Generation Interconnection

Feasibility Study Report

for

Queue Project AF1-009

DIXON-MCGIRR

5 MW Capacity / 25 MW Energy

January, 2020

1 Preface

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

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

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a $10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

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

2 General

The Interconnection Customer (IC) has proposed a storage generating facility located in Lee County, Illinois. The installed facilities will have a capability of 25.0 MW with 5.0 of new request being recognized by PJM as Capacity. Note, this project is an increase to the Interconnection Customer's prior queue project which will share the same property and connection point. The conduct of light load analysis as required under the PJM planning process is not performed during the Feasibility Study phase. Additional reinforcement requirements for this Interconnection Request may be defined during the conduct of the light load analysis which shall be performed following execution of the System Impact Study agreement.

Queue Number	AF1-009
Project Name	DIXON-MCGIRR
State	Illinois
County	Lee
Transmission Owner	ComEd
MFO	25
MWE	25
MWC	5
Fuel	Storage
Basecase Study Year	2023

2.1 Point of Interconnection

Queue Position AF1-009, a 25 MW storage facility, proposes to interconnect with the ComEd transmission system by utilizing the same attachment facilities as their prior queue project.

2.2 Cost Summary

The AF1-009 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$200,00
Direct Connection Network Upgrade	$
Non Direct Connection Network Upgrades	$
Total Costs	$200,000

In addition, the AF1-009 project may be responsible for a contribution to the following costs

Description	Total Cost
44070916	$21,700,000
44071008	$13,100,000
44070660	$4,800,000

Description	Total Cost
Total	**$39,600,000**

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

3 Transmission Owner Scope of Work

The addition of a 25 MW storage facility will require review and possible upgrade of SCADA, Communication, relays and metering.

4 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
SCADA, Communication, relays and metering	$200,000
Total Attachment Facility Costs	**$200,000**

5 Direct Connection Cost Estimate

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

Description	Total Cost
Total Direct Connection Facility Costs	**$0**

6 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
Total Non-Direct Connection Facility Costs	**$0**

7 Schedule

ComEd would take approximately 18-months to review and possibly upgrade SCADA, Communication, relays and metering after the ISA / ICSA are signed.

8 Transmission Owner Analysis

The addition of a 25 MW storage facility will require review and possible upgrade of SCADA, Communication, relays and metering. The estimated cost is $200,000.

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

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.

11 Network Impacts

The Queue Project AF1-009 was evaluated as a 25.0 MW (Capacity 5.0 MW) injection tapping the Dixon to McGirr Road 138 kV line in the ComEd area. Project AF1-009 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-009 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

Summer Peak Load Flow

12 Generation Deliverability

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

None

13 Multiple Facility Contingency

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

None

14 Contribution to Previously Identified Overloads

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

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
44071008	272728	WATERMAN ; B	138.0	CE	272445	SANDWICH ; R	138.0	CE	1	COMED_P4_083-38-BT3-4__	breaker	331.0	113.6	116.62	DC	9.98
44070660	272756	W DEKALB ;3T	138.0	CE	272730	WATERMAN ;3B	138.0	CE	1	COMED_P2-2_083_GL-138R__4	bus	471.0	107.96	110.56	DC	12.26
44070916	934700	AD1-098 TAP	138.0	CE	271333	DIXON ; R	138.0	CE	1	COMED_P4_083-38-L11323_	breaker	471.0	120.37	125.67	DC	24.99

15 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 will study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
44071715	272002	MCGIRRRD;	138.0	CE	272365	ESS H440 ;RT	138.0	CE	1	Base Case	operation	351.0	100.78	104.96	DC	14.69
44071466	272362	ESS H445 ;3B	138.0	CE	272757	W DEKALB ;7T	138.0	CE	1	COMED_P2-1_094-L11323__	operation	298.0	128.9	132.62	DC	11.11
44071423	272365	ESS H440 ;RT	138.0	CE	272363	ESS H440 ; R	138.0	CE	1	COMED_P2-1_186-L16914__	operation	197.0	150.13	156.29	DC	12.12
45385254	272728	WATERMAN ; B	138.0	CE	271560	GLIDDEN ;BT	138.0	CE	1	272803 W PLANO ; R 138 943120 AE2-341 TAP 138 1	operation	321.0	113.11	115.28	DC	6.98
44071699	272756	W DEKALB ;3T	138.0	CE	272730	WATERMAN ;3B	138.0	CE	1	COMED_P1-2_138-L10714_R-R-A	operation	452.0	101.46	104.93	DC	15.69
44071444	272757	W DEKALB ;7T	138.0	CE	271558	GLIDDEN ; B	138.0	CE	1	COMED_P2-1_094-L11323__	operation	264.0	138.19	142.39	DC	11.11

16 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
44070916	5	AD1-098 TAP 138.0 kV - DIXON ; R 138.0 kV Ckt 1	CE_NUN_10714 (59) : ComEd 138kV L10714 SLD & ALDR ratings are 471 MVA & 542 MVA respectively. The upgrade will be re-conductor the line and upgrade the station conductor at both terminals. A preliminary estimate for the upgrade is 21.7M with a estimated construction timeline of 24-30 Upon completion the ratings will be 447/575/602/672 MVA (SN/SLTE/SSTE/SLD). Project Type : FAC Cost : $21,700,000 Time Estimate : 24-30 Months	$21,700,000
44071008	3	WATERMAN ; B 138.0 kV - SANDWICH ; R 138.0 kV Ckt 1	ce-007 (7) : L11301 SLD = 331 MVA& ALDR = 381 MVA. The post contingency flow for this event exceeds the rating therefore upgrades are required. The upgrades will be to reconductor the line, station conductor upgrades. A preliminary estimate is $ 13.1 M with a estimated construction time of 30 months. Upon completion the ratings will be 292/321/367/433/498 MVA N1:N6SN/SLTE/SSTE/SLD/ALDR). Project Type : FAC Cost : $13,100,000 Time Estimate : 30.0 Months	$13,100,000
44070660	4	W DEKALB ;3T 138.0 kV - WATERMAN ;3B 138.0 kV Ckt 1	ce-008a (9) : ComEd 138kV L11323 SLD = 471 MVA, ALDR = 542 MVA. The post contingency flow for this event exceeds the ratings thererfore an upgrade is required. The upgrade will be to re-conductor the line, upgrade the line relay scheme and a line disconnect switch. A preliminary estimate for the upgrades is $4.8M with a estiamted construction timeline of 30 months. Upon complteion of the upgrades, the new ratings will be 730/954/955 MVA (SN/SSTE/SLD). Project Type : FAC Cost : $4,800,000 Time Estimate : 30.0 Months	$4,800,000
			TOTAL COST	$39,600,000

17 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.

17.1 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
44071118	271331	DIXON ;8R	CE	271333	DIXON ; R	CE	1	COMED_P4_155-38-TR81___	breaker	421.0	104.96	106.58	DC	6.82

Bus #	Bus	MW Impact
276156	O-029 C	0.2582
276157	O-029 C	0.2792
276158	O-029 C	0.5095
293513	O-009 C1	0.4769
293514	O-009 C2	0.2419
293515	O-009 C3	0.2675
293516	O-009 E1	13.6728
293517	O-009 E2	6.9447
293518	O-009 E3	7.6480
293715	O-029 E	14.6177
293716	O-029 E	8.0147
293717	O-029 E	7.3664
293771	O-035 E	2.8048
294401	BSHIL;1U E	4.5220
294410	BSHIL;2U E	4.5220
919621	AA2-039 C	1.1022
919622	AA2-039 E	7.3765
925581	AC1-033 C	0.7407
925582	AC1-033 E	4.9587
927201	AC1-214 C O1	0.9002
927202	AC1-214 E O1	2.8617
934051	AD1-031 C O1	1.5051
934052	AD1-031 E O1	2.4558
937531	AD2-214 C	4.2289
937532	AD2-214 E	2.8193
943383	AF1-009 BAT	6.8198
943401	AF1-011 C	4.8665
943402	AF1-011 E	5.1331
943423	AF1-013 BAT	6.8198
943922	AF1-060 BAT	2.3327
946321	AF1-296 C O1	1.2574
946322	AF1-296 E O1	5.8869
990901	L-005 E	5.9395
LGEE	LGEE	0.0565
CPLE	CPLE	0.0893
G-007A	G-007A	0.0695
VFT	VFT	0.1870
CBM-W2	CBM-W2	4.2752
CBM-W1	CBM-W1	2.4645
TVA	TVA	0.4956
CBM-S2	CBM-S2	0.9653
CBM-S1	CBM-S1	2.6156

Bus #	Bus	MW Impact
MADISON	MADISON	1.4152
MEC	MEC	2.5726

17.2 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
44071122	272097	NELSON ;RT	CE	271331	DIXON ;8R	CE	1	COMED_P4_155-38-TR81___	breaker	440.0	104.72	106.27	DC	6.82

Bus #	Bus	MW Impact
276156	O-029 C	0.2582
276157	O-029 C	0.2792
276158	O-029 C	0.5095
293513	O-009 C1	0.4769
293514	O-009 C2	0.2419
293515	O-009 C3	0.2675
293516	O-009 E1	13.6728
293517	O-009 E2	6.9447
293518	O-009 E3	7.6480
293715	O-029 E	14.6177
293716	O-029 E	8.0147
293717	O-029 E	7.3664
293771	O-035 E	2.8048
294401	BSHIL;1U E	4.5220
294410	BSHIL;2U E	4.5220
919621	AA2-039 C	1.1022
919622	AA2-039 E	7.3765
925581	AC1-033 C	0.7407
925582	AC1-033 E	4.9587
927201	AC1-214 C O1	0.9002
927202	AC1-214 E O1	2.8617
934051	AD1-031 C O1	1.5051
934052	AD1-031 E O1	2.4558
937531	AD2-214 C	4.2289
937532	AD2-214 E	2.8193
943383	AF1-009 BAT	6.8198
943401	AF1-011 C	4.8665
943402	AF1-011 E	5.1331
943423	AF1-013 BAT	6.8198
943922	AF1-060 BAT	2.3327
946321	AF1-296 C O1	1.2574
946322	AF1-296 E O1	5.8869
990901	L-005 E	5.9395
LGEE	LGEE	0.0565
CPLE	CPLE	0.0893
G-007A	G-007A	0.0695
VFT	VFT	0.1870

Bus #	Bus	MW Impact
CBM-W2	CBM-W2	4.2752
CBM-W1	CBM-W1	2.4645
TVA	TVA	0.4956
CBM-S2	CBM-S2	0.9653
CBM-S1	CBM-S1	2.6156
MADISON	MADISON	1.4152
MEC	MEC	2.5726

17.3 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
44071008	272728	WATERMAN ; B	CE	272445	SANDWICH ; R	CE	1	COMED_P4_083-38-BT3-4__	breaker	331.0	113.6	116.62	DC	9.98

Bus #	Bus	MW Impact
272364	ESS H440N ;R	1.3041
274850	MENDOTA H;RU	0.3029
274855	GSG-6 ;RU	1.2756
274872	LEE DEKAL;1U	3.5810
276160	W4-084	0.2694
290051	GSG-6; E	36.5546
290108	LEEDK;1U E	106.8960
916221	AB2-191	0.4893
933341	AC2-147 C	0.3928
933342	AC2-147 E	0.6409
933911	AD1-013 C	6.5736
933912	AD1-013 E	10.5008
934431	AD1-067 C	0.4590
934432	AD1-067 E	1.9300
934701	AD1-098 C O1	23.0651
934702	AD1-098 E O1	16.8399
937001	AD2-134 C	9.5559
937002	AD2-134 E	39.4756
941131	AE2-107 C	33.4266
941132	AE2-107 E	22.2844
943381	AF1-009 C	1.9952
943382	AF1-009 E	7.9810
943422	AF1-013 E	9.9762
946671	AF1-331	8.5372
WEC	WEC	0.1480
CBM-W2	CBM-W2	1.8837
NY	NY	0.0470
CBM-W1	CBM-W1	6.3050
TVA	TVA	0.1946
O-066	O-066	0.5443
CBM-S2	CBM-S2	0.0694
CBM-S1	CBM-S1	0.9031

Bus #	Bus	MW Impact
TILTON	TILTON	0.0006
G-007	G-007	0.0842
MADISON	MADISON	1.8426
MEC	MEC	1.7940
GIBSON	GIBSON	0.0071
BLUEG	BLUEG	0.0833
TRIMBLE	TRIMBLE	0.0295

17.4 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
44070660	272756	W DEKALB ;3T	CE	272730	WATERMAN ;3B	CE	1	COMED_P2-2_083_GL-138R__4	bus	471.0	107.96	110.56	DC	12.26

Bus #	Bus	MW Impact
272364	ESS H440N ;R	1.6032
274850	MENDOTA H;RU	0.3723
274855	GSG-6 ;RU	1.5681
274872	LEE DEKAL;1U	4.4048
276160	W4-084	0.3854
290051	GSG-6; E	44.9353
290108	LEEDK;1U E	131.4860
916221	AB2-191	0.6014
933341	AC2-147 C	0.4749
933342	AC2-147 E	0.7748
933911	AD1-013 C	8.0813
933912	AD1-013 E	12.9091
934431	AD1-067 C	0.5643
934432	AD1-067 E	2.3724
934701	AD1-098 C O1	28.3497
934702	AD1-098 E O1	20.6983
937001	AD2-134 C	11.7468
937002	AD2-134 E	48.5260
941131	AE2-107 C	41.1192
941132	AE2-107 E	27.4128
943381	AF1-009 C	2.4524
943382	AF1-009 E	9.8096
943422	AF1-013 E	12.2620
946671	AF1-331	10.4952
WEC	WEC	0.1433
CBM-W2	CBM-W2	2.2113
NY	NY	0.0514
CBM-W1	CBM-W1	7.1057
TVA	TVA	0.2310
O-066	O-066	0.6048
CBM-S2	CBM-S2	0.1040

Bus #	Bus	MW Impact
CBM-S1	CBM-S1	1.0735
G-007	G-007	0.0936
MADISON	MADISON	2.1047
MEC	MEC	2.0879
GIBSON	GIBSON	0.0060
BLUEG	BLUEG	0.0903
TRIMBLE	TRIMBLE	0.0317

17.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
44070916	934700	AD1-098 TAP	CE	271333	DIXON ; R	CE	1	COMED_P4_083-38-L11323_	breaker	471.0	120.37	125.67	DC	24.99

Bus #	Bus	MW Impact
272364	ESS H440N ;R	3.0691
274850	MENDOTA H;RU	0.7254
274855	GSG-6 ;RU	3.0551
274872	LEE DEKAL;1U	6.6962
290051	GSG-6; E	87.5501
290108	LEEDK;1U E	199.8860
916221	AB2-191	1.1718
933911	AD1-013 C	15.3912
933912	AD1-013 E	24.5860
934431	AD1-067 C	1.0994
934432	AD1-067 E	4.6224
934701	AD1-098 C O1	57.7671
934702	AD1-098 E O1	42.1759
937001	AD2-134 C	22.8869
937002	AD2-134 E	94.5461
943381	AF1-009 C	4.9972
943382	AF1-009 E	19.9886
943422	AF1-013 E	24.9858
946671	AF1-331	19.9886
DUCKCREEK	DUCKCREEK	0.0656
NEWTON	NEWTON	0.0612
FARMERCITY	FARMERCITY	0.0032
NY	NY	0.0321
PRAIRIE	PRAIRIE	0.1472
O-066	O-066	0.3830
COFFEEN	COFFEEN	0.0301
EDWARDS	EDWARDS	0.0199
CHEOAH	CHEOAH	0.0285
TILTON	TILTON	0.0359
G-007	G-007	0.0593
GIBSON	GIBSON	0.0311

Bus #	Bus	MW Impact
CALDERWOOD	CALDERWOOD	0.0283
BLUEG	BLUEG	0.0990
TRIMBLE	TRIMBLE	0.0317
CATAWBA	CATAWBA	0.0199

Affected Systems

18 Affected Systems

18.1 LG&E

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

18.2 MISO

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

18.3 TVA

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

18.4 Duke Energy Progress

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

18.5 NYISO

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

Contingency Name	Contingency Definition
COMED_P4_155-38-TR81___	CONTINGENCY 'COMED_P4_155-38-TR81___' TRIP BRANCH FROM BUS 270828 TO BUS 272094 TO BUS 275341 CKT 1 / NELSO; B 345 NELSO; B 138 NELSO;1C 34.5 TRIP BRANCH FROM BUS 272094 TO BUS 271330 CKT 1 / NELSO; B 138 DIXON;7B 138 TRIP BRANCH FROM BUS 272094 TO BUS 272366 CKT 1 / NELSO; B 138 R FAL; B 138 TRIP BRANCH FROM BUS 272094 TO BUS 275204 CKT 1 / NELSO; B 138 NELSO;4M 138 END
COMED_P2-2_083_GL-138R__4	CONTINGENCY 'COMED_P2-2_083_GL-138R__4' TRIP BRANCH FROM BUS 271558 TO BUS 272730 CKT 1 / GLIDD; B 138 WATER;3B 138 MOVE 100 PERCENT LOAD FROM BUS 272761 TO BUS 272759 / W DEK;7R 138 W DEK;4R 138 DISCONNECT BUS 271581 / B200 ; R 138 DISCONNECT BUS 272757 / W DEK;7T 138 END
COMED_P1-2_138-L10714_R-R-A	CONTINGENCY 'COMED_P1-2_138-L10714_R-R-A' TRIP BRANCH FROM BUS 271333 TO BUS 934700 CKT 1 / DIXON; R 138 AD1-098 TAP 138 END
COMED_P2-1_094-L11323__	CONTINGENCY 'COMED_P2-1_094-L11323__' TRIP BRANCH FROM BUS 271680 TO BUS 272756 CKT 1 / HAUME; B 138 W DEK;3T 138 END
Base Case	
272803 W PLANO ; R 138 943120 AE2-341 TAP 138 1	CONTINGENCY '272803 W PLANO ; R 138 943120 AE2-341 TAP 138 1' OPEN BRANCH FROM BUS 272803 TO BUS 943120 CKT 1 END
COMED_P2-1_186-L16914__	CONTINGENCY 'COMED_P2-1_186-L16914__' TRIP BRANCH FROM BUS 272365 TO BUS 272516 CKT 1 / H440 ;RT 138 STEWA; B 138 END
COMED_P4_083-38-L11323_	CONTINGENCY 'COMED_P4_083-38-L11323_' TRIP BRANCH FROM BUS 271680 TO BUS 272756 CKT 1 / HAUME; B 138 W DEK;3T 138 TRIP BRANCH FROM BUS 272730 TO BUS 271558 CKT 1 / WATER;3B 138 GLIDD; B 138 TRIP BRANCH FROM BUS 272730 TO BUS 272728 CKT 1 / WATER;3B 138 WATER; B 138 TRIP BRANCH FROM BUS 272756 TO BUS 272730 CKT 1 / W DEK;3T 138 WATER;3B 138 TRIP BRANCH FROM BUS 272756 TO BUS 941130 CKT 1 / W DEK;3T 138 AE2-107 TAP 138 DISCONNECT BUS 271581 / B200 ; R 138 DISCONNECT BUS 272757 / W DEK;7T 138 END

Contingency Name	Contingency Definition
COMED_P4_083-38-BT3-4__	CONTINGENCY 'COMED_P4_083-38-BT3-4__' TRIP BRANCH FROM BUS 271390 TO BUS 271586 CKT 1 / ELECT; B 138 W541 ; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 271558 CKT 1 / GLIDD;BT 138 GLIDD; B 138 TRIP BRANCH FROM BUS 271560 TO BUS 272728 CKT 1 / GLIDD;BT 138 WATER; B 138 TRIP BRANCH FROM BUS 271586 TO BUS 272114 CKT 1 / W541 ; B 138 N AUR; B 138 TRIP BRANCH FROM BUS 272114 TO BUS 272522 CKT 1 / N AUR; B 138 SUGAR; B 138 TRIP BRANCH FROM BUS 272522 TO BUS 271560 CKT 1 / SUGAR; B 138 GLIDD;BT 138 MOVE 100 PERCENT LOAD FROM BUS 271586 TO BUS 271587 / W541 ; B 138 W541 ; R 138 MOVE 100 PERCENT LOAD FROM BUS 272522 TO BUS 272523 / SUGAR; B 138 SUGAR; R 138 CLOSE LINE FROM BUS 272114 TO BUS 272115 CKT 1 / N AUR; B 138 N AUR; R 138 TRIP BRANCH FROM BUS 271558 TO BUS 272730 CKT 1 / GLIDD; B 138 WATER;3B 138 MOVE 100 PERCENT LOAD FROM BUS 272761 TO BUS 272759 / W DEK;7R 138 W DEK;4R 138 DISCONNECT BUS 271581 / B200 ; R 138 DISCONNECT BUS 272757 / W DEK;7T 138 END

Short Circuit

19 Short Circuit

The following breakers are overdutied:

None