E	11.9168
952871	J757 C	3.9305
952872	J757 E	21.2652
953371	J808	8.8051
953401	J811	17.7527
953431	J853	10.8085
953641	J813	39.5225
953651	J815	31.4750
953671	J817	10.3791
953741	J826 C	1.6144
953742	J826 E	8.7346
953851	J845 C	1.6818
953852	J845 E	9.0990
953881	J848 C	5.1492
953882	J848 E	27.8583
953951	J859	9.4027
954181	J884	7.3910
954411	J912	14.0350
954681	J949 C	32.7828
954721	J750 C	2.0377
954722	J750 E	11.0243
954761	J468 C	5.2098
954762	J468 E	29.5221
954821	J955	107.6504
954831	J956	13.0280
955001	J976	22.7910
955031	J979 C	4.1193
955032	J979 E	22.2867
955041	J980 C	4.1193
955042	J980 E	22.2867
955101	J987	7.0950
955131	J991	40.7140
955161	J994	6.4670
955171	J995	8.4020
955391	J1021 C	3.5231
955392	J1021 E	19.0609
955401	J1022 C	2.4217
955402	J1022 E	13.1018
955441	J1026 C	3.8351
955442	J1026 E	20.7489
955551	J1039	3.7985
956071	J1094	13.5180
956091	J1096	11.0880
956151	J1102	5.2353
956241	J1111	10.7055
956281	J1115 C	2.8027
956282	J1115 E	15.1633
956341	J1123 C	1.5243
956342	J1123 E	8.2467
956451	J1139	21.9840

Bus #	Bus	MW Impact
956501	J1145	16.0975
956821	J1180	36.4837
990901	L-005 E	9.1892
CPLE	CPLE	0.5987
WEC	WEC	2.0236
CBM-W2	CBM-W2	71.4987
NY	NY	0.4524
CBM-W1	CBM-W1	61.4366
TVA	TVA	7.8036
O-066	O-066	5.0870
CBM-S2	CBM-S2	8.6527
CBM-S1	CBM-S1	36.9853
G-007	G-007	0.7842
MADISON	MADISON	25.3331
MEC	MEC	15.7740
BLUEG	BLUEG	2.7012
TRIMBLE	TRIMBLE	0.9995

## Affected Systems

### 17 Affected Systems

#### 17.1 LG&E

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

#### 17.2 MISO

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

#### 17.3 TVA

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

#### 17.4 Duke Energy Progress

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

#### 17.5 NYISO

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

Contingency Name	Contingency Definition
COMED_P2-2_119_LN-138__6	CONTINGENCY 'COMED_P2-2_119_LN-138__6' TRIP BRANCH FROM BUS 271897 TO BUS 271499 CKT 1 / LANCASTER; R 138 FREEPORT ;5T 138 TRIP BRANCH FROM BUS 271897 TO BUS 271898 CKT 1 / LANCASTER; R 138 LANCASTER;BT 138 END
COMED_P7_138-L11902GB-R+_138-L19414GR-R-A	CONTINGENCY 'COMED_P7_138-L11902GB-R+_138-L19414GR-R-A' TRIP BRANCH FROM BUS 271399 TO BUS 271397 CKT 1 / ELEROY ;RT 138 ELEROY ; R 138 TRIP BRANCH FROM BUS 271399 TO BUS 271915 CKT 1 / ELEROY ;RT 138 LENA ; R 138 TRIP BRANCH FROM BUS 271898 TO BUS 271399 CKT 1 / LANCASTER;BT 138 ELEROY ;RT 138 TRIP BRANCH FROM BUS 271898 TO BUS 271897 CKT 1 / LANCASTER;BT 138 LANCASTER; R 138 TRIP BRANCH FROM BUS 938860 TO BUS 272598 CKT 1 / AE1-114 TAP 138 ESS B427 ;1T 138 TRIP BRANCH FROM BUS 272598 TO BUS 271898 CKT 1 / ESS B427 ;1T 138 LANCASTER;BT 138 TRIP BRANCH FROM BUS 272598 TO BUS 272596 CKT 1 / ESS B427 ;1T 138 ESS B427 ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271397 TO BUS 271396 / ELEROY ; R 138 ELEROY ; B 138 MOVE 100 PERCENT LOAD FROM BUS 271915 TO BUS 271914 / LENA ; R 138 LENA ; B 138 CLOSE BRANCH FROM BUS 271328 TO BUS 271332 CKT 1 / DIXON ;BT 138 DIXON ; B 138 TRIP BRANCH FROM BUS 271483 TO BUS 273154 CKT 1 / FORDAM ; R 138 FORDHAM ; R 12.5 TRIP BRANCH FROM BUS 271495 TO BUS 274184 CKT 6 / FREEPORT ;5R 138 FREEPORT ; 34.5 TRIP BRANCH FROM BUS 271499 TO BUS 271495 CKT 1 / FREEPORT ;5T 138 FREEPORT ;5R 138 TRIP BRANCH FROM BUS 271499 TO BUS 271897 CKT 1 / FREEPORT ;5T 138 LANCASTER; R 138 TRIP BRANCH FROM BUS 272245 TO BUS 271483 CKT 1 / PIERPONT ; R 138 FORDAM ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272245 CKT 1 / PIERPONT ;RT 138 PIERPONT ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272491 CKT 1 / PIERPONT ;RT 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272433 TO BUS 272247 CKT 1 / SABROOKE ; R 138 PIERPONT ;RT 138 TRIP BRANCH FROM BUS 272599 TO BUS 271499 CKT 1 / ESS B427 ;4T 138 FREEPORT ;5T 138 TRIP BRANCH FROM BUS 272599 TO BUS 272491 CKT 1 / ESS B427 ;4T 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272599 TO BUS 272597 CKT 1 / ESS B427 ;4T 138 ESS B427 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 271495 TO BUS 271494 / FREEPORT ;5R 138 FREEPORT ;2R 138 MOVE 100 PERCENT LOAD FROM BUS 272245 TO BUS 272244 / PIERPONT ; R 138 PIERPONT ; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272240 / S PECATON; R 138 PECATONIC; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272244 / S PECATON; R 138 PIERPONT ; B 138 CLOSE BRANCH FROM BUS 272596 TO BUS 272597 CKT 1 / ESS B427 ; B 138 ESS B427 ; R 138 END
COMED_P4_016-45-BT6-11_	CONTINGENCY 'COMED_P4_016-45-BT6-11_' TRIP BRANCH FROM BUS 270914 TO BUS 270830 CKT 1 / WAUKEGAN ; B 345 NBROOK159; B 345 TRIP BRANCH FROM BUS 270915 TO BUS 270914 CKT 1 / WAUKEGAN ; R 345 WAUKEGAN ; B 345 TRIP BRANCH FROM BUS 275206 TO BUS 270830 CKT 1 / NBROOK159;2M 138 NBROOK159; B 345 TRIP BRANCH FROM BUS 275206 TO BUS 272120 CKT 1 / NBROOK159;2M 138 NBROOK159; B 138 TRIP BRANCH FROM BUS 275206 TO BUS 275306 CKT 1 / NBROOK159;2M 138 NBROOK159;2C 34.5 CLOSE BRANCH FROM BUS 272120 TO BUS 272121 CKT 1 / NBROOK159; B 138 NBROOK159; R 138 TRIP BRANCH FROM BUS 270942 TO BUS 270915 CKT 1 / ZION STA ;0B 345 WAUKEGAN ; R 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

Contingency Name	Contingency Definition
COMED_P4_119-38-L11902_	<p>CONTINGENCY 'COMED_P4_119-38-L11902_'</p> <p>TRIP BRANCH FROM BUS 271399 TO BUS 271397 CKT 1 / ELEROY ;RT 138 ELEROY ; R 138</p> <p>TRIP BRANCH FROM BUS 271399 TO BUS 271915 CKT 1 / ELEROY ;RT 138 LENA ; R 138</p> <p>TRIP BRANCH FROM BUS 271898 TO BUS 271399 CKT 1 / LANCASTER;BT 138 ELEROY ;RT 138</p> <p>TRIP BRANCH FROM BUS 271898 TO BUS 271897 CKT 1 / LANCASTER;BT 138 LANCASTER; R 138</p> <p>TRIP BRANCH FROM BUS 938860 TO BUS 272598 CKT 1 / AE1-114 TAP 138 ESS B427 ;1T 138</p> <p>TRIP BRANCH FROM BUS 272598 TO BUS 271898 CKT 1 / ESS B427 ;1T 138 LANCASTER;BT 138</p> <p>TRIP BRANCH FROM BUS 272598 TO BUS 272596 CKT 1 / ESS B427 ;1T 138 ESS B427 ; B 138</p> <p>MOVE 100 PERCENT LOAD FROM BUS 271397 TO BUS 271396 / ELEROY ; R 138 ELEROY ; B 138</p> <p>MOVE 100 PERCENT LOAD FROM BUS 271915 TO BUS 271914 / LENA ; R 138 LENA ; B 138</p> <p>TRIP BRANCH FROM BUS 271897 TO BUS 271499 CKT 1 / LANCASTER; R 138 FREEPORT ;5T 138</p> <p>END</p>
COMED_P1-2_345-L0626__B-R-B	<p>CONTINGENCY 'COMED_P1-2_345-L0626__B-R-B'</p> <p>TRIP BRANCH FROM BUS 930480 TO BUS 270916 CKT 1 / AB1-089 TAP 345 WAYNE ; B 345</p> <p>END</p>
COMED_P4_167-45-BT8-9__	<p>CONTINGENCY 'COMED_P4_167-45-BT8-9__'</p> <p>TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1 / LASCO STA; B 345 PLANO ; B 345</p> <p>TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345</p> <p>TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345</p> <p>TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138</p> <p>TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138</p> <p>TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138</p> <p>PLANO;1C 34.5</p> <p>END</p>
COMED_P4_167-45-BT9-12__	<p>CONTINGENCY 'COMED_P4_167-45-BT9-12__'</p> <p>TRIP BRANCH FROM BUS 270802 TO BUS 270846 CKT 1 / LASCO STA; B 345 PLANO ; B 345</p> <p>TRIP BRANCH FROM BUS 270846 TO BUS 270847 CKT 1 / PLANO ; B 345 PLANO ; R 345</p> <p>TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765</p> <p>TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345</p> <p>TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33</p> <p>END</p>
COMED_P4_144-45-BT6-8__	<p>CONTINGENCY 'COMED_P4_144-45-BT6-8__'</p> <p>TRIP BRANCH FROM BUS 930480 TO BUS 270916 CKT 1 / AB1-089 TAP 345 WAYNE ; B 345</p> <p>TRIP BRANCH FROM BUS 270730 TO BUS 270916 CKT 1 / ELEC JUNC; B 345 WAYNE ; B 345</p> <p>TRIP BRANCH FROM BUS 270916 TO BUS 270917 CKT 1 / WAYNE ; B 345 WAYNE ; R 345</p> <p>END</p>
AEP_P4_#3128_05EUGENE 345_A2	<p>CONTINGENCY 'AEP_P4_#3128_05EUGENE 345_A2'</p> <p>OPEN BRANCH FROM BUS 243221 TO BUS 249504 CKT 1 / 243221 05EUGENE 345 249504</p> <p>08CAYSUB 345 1</p> <p>OPEN BRANCH FROM BUS 243221 TO BUS 348885 CKT 1 / 243221 05EUGENE 345 348885</p> <p>7BUNSONVILLE 345 1</p> <p>END</p>
COMED_P1-2_345-L15501_B-R-A	<p>CONTINGENCY 'COMED_P1-2_345-L15501_B-R-A'</p> <p>TRIP BRANCH FROM BUS 270828 TO BUS 946160 CKT 1 / NELSO; B 345 AF1-281 TAP 345</p> <p>END</p>

Contingency Name	Contingency Definition
COMED_P1-2_345-L2221__R-N	CONTINGENCY 'COMED_P1-2_345-L2221__R-N' TRIP BRANCH FROM BUS 270941 TO BUS 699432 CKT 1 / ZION ; R 345 PLS PR2 345 END
COMED_P1-2_138-L19414GR-R	CONTINGENCY 'COMED_P1-2_138-L19414GR-R' TRIP BRANCH FROM BUS 271483 TO BUS 273154 CKT 1 / FORDAM ; R 138 FORDHAM ; R 12.5 TRIP BRANCH FROM BUS 271495 TO BUS 274184 CKT 6 / FREEPORT ;5R 138 FREEPORT; 34.5 TRIP BRANCH FROM BUS 271499 TO BUS 271495 CKT 1 / FREEPORT ;5T 138 FREEPORT ;5R 138 TRIP BRANCH FROM BUS 271499 TO BUS 271897 CKT 1 / FREEPORT ;5T 138 LANCASTER; R 138 TRIP BRANCH FROM BUS 272245 TO BUS 271483 CKT 1 / PIERPONT ; R 138 FORDAM ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272245 CKT 1 / PIERPONT ;RT 138 PIERPONT ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272491 CKT 1 / PIERPONT ;RT 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272433 TO BUS 272247 CKT 1 / SABROOKE ; R 138 PIERPONT ;RT 138 TRIP BRANCH FROM BUS 272599 TO BUS 271499 CKT 1 / ESS B427 ;4T 138 FREEPORT ;5T 138 TRIP BRANCH FROM BUS 272599 TO BUS 272491 CKT 1 / ESS B427 ;4T 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272599 TO BUS 272597 CKT 1 / ESS B427 ;4T 138 ESS B427 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 271495 TO BUS 271494 / FREEPORT ;5R 138 FREEPORT ;2R 138 MOVE 100 PERCENT LOAD FROM BUS 272245 TO BUS 272244 / PIERPONT ; R 138 PIERPONT ; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272240 / S PECATON; R 138 PECATONIC; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272244 / S PECATON; R 138 PIERPONT ; B 138 CLOSE BRANCH FROM BUS 272596 TO BUS 272597 CKT 1 / ESS B427 ; B 138 ESS B427 ; R 138 END
COMED_P4_119-38-L19414_	CONTINGENCY 'COMED_P4_119-38-L19414_' TRIP BRANCH FROM BUS 271483 TO BUS 273154 CKT 1 / FORDAM ; R 138 FORDHAM ; R 12.5 TRIP BRANCH FROM BUS 271495 TO BUS 274184 CKT 6 / FREEPORT ;5R 138 FREEPORT; 34.5 TRIP BRANCH FROM BUS 271499 TO BUS 271495 CKT 1 / FREEPORT ;5T 138 FREEPORT ;5R 138 TRIP BRANCH FROM BUS 271499 TO BUS 271897 CKT 1 / FREEPORT ;5T 138 LANCASTER; R 138 TRIP BRANCH FROM BUS 272245 TO BUS 271483 CKT 1 / PIERPONT ; R 138 FORDAM ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272245 CKT 1 / PIERPONT ;RT 138 PIERPONT ; R 138 TRIP BRANCH FROM BUS 272247 TO BUS 272491 CKT 1 / PIERPONT ;RT 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272433 TO BUS 272247 CKT 1 / SABROOKE ; R 138 PIERPONT ;RT 138 TRIP BRANCH FROM BUS 272599 TO BUS 271499 CKT 1 / ESS B427 ;4T 138 FREEPORT ;5T 138 TRIP BRANCH FROM BUS 272599 TO BUS 272491 CKT 1 / ESS B427 ;4T 138 S PECATON; R 138 TRIP BRANCH FROM BUS 272599 TO BUS 272597 CKT 1 / ESS B427 ;4T 138 ESS B427 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 271495 TO BUS 271494 / FREEPORT ;5R 138 FREEPORT ;2R 138 MOVE 100 PERCENT LOAD FROM BUS 272245 TO BUS 272244 / PIERPONT ; R 138 PIERPONT ; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272240 / S PECATON; R 138 PECATONIC; B 138 MOVE 50 PERCENT LOAD FROM BUS 272491 TO BUS 272244 / S PECATON; R 138 PIERPONT ; B 138 CLOSE BRANCH FROM BUS 272596 TO BUS 272597 CKT 1 / ESS B427 ; B 138 ESS B427 ; R 138 TRIP BRANCH FROM BUS 271897 TO BUS 271898 CKT 1 / LANCASTER; R 138 LANCASTER;BT 138 END

Contingency Name	Contingency Definition
COMED_P4_167-45-BT8-12_	CONTINGENCY 'COMED_P4_167-45-BT8-12_' TRIP BRANCH FROM BUS 275207 TO BUS 270630 CKT 1 / PLANO ;3M 345 PLANO ; 765 TRIP BRANCH FROM BUS 275207 TO BUS 270846 CKT 1 / PLANO ;3M 345 PLANO ; B 345 TRIP BRANCH FROM BUS 275207 TO BUS 275307 CKT 1 / PLANO ;3M 345 PLANO ;3C 33 TRIP BRANCH FROM BUS 270846 TO BUS 270730 CKT 1 / PLANO ; B 345 ELEC JUNC; B 345 TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 1 / PLANO ; B 138 PLANO;1I 138 TRIP BRANCH FROM BUS 272250 TO BUS 272278 CKT 2 / PLANO ; B 138 PLANO;1I 138 TRIP BRANCH FROM BUS 270846 TO BUS 272278 TO BUS 275354 CKT 1 / PLANO ; B 345 PLANO;1I 138 PLANO;1C 34.5 END
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
COMED_P4_116-45-L11614_	CONTINGENCY 'COMED_P4_116-45-L11614_' TRIP BRANCH FROM BUS 270667 TO BUS 270665 CKT 1 / B ISL;RT 345 B ISL; R 345 TRIP BRANCH FROM BUS 270667 TO BUS 270927 CKT 1 / B ISL;RT 345 WILTO; R 345 TRIP BRANCH FROM BUS 270769 TO BUS 270667 CKT 1 / GOODI;2R 345 B ISL;RT 345 DISCONNECT BUS 270769 / GOODI;2R 345 END
Base Case	
COMED_P7_345-L2221__R-N+_345-L2222__B-N-B	CONTINGENCY 'COMED_P7_345-L2221__R-N+_345-L2222__B-N-B' TRIP BRANCH FROM BUS 270940 TO BUS 270941 CKT 1 / ZION ; B 345 ZION ; R 345 TRIP BRANCH FROM BUS 270940 TO BUS 270942 CKT 1 / ZION ; B 345 ZION ;0B 345 TRIP BRANCH FROM BUS 270941 TO BUS 699432 CKT 1 / ZION ; R 345 PLS PR2 345 TRIP BRANCH FROM BUS 955310 TO BUS 699247 CKT 1 / J1010 TAP 345 ARCADN3 345 CLOSE BRANCH FROM BUS 270941 TO BUS 270942 CKT 1 / ZION ; R 345 ZION ;0B 345 END
COMED_P7_345-L2221__R-N+_345-L2222__B-N-A	CONTINGENCY 'COMED_P7_345-L2221__R-N+_345-L2222__B-N-A' TRIP BRANCH FROM BUS 270940 TO BUS 270941 CKT 1 / ZION ; B 345 ZION ; R 345 TRIP BRANCH FROM BUS 270940 TO BUS 270942 CKT 1 / ZION ; B 345 ZION ;0B 345 TRIP BRANCH FROM BUS 270941 TO BUS 699432 CKT 1 / ZION ; R 345 PLS PR2 345 TRIP BRANCH FROM BUS 270942 TO BUS 955310 CKT 1 / ZION ;0B 345 J1010 TAP 345 CLOSE BRANCH FROM BUS 270941 TO BUS 270942 CKT 1 / ZION ; R 345 ZION ;0B 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_P1-3_TR94_PLANO_R-S	CONTINGENCY 'COMED_P1-3_TR94_PLANO_R-S' TRIP BRANCH FROM BUS 275208 TO BUS 270630 CKT 1 / PLANO;4M 345 PLANO; 765 TRIP BRANCH FROM BUS 275208 TO BUS 270847 CKT 1 / PLANO;4M 345 PLANO; R 345 TRIP BRANCH FROM BUS 275208 TO BUS 275308 CKT 1 / PLANO;4M 345 PLANO;4C 33 END

Contingency Name	Contingency Definition
COMED_P2-1_119-L11904__	CONTINGENCY 'COMED_P2-1_119-L11904__' TRIP BRANCH FROM BUS 271897 TO BUS 271498 CKT 1 / LANCASTER; R 138 FREEPORT ;BT END

# Short Circuit

## 18 Short Circuit

The following Breakers are overdutied:

None