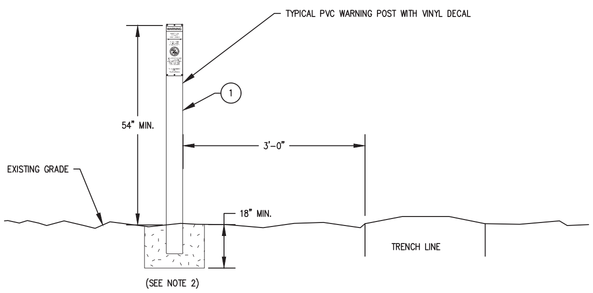
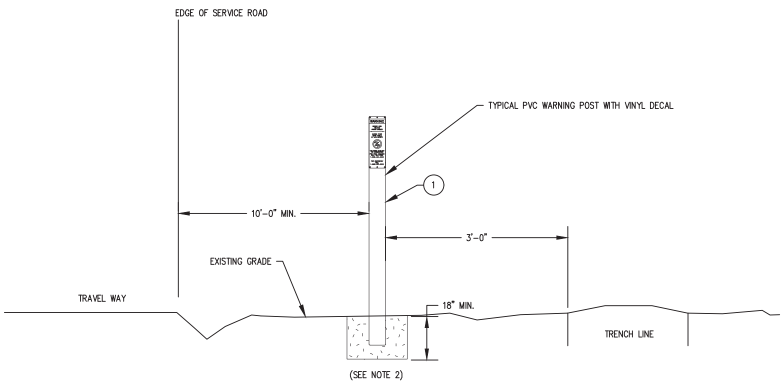
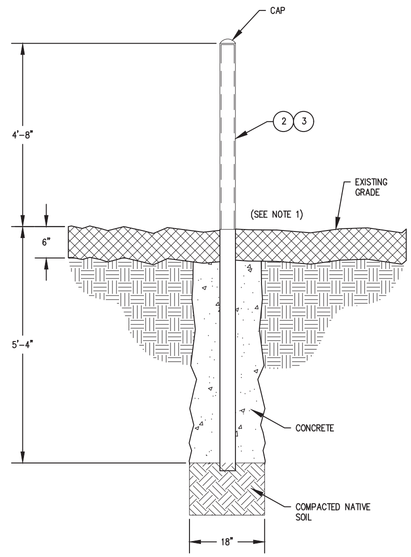


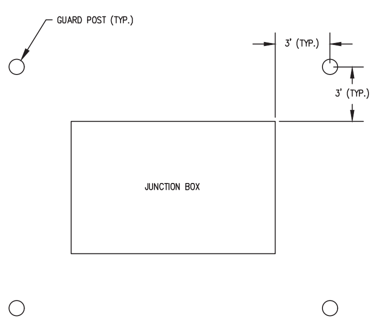
1 Marker Placement Along Trench Line
No Scale



2 Marker Placement Along Roadway
No Scale



3 Bollard (Guard Post) Detail
No Scale



4 Typical Guard Post Arrangement At Junction Boxes
No Scale

MATERIAL LIST

ITEM	QTY	UNITS	DESCRIPTION	MFG.	PART #
1	1	FT	UTILITY MARKER POLE, FLAT, RED, 72"		
2	4	EA	PIPE, GALVANIZED RIGID 4" X 10'		
3	4	EA	GUARD, BUMPER POST SLEEVE, SAFETY YELLOW, 4.75" ID, 56" HEIGHT		

GENERAL NOTES

1. ROUTE MARKER POLES SHALL BE PLACED ALONG THE COLLECTOR LINES EVERY 1000 FEET UNLESS DIRECTED OTHERWISE BY ELECTRICAL SUPERINTENDENT. THEY SHALL ALSO BE PLACED AT ALL ROUTING ANGLES, ROAD CROSSINGS, UTILITY CROSSINGS, AND CABLE SPLICES. ADDITIONAL MARKERS MAY BE ADDED AS REQUESTED BY THE OWNER.
2. COMPACT NATIVE SOIL.
3. ADDITIONAL MARKERS CAN BE ADDED DURING CONSTRUCTION AS REQUESTED BY CLIENT.

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Westwood Professional Services, Inc.

Designed: JRV
Checked: ANS
Drawn: JMC, JRG
As-Built Drawing:

Revisions:

#	DATE	DESCRIPTION
A	09/27/17	30% plans
B	10/03/17	Issued for Procurement – Revised
C	10/19/17	60% plans

Prepared for:

WHITE an IEA company
3900 E. White Ave
Clinton, IN 47842

Trishe Wind Ohio, LLC
c/o Starwood Energy Group, LLC
5 Greenwich Office Park, 2nd Floor
Greenwich, CT 06831

Northwest Ohio Wind Project
Paulding County, Ohio

Marker Poles and Bollards

Not For Construction
Array Date: 09/14/2017
Date: 10/19/17
Sheet: E.440
0007186_E440_Marker Poles.dwg

MVAC WIRING SCHEDULE

CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	Rated Vac (kV)	Iac (A)	# OF TUBRINES	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CONDUCTORS	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	DRAWING REFERENCE	CONDUCTOR SPECIFICS
MV1.SUB-T25	SUB	T25	34.5	516	10	4,616	3#1250 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.T25-10	T25	T10	34.5	412.8	8	10,172	3#1000 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.T10-09	T10	T09	34.5	361.2	7	2,161	3#750 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.T09-08	T09	T08	34.5	309.6	6	3,297	3#500 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV1.T08-05	T08	T05	34.5	258	5	2,679	3#500 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV1.T05-04	T05	T04	34.5	206.4	4	1,991	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV1.T04-03	T04	T03	34.5	154.8	3	1,777	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV1.T03-02	T03	T02	34.5	103.2	2	1,878	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV1.T02-01	T02	T01	34.5	51.6	1	2,213	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV1.T25-24	T25	T24	34.5	51.6	1	1,633	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.SUB-JB2/1	SUB	JB2/1	34.5	567.6	11	8,109	3#1250 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV2.JB2/1-T22	JB2/1	T22	34.5	103.2	2	2,964	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.T22-29	T22	T29	34.5	51.6	1	4,171	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.T22-21	T22	T21	34.5	103.2	2	1,417	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3), (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.T21-20	T21	T20	34.5	51.6	1	3,551	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3), (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.JB2/1-T17	JB2/1	T17	34.5	206.4	4	2,718	3#750 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV2.T17-15	T17	T15	34.5	154.8	3	4,579	3#500 KCMIL	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV2.T15-14	T15	T14	34.5	103.2	2	3,770	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.T14-13	T14	T13	34.5	51.6	1	1,517	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.T15-07	T15	T07	34.5	103.2	2	2,790	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.T07-06	T07	T06	34.5	51.6	1	1,388	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.T07-16	T07	T16	34.5	51.6	1	3,068	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.SUB-T23	SUB	T23	34.5	567.6	11	12,285	3#1250 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T23-28	T23	T28	34.5	154.8	3	2,947	3#1250 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T28-27	T28	T27	34.5	103.2	2	1,703	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T27-26	T27	T26	34.5	51.6	1	1,780	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T28-33	T28	T33	34.5	154.8	3	5,853	3#750 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T33-32	T33	T32	34.5	103.2	2	1,314	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T32-31	T32	T31	34.5	51.6	1	5,205	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T33-34	T33	T34	34.5	154.8	3	1,674	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV3.T34-36	T34	T36	34.5	103.2	2	3,312	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T36-37	T36	T37	34.5	51.6	1	1,301	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T34-39	T34	T39	34.5	51.6	1	5,680	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.SUB-T40	SUB	T40	34.5	516	10	29,905	3#1250 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T40-46	T40	T46	34.5	309.6	6	2,581	3#1000 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T46-45	T46	T45	34.5	258	5	3,997	3#1000 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T45-44	T45	T44	34.5	206.4	4	2,881	3#750 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T44-JB4/1	T44	JB4/1	34.5	154.8	3	3,486	3#500 KCMIL	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV4.JB4/1-T42	JB4/1	T42	34.5	154.8	3	30	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV4.T42-49	T42	T49	34.5	103.2	2	6,471	3#4/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV4.T49-48	T49	T48	34.5	51.6	1	1,717	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.T49-50	T49	T50	34.5	51.6	1	1,661	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.JB4/1-T43	JB4/1	T43	34.5	51.6	1	1,349	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.JB4/1-T41	JB4/1	T41	34.5	51.6	1	1,386	3#1/0 AWG	AL	1	7#7	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90

NOTES

1. DISTANCES SHOWN ARE POINT TO POINT DISTANCES MEASURED IN CAD. THEY DO NOT ACCOUNT FOR VERTICAL LENGTHS. ALL LENGTHS TO BE FIELD VERIFIED.
2. REFER TO MVAC SITE PLANS FOR WIRING ROUTING.

Westwood

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Westwood Professional Services, Inc.

Designed: JRV
Checked: ANS
Drawn: JMC, JRG
As-Built Drawing:

Revisions:

#	DATE	DESCRIPTION
A	09/27/17	30% plans
B	10/03/17	Issued for Procurement – Revised
C	10/19/17	60% plans

Prepared for:

WHITE
an IEA company

3900 E. White Ave
Clinton, IN 47842

Trishe Wind Ohio, LLC
c/o Starwood Energy Group, LLC
5 Greenwich Office Park, 2nd Floor
Greenwich, CT 06831

Northwest Ohio Wind Project

Paulding County, Ohio

MVAC Wiring Schedule

Not For Construction
Array Date: 09/14/2017
Date: 10/19/17
Sheet: E.800

0007186_E800 Schedules.dwg

Bore ID	Circuit	Sheet #	Bore Type	From	To	Cable Size
MV1.T02-T01.1	MV1	E.310 & E.312	county road	T02	T01	1/0 AWG
MV1.T03-T02.1	MV1	E.312	wetland	T03	T02	1/0 AWG
MV1.T05-T04.1	MV1	E.312 & E.317	county road	T05	T04	4/0 AWG
MV1.T08-T05.1	MV1	E.317 & E.318	county road	T08	T05	500 MCM
MV1.T09-T08.1	MV1	E.318	gas line	T09	T08	500 MCM
MV1.T09-T08.2	MV1	E.318	wetland	T09	T08	500 MCM
MV1.T09-T08.3	MV1	E.318 & E.325	county road	T09	T08	500 MCM
MV1.T25-T10.1	MV1	E.325 & E.326	county road	T25	T10	1000 MCM
MV1.T25-T10.2	MV1	E.325 & E.326	wetland	T25	T10	1000 MCM
MV1.T25-T10.3	MV1	E.326 & E.327	wetland	T25	T10	1000 MCM
MV1.SUB-T25.1	MV1	E.327	gas line	SUB	T25	1250 MCM
MV1.SUB-T25.2	MV1	E.327 & E.331	state highway	SUB	T25	1250 MCM
MV2.T15-T14.1	MV2	E.313 & E.319	county road	T15	T14	1/0 AWG
MV2.T15-T07.1	MV2	E.318 & E.319	county road	T15	T07	4/0 AWG
MV2.T07-T16.1	MV2	E.319	wetland	T07	T16	1/0 AWG
MV2.T07-T16.2	MV2	E.318 & E.319	county road	T07	T16	1/0 AWG
MV2.T17-T15.1	MV2	E.319	wetland	T17	T15	500 MCM
MV2.T17-T15.2	MV2	E.319	county road	T17	T15	500 MCM
MV2.T17-T15.3	MV2	E.319 & E.326	wetland	T17	T15	500 MCM
MV2.T17-T15.4	MV2	E.319 & E.326	wetland	T17	T15	500 MCM
MV2.JB2/1-T17.1	MV2	E.326 & E.327	wetland	JB2/1	T17	750 MCM
MV2.JB2/1-T22.1	MV2	E.320	wetland	JB2/1	T22	4/0 AWG
MV2.JB2/1-T22.2	MV2	E.320 & E.327	county road	JB2/1	T22	4/0 AWG
MV2.T22-T29.1	MV2	E.321 & E.328	county road	T22	T29	1/0 AWG
MV2.T22-T29.2	MV2	E.320 & E.321	county road	T22	T29	1/0 AWG
MV2.T21-T20.1	MV2	E.314 & E.320	county road	T21	T20	1/0 AWG
MV2.T21-T20.2	MV2	E.320	wetland	T21	T20	1/0 AWG
MV2.T21-T20.3	MV2	E.320	wetland	T21	T20	1/0 AWG
MV2.SUB-JB2/1.1	MV2	E.327	wetland	SUB	JB2/1	1250 MCM
MV2.SUB-JB2/1.2	MV2	E.327 & E.331	county road	SUB	JB2/1	1250 MCM
MV2.SUB-JB2/1.3	MV2	E.327	gas line	SUB	JB2/1	1250 MCM
MV2.SUB-JB2/1.4	MV2	E.327, E.331	state highway	SUB	JB2/1	1250 MCM
MV3.T32-T31.1	MV3	E.315	wetland	T32	T31	1/0 AWG
MV3.T32-T31.2	MV3	E.315 & E.322	county road	T32	T31	1/0 AWG
MV3.T34-T36.1	MV3	E.322 & E.323	county road	T34	T36	1/0 AWG
MV3.T34-T39.1	MV3	E.329	wetland	T34	T39	1/0 AWG
MV3.T34-T39.2	MV3	E.323 & E.329	county road	T34	T39	1/0 AWG
MV3.T34-T39.3	MV3	E.322 & E.323	county road	T34	T39	1/0 AWG
MV3.T28-T33.1	MV3	E.321 & E.322	state highway	T28	T33	750 MCM
MV3.T28-T33.2	MV3	E.321	wetland	T28	T33	750 MCM
MV3.T23-T28.1	MV3	E.320 & E.321	wetland	T23	T28	1250 MCM
MV3.SUB-T23.1	MV3	E.320	wetland	SUB	T23	1250 MCM
MV3.SUB-T23.2	MV3	E.320 & E.327	county road	SUB	T23	1250 MCM
MV3.SUB-T23.3	MV3	E.327	gas line	SUB	T23	1250 MCM
MV3.SUB-T23.4	MV3	E.327 & E.331	state highway	SUB	T23	1250 MCM
MV4.T49-T50.1	MV4	E.311	wetland	T49	T50	1/0 AWG
MV4.T49-T50.2	MV4	E.311	wetland	T49	T50	1/0 AWG
MV4.T49-T48.1	MV4	E.311	turbine access	T49	T48	1/0 AWG
MV4.T49-T48.2	MV4	E.311	wetland	T49	T48	1/0 AWG
MV4.T42-T49.1	MV4	E.311 & E.316	county road	T42	T49	4/0 AWG
MV4.T42-T49.2	MV4	E.316	county road	T42	T49	4/0 AWG
MV4.T44-JB4/1.1	MV4	E.316 & E.324	county road	T44	JB4/1	500 MCM
MV4.T46-T45.1	MV4	E.324 & E.330	county road	T46	T45	1000 MCM
MV4.T45-T44.1	MV4	E.324	wetland	T45	T44	750 MCM
MV4.T45-T44.2	MV4	E.324	county road	T45	T44	750 MCM
MV4.T40-T46.1	MV4	E.329 & E.330	county road	T40	T46	1000 MCM
MV4.SUB-T40.1	MV4	E.329	wetland	SUB	T40	1250 MCM
MV4.SUB-T40.2	MV4	E.323 & E.329	county road	SUB	T40	1250 MCM
MV4.SUB-T40.3	MV4	E.322 & E.323	county road	SUB	T40	1250 MCM
MV4.SUB-T40.4	MV4	E.321 & E.322	state highway	SUB	T40	1250 MCM
MV4.SUB-T40.5	MV4	E.321	wetland	SUB	T40	1250 MCM
MV4.SUB-T40.6	MV4	E.320 & E.321	county road	SUB	T40	1250 MCM
MV4.SUB-T40.7	MV4	E.320	MVAC circuit 3	SUB	T40	1250 MCM
MV4.SUB-T40.8	MV4	E.320	wetland	SUB	T40	1250 MCM
MV4.SUB-T40.9	MV4	E.320 & E.327	county road	SUB	T40	1250 MCM
MV4.SUB-T40.10	MV4	E.327	gas line	SUB	T40	1250 MCM
MV4.SUB-T40.11	MV4	E.327 & E.331	state highway	SUB	T40	1250 MCM

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Northwest Ohio Wind Project

Paulding County, Ohio

Boring Schedule

Not For Construction

Array Date: 09/14/2017
Date: 10/19/17
Sheet: E.801

0007186_E800 Schedules.dwg

KLJ REVIEW
Trische Wind
Updated: 9/6/2017

Comment	From	Responsible	Date Received	Response	Response Date	Document	Status
No Comments	KLJ	UEI	9/6/2017	NA		0101-Northwest Wind Power Transformer Specification.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0101- Northest Wind Power Transformer Attachment A.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0101- Northest Wind Power Transformer Attachment B.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0201 - NW Ohio SF6 Breaker Specification.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0201 - NW Ohio SF6 Breaker Attachment A1.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0201 - NW Ohio SF6 Breaker Attachment A2.pdf	
12.02.2: Recommend AWG 10	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Specification.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment A1.pdf	
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment A2 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment B1 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment B2 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0204 - NW Ohio Capacitor Switcher Attachment A KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0204 - NW Ohio Capacitor Switcher Attachment B KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0204 - NW Ohio Capacitor Switcher Specification KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0302 - NW Ohio GOAB Switch Attachment A1 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0302 - NW Ohio GOAB Switch Attachment A2 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0302 - NW Ohio GOAB Switch Attachment B1 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0302 - NW Ohio GOAB Switch Attachment B2 KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0302 - NW Ohio GOAB Switch Specification KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0303 - NW Ohio Disconnect Switch - Hookstick Attachment A KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0303 - NW Ohio Disconnect Switch - Hookstick Attachment B KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0303 - NW Ohio Disconnect Switch - Hookstick Specification KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0401 - NW Ohio CCVT Attachment A KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0401 - NW Ohio CCVT Attachment B KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0401 - NW Ohio CCVT Specification KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0501 - NW Ohio Neutral Grounding Reactor Attachment A KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0501 - NW Ohio Neutral Grounding Reactor Attachment B KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0501 - NW Ohio Neutral Grounding Reactor Specification KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0502 - NW Ohio Capacitor Bank Attachment A KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0502 - NW Ohio Capacitor Bank Attachment B KLJ REVIEW	
No Comments	KLJ	UEI	9/6/2017	NA		0502 - NW Ohio Capacitor Bank Specification KLJ REVIEW	

4.: WILL AN INSULATION COORDINATION CALCULATION CHECKING PROTECIVE MARGINS BE PROVIDED?	KLJ	UEI	9/6/2017	NA		Northwest Ohio Wind Substation Design Basis 7.14.2017 REV_A KLJ REVIEW		
6.: THIS CAN BE CONFUSING; CONSIDER USING A SHORT STATEMENT "A reactor is not anticipated at this time, but may be required based on the project reactive power study"	KLJ	UEI	9/6/2017	NA		Northwest Ohio Wind Substation Design Basis 7.14.2017 REV_A KLJ REVIEW		
7.: WHERE IN THIS DOCUMENT ARE THE EXPECTED REQUIRED RATINGS OUTLINED? USE THIS SECTION TO SHOW YOUR WIRE AND BUS MEET THE REQUIREMENTS OF THE WIND FARM	KLJ	UEI	9/6/2017	NA		Northwest Ohio Wind Substation Design Basis 7.14.2017 REV_A KLJ REVIEW		
8.: ARE YOU USING A SOFTWARE FOR CALCS? IF SO, WHICH ONE?	KLJ	UEI	9/6/2017	NA		Northwest Ohio Wind Substation Design Basis 7.14.2017 REV_A KLJ REVIEW		
8.: MAY WANT TO CONSIDER THESE ARE "TBD" AT THIS STAGE, PRIOR TO YOUR AC LOADING STUDY (EVEN THOUGH BEING A SMALL STATION IT'S LIKELY THESE SPECS ARE FINE)	KLJ	UEI	9/6/2017	NA		Northwest Ohio Wind Substation Design Basis 7.14.2017 REV_A KLJ REVIEW		
16.02: IS THERE A REFERENCE LOADING CALC TO SUPPORT THIS AT THIS TIME?	KLJ	UEI	9/6/2017	NA		0600 - NWO Wind Electrical Equipment Enclosure Attachment A KLJ REVIEW		
16.03: IS THERE A REFERENCE LOADING CALC TO SUPPORT THIS AT THIS TIME?	KLJ	UEI	9/6/2017	NA		0600 - NWO Wind Electrical Equipment Enclosure Attachment A KLJ REVIEW		
16.04: IS THERE A CALC OR SIMULATION TO SUPPORT THIS RATING?	KLJ	UEI	9/6/2017	NA		0600 - NWO Wind Electrical Equipment Enclosure Attachment A KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0600 - NWO Wind Electrical Equipment Enclosure Specification KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0602 - NWO Control and Relay Panel Specification KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0602 - NWO Control Panel Attachment A KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0602 - NWO Control Panel Attachment B KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-CH1-001 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-EQ1-001 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-OL1-001 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-SW1-001 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-001 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-002 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-003 KLJ REVIEW		
WILL THERE BE A "MAINTENANCE MODE FOR THE ARC FLASH ON THE FEEDER RELAYS?	KLJ	UEI	9/6/2017	NA		NWO-FE-004 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-005 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-006 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-007 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		NWO-FE-008 KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment A1_revB KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0202 - NW Ohio Vacuum Breaker Attachment A2_revB KLJ REVIEW		
No Comments	KLJ	UEI	9/6/2017	NA		0501 - NW Ohio Neutral Grounding Reactor Attachment A_revB KLJ REVIEW		

KLJ REVIEW
TRISCHE WIND
Updated: 9/6/2017

Comment	From	Responsible	Date	Response	Document	Status	
What is "WW"?	KLJ	Westwood	10/12/2017	This was an abbreviation for Westwood Professional Services.	20170927_NW_OH_Wind_BOD_Rev0 KLJ Review 10-12-17		
Are these feeder breaker setting trip times?	KLJ	Westwood	10/12/2017	Yes, trip times per Ulteig Engineers.	20170927_NW_OH_Wind_BOD_Rev0 KLJ Review 10-12-17		
Has any consideration been taken for a feeder breaker failure event?	KLJ	Westwood	10/12/2017	The design basis for selection of the concentric neutral was for an invidual phase conductor to have capacity for a minimum of the available fault current (with allowance for future increase) for the expected clearing time. Clearing time of 8.5 cycles for phase faults and 3.5 cycles for ground faults was provided by Ulteig Engineers. Based on final cable selected, neutrals have a minimum of 10.5 cycle withstand and trench ground conductor will share a percentage of ground fault current.	20170927_NW_OH_Wind_BOD_Rev0 KLJ Review 10-12-17		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.100		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.101		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.105		
This symbol should be defined in the legend.	KLJ	Westwood	10/12/2017	This has been revised.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
For consistency, this should say "MV2.T22-2X".	KLJ	Westwood	10/12/2017	This has been revised.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
Are the GSU transformers being purchased with the ability to have (2) sets of load side elbows connected to the bushings?	KLJ	Westwood	10/12/2017	Transformers are purchased as loop feed, i.e. they have two sets of bushings	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
Are the 600 Amp elbows being piggy-backed?	KLJ	Westwood	10/12/2017	Yes, 600 amp elbows are piggy-backed at several turbine locations.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
Are the bushings rated for the weight of (2) elbows and (2) lengths of cable?	KLJ	Westwood	10/12/2017	Vendor has been requested to supply rating of bushing. In addition, cable support struts are being investigated.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
In the event of a fault, how will isolation be accomplished to re-energize the maximum amount of turbines to keep production going while maintenance is occurring?	KLJ	Westwood	10/12/2017	For medium voltage cable or transformer faults, elbows will be parked and grounded at the next upstream transformer, which can then be placed back into service. Cables and transformers downstream of the fault will remain out of service.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.200		
This symbol should be defined in the legend.	KLJ	Westwood	10/12/2017	This has been revised.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.201		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.210		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.211		
Key map is somewhat confusing as it appears non-participating landowners are not shaded and participating are shaded. This is opposite of sheet E300 and the shading methodology utilized on the plan sheets E310-E331.	KLJ	Westwood	10/12/2017	Key map adjusted for clarity	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.310		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.311		
LV Power routing variance from the MV trench should be shown here.	KLJ	Westwood	10/12/2017	This has been revised to show the LV routing trench	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.312		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.313		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.314		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.315		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.316		

Can property corners be "split" like this or does a small easement need to be procured for this crossing? Different jurisdictions vary on rulings and enforcements of these types of crossings.	KLJ	Westwood	10/12/2017	Yes, County right of way is available for this route to be taken.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.317		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.318		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.319		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.320		
Is there an agreement to go across/under this non-participating piece of land?	KLJ	Westwood	10/12/2017	The thin strip of land shown as "non-participating" is the highway right of way, and therefore available.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.321		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.322		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.323		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.324		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.325		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.326		
I haven't seen a cable ampacity report for the project, but please verify that mutual heating in this small of an easement will not be detrimental to the ratings of the cable.	KLJ	Westwood	10/12/2017	Ampacity study has been revised and is issued with 60% package.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.327		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.328		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.329		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.330		
No Comments	KLJ	Westwood	10/12/2017		Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.331		
URD stands for Underground Residential Distribution. Most medium voltage cable is commonly referred to as "URD" but it is not believed that the intention here is actually for a "URD" cable to installed for this renewable energy installation.	KLJ	Westwood	10/12/2017	Cable designed and procured is MV-90 cable. This has been changed.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.400		
This will need to be included as part of the cable sizing and studies work and be included.	KLJ	Westwood	10/12/2017	Ampacity study has been revised and is issued with 60% package.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.400		
What size are these?	KLJ	Westwood	10/12/2017	Materials listed (with sizes) in Section View.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.410		
What size are these?	KLJ	Westwood	10/12/2017	Materials listed (with sizes) in Section View.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.410		
What size is this?	KLJ	Westwood	10/12/2017	Materials listed (with sizes) in Section View.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.410		
What is the intent for getting the 35 kV cable into the transformer box pad?	KLJ	Westwood	10/12/2017	MV Conduits routing included in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.410		
Per Key Note 1, this is not shown in Detail A.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.411		
How does PES6 penetrate the concrete or transformer box pad to connect the transformer ground to the grounding ring?	KLJ	Westwood	10/12/2017	Conductor enters box bad underneath through slurry.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.411		
Is the box pad large enough to allow this slack coil without exceeding the bend radius for all sizes?	KLJ	Westwood	10/12/2017	Min bend radius is 12 x cable diameter, or 30" for 1250 kcmil cable. Boxpad dimensions typically accommodate this.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.420		
Verify you are in compliance with NESC separation of grounding requirements.	KLJ	Westwood	10/12/2017	Design does not violate applicable sections of NESC 2017, Rule 097	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.420		
Are the bushings rated for this much weight when larger sized cables may be piggy-backed?	KLJ	Westwood	10/12/2017	See Item 16	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.420		
Material list states "Cap Screw" this states "Bolt". Which is it?	KLJ	Westwood	10/12/2017	Both cap screws and bolts are used. Materials have been updated.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.420		
Item 6 states a "Cap Screw" not 4/0 AWG Copper Ground Bus.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.420		
Is the box pad large enough to allow this slack coil without exceeding the bend radius for all sizes?	KLJ	Westwood	10/12/2017	Min bend radius is 12 x cable diameter, or 30" for 1250 kcmil cable. Boxpad dimensions typically accommodate this.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.421		
Verify you are in compliance with NESC separation of grounding requirements.	KLJ	Westwood	10/12/2017	Design does not violate applicable sections of NESC 2017, Rule 097	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.421		
Material list states "Cap Screw" this states "Bolt". Which is it?	KLJ	Westwood	10/12/2017	Both cap screws and bolts are used. Materials have been updated.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.421		
Item 6 states a "Cap Screw" not 4/0 AWG Copper Ground Bus.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.421		
"JUNCTION"	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.422		

This is a detail for a 3-Way Junction Box but the project contains a 4-Way Junction Box as well. Please revise/append/develop a detail/sheet to incorporate the 4-Way Junction Box.	KLJ	Westwood	10/12/2017	4-way junction added.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.422		
Item 6 is a connector not a 4/0 AWG Copper Ground Bus.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.422		
No 400 kcmil Copper on this sheet.	KLJ	Westwood	10/12/2017	400 copper removed.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.422		
There is no transformer grounding pad on this sheet.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.422		
Use of "T" or not is not consistent for labeling.	KLJ	Westwood	10/12/2017	This has been updated for consistency.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.800		
No turbine documents have been provided so can not verify these values.	KLJ	Westwood	10/12/2017	Turbine Grid Interconnection document attached.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.800		
No studies have been supplied to verify this information.	KLJ	Westwood	10/12/2017	Studies provided include AC cable ampacity, AC short circuit, AC load flow. AC harmonic study, grounding study, TOV study, and LVRT study forthcoming.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.800		
Overlapping text.	KLJ	Westwood	10/12/2017	This is resolved in latest version.	Northwest Ohio Wind Project - 30 pct Electrical Plans KLJ Review 10-12-17 E.800		

KLJ REVIEW
TRISCHE WIND
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Comment	From	Responsible	Date	Response	Document	Status	
1: Is the POI at the high side of the Northwest Ohio ollector sub or at the Haviland switching station?	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
1: Why is the pf measured during production at the high side of the Northwest Ohio Substation but at the POI for the 0% production case?	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
2.3: Does this assumption tell me that the turbines will be operating in power factor control mode? If so, were the dotted lines from…	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
2.4: This is true for power factor control mode operation. It is not true for voltage control mode operation which is what the reactive power turbine capabilities shown in Appendix A represent.	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
3: Mvar	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
3.2: General Note - Some of these scenarios may not be valid depending on the operating control mode of the turbine as previously discussed under assumptions and study procedure.	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
General Note: Same comment as before a vailidity of data based on discussion in assumptions and procedure sections	KLJ	UEI	9/6/2017		NWO-COL-RPF-RA KLJ REVIEW		
1: This does not summarize the analysis but only redirects the reader to another section. Typically, executive summary sections will summarize the output of the analysis and allow the reader from having to bounce between sections and pages.	KLJ	UEI	9/7/2017		NWO-COL-SHC-RA KLJ REVIEW		
2.3: It may be prudent to note in section 2.3 that parameter for transformers, transmission lines, collection layout, etc. can be found in Appendix A to make the study more complete.	KLJ	UEI	9/7/2017		NWO-COL-SHC-RA KLJ REVIEW		
3: The sentences after the tables giving maximum values should be the sentences/values that are included in the executive summary.	KLJ	UEI	9/7/2017		NWO-COL-SHC-RA KLJ REVIEW		

KLJ REVIEW
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Updated: 9/6/2017

KLJ

Comment	From	Responsible	Date	Response	Document	Status

GE Renewable Energy

– Original –

Technical Documentation
Wind Turbine Generator Systems
2.5-116 - 50/60 Hz

Grid Interconnection

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– Original –

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All technical data is subject to change in line with ongoing technical development!

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Table of Contents

1 Technology

The 1&2MW Platform – 2.5-116 50 Hz and60 Hz wind turbine is variable speed and employs a doubly-fed induction generator with a power converter interfacing the rotor to the grid. The wind turbine is capable of supplying/drawing reactive power to/from the grid thus contributing to grid voltage support. The turbine employs the Electrically Simplified System (ESS). The wind turbine is capable of quickly regulating voltage on a continuous basis and providing dynamic reactive power to the power system that corresponds to a selection of under excited/overexcited power factor offerings.

Unless stated otherwise, all the data shown is referenced to 690 V side of the WTG transformer.

2 Step-Up Transformer

The individual wind turbines are connected through a step-up transformer to the collection system. The turbine operating performance, arc flash protection, and certification requirements listed in this and other documents are based on the assumption that the (pad mount) transformer at the turbine is designed to these requirements:

- 690 VAC L-L (wye-grounded): 2000-34500 VAC (Delta)
- Impedance of 5.75% with a tolerance of +/- 0.575 percentage points
- kVA rating in the range of 2700kVA to 3000kVA and selected in relation to impedance and the connected grid MVA such that the available short circuit current is no less than 8.4 kA or 12 kA (for turbines with voltage ride-through not enabled and enabled, respectively), and is less than the Maximum symmetrical short circuit withstand capability (at LV side of pad-mount transformer) value listed in the appendix. For kVA ratings outside this range, please consult with GE.

The customer is responsible for ensuring the size of the transformer size and type meets industry acceptable practices with respect to thermal management and its impact on reliability.

The collector system design, grid strength size, and impedance of the transformer determine available short circuit current.

Low voltage side protection may or may not be included. The decision not to supply protection on the low-voltage side of the wind turbine's step-up transformer can only be taken under the assumption that proper fusing is selected for the medium-voltage. Equipment experiencing this level of intake may be significantly damaged with likely hardware replacement.

The voltage tolerance in section 4 is a dynamic range in which the turbine operates. Long term changes to the steady state voltage at the LV terminals due to changes of the MV level in the grid or collector system may result in a reduction of the active and reactive power range or in a turbine trip. Transformer tap changers can help keep collector system voltage centered and maximize turbine capability. Taps of +/- 2 x 2.5 % are recommended.

3 Frequency Tolerance

Frequency limits for the 2.5-116 50 Hz and 60 Hz wind turbine follow:

Frequency (Hz)	Withstand time (s)
45.0 – 47.0	60
47.0 – 53.0	Continuous
53.0 – 55.0	60

Table 1: Frequency Tolerance 50 Hz

Frequency (Hz)	Withstand time (s)
55.0 – 57.0	60
57.0 – 63.0	Continuous
63.0 – 65.0	60

Table 2: Frequency Tolerance 60 Hz

4 Voltage Tolerance and Fault Ride-Thru

Wind Ride-Thru packages enable the wind turbine to continue to operate during ("ride-through") and after transmission system faults resulting in a severe voltage dip at the wind farm. Available options are Low Voltage Ride-Thru (LVRT) & Zero Voltage Ride-Thru (ZVRT). The table below and Figure 1 summarize voltage ride through capabilities for a single event.

It is possible to adjust the behavior of active and reactive current during and immediately after a fault to meet a variety of grid codes.

Dynamic Voltage Range (%)	Time (s)	
	LVRT	ZVRT
90[1]-100	Continuous	Continuous
85-90[1]	600	600
75-85	10	10
15-75	0.625 to 2.5[2]	
0-15	-	1.0-3.0[3] [4]

Table 3: Voltage Tolerance & Fault Ride-Thru

[1] 690 V terminals clamped at 90%. MV side voltage will depend on reactive power command.
[2] Ramp from 15% at 0.625s to 75 % at 2.5s
[3] Ramp from 0% at 1.0s to 70 % at 3.0s
[4] Converter may stop pulsing during this period

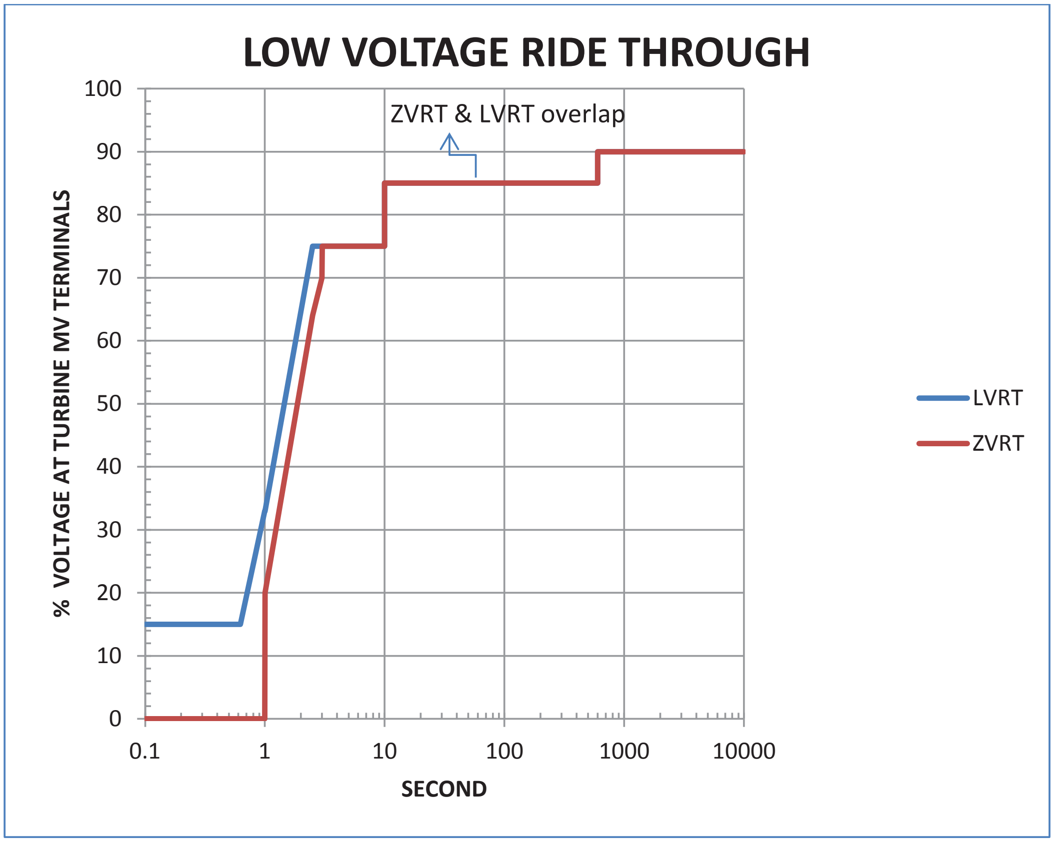


Figure 1: Low voltage ride thru

The turbine high voltage ride-through capability for a single event is summarized in Table 4 and Figure 2.

Dynamic Voltage Range (%)	Time (s) HVRT
100-112[5]	Continuous
112[5]-115	300
115-120	30
120-125	2
125-138	0.5
138-150	0.3
150-160	0.03[6]

Table 4: Voltage Tolerance

[5] 690V terminals clamped at 110%. MV side voltage will depend on reactive power command.
[6] Capacitor switching transients

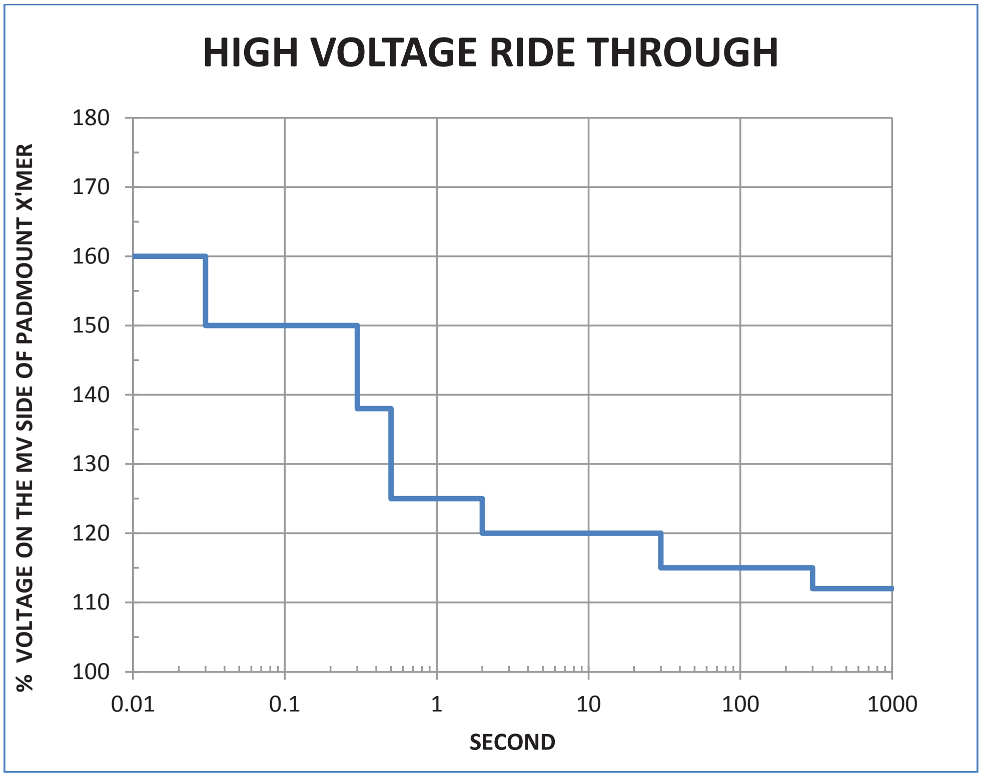


Figure 2: High voltage ride thru

The turbines are also capable of riding through three reclosing events of 160 ms with a minimum of 1.5 s time lag between the end of the previous closure and the start of the next ZVRT event. The Figure below represents the multiple fault ride-through capability of the turbine.

It is not recommended or envisioned for the wind farm to be radially connected to the grid via auto-reclosers.

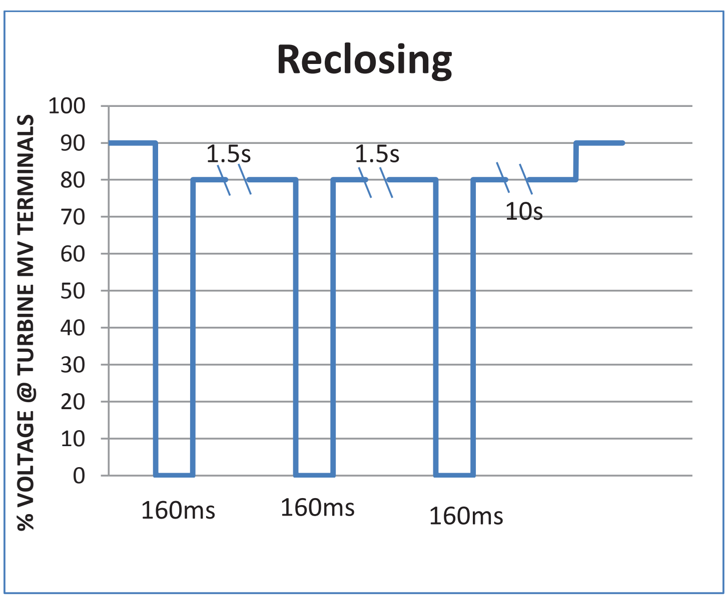


Figure 3: Reclosing

5 Protection

The GE wind turbine has the following built-in protection functions:

- Over Voltage (ANSI-59) / Under Voltage (ANSI-27)
- Over Frequency (ANSI-81O) / Under Frequency (ANSI-81U)
- Voltage Imbalance (ANSI-60)

Additionally, the main circuit breaker, located in the control cabinet at the bottom of the tower, provides over current protection (ANSI-51) and comes with instantaneous, short-time and long-time settings. Note that these functions are designed for protection of the wind turbine hardware.

6 Minimum Grid Strength

The 1&2MW Platform 50 Hz and 60 Hz wind turbine is designed to operate with a composite short circuit ratio (CSCR) above 1.7 (on a MW base) at the medium voltage side of the turbine transformer. Composite SCR is defined as the ratio of the Composite short circuit MVA to the sum of the nameplate MW of all electrically close wind turbine generators within and outside the wind farm of interest. The composite short circuit MVA is calculated for a 3 phase short circuit applied to the medium voltage side of all the turbine transformers that are electrically close within and outside the wind farm of interest, interconnected with zero impedance between each other. The composite short circuit MVA calculation should reflect the maximum grid impedance under which the wind farm is expected to continue normal operation. The composite short circuit MVA should not include the short circuit contribution from the wind turbine generators themselves. The denominator in the calculation of CSCR is the sum of the nameplate MW and must include all wind turbine generators in the proposed wind farm as well as other nearby wind farms that are electrically close. For complex networks with multiple wind farms in the vicinity of each other the information required to calculate CSCR accurately may be available only to the grid operator.

Note that the CSCR capability of 1.7 is determined based on a broad set of operating points, network parameters and grid contingencies. However, the turbines can operate at CSCR values as low as 1.1 depending on evaluation of actual condition associated with the wind farm. The evaluation of operation at low CSCR values is typically based on transient simulations of the network considering a range of operating points, network parameters and grid contingencies, which differ from project to project. If a grid operator has a concern on the short circuit ratio, GE can provide a black box PSCAD model of the wind farm that can be used for transient simulations of the network for the purpose of determining expected performance. If a grid operator decides to perform such a study, it is essential that GE be involved to highlight how changes within the product capability can achieve the desired performance. Alternatively, if the grid operator can define the requirements for such a study and is willing to provide GE with the details of the network, then GE Energy Consulting can be contracted to perform the study.

In situations where there is a low grid strength and therefore low fault current available, there is an increased risk of arc flash hazards in the down tower of the turbine unless additional protection/procedures are utilized on the secondary (LV) side of the pad-mount transformer. In all cases there is an absolute minimum LV side 3 phase fault current at each turbine of 12 kA. This means that for projects with a small numbers of units, the ratio given above may not be adequate for protection purposes. In all cases the guidelines of Section 17 apply related to step up transformer protection.

7 Reactive Power Capability

Standard power factor range for all 1&2MW Platform wind turbines is ±0.95. Enhanced reactive power capability (range of ±0.90) is available as an option and in many cases can be used to meet a ±0.95 requirement at the point-of-interconnection. It is possible that high altitude and/or high temperature conditions and low terminal voltage may lead to real power de-rating especially if there is a concurrent high demand for reactive power.

Reactive power capability curves for these machines are shown in section 18.

8 WindFREE Reactive Power

As an optional feature, the 2.5-116 - 50 Hz and 60 Hz wind turbine can provide reactive power (+/-400 kVAR) even when there is no active power generation (i.e. wind speed below cut-in or above cut-out). This is achieved by utilizing capabilities of the line side converter.

9 WindINERTIA

With the optional “WindINERTIA” feature, the 2.5-116 - 50 Hz and 60 Hz wind turbine can provide inertial response to help stabilize grid frequency. This feature supports the grid during under frequency events by providing a temporary increase in power production (6-7 %) increase in kW) for a short duration (10 sec), contributing towards frequency recovery. This is achieved by tapping into the stored kinetic energy in the rotor mass. The response is equivalent to that of a synchronous generator with an inertia constant of 3.5 sec.

10 Series Compensation Compatibility

Wind turbine generators (WTGs) connected to series compensated transmission can exhibit sub-synchronous interaction (SSI). For 1&2MW turbines, an option exists to allow the WTGs to operate with series compensated transmission lines, where the series compensation is up to 50 %. This option presents a positive resistance to the grid for the range of sub-synchronous frequencies where resonance is likely to occur, and thereby provides damping to reduce the effect of SSI and sub-synchronous resonances (SSR). Should the option for operation with series compensated transmission not be selected, the base capability of the 1&2MW turbines includes a detection algorithm for SSR. When a SSR situation is detected, the WTG is tripped.

11 Voltage Regulation

GE's WindCONTROL is a voltage / power factor / VAR controller that exploits the reactive power capability of the individual wind turbine to meet a voltage / power factor / VAR set point at the point of interconnection. It measures the voltage and current at the point of interconnection (POI) and controls the wind farm's reactive power to regulate the voltage, power factor or VAR at the POI. Through a graphical user interface (GUI), the user selects the mode of operation and enters the set points for voltage, power factor or VAR control. Set points can also be read using communication interfaces or hardwired inputs.

WindCONTROL is available with the following optional grid friendly features (see WindCONTROL overview for more info):

- Dynamic VAR Control (Voltage, PF or VAR control)
- Line Drop Compensation
- Voltage Droop
- Power Curtailment with capability to curtail segments
- Capacitor/Reactor Bank Control
- Ramp Rate Control
- Frequency Droop Control

The figures below plot the simulated response of a wind farm with GE wind turbines connected to a weak grid. The wind farm is subjected to ten minutes of highly variable wind near rated wind speed. The red traces show the response with Dynamic VAR control operational. The black traces show the response with Dynamic VAR control disabled, namely the individual wind turbines operating in conventional local fixed power factor mode. At the point of interconnection (44 miles / 77 km from the wind farm), the system voltage with conventional power factor control exhibits unacceptable fluctuations. With the WindCONTROL controlled system, the host utility voltage is tightly regulated and voltage variation is quite limited GE's WindCONTROL provides tight voltage regulation, effectively eliminating concerns about flicker.

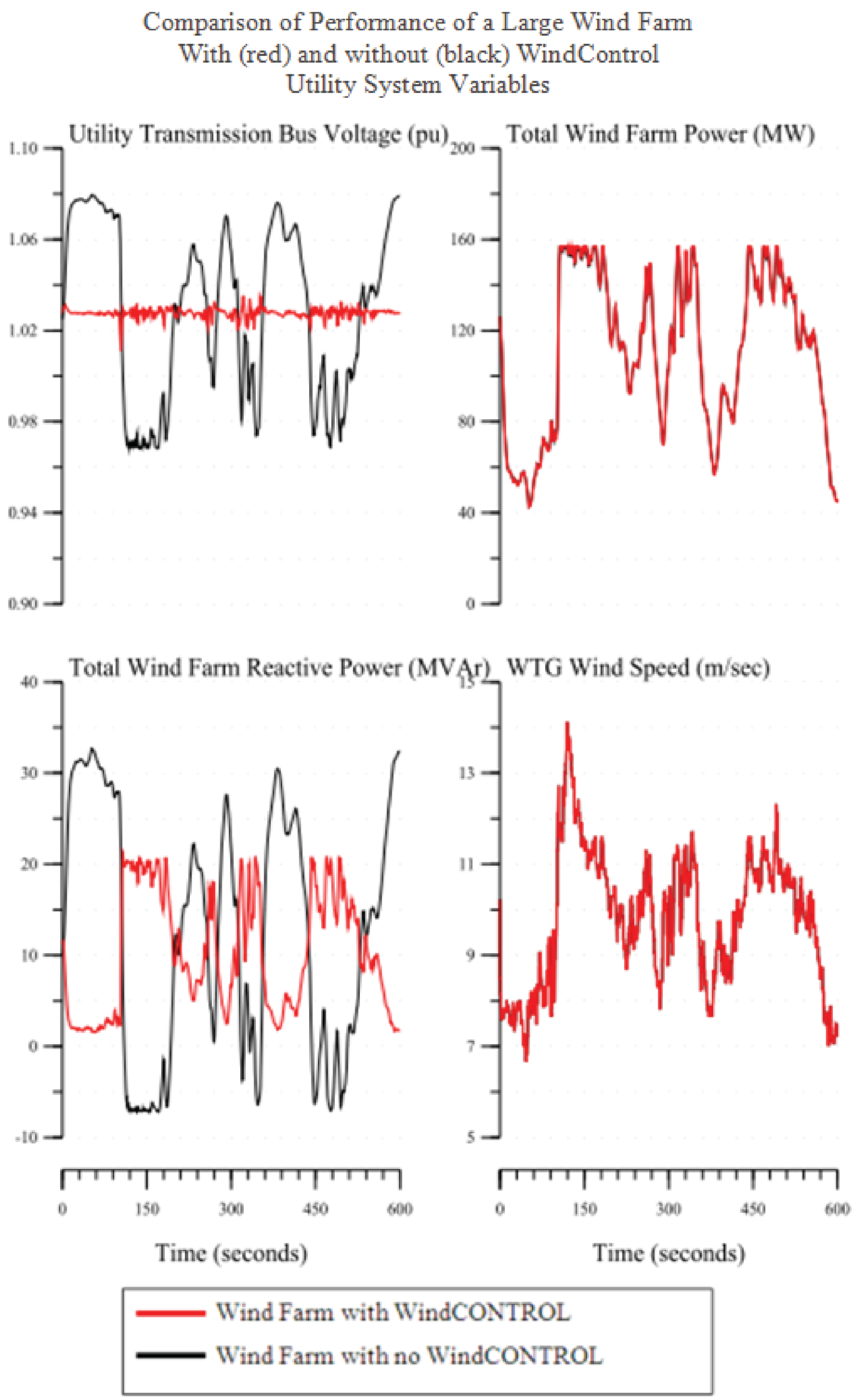


Figure 4: System Performance with and without WindCONTROL

12 Harmonic Distortion

Harmonic distortion data for the 2.5-116 - 50 Hz and 60 Hz machines can be provided as required by IEC 61400-21. Scaled up values based on the tests conducted on the sub-2MW turbines will be provided till test results are available.

12.1 IEEE 60 Hz Distortions

The 1&2MW wind turbine current harmonic distortion measured at the 690 V terminals of a turbine is within limits specified below in IEEE Std. 519-1992, "IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems." Limits are summarized in Table 5.

- PCC is the point of common coupling
- TDD is the total demand distortion (THD normalized by the current In)
- In is the maximum fundamental frequency current at PCC
- Even Harmonics shall be limited to 25 % of the odd harmonics limits.

Voltage @ PCC	h < 11	11 ≤ h < 17	17 ≤ h < 23	23 ≤ h < 35	h ≥ 35	Current TDD%
V ≤ 69 kV	4.0	2.0	1.5	0.6	0.3	5.0

Table 5: IEEE Current Distortion Limits

13 System Modeling

13.1 Wind Turbine Short Circuit Modeling

The 1&2MW Platform 2.5-116 - 50 Hz and 60 Hz wind turbine is a doubly-fed asynchronous generator with the stator directly connected to the grid while the rotor is interfaced through a frequency converter to the grid. For most faults that occur on the grid, the turbine will act as a controlled current source- contributing up to 3 per unit fault current for up to 5 cycles, after which it returns to normal current contribution (i.e. 1 per unit). For faults on the grid, the contribution from the turbines is minimal compared to that from the grid.

One exception is for "close-in" faults (e.g.: inside the wind farm, at the wind farm substation etc.) where, depending on the severity, the converter may "crowbar" (i.e. disconnect itself to protect the power electronics within). In this case the turbine rotor is short-circuited like that of a squirrel cage induction generator. The behavior can be approximated to X' = 0.2, contributing a max of 5 per unit fault current.

13.2 Wind Turbine Dynamic Modeling

A dynamic model of the GE wind turbine is available in GE's dynamic simulation program known as Positive Sequence Load Flow (PSLF -- from GE Energy Consulting) and Power System Simulation for Engineering (PSS/E). Any user with a valid license and current maintenance and support (M&S) agreement of the respective software can obtain the latest GE wind turbine model in that software directly from GE or PTI. The model comes with documentation and default data. This is intended to save time, reduce data entry efforts and copying errors, and get rid of unnecessary mechanical work. The dynamic model is based on GE's document "Modeling of GE Wind Turbine-Generators for Grid Studies".

13.3 Wind Turbine Transient Modeling

GE Energy Consulting maintains a transient model of the GE wind turbine and can be contracted to perform detailed studies.

13.4 Wind Turbine Dynamic Model Validation

The dynamic model of the GE wind turbine implemented in PSLF, has been validated by comparing the response to simulations performed in WindTRAP (transient program). Simulations show closely matching results with a small offset in the wind turbine's reactive power and reactive current. High-frequency transients in WindTRAP are not expected to be present in PSLF simulations. Details of PSLF Validation are in the document "Modeling of GE Wind Turbine-Generators for Grid Studies".

13.5 Wind Turbine Transient Model Validation

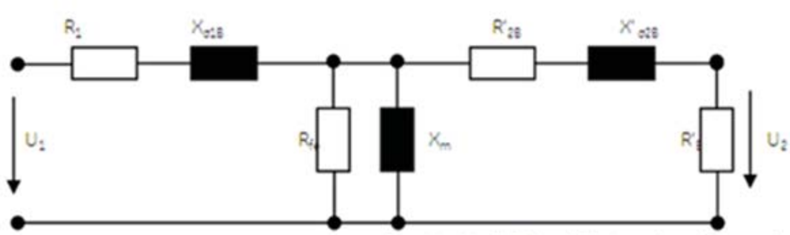
The transient model of the GE wind turbine has been validated against factory tests for three-phase and line-to-ground faults at the generator terminals. Results show that simulations closely matched recorded data.

14 Power Demand

The power demand of the wind turbine generator system during calm wind periods can include the yaw motor, control system, cold weather package, lighting and hydraulic pump and amount to a maximum 40 kW if all loads are operating at the same time.

The annual energy demand at a site with an average wind speed is 4000 to 10000 kWh/a.

15 Representative Generator Data: Equivalent Circuit Diagram



R'_2, U_2: Variable with Load and Speed

U_1= 690 V
R_1= 0.00192 Ω
$X_{\sigma 18}$= 0.02 Ω
R'_{28}= 0.00191 Ω
$X'_{\sigma 28}$= 0.04 Ω
R_{fe}= 39.41 Ω
X_m= 0.74 Ω

The above diagram is an operating equivalent circuit. Equivalent circuit parameters will vary according to generator installed. Data can be provided for specific generator models upon request.

16 Wind Farm Open Circuit Protection

Wind turbines are controlled current sources and need to be connected to the grid for proper operation. The effect of an open circuit event (islanding) on the wind turbine's converter is related to the charging capacitance that is present in the island. Islanding under high capacitance may result in transient over voltages that can lead to power converter component damage. To protect the power converter against this condition, GE wind turbines utilize a proprietary algorithm to detect an open-circuit event and initiate a shut-down to safely take the turbine off line while protecting against high voltage excursions. Open-circuit detection is determined based on analysis of three elements: voltage, frequency, and real power output. Since the machine behaves as a controlled current source, overvoltage is typically a first indicator, but other diagnostics, such as frequency deviation and reduction in real power output are used to confirm the open-circuit condition. The algorithms differentiate open-circuit events, which require the unit to shut down, from voltage and frequency ride-through events, which require turbines to stay on-line and ride-through the event.

Since charging capacitance plays a vital role in the level of protection that can be achieved, it is important that the per turbine charging capacitance be calculated. In this calculation, the wind farm collection system and the portion of the transmission lines outside the wind farm that may be part of the island should be considered. Guidelines for calculation per turbine charging capacitance are provided in a GE white paper. Protection against an open-circuit event is achieved if the per turbine charging capacitance is less than 1200kVAR at the time of the event.

17 Step-Up Transformer Protection

Arc hazard resulting from a phase-to-phase or phase-to-ground fault within the cable entry area of the Power Distribution Cabinet (PDC) of the Down tower Assembly (DTA) can be significant and needs to be controlled. Low voltage protection at the turbine step up transformer is the preferred method of controlling the amount of energy released into the cabinet during a fault. Design effort has been taken to increase robustness of the PDC and to isolate incoming conductors.

1. Access to the cable entry area of the PDC, where incoming cables connect to the circuit breaker, is restricted. The enclosure around the cable entry area has been reinforced. This configuration aids in the prevention of an arc hazard. No access is allowed to the cable entry area of the PDC when energized. Any special need to troubleshoot this area of the cabinet requires the step-up transformer to be de-energized at the medium-voltage side unless a circuit breaker exists on the low voltage side of the pad mounted transformer to isolate the wind turbine generator that can be locked out.
2. All incoming power to the other areas within the DTA is protected by fuses and circuits breakers. Access to these cabinets is acceptable while the incoming power to the PDC is energized as long as Log-out Tag-out (LOTO) and standard safety precautions are followed and personal protection equipment (PPE) is employed.

Factors that influence the time duration and energy released during a fault include the impedance of the step-up transformer, the medium-voltage fuse on the step-up transformer, and the type of fault (3-phase, line-to-line, or line-to-ground). The larger the impedance of the arcing fault, the longer the fault and the greater the danger potential to personnel and equipment.

The equipment owner should conduct an arc flash analysis that is based on the expected maintenance and operating procedures, LOTO procedures, personnel protective equipment, transformer impedance and available short circuit MVA. This analysis should determine what protection should be applied to the MV side of the transformer (breakers, fuses) and if any LV side protection is required. If LV side protection is determined to be required then it should be in the form of a circuit breaker with LSIG protection with settings coordinated with the Q1 breaker in the wind turbine.

18 Reactive Power Capability Curves

The reactive power capability of the 2.5-116 MW - 50 Hz and 60 Hz turbines for sites at altitude less than 1000 m is represented here. These curves are shown at different ambient temperatures and terminal voltages. For high ambient temperature and/or low voltage, de-rating may be necessary to meet the demanded reactive power output. The turbine will operate in a Q priority mode, which will provide the demanded reactive power and reduce, if necessary, the real power. An example of this de-rating is shown by the rounded corners in the graph below.

The rectangular curves show the reactive power capability of turbines rated at 0.9PF when the plant is operating in voltage control mode. The max reactive power capability in MVAR of turbines rated at 0.95 PF is 0.328 times the MW rating. When the turbines are operating in the power factor control mode, their capability is shown by the dotted lines. Reactive power capability may be reduced during noise reduced operation modes.

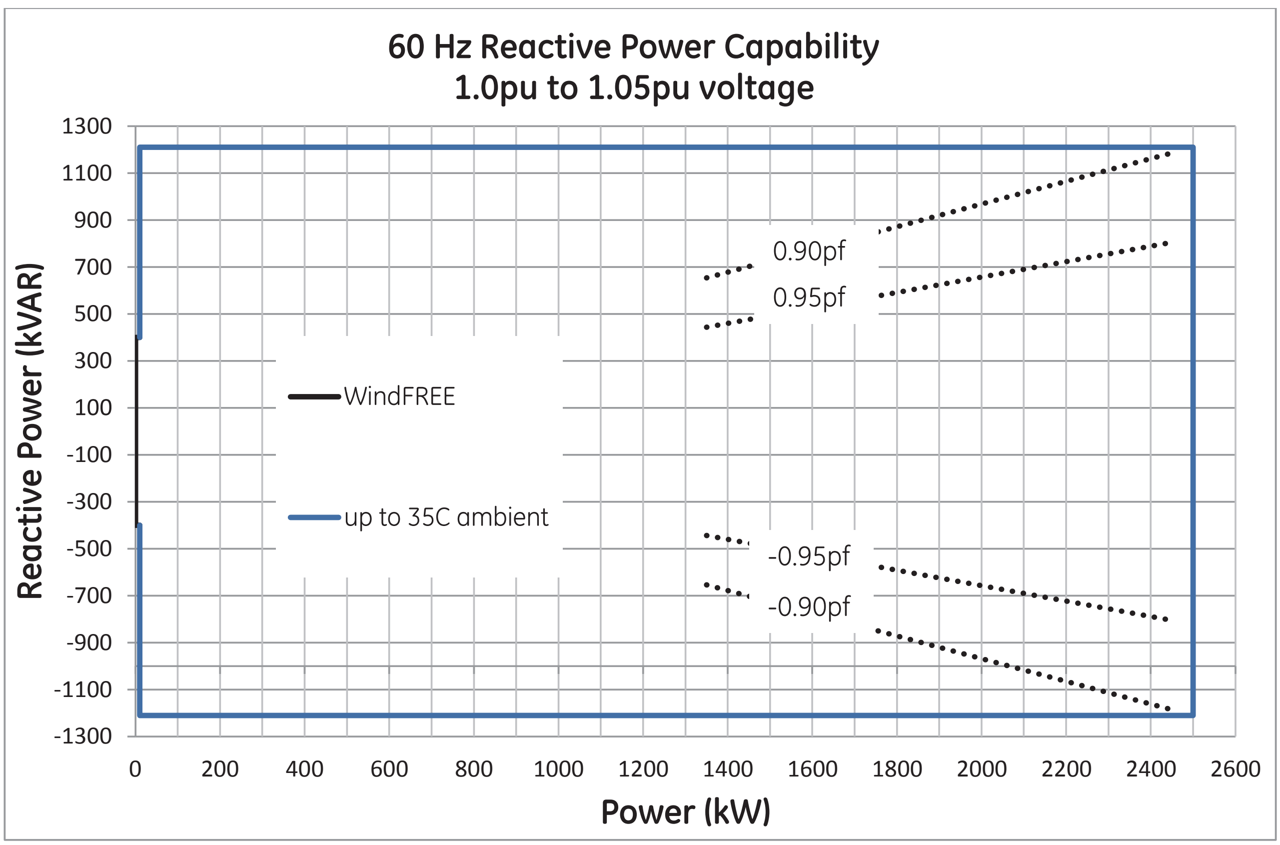


Figure 5: 60 Hz Reactive Power Capability – from 1.0pu to 1.05pu voltage

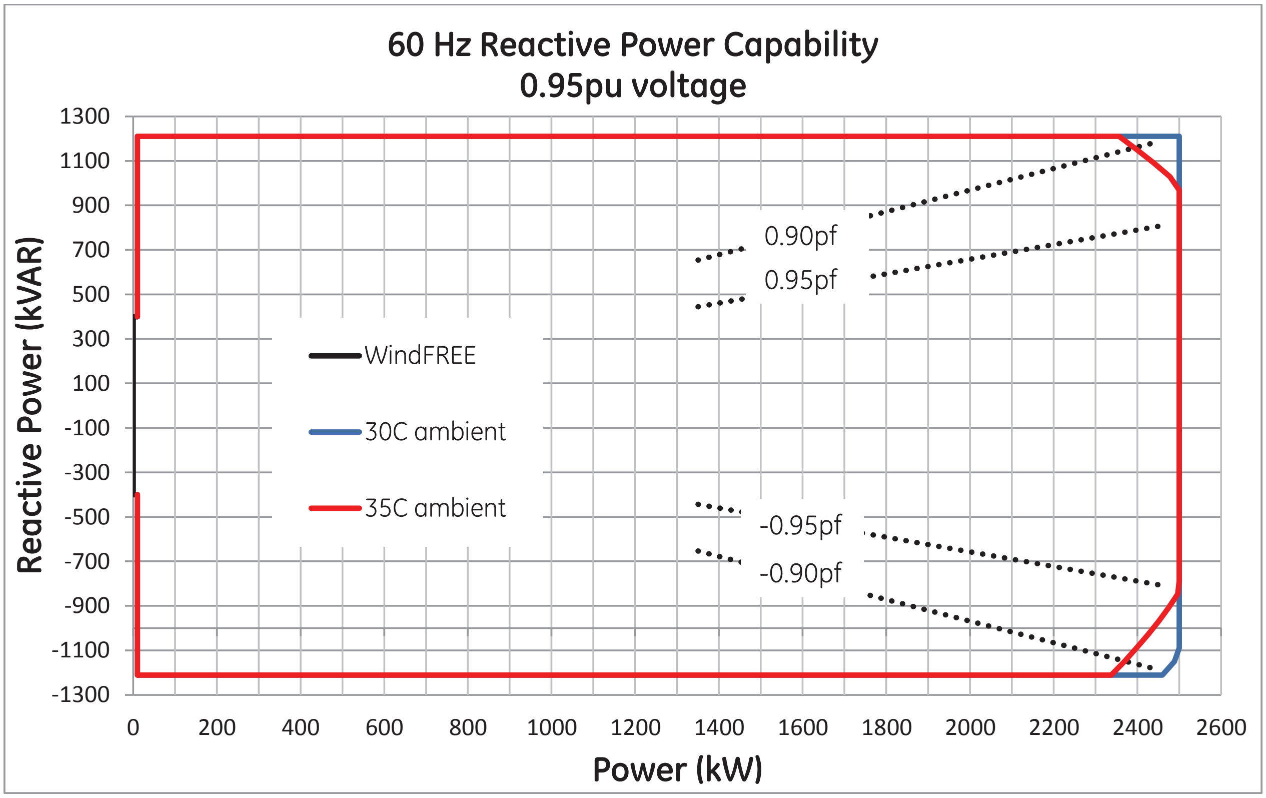


Figure 6: 60 Hz Reactive Power Capability – 0.95pu voltage

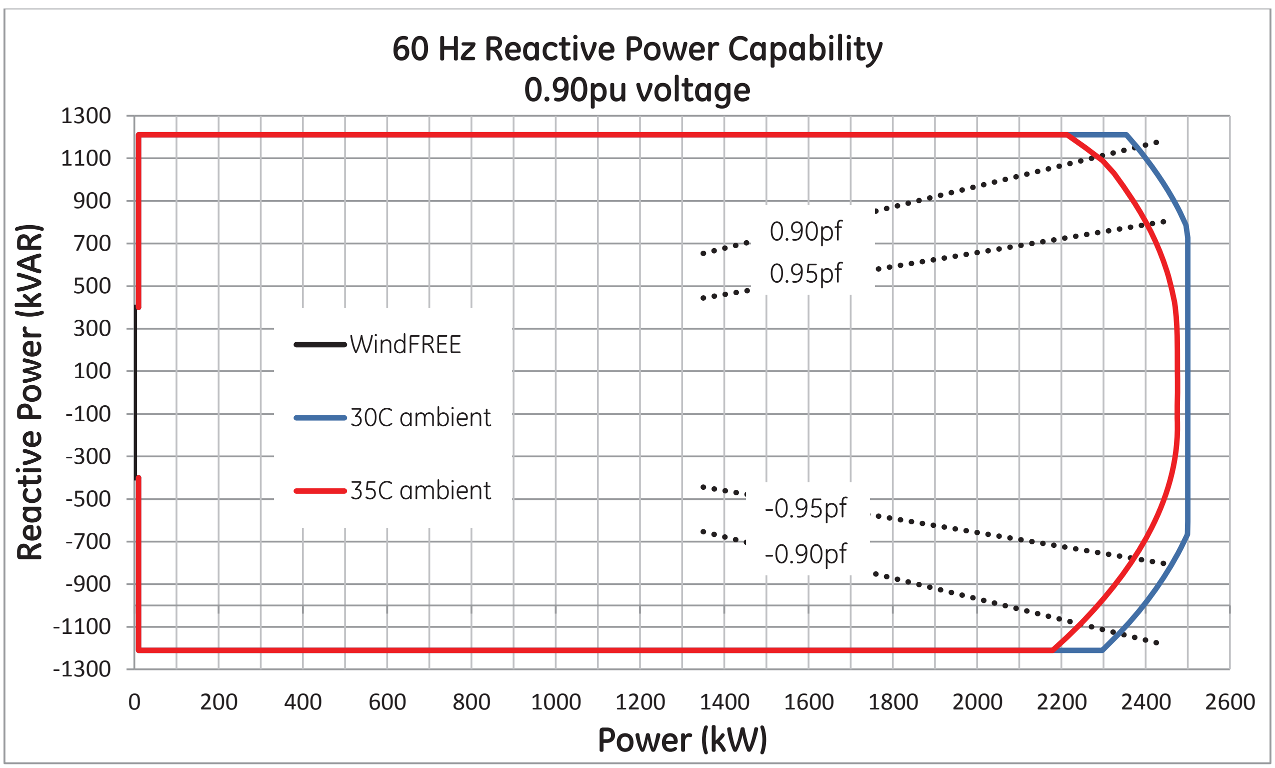


Figure 7: 60 Hz Reactive Power Capability – 0.9pu voltage

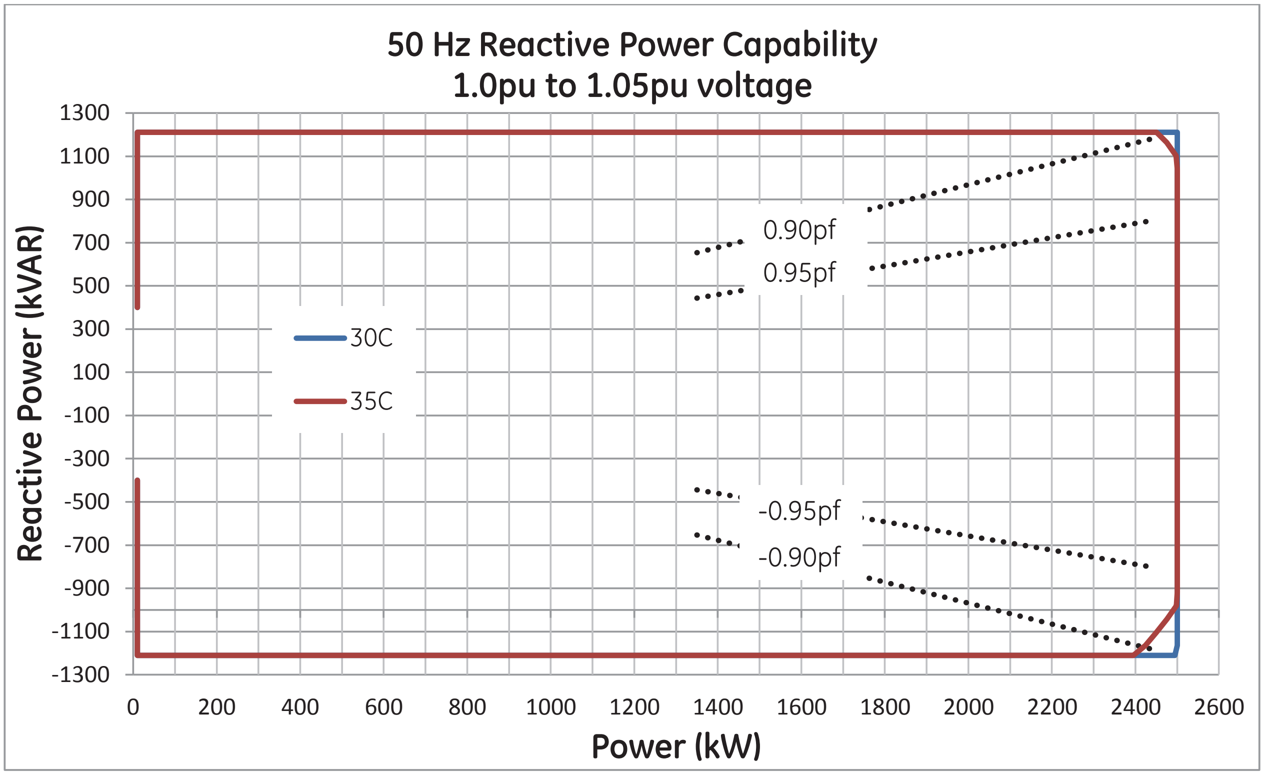


Figure 8: 50 Hz Reactive Power Capability – from 1.0pu to 1.05pu voltage

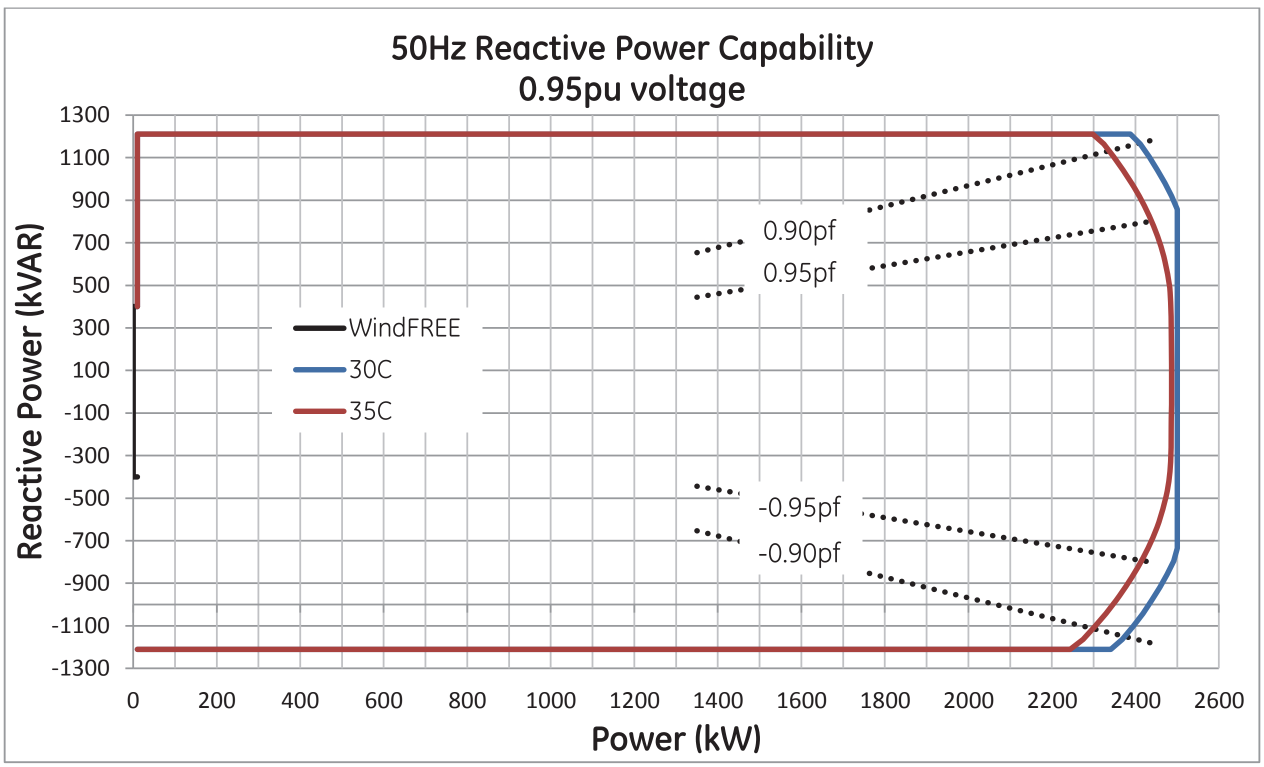


Figure 9: 50 Hz Reactive Power Capability – 0.95pu voltage

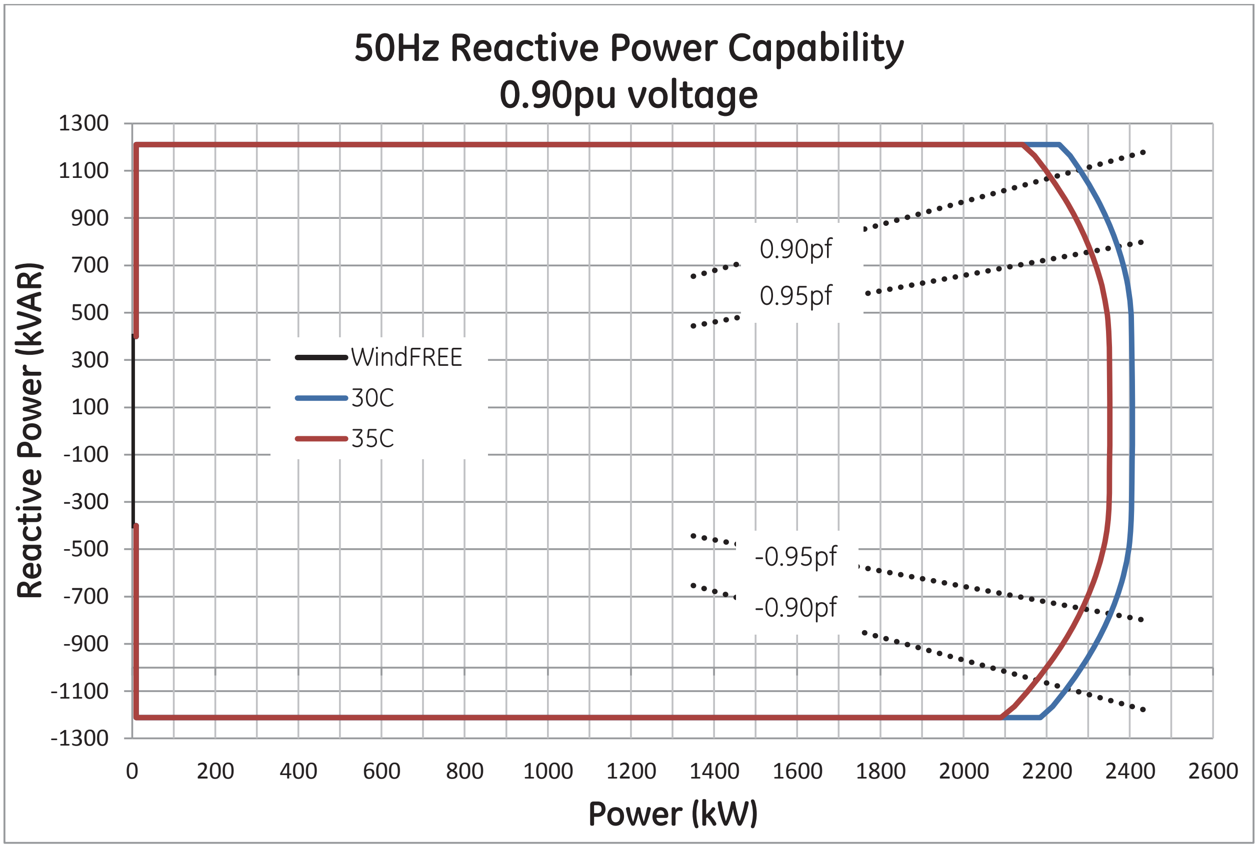
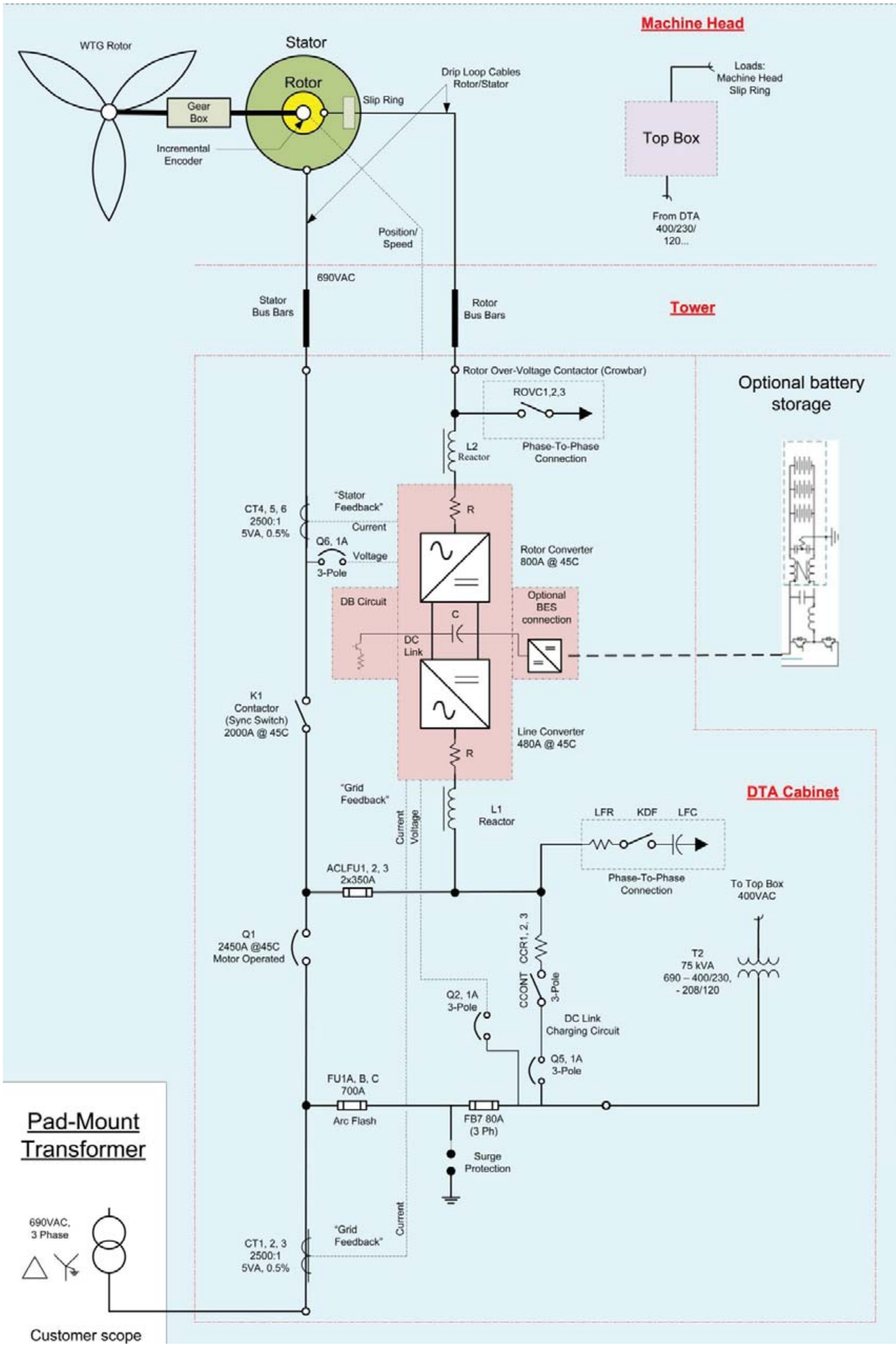


Figure 10: 50 Hz Reactive Power Capability – 0.9pu voltage

Note

These reactive power curves do not represent the capability of turbines for installation in Canada. The cable derating requirements in the Canadian Electric code result in a slight derating of the reactive power curves.
Please contact your GE representative to obtain reactive power curves for Canadian projects.

19 Doubly-Fed Induction Generator (for reference only)



Appendix I – 2.5-116 – 50 Hz and 60 Hz

General Data (Reference Only)

Parameter	50 Hz	60 Hz	Units
Turbine Rated Output	2500		kW
Generator Rating	2600		kW
Rated Voltage	690		V
Apparent Power [@ PF = 0.95 lag]	2632		kVA
Rated Frequency	50	60	Hz
Poles	4	6	--
Power Factor – Options	+/-0.95; +/- 0.90		--
Rated Current:			
Stator	2000		A
Rotor	800		A
Locked Rotor Voltage	1895	1933	V
Connection:			
Stator	Delta or Star		--
Rotor	Star		--
Synchronous Speed	1500	1200	rpm
Rated Speed	1820	1497	rpm
Slip at Rated Speed	21	25	%
Speed Range	1000-2038	800-1665	rpm
Max Frequency Drift	4		Hz/sec
Maximum symmetrical short circuit withstand capability (at LV side of Pad-mount Transformer)	35		kA
Max Voltage Imbalance	4		%

Table 6

SHORT CIRCUIT STUDY

Northwest Ohio Wind Project

Paulding, Ohio
September 25, 2017

Prepared for:
WHITE
an IEA company

Prepared by:
Westwood

Westwood

Project Name: NW OH Wind Project	
Title	**J.O. or W.O. Number**
Short Circuit Study	0007186.00

Approvals		Revision Number	Date	Description
Preparer(s) Name	**Reviewer(s) Name**			
Josh Venden	Drew Szabo	0	09/25/2017	Original Release

Westwood

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INTRODUCTION

NW OH Wind Project is a 100 MW wind generation installation in Paulding, OH consisting 42 of GE 2.5 MW wind turbines. The turbines are grouped into four medium voltage (MV) feeders with 10 turbines on Feeders 1 and 4 and 11 turbines on Feeders 2 and 3. The feeders are connected to a main power transformer that steps the voltage up to 138kV where it interconnects with the AEP transmission system via a short overhead line segment.

OBJECTIVE

The objective of this report is to determine the fault currents at the medium and low voltage buses within the NW OH wind generation plant. The fault current information is used to determine minimum conductor and concentric neutral sizes required to withstand the short circuit current for a set time.

INPUTS & ASSSUMPTIONS

- Short circuit analysis performed with ETAP v16.0.0C power system simulation software.
- Medium voltage AC collector electrical layout is per the Westwood Professional Services Electrical Drawings, MVAC Collection One-Line Diagrams E.200 & E.210.
- ETAP model parameters for equipment such as turbines (WTG), step-up transformers (GSU) and main power transformer (MPT) based on manufacturer data when available or typical ETAP values when information is not available.
- ETAP model parameters for MV cables based on thermal analysis using CYME Cymcap Underground Cable Thermal Analysis software.
- ETAP model parameters for overhead transmission line data based on ETAP library of standard overhead conductors.
- ETAP model parameters for utility equivalent impedance information provided by AEP.
- The short circuit contribution of the wind turbines, as provided by GE, is a maximum of five times the rated current for up to 5 cycles (~12kA).
- The grounded wye connection of the main power transformer secondary is connected to ground reactor of 0.6 ohms.
- Per the Ulteig Relay Settings Philosophy, the maximum clearing times are assumed to be 8.5 cycles for phase faults and 3.5 cycles for ground faults; it is also assumed for CN sizing that 100% of ground fault current flows in the concentric neutral.
- An operating temperature (T_{OP}) of 90°C is assumed for phase conductors and 80°C for concentric neutrals.
- The maximum, or short circuit temperature (T_{SC}), is assumed to be 250°C for phase conductors and 200°C for the concentric neutrals.
- A parallel ground conductor is included in all of the MV cable trenches and is assumed to be 7#8 copper-clad steel.
- Appendix C shows the various ETAP inputs used.

METHODOLOGY

- This analysis utilizes the Short Circuit module of ETAP to calculate bus fault currents at all medium and low voltage buses in the NW OH wind generation facility.
- For each bus the maximum 3-phase (3PH), line-to-ground (SLG), line-to-line (L2L) and double-line-to-ground (LLG) fault currents are shown with the wind farm in and out of service.
- The maximum phase fault current is used to verify conductor sizing; maximum ground fault current is used to determine minimum CN sizing and trench ground conductor withstand time.
- Conductor and concentric neutral (CN) sizing worksheet based on the following ICEA cable temperature rise equation:

$$A = \frac{I * \sqrt{t}}{\sqrt{\mathrm{K} * \log_{10}\left[\frac{T_{SC} + \lambda}{T_{OP} + \lambda}\right]}}$$

Where:

A = cross-sectional area (Circular mils);
I = short circuit current (A);
t = fault clearing time (s);
K = time/temp coefficient (0.0125 Al; 0.0297 Cu);
T_{SC} = short circuit temperature;
T_{OP} = operating temperature;
λ = base temperature (228°C Al; 234°C Cu)

- Appendix A shows the fault currents for each MV and LV bus in the wind farm.

CONCLUSION

- The maximum phase fault current for each cable size is determined from the ETAP analysis. This current corresponds to the minimum required cross-sectional area of phase conductor necessary to withstand the respective fault current for up to 8.5 cycles.
- The table below confirms the cross-sectional area of the phase conductors is larger than the required minimum for every cable size. Cable ampacities are also shown.

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Table 1: Phase Conductor Summary

Cable	Material	Maximum 3PH Fault Current	Min. Required Area	Phase Conductor Area	Ampacity & Configuration	
1/0	Al	10486	83908	105600	142.3	Trefoil
4/0	Al	13367	106961	211600	212.9	Trefoil
500	Al	6848	54797	500000	334.7	Trefoil
750	Al	11533	92286	750000	408.6	Trefoil
1000	Al	10238	81923	1000000	477.1	Trefoil
1250	Al	12754	102056	1250000	540.5	Trefoil
1250*	Al	12754	102056	1250000	570.5	Trefoil

** Increased ampacity based on 90% soil compaction in trenches with 11 turbines on the ckt*

- The maximum ground fault current for each cable size is determined from the ETAP analysis. This current is used to determine a minimum required total cross-sectional area of concentric neutral conductors necessary to withstand the respective fault current for up to 3.5 cycles. The cross-sectional area is a combined area of several smaller gauge conductors concentrically wrapped around the phase conductor.

- The following table summarizes the fault current, cross-sectional area and concentric neutral sizes for the cables used at the NW OH wind generation facility. A list of stock cables was provided by White Construction and the cross-sectional area of all CN sizes as indicated below exceed the required minimums.

Table 2: Concentric Neutral Summary

Cable	CN Material	Maximum SLG Fault Current	Fault Location	CN Min. Required Area	Conc Neut SC Withstand Min. Size	
1/0	Cu	7303	T-21	27299	2/3	18x16AWG
4/0	Cu	9801	T-24	36637	1/2	17x14AWG
500	Cu	5922	T-15	22137	1/3	16x12AWG
750	Cu	8634	T-17	32275	1/6	19x14AWG
1000	Cu	7634	T-10	28537	1/6	25x14AWG
1250	Cu	10692	T-25	39968	1/6	20x12AWG

- Future utility system data was also provided based on 2022 projected power flow models. The model was adjusted to reflect the future utility equivalent data and the resulting bus fault currents within the collector system were analyzed to ensure CN sizing was adequate for near term projected increases in fault current. The following table shows the increase in fault current does not result in the need for larger concentric neutrals.

Table 3: Projected Fault Current and CN Sizing

Cable	CN Material	Projected SLG Fault Current	Fault Location	Min. Required cmils neutral	Conc Neut SC Withstand Min. Size	
1/0	Cu	7362	T-21	27520	2/3	18x16AWG
4/0	Cu	9920	T-24	37082	1/2	17x14AWG
500	Cu	7142	T-15	22242	1/3	16x12AWG
750	Cu	8535	T-17	32600	1/6	19x14AWG
1000	Cu	7699	T-10	28780	1/6	25x14AWG
1250	Cu	10834	T-25	40498	1/6	20x12AWG

- The trench ground and low voltage conductors' short circuit withstand time is based on a simplified version of the ICEA equation shown above. Taking Equation (42) from the IEEE 80-2000 standard and solving for time (t) results in the following equation. K_f is the material constant based on Table 2 in IEEE 80-2000.

$$t = \left(\frac{Area_{kCMIL}}{K_f * I_{kA}}\right)^2$$

- K_f is equal to 10.45 for copper-clad steel wire with a conductivity of 40%. The short circuit withstand for the parallel trench ground is approximately 0.725 seconds or 43.5 cycles. This is adequate to withstand maximum ground fault current until protective devices can interrupt the fault.

$$t = \left(\frac{115.570}{10.45 * 12.975}\right)^2 = 0.727\ sec$$

- K_f is equal to 7.00 for soft-drawn copper wire. The connections between the turbine and transformer are 9x1000kCMIL cables. The short circuit withstand for the low voltage cables is over 10 minutes. This is adequate to withstand maximum ground fault current until protective devices can interrupt the fault.

$$t = \left(\frac{9000}{7.00 * 49.876}\right)^2 = 664.5\ sec$$

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APPENDIX A: SHORT CIRCUIT SUMMARY REPORTS

Short-Circuit Summary Report

1/2 Cycle - 3-Phase, LG, LL, & LLG Fault Currents

Prefault Voltage = 100 % of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	kV	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.
89F1A	34.500	0.682	-8.285	8.313	0.529	-8.434	8.451	7.175	0.591	7.200	6.993	4.881	8.528
89F2A	34.500	0.682	-8.285	8.313	0.529	-8.434	8.451	7.175	0.591	7.200	6.993	4.881	8.528
89F3A	34.500	0.682	-8.285	8.313	0.529	-8.434	8.451	7.175	0.591	7.200	6.993	4.881	8.528
89F4A	34.500	0.682	-8.285	8.313	0.529	-8.434	8.451	7.175	0.591	7.200	6.993	4.881	8.528
89T1A	138.000	1.600	-7.007	7.187	1.491	-7.268	7.419	6.068	1.386	6.224	5.388	5.156	7.457
89T1B	34.500	0.682	-8.285	8.313	0.529	-8.434	8.451	7.175	0.591	7.200	6.993	4.881	8.528
HV BUS MPT	138.000	1.600	-7.007	7.187	1.491	-7.268	7.419	6.068	1.386	6.224	5.388	5.156	7.457
JB-2/1	34.500	0.964	-7.347	7.410	1.975	-6.522	6.814	6.362	0.835	6.417	-7.651	1.973	7.901
JB-4/1	34.500	2.346	-3.482	4.199	2.145	-2.057	2.972	3.016	2.032	3.636	-3.914	-1.349	4.140
MV BUS T-01	34.500	2.638	-2.019	3.322	2.418	-1.720	2.968	1.749	2.284	2.877	-2.862	-1.539	3.250
MV BUS T-02	34.500	2.773	-2.302	3.603	2.555	-1.976	3.230	1.993	2.401	3.121	-3.174	-1.540	3.528
MV BUS T-03	34.500	2.884	-2.591	3.877	2.670	-2.241	3.485	2.244	2.498	3.357	-3.482	-1.514	3.797
MV BUS T-04	34.500	2.963	-2.734	4.032	2.761	-2.414	3.667	2.368	2.566	3.492	-3.657	-1.489	3.949
MV BUS T-05	34.500	3.054	-2.912	4.220	2.865	-2.635	3.892	2.522	2.645	3.655	-3.869	-1.443	4.130
MV BUS T-06	34.500	3.150	-3.100	4.419	2.971	-2.781	4.070	2.684	2.728	3.827	-4.088	-1.470	4.344
MV BUS T-07	34.500	3.217	-3.434	4.705	3.044	-3.109	4.351	2.974	2.786	4.075	-4.416	-1.368	4.623
MV BUS T-08	34.500	2.951	-4.308	5.222	2.922	-3.517	4.573	3.731	2.556	4.522	-5.131	-1.097	5.247
MV BUS T-09	34.500	1.282	-6.356	6.484	2.454	-4.999	5.569	5.504	1.110	5.615	-6.904	0.766	6.946
MV BUS T-10	34.500	1.207	-6.582	6.692	2.392	-5.324	5.837	5.700	1.045	5.795	-7.109	1.010	7.180
MV BUS T-13	34.500	3.040	-2.582	3.988	2.874	-2.344	3.709	2.236	2.633	3.454	-3.597	-1.561	3.921
MV BUS T-14	34.500	3.144	-2.867	4.255	2.981	-2.630	3.976	2.483	2.723	3.685	-3.899	-1.509	4.181
MV BUS T-15	34.500	3.337	-3.807	5.062	3.172	-3.593	4.793	3.297	2.890	4.384	-4.808	-1.189	4.953
MV BUS T-16	34.500	3.050	-2.754	4.109	2.865	-2.446	3.767	2.385	2.641	3.559	-3.732	-1.544	4.039
MV BUS T-17	34.500	1.110	-7.014	7.101	2.202	-6.012	6.402	6.074	0.962	6.150	-7.448	1.519	7.602
MV BUS T-20	34.500	2.850	-4.822	5.601	3.030	-3.683	4.769	4.176	2.468	4.851	-5.645	-1.045	5.741
MV BUS T-21	34.500	2.137	-6.184	6.543	2.799	-4.985	5.717	5.356	1.850	5.666	-6.853	0.132	6.855
MV BUS T-22	34.500	1.603	-6.721	6.910	2.508	-5.599	6.135	5.821	1.389	5.984	-7.265	0.883	7.319
MV BUS T-23	34.500	1.061	-6.916	6.997	2.272	-5.648	6.087	5.990	0.919	6.060	-7.356	1.295	7.469
MV BUS T-24	34.500	1.289	-7.385	7.496	2.021	-6.807	7.100	6.395	1.117	6.492	-7.667	1.965	7.915
MV BUS T-25	34.500	0.857	-7.744	7.791	1.511	-7.356	7.509	6.706	0.742	6.747	-7.727	2.706	8.188
MV BUS T-26	34.500	2.279	-5.481	5.936	2.779	-3.900	4.789	4.746	1.974	5.141	-6.100	-0.568	6.127
MV BUS T-27	34.500	1.786	-6.103	6.359	2.644	-4.492	5.213	5.285	1.547	5.507	-6.655	0.089	6.655
MV BUS T-28	34.500	1.113	-6.640	6.732	2.372	-5.120	5.643	5.750	0.964	5.830	-7.098	0.933	7.159
MV BUS T-29	34.500	2.750	-5.120	5.812	3.021	-3.947	4.970	4.434	2.382	5.033	-5.922	-0.850	5.983
MV BUS T-31	34.500	2.571	-4.113	4.851	2.610	-2.687	3.746	3.562	2.227	4.201	-4.732	-1.300	4.907

1/2 Cycle - 3-Phase, LG, LL, & LLG Fault Currents

Prefault Voltage = 100 % of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	kV	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.	Real	Imag.	Mag.
MV BUS T-32	34.500	1.734	-5.671	5.930	2.579	-3.942	4.710	4.911	1.501	5.135	-6.197	-0.139	6.199
MV BUS T-33	34.500	1.310	-6.052	6.192	2.462	-4.348	4.996	5.241	1.134	5.362	-6.538	0.381	6.549
MV BUS T-34	34.500	1.541	-5.769	5.972	2.517	-4.012	4.736	4.997	1.334	5.172	-6.269	0.041	6.269
MV BUS T-36	34.500	2.282	-4.779	5.296	2.622	-3.141	4.091	4.139	1.976	4.586	-5.349	-0.906	5.426
MV BUS T-37	34.500	2.440	-4.401	5.032	2.605	-2.860	3.869	3.811	2.113	4.358	-4.990	-1.138	5.118
MV BUS T-39	34.500	2.528	-4.108	4.824	2.577	-2.653	3.699	3.558	2.189	4.177	-4.708	-1.283	4.880
MV BUS T-40	34.500	1.244	-5.513	5.652	2.309	-3.336	4.057	4.775	1.078	4.895	-5.848	-0.044	5.848
MV BUS T-41	34.500	2.379	-3.204	3.990	2.102	-1.899	2.833	2.774	2.060	3.456	-3.648	-1.425	3.917
MV BUS T-42	34.500	2.346	-3.475	4.192	2.143	-2.051	2.967	3.009	2.031	3.631	-3.906	-1.350	4.133
MV BUS T-43	34.500	2.378	-3.219	4.002	2.105	-1.908	2.841	2.787	2.059	3.465	-3.663	-1.422	3.929
MV BUS T-44	34.500	1.329	-4.890	5.068	2.161	-2.714	3.469	4.235	1.151	4.389	-5.182	-0.349	5.193
MV BUS T-45	34.500	1.293	-5.082	5.243	2.205	-2.879	3.626	4.401	1.120	4.541	-5.380	-0.260	5.387
MV BUS T-46	34.500	1.267	-5.336	5.485	2.270	-3.143	3.877	4.621	1.097	4.750	-5.657	-0.138	5.659
MV BUS T-48	34.500	2.277	-2.629	3.478	1.908	-1.529	2.445	2.277	1.972	3.012	-3.055	-1.463	3.387
MV BUS T-49	34.500	2.286	-2.889	3.683	1.964	-1.666	2.575	2.502	1.979	3.190	-3.306	-1.430	3.602
MV BUS T-50	34.500	2.277	-2.637	3.484	1.910	-1.533	2.449	2.284	1.972	3.017	-3.063	-1.462	3.394
POI	138.000	1.607	-7.030	7.211	1.499	-7.298	7.451	6.088	1.392	6.245	5.403	5.181	7.486

All fault currents are symmetrical (1/2 Cycle network) values in rms kA.
* LLG fault current is the larger of the two faulted line currents.

Sequence Impedance Summary Report

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	kV	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
89F1A	34.500	0.19663	2.38789	2.39597	0.19663	2.38789	2.39597	0.04950	2.28159	2.28213	0.00000	0.00000	0.00
89F2A	34.500	0.19663	2.38789	2.39597	0.19663	2.38789	2.39597	0.04950	2.28159	2.28213	0.00000	0.00000	0.00
89F3A	34.500	0.19663	2.38789	2.39597	0.19663	2.38789	2.39597	0.04950	2.28159	2.28213	0.00000	0.00000	0.00
89F4A	34.500	0.19663	2.38789	2.39597	0.19663	2.38789	2.39597	0.04950	2.28159	2.28213	0.00000	0.00000	0.00
89T1A	138.000	2.46787	10.80704	11.08523	2.46787	10.80704	11.08523	1.53784	9.94717	10.06534	0.00000	0.00000	0.00
89T1B	34.500	0.19663	2.38789	2.39597	0.19663	2.38789	2.39597	0.04950	2.28159	2.28213	0.00000	0.00000	0.00
HV BUS MPT	138.000	2.46787	10.80704	11.08523	2.46787	10.80704	11.08523	1.53784	9.94717	10.06534	0.00000	0.00000	0.00
JB-2/1	34.500	0.34972	2.66537	2.68822	0.34972	2.66537	2.68822	1.84180	3.06233	3.57352	0.00000	0.00000	0.00
JB-4/1	34.500	2.65038	3.93435	4.74379	2.65038	3.93435	4.74379	9.21412	6.04556	11.02038	0.00000	0.00000	0.00
MV BUS T-01	34.500	4.76115	3.64527	5.99637	4.76115	3.64527	5.99637	6.88580	4.38042	8.16102	0.00000	0.00000	0.00
MV BUS T-02	34.500	4.25324	3.53059	5.52767	4.25324	3.53059	5.52767	6.12909	4.25911	7.46363	0.00000	0.00000	0.00
MV BUS T-03	34.500	3.82221	3.43327	5.13777	3.82221	3.43327	5.13777	5.48693	4.15616	6.88331	0.00000	0.00000	0.00
MV BUS T-04	34.500	3.63083	3.35013	4.94027	3.63083	3.35013	4.94027	5.00579	4.02514	6.42337	0.00000	0.00000	0.00
MV BUS T-05	34.500	3.41640	3.25697	4.72013	3.41640	3.25697	4.72013	4.46670	3.87834	5.91549	0.00000	0.00000	0.00
MV BUS T-06	34.500	3.21252	3.16132	4.50713	3.21252	3.16132	4.50713	4.29441	3.71037	5.67528	0.00000	0.00000	0.00
MV BUS T-07	34.500	2.89396	3.08939	4.23312	2.89396	3.08939	4.23312	3.81980	3.63428	5.27246	0.00000	0.00000	0.00
MV BUS T-08	34.500	2.15564	3.14673	3.81427	2.15564	3.14673	3.81427	4.03898	3.75811	5.51695	0.00000	0.00000	0.00
MV BUS T-09	34.500	0.60733	3.01134	3.07198	0.60733	3.01134	3.07198	3.51370	3.61045	5.03800	0.00000	0.00000	0.00
MV BUS T-10	34.500	0.53670	2.92782	2.97661	0.53670	2.92782	2.97661	3.12293	3.48265	4.67777	0.00000	0.00000	0.00
MV BUS T-13	34.500	3.80690	3.23282	4.99436	3.80690	3.23282	4.99436	4.87220	3.71841	6.12902	0.00000	0.00000	0.00
MV BUS T-14	34.500	3.45873	3.15421	4.68101	3.45873	3.15421	4.68101	4.35348	3.63525	5.67167	0.00000	0.00000	0.00
MV BUS T-15	34.500	2.59347	2.95885	3.93457	2.59347	2.95885	3.93457	3.06438	3.42858	4.59843	0.00000	0.00000	0.00
MV BUS T-16	34.500	3.59810	3.24837	4.84750	3.59810	3.24837	4.84750	4.86886	3.80247	6.17775	0.00000	0.00000	0.00
MV BUS T-17	34.500	0.43855	2.77042	2.80492	0.43855	2.77042	2.80492	2.33330	3.22307	3.97900	0.00000	0.00000	0.00
MV BUS T-20	34.500	1.80916	3.06150	3.55609	1.80916	3.06150	3.55609	4.34308	3.55321	5.61139	0.00000	0.00000	0.00
MV BUS T-21	34.500	0.99416	2.87748	3.04438	0.99416	2.87748	3.04438	3.12886	3.35854	4.59016	0.00000	0.00000	0.00
MV BUS T-22	34.500	0.66894	2.80406	2.88274	0.66894	2.80406	2.88274	2.64433	3.28086	4.21385	0.00000	0.00000	0.00
MV BUS T-23	34.500	0.43158	2.81375	2.84665	0.43158	2.81375	2.84665	2.80021	3.47981	4.46657	0.00000	0.00000	0.00
MV BUS T-24	34.500	0.45702	2.61749	2.65709	0.45702	2.61749	2.65709	1.48113	2.83302	3.19683	0.00000	0.00000	0.00
MV BUS T-25	34.500	0.28115	2.54108	2.55659	0.28115	2.54108	2.55659	1.03898	2.71261	2.90478	0.00000	0.00000	0.00
MV BUS T-26	34.500	1.28848	3.09847	3.35570	1.28848	3.09847	3.35570	4.66446	3.96404	6.12134	0.00000	0.00000	0.00
MV BUS T-27	34.500	0.87995	3.00623	3.13237	0.87995	3.00623	3.13237	4.05581	3.86646	5.60349	0.00000	0.00000	0.00
MV BUS T-28	34.500	0.48909	2.91798	2.95869	0.48909	2.91798	2.95869	3.47349	3.77310	5.12849	0.00000	0.00000	0.00
MV BUS T-29	34.500	1.62165	3.01916	3.42711	1.62165	3.01916	3.42711	4.06372	3.50842	5.36869	0.00000	0.00000	0.00
MV BUS T-31	34.500	2.17657	3.48202	4.10632	2.17657	3.48202	4.10632	6.76098	4.47662	8.10870	0.00000	0.00000	0.00
MV BUS T-32	34.500	0.98196	3.21229	3.35903	0.98196	3.21229	3.35903	4.98120	4.19128	6.50993	0.00000	0.00000	0.00
MV BUS T-33	34.500	0.68038	3.14420	3.21697	0.68038	3.14420	3.21697	4.53189	4.11925	6.12423	0.00000	0.00000	0.00
MV BUS T-34	34.500	0.86067	3.22253	3.33548	0.86067	3.22253	3.33548	4.98514	4.24267	6.54614	0.00000	0.00000	0.00
MV BUS T-36	34.500	1.62081	3.39416	3.76129	1.62081	3.39416	3.76129	6.11764	4.42423	7.54979	0.00000	0.00000	0.00
MV BUS T-37	34.500	1.91941	3.46157	3.95811	1.91941	3.46157	3.95811	6.56250	4.49555	7.95465	0.00000	0.00000	0.00
MV BUS T-39	34.500	2.16430	3.51687	4.12947	2.16430	3.51687	4.12947	6.92735	4.55405	8.29021	0.00000	0.00000	0.00
MV BUS T-40	34.500	0.77589	3.43782	3.52428	0.77589	3.43782	3.52428	6.83122	5.23575	8.60689	0.00000	0.00000	0.00
MV BUS T-41	34.500	2.97605	4.00788	4.99199	2.97605	4.00788	4.99199	9.69933	6.12335	11.47050	0.00000	0.00000	0.00
MV BUS T-42	34.500	2.65845	3.93786	4.75122	2.65845	3.93786	4.75122	9.23443	6.05109	11.04039	0.00000	0.00000	0.00
MV BUS T-43	34.500	2.95769	4.00373	4.97773	2.95769	4.00373	4.97773	9.67198	6.11896	11.44503	0.00000	0.00000	0.00
MV BUS T-44	34.500	1.03101	3.79275	3.93038	1.03101	3.79275	3.93038	8.66473	5.89112	10.47774	0.00000	0.00000	0.00
MV BUS T-45	34.500	0.93685	3.68140	3.79873	0.93685	3.68140	3.79873	8.14376	5.72074	9.95227	0.00000	0.00000	0.00
MV BUS T-46	34.500	0.83905	3.53339	3.63164	0.83905	3.53339	3.63164	7.34622	5.42604	9.13284	0.00000	0.00000	0.00
MV BUS T-48	34.500	3.74945	4.32961	5.72747	3.74945	4.32961	5.72747	11.57362	6.62232	13.33431	0.00000	0.00000	0.00

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	kV	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
MV BUS T-49	34.500	3.35538	4.24063	5.40755	3.35538	4.24063	5.40755	10.98652	6.52819	12.77971	0.00000	0.00000	0.00
MV BUS T-50	34.500	3.73660	4.32671	5.71687	3.73660	4.32671	5.71687	11.55448	6.61925	13.31617	0.00000	0.00000	0.00
POI	138.000	2.46184	10.77056	11.04833	2.46184	10.77056	11.04833	1.53107	9.88268	10.00058	0.00000	0.00000	0.00

Short-Circuit Summary Report

1M2 Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
59F1A	/ 4.800	2.117	-18.99/	16.1/ 2	0.996	-12.866	12.608	1/ .570	1.548	1/ .99/	1/ .6/ 7	6.959	18./ 2/
59F2A	/ 4.800	2.117	-18.99/	16.1/ 2	0.996	-12.866	12.608	1/ .570	1.548	1/ .99/	1/ .6/ 7	6.959	18./ 2/
59F/ A	/ 4.800	2.117	-18.99/	16.1/ 2	0.996	-12.866	12.608	1/ .570	1.548	1/ .99/	1/ .6/ 7	6.959	18./ 2/
59F4A	/ 4.800	2.117	-18.99/	16.1/ 2	0.996	-12.866	12.608	1/ .570	1.548	1/ .99/	1/ .6/ 7	6.959	18./ 2/
59T1A	1/ 5.000	1.741	-5.17/	5./ 86	1.88/	-5.060	5.205	7.050	1.805	7.2/ 9	6./ 92	8.475	5.415
59T1B	/ 4.800	2.117	-18.99/	16.1/ 2	0.996	-12.866	12.608	1/ .570	1.548	1/ .99/	1/ .6/ 7	6.959	18./ 2/
HV BUS k PT	1/ 5.000	1.741	-5.17/	5./ 86	1.88/	-5.060	5.205	7.050	1.805	7.2/ 9	6./ 92	8.475	5.415
JB-2MI	/ 4.800	2.897	-1/ .824	1/ .771	/ .82/	-5.70/	9./ 59	11.728	2.289	11.940	-1/ ./ 49	0.547	1/ ./ 76
JB-4MI	/ 4.800	/ .5/ 9	-8.211	6.472	2.655	-2./ 00	/ .8/ 7	4.844	/ ./ / 1	8.6/ 4	-8.810	-2.6/ 8	6.105
LV BUS T-01	0.690	82.578	-8/ .662	78./ / 8	85.717	-89.705	5/ .742	46.465	48.796	68.242	1/ .47/	79.446	50.851
LV BUS T-02	0.690	8/ .577	-88.929	77.685	89.8/ 9	-61.860	58.641	45.4/ 1	46.668	67.284	-51.655	-12.4/ 0	52.625
LV BUS T-0/	0.690	84.508	-87.521	79.667	60.298	-6/ .079	57.261	80.070	47.465	65.994	-5/ .86/	-12.767	54.8/ /
LV BUS T-04	0.690	88.4/ 2	-85.850	50.680	60.500	-6/ .650	55.044	80.727	45.012	69.548	-54./ 76	-1/ .129	58./ 91
LV BUS T-08	0.690	86.165	-89./ 78	51.7/ /	61./ 59	-64./ 04	55.902	81.418	45.680	70.754	-58.244	-1/ .850	56./ 19
LV BUS T-06	0.690	86.9/ 8	-89.8/ /	52./ 78	61.99/	-64.42/	59.406	81.881	49./ 14	71./ 40	-58.861	-14.210	56.7/ /
LV BUS T-07	0.690	87.60/	-61.278	54.100	62.827	-68.779	90.788	8/ .060	49.59/	72.5/ 4	-57.2/ 2	-14./ 55	55.411
LV BUS T-05	0.690	85.817	-68.042	57.492	6/ .250	-65.689	9/ ./ 7/	86./ 2/	80.656	78.772	-90.7/ 0	-14./ 45	91.587
LV BUS T-09	0.690	60.162	-7/ .479	94.967	64.74/	-74.568	95.977	6/ .6/ 2	82.114	52.249	-95.819	-14.060	99.817
LV BUS T-10	0.690	60.647	-7/ .921	98.618	68.110	-78.164	99.444	64.014	82.8/ 4	52.511	-99.008	-14.408	100.047
LV BUS T-1/	0.690	88.599	-86.825	79.499	61.165	-62.041	57.128	45.949	45.416	65.549	18.194	52.798	54.175
LV BUS T-14	0.690	86.687	-85.266	51.271	61.771	-6/ .426	55.8/ 8	80.488	49.07/	70./ 54	-54./ 96	-14.269	58.894
LV BUS T-18	0.690	85.685	-62.721	58.576	6/ ./ 88	-66.556	92.127	84./ 1/	80.507	74./ 72	-55.7/ 0	-14.952	59.956
LV BUS T-16	0.690	86.11/	-87.842	50./ 7/	61./ / 5	-62.581	57.522	49.525	45.602	69.606	-5/ .6/ 5	-1/ .971	54.797
LV BUS T-17	0.690	61.689	-74.601	96.754	68.562	-78.614	100.276	64.60/	8/ .411	5/ .52/	-99.50/	-18.172	100.980
LV BUS T-20	0.690	89.286	-68.125	55.081	6/ .542	-65.71/	9/ .794	86./ 95	81./ 27	76.285	-90.968	-14.975	92.190
LV BUS T-21	0.690	60.796	-70.62/	9/ .157	68.109	-72.766	97.642	61.185	82.66/	50.707	-96.116	-18.157	97./ 05
LV BUS T-22	0.690	61./ 82	-72.946	98./ 16	68.854	-74.4/ 6	99.207	6/ .170	8/ .148	52.882	-95.275	-18.220	99.480
LV BUS T-2/	0.690	61.478	-74.750	96.508	68.7/ 5	-78.749	100.296	64.785	8/ .281	5/ .541	-99.927	-14.974	101.04/
LV BUS T-24	0.690	62.407	-74.151	96.940	66./ 52	-78.255	100./ 74	64.2/ 9	84.089	5/ .989	-99.87/	-18.918	100.5/ 7
LV BUS T-28	0.690	62.957	-78.60/	95.40/	66.544	-76.279	101.42/	68.471	84.862	58.226	-100.942	-16.189	102.227
LV BUS T-26	0.690	89.6/ 4	-65.726	90.991	64.201	-71.400	96.019	89.818	81.688	75.508	-94.206	-14.849	98./ 2/
LV BUS T-27	0.690	60./ 17	-71.617	9/ .6/ /	64.759	-7/ .807	97.954	62.019	82.247	51.09/	-96.599	-14.868	97.957
LV BUS T-25	0.690	60.90/	-74.46/	96.195	68./ 16	-78.844	99.568	64.454	82.786	5/ ./ 18	-99.8/ 6	-14.825	100.891
LV BUS T-29	0.690	89.6/ 0	-66.248	59.1/ 0	64.14/	-69.845	94.611	87./ 66	81.682	77.19/	-92.024	-18.066	9/ .249
LV BUS T-/ 1	0.690	87.145	-6/ .4/ 5	58./ 5/	62.208	-67.485	91.761	84.9/ 8	49.800	7/ .947	-59.020	-1/ .802	90.0/ 5

1/2 Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
LV BUS T-/ 2	0.690	89.145	-71.194	92.889	6/ .919	-7/ .2/ 7	97.207	61.68/	81.2/ 8	50.16/	-96.290	-1/ .614	97.247
LV BUS T-/ /	0.690	89.870	-7/ ./ 12	94.46/	64./ 05	-74.767	95.619	6/ .457	81.601	51.512	-95.284	-1/ .867	99.157
LV BUS T-/ 4	0.690	89.054	-72.1/ 9	9/ .246	6/ .907	-7/ .9/ 2	97.724	62.471	81.179	50.785	-97.118	-1/ ./ 67	95.0/ 0
LV BUS T-/ 6	0.690	87.595	-67.168	55.678	62.560	-70.250	94.290	85.16/	80.180	76.799	-92.468	-1/ ./ 48	9/ .42/
LV BUS T-/ 7	0.690	87./ 94	-68.25/	56.924	62.4/ 1	-65.566	92.982	86.8/ /	49.71/	78.252	-90.696	-1/ ./ 09	91.667
LV BUS T-/ 9	0.690	86.951	-6/ .859	58./ 54	62.079	-67.875	91.764	88.066	49./ 86	7/ .945	-59.118	-1/ ./ 22	90.106
LV BUS T-40	0.690	85.208	-72.792	9/ .201	6/ ./ 20	-74.48/	97.7/ 5	6/ .045	80.481	50.745	-97.814	-12.479	95./ 10
LV BUS T-41	0.690	84.45/	-62.166	52.662	60.148	-66.897	59.7/ 6	8/ .914	47.2/ 0	71.678	-57./ 28	-11.808	55.079
LV BUS T-42	0.690	84.968	-6/ .968	54./ / 6	60.601	-69./ 16	92.072	86./ 76	47.675	7/ .5/ 4	-59.86/	-11.256	90.271
LV BUS T-4/	0.690	84.812	-62.267	52.787	60.205	-67.995	90.52/	84.904	47.256	72.489	-57.985	-11.259	55.650
LV BUS T-44	0.690	86.806	-71.806	91.1/ 7	62.022	-7/ .890	96.240	61.94/	45.992	75.976	-96.02/	-11.2/ 8	96.675
LV BUS T-48	0.690	87.046	-71.991	91.58/	62.440	-7/ .921	96.76/	62./ 89	49.488	79.890	-96.866	-11.614	97.262
LV BUS T-46	0.690	87.788	-72.454	92.650	62.979	-74.249	97./ 62	62.75/	80.064	50./ 00	-97.149	-12.142	97.908
LV BUS T-45	0.690	82.414	-85.500	75.769	85.427	-6/ .960	56.6/ 0	80.955	48.4/ 7	65.298	-5/ .587	-10.456	54.810
LV BUS T-49	0.690	8/ .021	-60.791	50.668	85.985	-68.842	55.185	82.716	48.96/	69.940	-58.762	-10.8/ 5	56.407
LV BUS T-80	0.690	82.4/ 4	-85.56/	75.5/ 0	85.448	-64.011	56.679	81.04/	48.484	65./ 45	-5/ .915	-10.455	54.871
k V BUS T-01	/ 4.800	/ .474	-2.845	4./ 05	2.5/ 2	-1.944	/ .4/ 8	2.206	/ .009	/ .7/ 1	-/ ./ 99	-2.228	4.062
k V BUS T-02	/ 4.800	/ .742	-2.975	4.75/	/ .0/ /	-2.268	/ .756	2.875	/ .242	4.142	-/ .581	-2./ / 0	4.801
k V BUS T-0/	/ 4.800	/ .999	-/ .40/	8.281	/ .215	-2.891	4.1/ 2	2.946	/ .468	4.845	-4.290	-2.420	4.928
k V BUS T-04	/ 4.800	4.174	-/ .892	8.807	/ ./ 62	-2.501	4./ 76	/ .109	/ .617	4.769	-4.818	-2.465	8.146
k V BUS T-08	/ 4.800	4./ 9/	-/ .508	8.512	/ .8/ 6	-/ .068	4.650	/ .29/	/ .507	8.0/ 4	1.518	8.090	8.404
k V BUS T-06	/ 4.800	4.627	-/ .5/ 7	6.011	/ .711	-/ .1/ 8	4.585	/ ./ 21	4.009	8.206	1.774	8./ / 4	8.621
k V BUS T-07	/ 4.800	4.574	-4.40/	6.865	/ .570	-/ .879	8.271	/ .511	4.224	8.659	2.209	8.7/ 2	6.14/
k V BUS T-05	/ 4.800	8.101	-8.96/	7.547	/ .922	-4.067	8.681	8.16/	4.422	6.795	-6.74/	-2.556	7./ / 8
k V BUS T-09	/ 4.800	/ .080	-10.576	11.298	/ .569	-6.068	7.194	9.428	2.649	9.791	-11.07/	-0.657	11.094
k V BUS T-10	/ 4.800	2.989	-11.427	11.504	/ .572	-6.879	7.6/ 4	9.904	2.871	10.2/ 2	-11.854	-0.401	11.890
k V BUS T-1/	/ 4.800	4.2/ 2	-/ .047	8.218	/ .491	-2.879	4./ 41	2.6/ 7	/ .666	4.816	1.18/	4.754	4.921
k V BUS T-14	/ 4.800	4.808	-/ .47/	8.655	/ .654	-2.94/	4.718	/ .006	/ .90/	4.926	1.480	8.179	8./ 75
k V BUS T-18	/ 4.800	8.278	-4.987	7.2/ 9	4.18/	-4.222	8.922	4.291	4.872	6.270	2.855	6.404	6.907
k V BUS T-16	/ 4.800	4./ 29	-/ .296	8.441	/ .807	-2.701	4.427	2.58/	/ .780	4.712	1./ 50	4.598	8.056
k V BUS T-17	/ 4.800	2.576	-12.890	12.914	/ .769	-7.765	5.6/ 4	10.914	2.800	11.196	-12.608	0.190	12.606
k V BUS T-20	/ 4.800	8.444	-6.065	5.182	4.181	-/ .921	8.710	8.284	4.720	7.06/	-6.909	-/ .256	7.681
k V BUS T-21	/ 4.800	8.044	-9.622	10.564	4./ 1/	-8.59/	7./ 0/	5./ / 6	4./ 75	9.418	-10.102	-2./ 02	10./ 60
k V BUS T-22	/ 4.800	4.086	-11.428	12.12/	4.098	-6.969	5.05/	9.901	/ .82/	10.809	-11.648	-1.098	11.696
k V BUS T-2/	/ 4.800	2.627	-12.806	12.779	/ .775	-7.16/	5.095	10.541	2.254	11.079	-12.490	0.058	12.490
k V BUS T-24	/ 4.800	/ .679	-1/ .060	1/ .865	/ .662	-9.091	9.501	11./ 21	/ .197	11.764	-12.981	0.247	12.98/
k V BUS T-28	/ 4.800	2.489	-14.467	14.674	2.560	-10./ 02	10.692	12.844	2.140	12.728	-1/ .557	1.516	14.008

1M2 Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
k V BUS T-26	/ 4.800	8.022	-5.081	9.459	/ .986	-4./ 21	8.589	6.974	4./ 86	5.222	-5.807	-2.925	5.996
k V BUS T-27	/ 4.800	4.262	-9.996	10.567	/ .975	-8.2/ 5	6.877	5.661	/ .700	9.415	-10.242	-2.010	10.4/ 7
k V BUS T-25	/ 4.800	2.645	-11.57/	12.168	/ .755	-6./ 01	7./ 82	10.291	2./ 01	10.846	-11.552	-0./ 06	11.556
k V BUS T-29	/ 4.800	8.820	-6.679	5.668	4.2/ 9	-4.272	6.015	8.75/	4.756	7.807	-7.478	-/ .2/ 4	5.148
k V BUS T-/ 1	/ 4.800	4.680	-8.159	6.967	/ ./ 60	-2.77/	4./ 87	4.49/	4.0/ 0	6.0/ 6	-8.770	-/ .112	6.888
k V BUS T-/ 2	/ 4.800	/ .547	-9.196	9.965	/ .725	-4.499	8.54/	7.967	/ ./ / 5	5.6/ 5	-9.428	-1.947	9.624
k V BUS T-/ /	/ 4.800	2.597	-10.418	10.510	/ .696	-8.1/ /	6./ 28	9.028	2.816	9./ 69	-10.814	-0.984	10.887
k V BUS T-/ 4	/ 4.800	/ ./ 84	-9.614	10.15/	/ .668	-4.6/ /	8.905	5./ / 1	2.911	5.528	-9.774	-1.804	9.559
k V BUS T-/ 6	/ 4.800	4.810	-6.549	5.200	/ .822	-/ ./ 97	4.59/	8.9/ 1	/ .911	7.108	-7.271	-2.5/ 6	7.504
k V BUS T-/ 7	/ 4.800	4.858	-8.945	7.810	/ .412	-/ .026	4.861	8.181	/ .978	6.806	-6.444	-/ .000	7.105
k V BUS T-/ 9	/ 4.800	4.877	-8.2/ 6	6.984	/ ./ 12	-2.744	4./ 01	4.8/ /	/ .967	6.024	-8.755	-/ .065	6.881
k V BUS T-40	/ 4.800	2.680	-9.428	9.791	/ .2/ 7	-/ .7/ 0	4.9/ 5	5.159	2./ 07	5.807	-9./ 74	-1.266	9.489
k V BUS T-41	/ 4.800	/ .525	-4.895	8.952	2.601	-2.096	/ ./ 40	4.007	/ ./ 24	8.207	-4.944	-2.679	8.62/
k V BUS T-42	/ 4.800	/ .5/ 8	-8.197	6.485	2.654	-2.294	/ .8/ 1	4.8/ 2	/ ./ 25	8.622	-8.496	-2.6/ 4	6.098
k V BUS T-4/	/ 4.800	/ .5/ 0	-4.629	6.009	2.606	-2.107	/ ./ 81	4.0/ 5	/ ./ 28	8.2/ 1	-4.976	-2.677	8.680
k V BUS T-44	/ 4.800	2.6/ /	-5.195	5.610	2.906	-2.968	4.182	7.125	2.292	7.457	-5.187	-1.490	5.292
k V BUS T-48	/ 4.800	2.618	-5.856	5.976	2.999	-/ .16/	4./ 85	7.464	2.277	7.50/	-5.8/ /	-1.417	5.649
k V BUS T-46	/ 4.800	2.640	-9.056	9.462	/ .14/	-/ .455	4.698	7.598	2.295	5.22/	-9.0/ /	-1./ / 8	9.1/ 1
k V BUS T-45	/ 4.800	/ .416	-/ .6/ 1	4.958	2.290	-1.672	2.5/ 6	/ .161	2.965	4./ / 8	-/ .957	-2.480	4.650
k V BUS T-49	/ 4.800	/ .497	-4.1/ 5	8.415	2./ 54	-1.541	/ .012	/ .604	/ .0/ 7	4.71/	-4.461	-2.477	8.102
k V BUS T-80	/ 4.800	/ .419	-/ .646	4.999	2.29/	-1.677	2.541	/ .174	2.970	4./ 47	-4.001	-2.482	4.69/
POI	1/ 5.000	1.747	-5.198	5./ 50	1.862	-5.092	5.242	7.099	1.814	7.289	6.406	8.808	5.446

All fault currents are symmetrical (1M2 Cycle networ%) values in rms %A.
* LL3 fault current is the larger of the two faulted line currents.

Project:	NW OH WIND	ETAP	Page:	4
Location:	Paulding, OH	16.0.0C	Date:	09-21-2017
Contract:			SN:	WESTWOODP
Engineer:	Josh Venden	Study Case: SC	Revision:	Base
Filename:	NW_OH		Config.:	Normal

Sequence Impedance Summary Report

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	%V	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
59F1A	/ 4.800	0.16201	1.22402	1.2/ 470	0.16/ 01	1.22008	1.2/ 059	0.04980	2.25189	2.2521/	0.00000	0.00000	0.00
59F2A	/ 4.800	0.16201	1.22402	1.2/ 470	0.16/ 01	1.22008	1.2/ 059	0.04980	2.25189	2.2521/	0.00000	0.00000	0.00
59F/ A	/ 4.800	0.16201	1.22402	1.2/ 470	0.16/ 01	1.22008	1.2/ 059	0.04980	2.25189	2.2521/	0.00000	0.00000	0.00
59F4A	/ 4.800	0.16201	1.22402	1.2/ 470	0.16/ 01	1.22008	1.2/ 059	0.04980	2.25189	2.2521/	0.00000	0.00000	0.00
59T1A	1/ 5.000	1.95605	9./ 2868	9.8/ 479	1.95857	9./ 2017	9.829/ 9	1.8/ 754	9.94717	10.068/ 4	0.00000	0.00000	0.00
59T1B	/ 4.800	0.16201	1.22402	1.2/ 470	0.16/ 01	1.22008	1.2/ 059	0.04980	2.25189	2.2521/	0.00000	0.00000	0.00
HV BUS k PT	1/ 5.000	1.95605	9./ 2868	9.8/ 479	1.95857	9./ 2017	9.829/ 9	1.8/ 754	9.94717	10.068/ 4	0.00000	0.00000	0.00
JB-2MI	/ 4.800	0.27275	1.42044	1.446/ 9	0.27/ 50	1.4167/	1.44298	1.54150	/ .062/ /	/ .87/ 82	0.00000	0.00000	0.00
JB-4MI	/ 4.800	1.528/ 1	2.47759	/ .07762	1.79490	2.46040	/ .0488/	9.21412	6.04886	11.020/ 5	0.00000	0.00000	0.00
LV BUS T-01	0.690	0.00/ 71	0.00/ 77	0.00829	0.00/ 71	0.00/ 77	0.00829	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-02	0.690	0.00/ 86	0.00/ 69	0.0081/	0.00/ 86	0.00/ 69	0.0081/	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-0/	0.690	0.00/ 44	0.00/ 6/	0.00800	0.00/ 44	0.00/ 6/	0.00800	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-04	0.690	0.00/ 40	0.00/ 89	0.00494	0.00/ 40	0.00/ 89	0.00494	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-08	0.690	0.00/ / 8	0.00/ 84	0.00457	0.00/ / 8	0.00/ 84	0.00457	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-06	0.690	0.00/ / 4	0.00/ 80	0.00454	0.00/ / 4	0.00/ 49	0.00454	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-07	0.690	0.00/ 24	0.00/ 48	0.00474	0.00/ 28	0.00/ 48	0.00474	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-05	0.690	0.00/ 08	0.00/ / 5	0.00488	0.00/ 08	0.00/ / 5	0.00488	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-09	0.690	0.00266	0.00/ 28	0.00419	0.00266	0.00/ 24	0.00419	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-10	0.690	0.00264	0.00/ 22	0.00417	0.00264	0.00/ 22	0.00417	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-1/	0.690	0.00/ 82	0.00/ 86	0.00801	0.00/ 82	0.00/ 86	0.00801	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-14	0.690	0.00/ 42	0.00/ 81	0.00490	0.00/ 42	0.00/ 81	0.00490	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-18	0.690	0.00/ 17	0.00/ / 9	0.00464	0.00/ 17	0.00/ / 9	0.00464	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-16	0.690	0.00/ 46	0.00/ 88	0.00496	0.00/ 46	0.00/ 88	0.00496	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-17	0.690	0.00262	0.00/ 17	0.00412	0.00262	0.00/ 17	0.00412	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-20	0.690	0.00/ 04	0.00/ / 8	0.00482	0.00/ 08	0.00/ / 8	0.00482	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-21	0.690	0.00279	0.00/ 24	0.00427	0.00279	0.00/ 24	0.00427	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-22	0.690	0.00269	0.00/ 20	0.00415	0.00269	0.00/ 20	0.00415	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-2/	0.690	0.00261	0.00/ 15	0.00412	0.00261	0.00/ 15	0.00411	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-24	0.690	0.00268	0.00/ 14	0.00411	0.00268	0.00/ 14	0.00411	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-28	0.690	0.00289	0.00/ 11	0.00408	0.00289	0.00/ 11	0.00408	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-26	0.690	0.00257	0.00/ / 1	0.004/ 5	0.00257	0.00/ / 1	0.004/ 5	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-27	0.690	0.00274	0.00/ 28	0.00428	0.00274	0.00/ 28	0.00428	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-25	0.690	0.00262	0.00/ 21	0.00414	0.00262	0.00/ 20	0.00414	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-29	0.690	0.00299	0.00/ / 2	0.00447	0.00299	0.00/ / 2	0.00447	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 1	0.690	0.00/ 12	0.00/ 47	0.00467	0.00/ 12	0.00/ 47	0.00467	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 2	0.690	0.00278	0.00/ / 1	0.004/ 0	0.00278	0.00/ / 1	0.004/ 0	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ /	0.690	0.00266	0.00/ 27	0.00422	0.00266	0.00/ 27	0.00422	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 4	0.690	0.00271	0.00/ / 1	0.00427	0.00271	0.00/ / 0	0.00427	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 6	0.690	0.0029/	0.00/ 40	0.00449	0.0029/	0.00/ 40	0.00449	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 7	0.690	0.00/ 0/	0.00/ 44	0.00485	0.00/ 0/	0.00/ 44	0.00485	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 9	0.690	0.00/ 11	0.00/ 47	0.00467	0.00/ 11	0.00/ 47	0.00467	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-40	0.690	0.00267	0.00/ / 4	0.00427	0.00267	0.00/ / /	0.00427	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-41	0.690	0.00/ 15	0.00/ 62	0.00452	0.00/ 17	0.00/ 62	0.00451	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-42	0.690	0.00/ 05	0.00/ 85	0.00472	0.00296	0.00/ 88	0.00462	0.00281	0.00264	0.00/ 64	0.00000	0.00000	0.00
LV BUS T-4/	0.690	0.00/ 17	0.00/ 62	0.00451	0.00/ 04	0.00/ 89	0.00471	0.00281	0.00264	0.00/ 64	0.00000	0.00000	0.00
LV BUS T-44	0.690	0.00271	0.00/ 4/	0.004/ 7	0.00271	0.00/ 42	0.004/ 7	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-48	0.690	0.00269	0.00/ 40	0.004/ 4	0.00269	0.00/ / 9	0.004/ /	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-46	0.690	0.00265	0.00/ / 6	0.004/ 0	0.00265	0.00/ / 6	0.00429	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-45	0.690	0.00/ / 7	0.00/ 75	0.00806	0.00/ / 6	0.00/ 77	0.00808	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	%V	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
LV BUS T-49	0.690	0.00/ 28	0.00/ 72	0.00494	0.00/ 24	0.00/ 71	0.0049/	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-80	0.690	0.00/ / 6	0.00/ 77	0.00808	0.00/ / 8	0.00/ 77	0.00804	0.00285	0.00264	0.00/ 70	0.00000	0.00000	0.00
k V BUS T-01	/ 4.800	/ .7277/	2.7/ 468	4.62/ 2/	/ .72971	2.7/ 202	4.62/ 27	6.55850	4./ 5042	5.16102	0.00000	0.00000	0.00
k V BUS T-02	/ 4.800	/ .28585	2.89/ 60	4.16478	/ .26084	2.89098	4.1646/	6.12909	4.28911	7.46/ 6/	0.00000	0.00000	0.00
k V BUS T-0/	/ 4.800	2.55568	2.48528	/ .79/ 08	2.59087	2.48888	/ .79277	8.4569/	4.18616	6.55/ / 1	0.00000	0.00000	0.00
k V BUS T-04	/ 4.800	2.74154	2./ 8904	/ .61701	2.74/ 78	2./ 86/ 0	/ .61667	8.00879	4.02814	6.42/ / 7	0.00000	0.00000	0.00
k V BUS T-08	/ 4.800	2.89074	2.24/ 64	/ .42722	2.89262	2.24054	/ .42651	4.46670	/ .575/ 4	8.91849	0.00000	0.00000	0.00
k V BUS T-06	/ 4.800	2.88065	2.1184/	/ ./ 1/ 76	2.88281	2.11246	/ ./ 1/ 25	4.29441	/ .710/ 7	8.67825	0.00000	0.00000	0.00
k V BUS T-07	/ 4.800	2.280/ 7	2.0/ 26/	/ .0/ 248	2.28215	2.02964	/ .0/ 179	/ .51950	/ .6/ 425	8.27246	0.00000	0.00000	0.00
k V BUS T-05	/ 4.800	1.68007	1.9257/	2.8/ 526	1.6816/	1.9286/	2.8/ 692	4.0/ 595	/ .78511	8.81698	0.00000	0.00000	0.00
k V BUS T-09	/ 4.800	0.4762/	1.69759	1.76/ 42	0.47727	1.694/ 9	1.760/ 2	/ .81/ 70	/ .61048	8.0/ 500	0.00000	0.00000	0.00
k V BUS T-10	/ 4.800	0.42/ 0/	1.6/ / 89	1.65747	0.42406	1.6/ 00/	1.65429	/ .1229/	/ .45268	4.67777	0.00000	0.00000	0.00
k V BUS T-1/	/ 4.800	/ .09967	2.2/ 204	/ .51965	/ .10188	2.22911	/ .51949	4.57220	/ .71541	6.12902	0.00000	0.00000	0.00
k V BUS T-14	/ 4.800	2.77/ 46	2.1/ 505	/ .80192	2.778/ 1	2.1/ 81/	/ .80189	4./ 8/ 45	/ .6/ 828	8.67167	0.00000	0.00000	0.00
k V BUS T-18	/ 4.800	2.00815	1.55428	2.78187	2.00696	1.55120	2.78075	/ .064/ 5	/ .42585	4.8954/	0.00000	0.00000	0.00
k V BUS T-16	/ 4.800	2.91260	2.21756	/ .66059	2.91444	2.21491	/ .66085	4.56556	/ .50247	6.17778	0.00000	0.00000	0.00
k V BUS T-17	/ 4.800	0./ 4/ 45	1.80/ 62	1.842/ 8	0./ 4481	1.49999	1.8/ 908	2./ / / / 0	/ .22/ 07	/ .97900	0.00000	0.00000	0.00
k V BUS T-20	/ 4.800	1.6/ 164	1.51566	2.44/ / 2	1.6/ 25/	1.51811	2.44146	4./ 4/ 05	/ .88/ 21	8.611/ 9	0.00000	0.00000	0.00
k V BUS T-21	/ 4.800	0.581/ 2	1.62/ 58	1.5/ / 47	0.58248	1.62028	1.5/ 052	/ .12556	/ ./ 8584	4.89016	0.00000	0.00000	0.00
k V BUS T-22	/ 4.800	0.84966	1.845/ 0	1.64295	0.88078	1.84465	1.6/ 99/	2.644/ /	/ .25056	4.21/ 58	0.00000	0.00000	0.00
k V BUS T-2/	/ 4.800	0./ 2042	1.828/ 5	1.88567	0./ 2146	1.82151	1.888/ 9	2.50021	/ .47951	4.46687	0.00000	0.00000	0.00
k V BUS T-24	/ 4.800	0./ 9508	1.41/ 08	1.46504	0./ 9906	1.40922	1.46464	1.4511/	2.5/ / 02	/ .1965/	0.00000	0.00000	0.00
k V BUS T-28	/ 4.800	0.22749	1./ / 520	1./ 8740	0.22580	1./ / 4/ 6	1./ 8/ 79	1.0/ 595	2.71261	2.90475	0.00000	0.00000	0.00
k V BUS T-26	/ 4.800	1.11059	1.75105	2.09912	1.11201	1.77768	2.09651	4.66446	/ .96404	6.121/ 4	0.00000	0.00000	0.00
k V BUS T-27	/ 4.800	0.71596	1.65609	1.5/ 297	0.72008	1.65264	1.5/ 024	4.08851	/ .56646	8.60/ 49	0.00000	0.00000	0.00
k V BUS T-25	/ 4.800	0./ 8644	1.89505	1.6/ 7/ 8	0./ 8749	1.89460	1.6/ 415	/ .47/ 49	/ .77/ 10	8.12549	0.00000	0.00000	0.00
k V BUS T-29	/ 4.800	1.46480	1.77196	2.2955/	1.46868	1.765/ 9	2.29650	4.06/ 72	/ .80542	8./ 6569	0.00000	0.00000	0.00
k V BUS T-/ 1	/ 4.800	1.90756	2.12917	2.58590	1.90906	2.12892	2.58727	6.76095	4.47662	5.10570	0.00000	0.00000	0.00
k V BUS T-/ 2	/ 4.800	0.77112	1.54/ 47	1.99528	0.77224	1.54017	1.99864	4.95120	4.19125	6.8099/	0.00000	0.00000	0.00
k V BUS T-/ /	/ 4.800	0.49/ 77	1.77815	1.54285	0.49456	1.77158	1.5/ 966	4.8/ 159	4.11928	6.1242/	0.00000	0.00000	0.00
k V BUS T-/ 4	/ 4.800	0.644/ 4	1.54694	1.98611	0.64847	1.54/ 68	1.98/ / 5	4.95814	4.24267	6.84614	0.00000	0.00000	0.00
k V BUS T-/ 6	/ 4.800	1./ / 890	2.02589	2.42598	1./ / 712	2.028/ 7	2.4269/	6.11764	4.4242/	7.84979	0.00000	0.00000	0.00
k V BUS T-/ 7	/ 4.800	1.61925	2.10072	2.682/ 7	1.62081	2.09781	2.68085	6.86280	4.49888	7.98468	0.00000	0.00000	0.00
k V BUS T-/ 9	/ 4.800	1.55809	2.18661	2.564/ 6	1.556/ 0	2.18/ / 5	2.56272	6.927/ 8	4.88408	5.29021	0.00000	0.00000	0.00
k V BUS T-40	/ 4.800	0.88062	1.98547	2.0/ 440	0.84914	1.94451	2.02058	6.5/ 122	8.2/ 878	5.60659	0.00000	0.00000	0.00
k V BUS T-41	/ 4.800	2.1/ 0/ 6	2.8855/	/ ./ 2985	2.10012	2.84119	/ .29669	9.699/ /	6.12/ / 8	11.47080	0.00000	0.00000	0.00
k V BUS T-42	/ 4.800	1.5/ 120	2.45168	/ .0541/	1.50070	2.46418	/ .08197	9.2/ 44/	6.08109	11.040/ 9	0.00000	0.00000	0.00
k V BUS T-4/	/ 4.800	2.11/ 20	2.8842/	/ ./ 1807	2.079/ 1	2.8/ 7/ 9	/ .2508/	9.67195	6.11596	11.4480/	0.00000	0.00000	0.00
k V BUS T-44	/ 4.800	0.707/ 8	2.20286	2./ 1/ / 8	0.70/ 41	2.15407	2.29488	5.6647/	8.59112	10.47774	0.00000	0.00000	0.00
k V BUS T-48	/ 4.800	0.64662	2.12251	2.21910	0.64/ 72	2.10896	2.20218	5.14/ 76	8.72074	9.98227	0.00000	0.00000	0.00
k V BUS T-46	/ 4.800	0.857/ /	2.02185	2.10817	0.858/ 4	2.0067/	2.090/ 8	7./ 4622	8.42604	9.1/ 254	0.00000	0.00000	0.00
k V BUS T-45	/ 4.800	2.7/ 791	2.90959	/ .99848	2.70904	2.59142	/ .9622/	11.87/ 62	6.622/ 2	1/ ./ / 4/ 1	0.00000	0.00000	0.00
k V BUS T-49	/ 4.800	2./ 7299	2.505/ 1	/ .67664	2./ 4/ 90	2.79002	/ .64/ 91	10.95682	6.82519	12.77971	0.00000	0.00000	0.00
k V BUS T-80	/ 4.800	2.72604	2.90684	/ .95455	2.69716	2.55505	/ .98167	11.88445	6.61928	1/ ./ 1617	0.00000	0.00000	0.00
POI	1/ 5.000	1.95266	9.29921	9.80522	1.95248	9.29/ 77	9.80256	1.8/ 107	9.55265	10.00085	0.00000	0.00000	0.00

Project:	NW OH WIND	ETAP	Page: 1
Location:	Paulding, OH	16.0.0C	Date: 09-21-2017
Contract:			SN: WESTWOODP
Engineer:	Josh Venden	Study Case: SC	Revision: Base
Filename:	NW_OH		Config.: Future

Short-Circuit Summary Report

1M2 Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
89F1A	/ 5.400	2.082	-16.590	16.621	0.961	-12.767	12.805	15./ 01	1.814	15.516	15.074	6.994	14.718
89F2A	/ 5.400	2.082	-16.590	16.621	0.961	-12.767	12.805	15./ 01	1.814	15.516	15.074	6.994	14.718
89F/ A	/ 5.400	2.082	-16.590	16.621	0.961	-12.767	12.805	15./ 01	1.814	15.516	15.074	6.994	14.718
89F5A	/ 5.400	2.082	-16.590	16.621	0.961	-12.767	12.805	15./ 01	1.814	15.516	15.074	6.994	14.718
89T1A	1/ 8.000	2.1/ 0	-9.879	10.104	1.776	-9.215	9./ 8/	8.447	1.854	8.745	7.810	6.146	9.954
89T1B	/ 5.400	2.082	-16.590	16.621	0.961	-12.767	12.805	15./ 01	1.814	15.516	15.074	6.994	14.718
HV BUS k PT	1/ 8.000	2.1/ 0	-9.879	10.104	1.776	-9.215	9./ 8/	8.447	1.854	8.745	7.810	6.146	9.954
JB-2M1	/ 5.400	2.621	-1/ .862	15.107	/ .471	-8.797	9.595	12.017	2.280	12.2/ 1	-1/ .641	0.8/ 8	1/ .677
JB-5M1	/ 5.400	/ .892	-4.2/ 0	6.419	2.699	-2.299	/ .454	5.460	/ ./ 78	4.674	-4.428	-2.682	6.155
LV BUS T-01	0.690	4/ .018	-4/ .6/ 2	74.515	48.8/ 4	-49.68/	8/ .807	56.552	54.919	64./ 10	1/ .509	79.462	80.685
LV BUS T-02	0.690	45.0/ 1	-44.901	77.754	49.662	-61.4/ 7	84.711	58.507	56.797	67./ 29	-81.70/	-12.469	82.665
LV BUS T-0/	0.690	45.968	-47.798	79.762	60.524	-6/ .049	87./ / 6	40.059	57.609	69.077	-8/ .48/	-12.915	85.475
LV BUS T-05	0.690	44.600	-48.448	80.759	60.9/ /	-6/ .661	88.12/	40.708	58.147	69.9/ 1	-85./ 97	-1/ .281	84.5/ 6
LV BUS T-04	0.690	46./ 55	-49./ 44	81.8/ 9	61.427	-65.287	88.984	41./ 98	58.801	70.874	-84.268	-1/ .7/ 7	86./ 67
LV BUS T-06	0.690	47.119	-49.417	82.591	62.1/ 8	-65.510	89.597	41.4/ 8	59.57/	71.550	-84.490	-15./ 75	86.789
LV BUS T-07	0.690	47.796	-61.26/	85.22/	62.676	-64.768	90.840	4/ .040	40.060	72.950	-87.266	-15.449	88.572
LV BUS T-08	0.690	48.724	-64.044	87.650	6/ .5/ 7	-68.664	9/ .585	46./ / 5	40.866	74.900	-90.786	-15.427	91.951
LV BUS T-09	0.690	60.507	-7/ .46/	94.187	65.92/	-75.916	99.1/ /	6/ .704	42./ 24	82.5/ 9	-98.652	-15.260	99.667
LV BUS T-10	0.690	60.898	-75.008	94.852	64.295	-74.218	99.605	65.090	42.741	8/ .007	-99.1/ 1	-15.610	100.202
LV BUS T-1/	0.690	46.070	-46.405	79.602	61./ 04	-62.02/	87.207	58.929	58.465	68.9/ 8	14.1/ 2	82.9/ 7	85./ 06
LV BUS T-15	0.690	46.8/ 7	-48.256	81./ 82	61.912	-6/ .509	88.622	40.5/ 7	59.228	70.579	-85.521	-15.529	84.656
LV BUS T-14	0.690	48.862	-62.71/	86.009	6/ .410	-66.877	92.229	45./ 06	40.98/	75.587	-88.769	-14.161	90.045
LV BUS T-16	0.690	46.288	-47.422	80.580	61.577	-62.8/ 6	87.908	59.810	58.74/	69.699	14.962	8/ ./ 75	85.888
LV BUS T-17	0.690	61.921	-75.692	97.021	66.042	-74.669	100.55/	65.682	4/ .6/ 7	85.028	-99.9/ 5	-14./ 86	101.111
LV BUS T-20	0.690	49.579	-64.172	88.2/ 5	65.011	-68.752	9/ .9/ 1	46.5/ 6	41.420	76.516	-91.042	-14.165	92./ 06
LV BUS T-21	0.690	61.055	-70.690	9/ ./ 99	64.291	-72.808	97.796	61.216	42.876	80.891	-96.224	-14./ 92	97.558
LV BUS T-22	0.690	61.610	-7/ .026	94.45/	64.772	-75.586	99./ 68	6/ .2/ 9	4/ ./ 67	82.758	-98./ 99	-14.5/ 1	99.602
LV BUS T-2/	0.690	61.7/ /	-75.869	97.0/ 8	64.924	-74.80/	100.560	65.8/ 4	4/ .575	85.052	-100.044	-14.186	101.201
LV BUS T-25	0.690	62.682	-75.276	97.190	66.482	-74./ 57	100.440	65./ 22	45.297	85.174	-99.710	-16.150	101.008
LV BUS T-24	0.690	6/ .270	-74.704	98.66/	67.057	-76./ 51	101.60/	64.460	45.807	84.541	-101.084	-16./ 91	102.506
LV BUS T-26	0.690	49.861	-68.782	91.18/	65./ 70	-71.5/ 6	96.149	49.465	41.841	78.970	-95./ 0/	-15.7/ 7	94.558
LV BUS T-27	0.690	60.444	-71.686	9/ .850	65.965	-7/ .459	98.1/ 2	62.079	42.54/	81.272	-97.008	-15.762	98.125
LV BUS T-28	0.690	61.14/	-75.458	96.521	64.598	-74.494	100.02/	65.447	42.972	8/ .408	-99.660	-15.7/ /	100.75/
LV BUS T-29	0.690	49.849	-66.294	89./ 20	65./ 14	-69.481	95.742	47.509	41.859	77./ 47	-92.116	-14.246	9/ ./ 71
LV BUS T-/ 1	0.690	47./ 5/	-6/ .572	84.4/ 9	62./ 44	-67.581	91.880	45.965	59.669	75.082	-89.095	-1/ .664	90.1/ 6

1½ Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
LV BUS T-/ 2	0.690	49./ 75	-71.248	92.74/	65.086	-7/ .276	97./ 57	61.708	41.5/ 0	80./ / 0	-96./ 92	-1/ .801	97./ 74
LV BUS T-/ /	0.690	49.805	-7/ ./ 87	95.669	65.580	-75.812	98.764	6/ .442	41.802	81.990	-98./ 67	-1/ .749	99./ 24
LV BUS T-/ 5	0.690	49./ 11	-72.206	9/ .55/	65.074	-7/ .972	97.864	62.429	41./ 74	80.928	-97.220	-1/ .444	98.161
LV BUS T-/ 6	0.690	48.104	-67.209	88.855	6/ .017	-70./ 07	95.516	48.201	40./ / 0	76.954	-92.458	-1/ .419	9/ .4/ 0
LV BUS T-/ 7	0.690	47.495	-64./ 20	87.085	62.485	-68.890	9/ .07/	46.464	59.886	74.520	-90.77/	-1/ .576	91.767
LV BUS T-/ 9	0.690	47.176	-6/ .62/	84.4/ 9	62.229	-67.600	91.882	44.094	59.425	75.082	-89.189	-1/ .585	90.20/
LV BUS T-50	0.690	48.519	-72.865	9/ ./ 91	6/ .578	-75.597	97.87/	6/ .110	40.6/ 4	80.912	-97.622	-12.645	98.5/ 9
LV BUS T-51	0.690	45.651	-62.167	82.767	60.268	-66.495	89.816	4/ .914	57./ 66	71.766	-87./ 6/	-11.65/	88.1/ 6
LV BUS T-52	0.690	44.1/ 0	-6/ .971	85.559	60.729	-69./ 16	92.146	46./ 81	57.820	7/ .9/ 0	-89.607	-11.5/ 0	90./ / /
LV BUS T-5/	0.690	45.671	-62.269	82.86/	60./ / 2	-67.996	90.90/	45.904	57.52/	72.440	-87.998	-11.528	88.7/ 7
LV BUS T-55	0.690	46.699	-71.468	91./ 06	62.167	-7/ .627	96./ 62	61.996	59.148	79.120	-96.118	-11./ 95	96.791
LV BUS T-54	0.690	47.254	-72.046	92.028	62.488	-7/ .960	96.889	62.516	59.627	79.750	-96.664	-11.777	97./ 80
LV BUS T-56	0.690	47.962	-72.44/	92.865	6/ .1/ /	-75.291	97.59/	62.85/	40.25/	80.548	-97.24/	-12./ 1/	98.0/ 0
LV BUS T-58	0.690	42.445	-48.79/	78.848	48.4/ 9	-6/ .942	86.699	40.981	54.447	68./ 71	-8/ .886	-10.610	85.445
LV BUS T-59	0.690	4/ .169	-60.788	80.760	49.075	-64.4/ 6	88.2/ 1	42.715	56.090	70.022	-84.794	-10.668	86.546
LV BUS T-40	0.690	42.475	-48.846	78.919	48.447	-65.002	86.758	41.0/ 6	54.474	68.525	-8/ .957	-10.61/	85.614
k V BUS T-01	/ 5.400	/ .400	-2.4/ 8	5./ 2/	2.852	-1.9/ 9	/ .551	2.197	/ .0/ 1	/ .755	-/ ./ 92	-2.259	5.069
k V BUS T-02	/ 5.400	/ .774	-2.968	5.802	/ .057	-2.260	/ .795	2.470	/ .270	5.149	-/ .854	-2./ 49	5.411
k V BUS T-0/	/ 5.400	5.050	-/ ./ 94	4.277	/ .2/ 4	-2.486	5.152	2.9/ 8	/ .400	5.470	-5.284	-2.546	5.9/ 9
k V BUS T-05	/ 5.400	5.220	-/ .48/	4.4/ 6	/ ./ 82	-2.797	5./ 88	/ .101	/ .646	5.795	-5.411	-2.408	4.161
k V BUS T-04	/ 5.400	5.554	-/ .796	4.854	/ .449	-/ .061	5.695	/ .286	/ .841	4.062	1.80/	4.1/ 5	4.551
k V BUS T-06	/ 5.400	5.68/	-/ .827	6.058	/ .7/ 6	-/ .1/ 1	5.874	/ ./ 1/	5.048	4.2/ 8	1.761	4./ 82	4.66/
k V BUS T-07	/ 5.400	5.95/	-5./ 97	6.616	/ .900	-/ .478	4.29/	/ .806	5.28/	4.7/ 0	2.198	4.791	6.195
k V BUS T-08	/ 5.400	4.196	-4.988	7.928	/ .946	-5.072	4.678	4.185	5.405	6.867	-6.770	-2.968	7./ 92
k V BUS T-09	/ 5.400	/ .107	-11.085	11.411	/ .915	-6.105	7.241	9.606	2.698	9.978	-11.261	-0.7/ 2	11.284
k V BUS T-10	/ 5.400	/ .010	-11.661	12.05/	/ .919	-6.627	7.699	10.106	2.614	10.5/ 9	-11.795	-0.550	11.802
k V BUS T-1/	/ 5.400	5.27/	-/ .0/ /	4.250	/ .411	-2.47/	5./ 4/	2.624	/ .701	5.4/ 8	1.1/ 7	5.818	5.941
k V BUS T-15	/ 5.400	5.444	-/ .560	4.720	/ .708	-2.9/ 8	5.7/ 1	2.995	/ .956	5.945	1.5/ 5	4.221	4.515
k V BUS T-14	/ 5.400	4./ 60	-5.944	7.299	5.191	-5.225	4.940	5.289	5.654	6./ 22	2.478	6.578	6.972
k V BUS T-16	/ 5.400	5./ 75	-/ .285	4.570	/ .428	-2.694	5.550	2.852	/ .790	5.7/ 7	1./ 66	5.9/ /	4.118
k V BUS T-17	/ 5.400	2.920	-12.879	1/ .206	/ .820	-7.850	8.721	11.165	2.4/ 8	11.558	-12.864	0.161	12.866
k V BUS T-20	/ 5.400	4.441	-6.108	8.245	5.188	-/ .928	4.752	4.288	5.81/	7.140	-6.940	-/ ./ 78	7.727
k V BUS T-21	/ 5.400	4.177	-9.779	11.064	5./ 66	-4.927	7./ 62	8.571	5.59/	9.489	-10.256	-2.51/	10.426
k V BUS T-22	/ 5.400	5.147	-11.662	12./ 81	5.159	-7.025	8.148	10.106	/ .610	10.7/ 2	-11.849	-1.176	11.917
k V BUS T-2/	/ 5.400	2.662	-12.786	1/ .060	/ .826	-7.222	8.17/	11.08/	2./ 15	11./ 22	-12.750	0.061	12.750
k V BUS T-25	/ 5.400	/ .748	-1/ ./ 90	1/ .907	/ .714	-9.198	9.920	11.606	/ .266	12.047	-1/ .257	0.194	1/ .259
k V BUS T-24	/ 5.400	2.566	-15.864	14.068	2.892	-10.551	10.8/ 5	12.888	2.156	1/ .066	-15.250	1.8/ 2	15./ 47

1½ Cycle - / -Phase, L3 , LL, & LL3 Fault Currents

Prefault Voltage G 100 = of the Bus Nominal Voltage

Bus		3-Phase Fault			Line-to-Ground Fault			Line-to-Line Fault			*Line-to-Line-to-Ground		
ID	%V	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.	Real	Imag.	k ag.
k V BUS T-26	/ 5.400	4.1/ 6	-8.158	9.6/ 2	/ .99/	-5./ / 5	4.89/	7.047	5.545	8./ 56	-8.496	-/ .024	9.11/
k V BUS T-27	/ 5.400	5./ 64	-10.164	11.062	5.020	-4.26/	6.622	8.807	/ .788	9.487	-10./ 95	-2.097	10.60/
k V BUS T-28	/ 5.400	2.688	-12.119	12.515	/ .8/ 2	-6./ 55	7.512	10.405	2./ / 4	10.761	-12.102	-0./ / 6	12.106
k V BUS T-29	/ 5.400	4.6/ 7	-6.7/ 4	8.78/	5.280	-5.28/	6.044	4.8/ 2	5.888	7.609	-7.4/ 0	-/ ./ / 5	8.2/ 4
k V BUS T-/ 1	/ 5.400	5.72/	-4.21/	7.0/ 5	/ ./ 80	-2.775	5./ 7/	5.415	5.09/	6.095	-4.795	-/ .174	6.607
k V BUS T-/ 2	/ 5.400	/ .9/ 0	-9./ / 2	10.126	/ .762	-5.414	4.877	8.084	/ .511	8.774	-9.458	-2.019	9.749
k V BUS T-/ /	/ 5.400	2.941	-10.497	11.000	/ .7/ /	-4.147	6./ 66	9.182	2.462	9.4/ /	-10.676	-0.998	10.72/
k V BUS T-/ 5	/ 5.400	/ .525	-9.766	10./ 59	/ .699	-5.641	4.952	8.561	2.972	8.968	-9.910	-1.46/	10.0/ 2
k V BUS T-/ 6	/ 5.400	5.497	-6.910	8./ 00	/ .457	-/ .501	5.915	4.985	/ .986	7.190	-7./ 28	-2.911	7.884
k V BUS T-/ 7	/ 5.400	5.664	-4.987	7.490	/ .5/ 5	-/ .028	5.479	4.184	5.055	6.474	-6.581	-/ .070	7.171
k V BUS T-/ 9	/ 5.400	5.659	-4.262	7.021	/ ./ / 2	-2.755	5./ 17	5.446	5.029	6.082	-4.81/	-/ .1/ 0	6.60/
k V BUS T-50	/ 5.400	2.692	-9.466	9.9/ 7	/ .260	-/ .7/ 9	5.961	8./ 10	2./ 55	8.6/ 5	-9.598	-1./ 02	9.487
k V BUS T-51	/ 5.400	/ .874	-5.608	6.020	2.611	-2.095	/ ./ 57	5.016	/ ./ 64	4.2/ 9	-5.945	-2.720	4.641
k V BUS T-52	/ 5.400	/ .888	-4.214	6.404	2.694	-2.292	/ .4/ 8	5.458	/ ./ 75	4.66/	-4.415	-2.681	6.1/ 1
k V BUS T-5/	/ 5.400	/ .878	-5.650	6.057	2.616	-2.104	/ ./ 48	5.057	/ ./ 66	4.265	-5.986	-2.719	4.679
k V BUS T-55	/ 5.400	2.67/	-8.296	8.716	2.92/	-2.969	5.166	7.212	2./ 28	7.479	-8.25/	-1.426	8./ 8/
k V BUS T-54	/ 5.400	2.646	-8.697	9.09/	/ .017	-/ .168	5./ 75	7.449	2./ 1/	7.904	-8.6/ 0	-1.542	8.741
k V BUS T-56	/ 5.400	2.682	-9.21/	9.496	/ .165	-/ .596	5.714	8.006	2./ / 4	8./ / 9	-9.156	-1./ 71	9.258
k V BUS T-58	/ 5.400	/ .559	-/ .6/ 2	4.009	2.297	-1.670	2.850	/ .162	2.996	5./ 46	-/ .989	-2.579	5.697
k V BUS T-59	/ 5.400	/ .4/ 4	-5.155	4.557	2./ 92	-1.8/ 9	/ .017	/ .609	/ .070	5.7/ 8	-5.567	-2.410	4.125
k V BUS T-40	/ 5.400	/ .542	-/ .658	4.022	2./ 00	-1.674	2.854	/ .174	2.999	5./ 67	-5.005	-2.581	5.710
POI	1/ 8.000	2.150	-9.915	10.152	1.788	-9.248	9.529	8.487	1.845	8.784	7.8/ 4	6.190	9.984

All fault currents are symmetrical (1½ Cycle networ%) values in rms %A.
* LL3 fault current is the larger of the two faulted line currents.

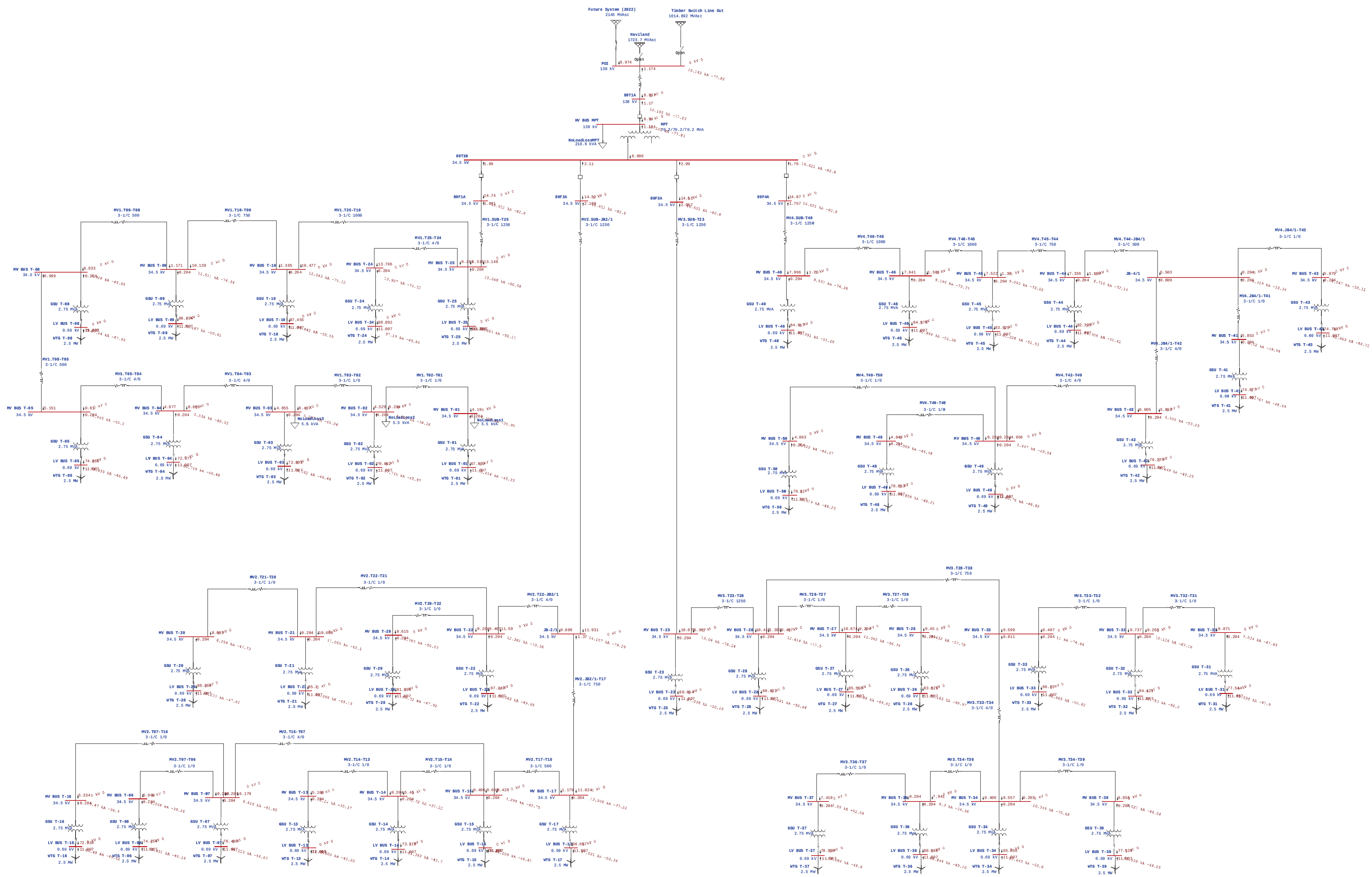
Sequence Impedance Summary Report

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	%V	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
89F1A	/ 5.400	0.14014	1.18895	1.198/ 9	0.1411/	1.18422	1.19581	0.05918	2.27981	2.280/ 5	0.00000	0.00000	0.00
89F2A	/ 5.400	0.14014	1.18895	1.198/ 9	0.1411/	1.18422	1.19581	0.05918	2.27981	2.280/ 5	0.00000	0.00000	0.00
89F/ A	/ 5.400	0.14014	1.18895	1.198/ 9	0.1411/	1.18422	1.19581	0.05918	2.27981	2.280/ 5	0.00000	0.00000	0.00
89F5A	/ 5.400	0.14014	1.18895	1.198/ 9	0.1411/	1.18422	1.19581	0.05918	2.27981	2.280/ 5	0.00000	0.00000	0.00
89T1A	1/ 8.000	1.6614/	7.70721	7.88527	1.661/ 6	7.70/ 57	7.88048	1.59876	9.60199	9.71826	0.00000	0.00000	0.00
89T1B	/ 5.400	0.14014	1.18895	1.198/ 9	0.1411/	1.18422	1.19581	0.05918	2.27981	2.280/ 5	0.00000	0.00000	0.00
HV BUS k PT	1/ 8.000	1.6614/	7.70721	7.88527	1.661/ 6	7.70/ 57	7.88048	1.59876	9.60199	9.71826	0.00000	0.00000	0.00
JB-2MI	/ 5.400	0.262/ 6	1./ 87/ /	1.51192	0.26/ / 6	1./ 8/ 84	1.50869	1.85158	/ .06045	/ .4718/	0.00000	0.00000	0.00
JB-5MI	/ 5.400	1.825/ 0	2.54107	/ .04456	1.79514	2.5/ 51/	/ .02/ 90	9.21/ 80	6.05/ 77	11.0191/	0.00000	0.00000	0.00
LV BUS T-01	0.690	0.00/ 71	0.00/ 76	0.00428	0.00/ 71	0.00/ 76	0.00428	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-02	0.690	0.00/ 46	0.00/ 68	0.00412	0.00/ 46	0.00/ 68	0.00412	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-0/	0.690	0.00/ 55	0.00/ 62	0.00599	0.00/ 55	0.00/ 62	0.00599	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-05	0.690	0.00/ 50	0.00/ 48	0.0059/	0.00/ 50	0.00/ 48	0.0059/	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-04	0.690	0.00/ / 4	0.00/ 4/	0.00587	0.00/ / 4	0.00/ 4/	0.00587	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-06	0.690	0.00/ / 5	0.00/ 58	0.0058/	0.00/ / 5	0.00/ 58	0.0058/	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-07	0.690	0.00/ 24	0.00/ 55	0.0057/	0.00/ 24	0.00/ 55	0.0057/	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-08	0.690	0.00/ 04	0.00/ / 7	0.00544	0.00/ 04	0.00/ / 7	0.00544	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-09	0.690	0.00266	0.00/ 2/	0.00519	0.00266	0.00/ 2/	0.00518	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-10	0.690	0.00265	0.00/ 21	0.00516	0.00265	0.00/ 21	0.00516	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-1/	0.690	0.00/ 4/	0.00/ 44	0.00400	0.00/ 4/	0.00/ 44	0.00400	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-15	0.690	0.00/ 52	0.00/ 40	0.00590	0.00/ 52	0.00/ 40	0.00590	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-14	0.690	0.00/ 17	0.00/ / 8	0.0056/	0.00/ 17	0.00/ / 8	0.0056/	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-16	0.690	0.00/ 56	0.00/ 45	0.00594	0.00/ 56	0.00/ 45	0.00594	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-17	0.690	0.00262	0.00/ 16	0.00511	0.00262	0.00/ 16	0.00511	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-20	0.690	0.00/ 05	0.00/ / /	0.00541	0.00/ 05	0.00/ / /	0.00541	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-21	0.690	0.00279	0.00/ 2/	0.00527	0.00279	0.00/ 2/	0.00526	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-22	0.690	0.00269	0.00/ 19	0.00517	0.00269	0.00/ 19	0.00517	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-2/	0.690	0.00261	0.00/ 17	0.00511	0.00261	0.00/ 17	0.00510	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-25	0.690	0.00265	0.00/ 1/	0.00510	0.00265	0.00/ 1/	0.00510	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-24	0.690	0.00249	0.00/ 10	0.00505	0.00249	0.00/ 10	0.00505	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-26	0.690	0.00287	0.00/ / 0	0.005/ 7	0.00287	0.00/ 29	0.005/ 7	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-27	0.690	0.00275	0.00/ 25	0.00524	0.00275	0.00/ 25	0.00525	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-28	0.690	0.00262	0.00/ 19	0.0051/	0.00262	0.00/ 19	0.0051/	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-29	0.690	0.00299	0.00/ / 1	0.00556	0.00299	0.00/ / 1	0.00556	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 1	0.690	0.00/ 12	0.00/ 56	0.00566	0.00/ 12	0.00/ 54	0.00566	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 2	0.690	0.00274	0.00/ / 0	0.00529	0.00274	0.00/ / 0	0.00529	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ /	0.690	0.00266	0.00/ 26	0.00521	0.00266	0.00/ 26	0.00521	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 5	0.690	0.00271	0.00/ 29	0.00526	0.00271	0.00/ 29	0.00526	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 6	0.690	0.0029/	0.00/ / 9	0.00558	0.0029/	0.00/ / 9	0.00558	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 7	0.690	0.00/ 0/	0.00/ 5/	0.00547	0.00/ 0/	0.00/ 5/	0.00547	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-/ 9	0.690	0.00/ 11	0.00/ 56	0.00566	0.00/ 11	0.00/ 56	0.00566	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-50	0.690	0.00267	0.00/ / /	0.00527	0.00267	0.00/ / 2	0.00526	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-51	0.690	0.00/ 18	0.00/ 62	0.00581	0.00/ 17	0.00/ 61	0.00580	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-52	0.690	0.00/ 08	0.00/ 47	0.00572	0.00296	0.00/ 45	0.00562	0.00241	0.00265	0.00/ 65	0.00000	0.00000	0.00
LV BUS T-5/	0.690	0.00/ 17	0.00/ 61	0.00581	0.00/ 05	0.00/ 48	0.00570	0.00241	0.00265	0.00/ 65	0.00000	0.00000	0.00
LV BUS T-55	0.690	0.00271	0.00/ 52	0.005/ 6	0.00271	0.00/ 51	0.005/ 6	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-54	0.690	0.00269	0.00/ / 9	0.005/ /	0.00269	0.00/ / 8	0.005/ 2	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-56	0.690	0.00268	0.00/ / 4	0.00529	0.00268	0.00/ / 4	0.00529	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-58	0.690	0.00/ / 7	0.00/ 77	0.00404	0.00/ / 6	0.00/ 76	0.00405	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00

Bus		Positive Seq. Imp. (ohm)			Negative Seq. Imp. (ohm)			Zero Seq. Imp. (ohm)			Fault Zf (ohm)		
ID	%V	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impedance	Resistance	Reactance	Impeda
LV BUS T-59	0.690	0.00/ 24	0.00/ 71	0.0059/	0.00/ 25	0.00/ 71	0.00592	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
LV BUS T-40	0.690	0.00/ / 6	0.00/ 76	0.00404	0.00/ / 4	0.00/ 76	0.00405	0.00248	0.00265	0.00/ 70	0.00000	0.00000	0.00
k V BUS T-01	/ 5.400	/ .72990	2.70401	5.60742	/ .7/ 179	2.70246	5.60762	6.88457	5./ 7865	8.14979	0.00000	0.00000	0.00
k V BUS T-02	/ 5.400	/ .26056	2.46/ 85	5.15776	/ .262/ 5	2.461/ 6	5.15770	6.12877	5.247/ 2	7.562/ 5	0.00000	0.00000	0.00
k V BUS T-0/	/ 5.400	2.89002	2.52829	/ .77576	2.89186	2.52477	/ .77544	4.58661	5.145/ 7	6.88198	0.00000	0.00000	0.00
k V BUS T-05	/ 5.400	2.75289	2./ 2888	/ .49822	2.75572	2./ 26/ 2	/ .49794	4.00456	5.02/ / 4	6.52200	0.00000	0.00000	0.00
k V BUS T-04	/ 5.400	2.491/ 0	2.21/ 18	/ .50778	2.49/ 10	2.21046	/ .50754	5.566/ 8	/ .87644	4.91507	0.00000	0.00000	0.00
k V BUS T-06	/ 5.400	2.44005	2.08/ 90	/ .29/ 2/	2.44180	2.08112	/ .2928/	5.29508	/ .70849	4.67/ 87	0.00000	0.00000	0.00
k V BUS T-07	/ 5.400	2.2594/	2.00105	/ .01075	2.24127	1.99824	/ .01018	/ .81957	/ .6/ 240	4.27100	0.00000	0.00000	0.00
k V BUS T-08	/ 5.400	1.65675	1.89745	2.41254	1.65824	1.89565	2.41124	5.0/ 864	/ .746/ 2	4.41459	0.00000	0.00000	0.00
k V BUS T-09	/ 5.400	0.56696	1.66612	1.7/ 0/ 2	0.56798	1.6628/	1.7275/	/ .41/ / 8	/ .60867	4.0/ 640	0.00000	0.00000	0.00
k V BUS T-10	/ 5.400	0.51/ 52	1.60154	1.64/ 96	0.5155/	1.49811	1.64097	/ .12260	/ .58086	5.67622	0.00000	0.00000	0.00
k V BUS T-1/	/ 5.400	/ .09948	2.20047	/ .801/ 0	/ .101/ 8	2.1978/	/ .80118	5.87188	/ .71662	6.12768	0.00000	0.00000	0.00
k V BUS T-15	/ 5.400	2.77/ 15	2.10645	/ .58241	2.7759/	2.10/ 78	/ .58226	5./ 4/ 16	/ .6/ / 56	4.67028	0.00000	0.00000	0.00
k V BUS T-14	/ 5.400	2.00/ 77	1.842/ 6	2.72880	2.00458	1.85941	2.72812	/ .06504	/ .52679	5.49688	0.00000	0.00000	0.00
k V BUS T-16	/ 5.400	2.91220	2.18651	/ .65161	2.91/ 97	2.18/ 66	/ .651/ 7	5.86845	/ .80068	6.17650	0.00000	0.00000	0.00
k V BUS T-17	/ 5.400	0./ / / 4/	1.57098	1.408/ 1	0./ / 545	1.56747	1.40422	2./ / 297	/ .22128	/ .977/ 7	0.00000	0.00000	0.00
k V BUS T-20	/ 5.400	1.62/ 22	1.78485	2.51/ / 1	1.625/ 8	1.78240	2.51162	5./ 5276	/ .44152	4.61000	0.00000	0.00000	0.00
k V BUS T-21	/ 5.400	0.852/ 1	1.49098	1.80020	0.85/ 52	1.48761	1.79775	/ .12845	/ ./ 4676	5.4886/	0.00000	0.00000	0.00
k V BUS T-22	/ 5.400	0.45019	1.41452	1.60882	0.45126	1.41202	1.60498	2.65501	/ .27908	5.21226	0.00000	0.00000	0.00
k V BUS T-2/	/ 5.400	0./ 1088	1.59/ 16	1.42418	0./ 1190	1.58981	1.42211	2.79988	/ .5780/	5.56598	0.00000	0.00000	0.00
k V BUS T-25	/ 5.400	0./ 870/	1./ 7899	1.5/ 227	0./ 880/	1./ 7450	1.52909	1.58081	2.8/ 12/	/ .19410	0.00000	0.00000	0.00
k V BUS T-24	/ 5.400	0.216/ 5	1./ 0511	1./ 219/	0.217/ /	1./ 0041	1./ 1845	1.0/ 866	2.7108/	2.90/ 00	0.00000	0.00000	0.00
k V BUS T-26	/ 5.400	1.10264	1.7594/	2.06802	1.10/ 74	1.756/ 1	2.06488	5.6651/	/ .96224	6.1199/	0.00000	0.00000	0.00
k V BUS T-27	/ 5.400	0.71055	1.64542	1.80060	0.71142	1.64129	1.79806	5.04458	/ .86567	4.60202	0.00000	0.00000	0.00
k V BUS T-28	/ 5.400	0./ 57/ 9	1.46658	1.60545	0./ 5852	1.46/ 22	1.60148	/ .57/ 16	/ .771/ 1	4.12696	0.00000	0.00000	0.00
k V BUS T-29	/ 5.400	1.54471	1.7/ 911	2.26794	1.5468/	1.7/ 476	2.26610	5.06/ / 9	/ .40665	4./ 6728	0.00000	0.00000	0.00
k V BUS T-/ 1	/ 5.400	1.90102	2.09847	2.8/ 148	1.90218	2.09442	2.8/ 010	6.76066	5.5758/	8.10755	0.00000	0.00000	0.00
k V BUS T-/ 2	/ 5.400	0.76/ 59	1.81280	1.96702	0.76549	1.80970	1.96548	5.98087	5.18959	6.4084/	0.00000	0.00000	0.00
k V BUS T-/ /	/ 5.400	0.58475	1.75558	1.81085	0.58681	1.751/ 4	1.80812	5.4/ 147	5.11756	6.12279	0.00000	0.00000	0.00
k V BUS T-/ 5	/ 5.400	0.6/ 680	1.816/ 7	1.92577	0.6/ 790	1.81/ 28	1.92222	5.98582	5.25088	6.4557/	0.00000	0.00000	0.00
k V BUS T-/ 6	/ 5.400	1./ 29/ 4	1.99812	2./ 999/	1./ / 045	1.99410	2./ 9807	6.117/ 2	5.52254	7.45859	0.00000	0.00000	0.00
k V BUS T-/ 7	/ 5.400	1.61292	2.07027	2.62552	1.61512	2.06727	2.62278	6.46218	5.59/ 77	7.94/ / 7	0.00000	0.00000	0.00
k V BUS T-/ 9	/ 5.400	1.87851	2.1261/	2.8/ 704	1.87948	2.12/ 10	2.8/ 444	6.9270/	5.44226	8.28896	0.00000	0.00000	0.00
k V BUS T-50	/ 5.400	0.45/ 00	1.92940	2.00554	0.45146	1.91625	1.991/ 0	6.8/ 089	4.2/ / 96	8.60444	0.00000	0.00000	0.00
k V BUS T-51	/ 5.400	2.12942	2.4/ 207	/ ./ 0841	2.09944	2.41596	/ .27614	9.69901	6.12146	11.56927	0.00000	0.00000	0.00
k V BUS T-52	/ 5.400	1.8/ 020	2.54585	/ .06200	1.79997	2.5/ 788	/ .0/ 0/ 7	9.2/ 510	6.059/ 0	11.0/ 915	0.00000	0.00000	0.00
k V BUS T-5/	/ 5.400	2.112/ 4	2.42754	/ .29/ 95	2.07874	2.41118	/ .24995	9.67164	6.11717	11.55/ 80	0.00000	0.00000	0.00
k V BUS T-55	/ 5.400	0.70098	2.17415	2.284/ 0	0.69709	2.14711	2.26694	8.66551	4.889/ 5	10.57656	0.00000	0.00000	0.00
k V BUS T-54	/ 5.400	0.6/ 984	2.09596	2.19040	0.6/ 701	2.07846	2.17/ 98	8.15/ 55	4.71896	9.94098	0.00000	0.00000	0.00
k V BUS T-56	/ 5.400	0.48008	1.99/ 09	2.07479	0.4781/	1.97865	2.061/ 8	7./ 5489	4.52526	9.1/ 142	0.00000	0.00000	0.00
k V BUS T-58	/ 5.400	2.7/ 820	2.88/ 75	/ .97664	2.70946	2.86482	/ .95/ 95	11.47/ / 0	6.6204/	1/ ./ / / 15	0.00000	0.00000	0.00
k V BUS T-59	/ 5.400	2./ 7/ 07	2.78210	/ .64671	2./ 5522	2.765/ 4	/ .62540	10.98619	6.42651	12.77841	0.00000	0.00000	0.00
k V BUS T-40	/ 5.400	2.726/ 2	2.880/ 9	/ .96605	2.69768	2.86257	/ .9/ / / 5	11.44514	6.61756	1/ ./ 1400	0.00000	0.00000	0.00
POI	1/ 8.000	1.64768	7.6790/	7.84491	1.64741	7.674/ 2	7.84224	1.59129	9.4/ 4/ 5	9.64124	0.00000	0.00000	0.00

APPENDIX B: ETAP SINGLE LINE DIAGRAM

One-Line Diagram - NW_OH (Short-Circuit Analysis)



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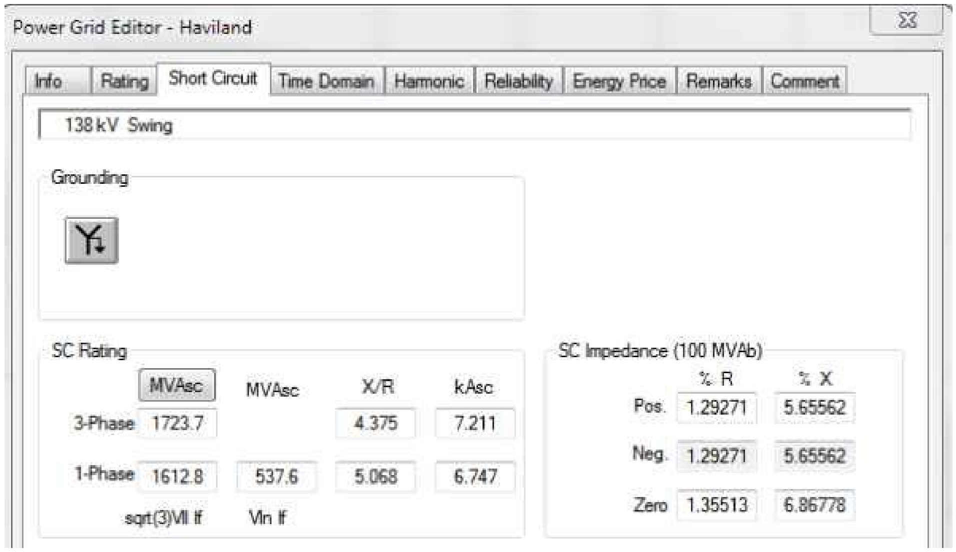
APPENDIX C: ETAP MODEL INPUTS



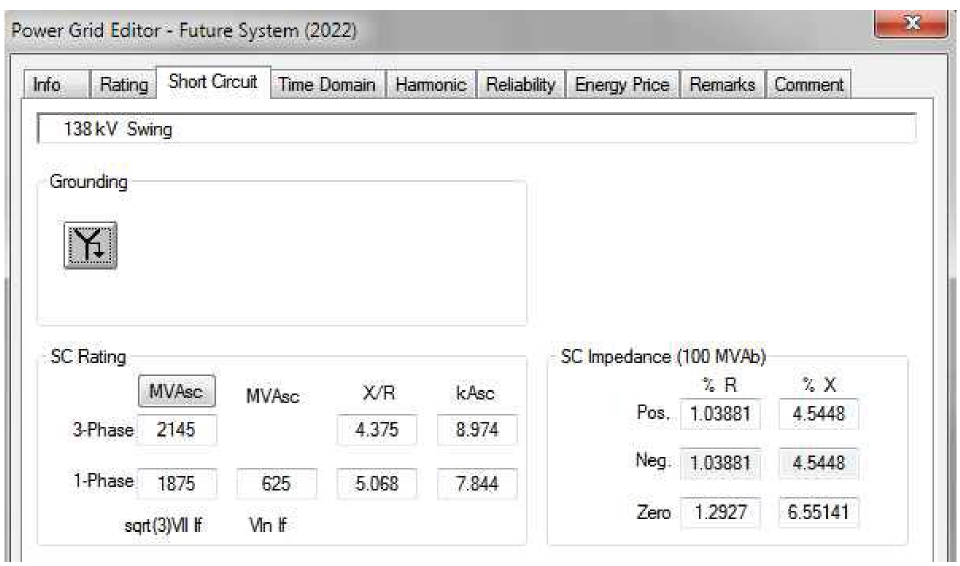


Figure 1: Utility Equivalent Data

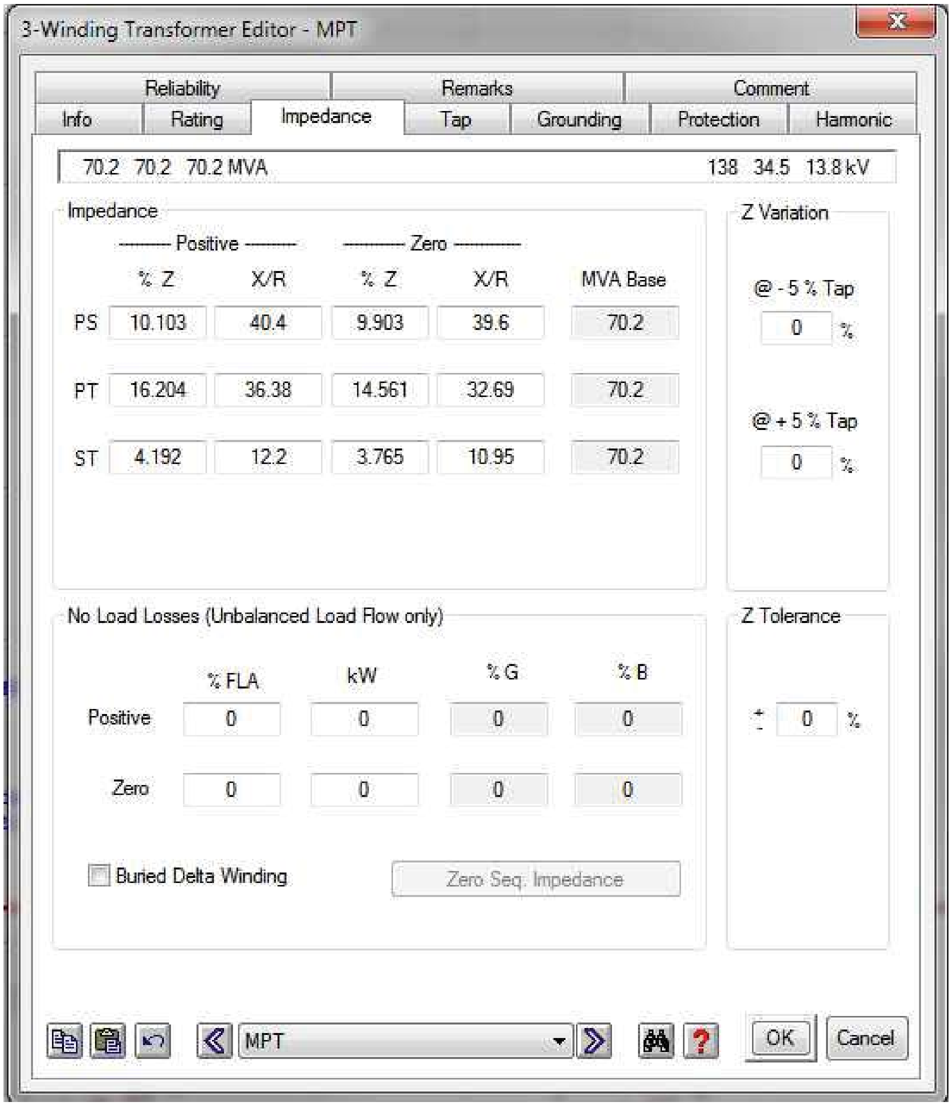


Figure 2: Main Power Transformer Impedance

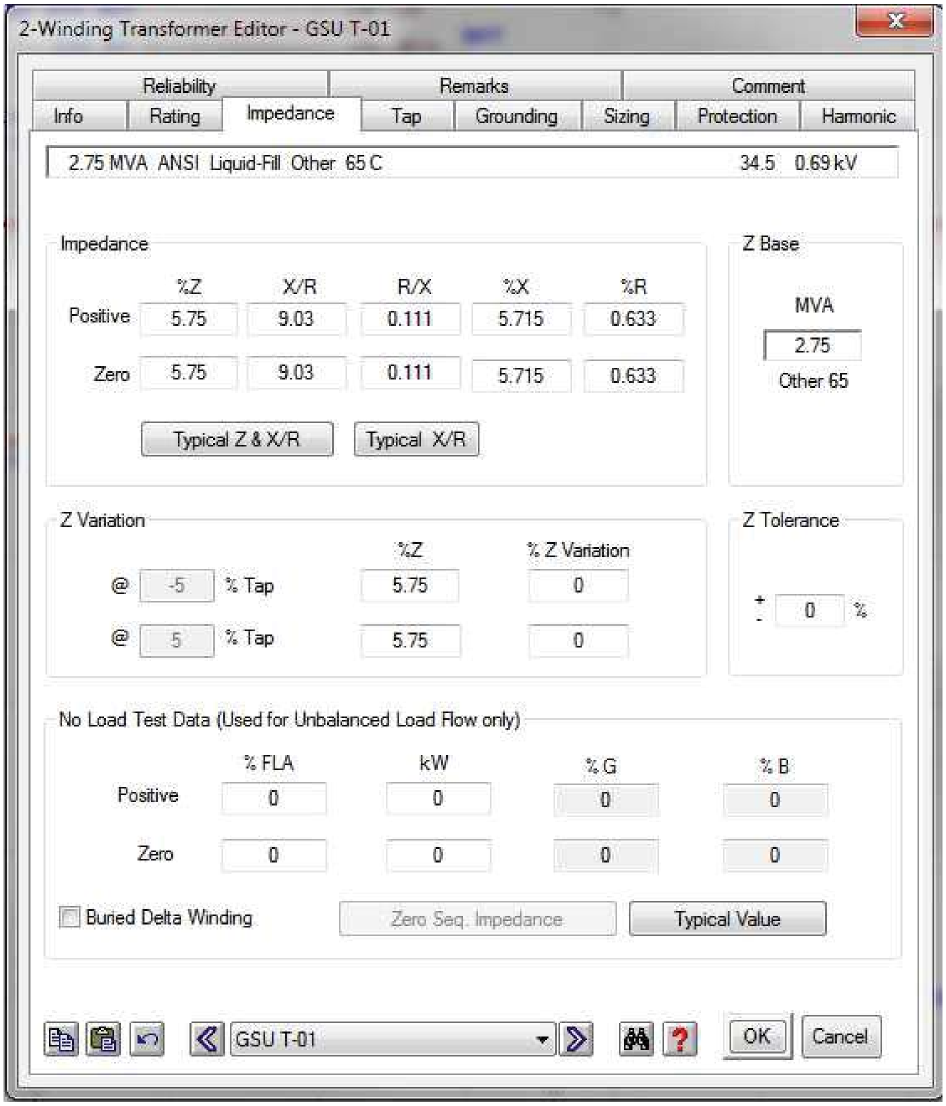


Figure 3: Step-Up Transformer Impedance Data

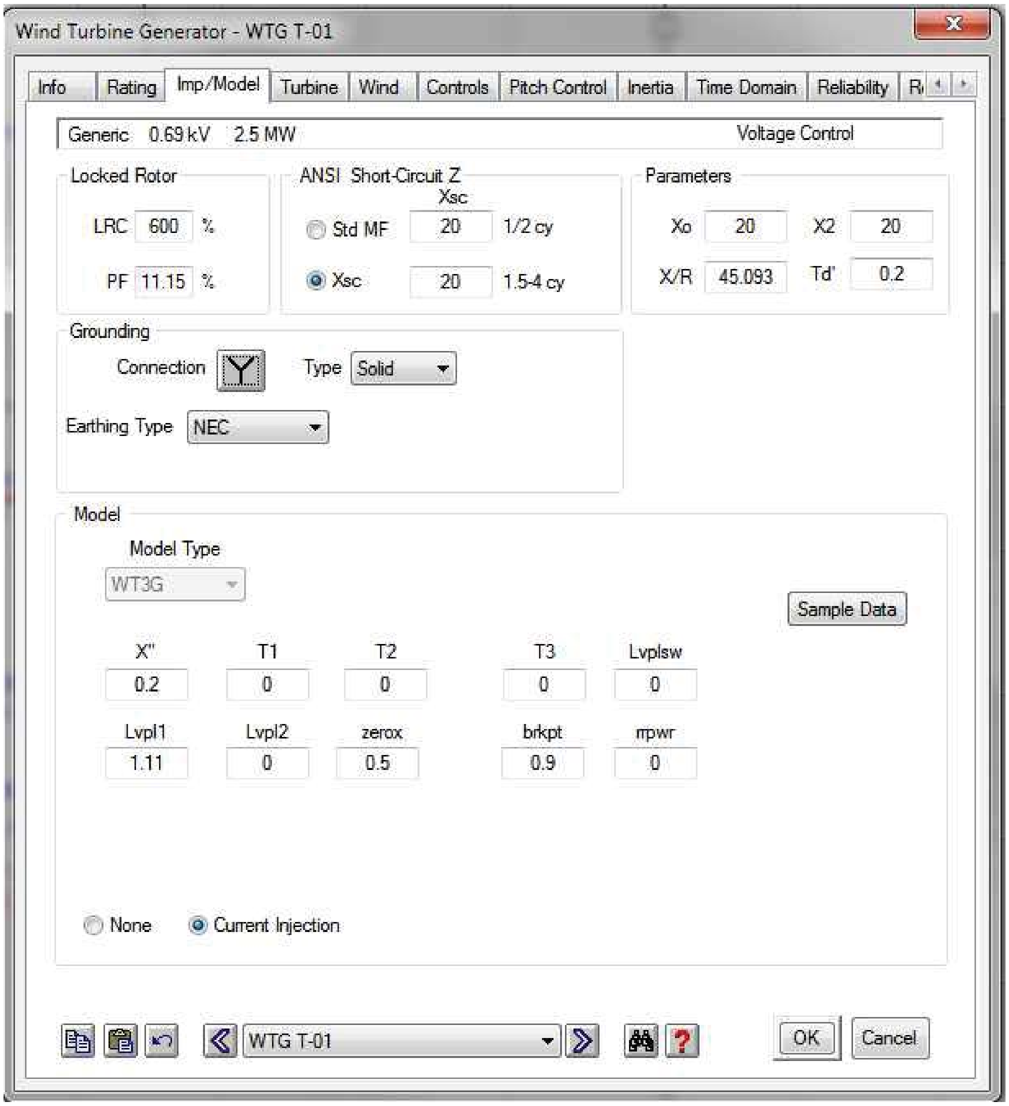


Figure 4: Turbine Impedance/Short Circuit Data

NW_OH 1/C AL XLPE 35 kV 100 % Non-Mag. 60 Hz Ohms/1000ft RHO 200°C.cm/W

Ampacity | Impedance | Physical | Cable Pulling

	Phase			Ground/Neutral		R	X	L	Y	Ro	Xo	Lo	Yo	Rdc
	Avail.	Code	Size	#	Size	90°C	60 Hz	60 Hz	60 Hz	90°C	60 Hz	60 Hz	60 Hz	25°C
1	Yes	1/0 - 2/3 CN	1/0	18	16	0.24087	0.05182	0.00014	1.77E-05	0.35886	0.05482	0.00015	1.77E-05	0.18596
2	Yes	4/0 - 1/2 CN	4/0	17	14	0.11303	0.04679	0.00012	2.2E-05	0.28416	0.07373	0.0002	2.2E-05	0.08673
3	Yes	500 - 1/3 CN	500	16	12	0.4939	0.04115	0.00011	3.05E-05	0.16756	0.04488	0.00012	3.05E-05	0.0361
4	Yes	750 - 1/6 CN	750	19	14	0.0343	0.03865	0.0001	3.56E-05	0.18978	0.05914	0.00016	3.56E-05	0.0248
5	Yes	1000 - 1/6 CN	1000	25	14	0.02568	0.03703	0.0001	3.98E-05	0.20941	0.07373	0.0002	3.98E-05	0.01814
6	Yes	1250 - 1/6 CN	1250	20	12	0.02048	0.03537	9E-05	4.36E-05	0.23977	0.09952	0.00026	4.36E-05	0.01422

Figure 5: Cable Impedance Data

AC CABLE SIZING STUDY

Northwest Ohio Wind Project

Paulding, Ohio
September 27, 2017

Prepared for:

WHITE an IEA company

Prepared by:

Westwood

Westwood

Project Name: NW OH Wind Project	
Title	**J.O. or W.O. Number**
AC Cable Sizing Study	0007186.00

Approvals		**Revision Number**	**Date**	**Description**
Preparer(s) Name	**Reviewer(s) Name**			
Josh Venden	Drew Szabo	0	09/27/2017	Original Release

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INTRODUCTION

NW OH Wind Project is a 100 MW wind generation installation in Paulding, OH consisting 42 of GE 2.5 MW wind turbines. The turbines are grouped into four medium voltage (MV) feeders with 10 turbines on Feeders 1 and 4 and 11 turbines on Feeders 2 and 3. The feeders are connected to a main power transformer that steps the voltage up to 138kV where it interconnects with the AEP transmission system via a short overhead line segment.

OBJECTIVE

The objective of this report is to provide the design basis for determining the ampacity ratings of the medium and low voltage AC cables between the turbines, transformers, and junction boxes.

INPUTS & ASSSUMPTIONS

- The native soil thermal resistivity is 150°C-cm/W as per the assessment of Westwood Professional Services based on the Geotechnical Engineering Report for Northwest Ohio Wind Project; completed by BARR, December 2014.
- Thermal resistivity of the disturbed soil in the cable trench is based on considerations of residual moisture, such that it indicates a worst case rho value of 200°C-cm/W at the specified 85% compaction.
- Thermal resistivity of the concrete ductbank is assumed to be 55 C-cm/W per NEC.
- Appendix D, has the excerpts for the dry out curves of the soil at various test points.
- Soil ambient temperature at various depths is shown in the following table.

Depth [ft]	Depth [m]	T_{max} [C]
3	0.91	22
4	1.22	21
5	1.52	20
6	1.83	19
7	2.13	18
8	2.44	18
9	2.74	17
10	3.05	17

- Cables are analyzed at their maximum allowable continuous operating temperature of 90° C.
- Load factor assumed conservatively at 100% for determining the cable ampacities.
- Direct buried medium voltage AC Cables are evaluated with minimum 48" soil cover.
- Medium voltage AC collector electrical layout is per the Westwood Professional Services Electrical Drawings, MVAC Collection One-Line Diagrams E.200 & E.210 and Trench Details E.600.
- The standard installation is based on a trefoil arrangement of cables, aluminum conductors with copper concentric neutral wires bonded at both ends.
- The nameplate rating of the turbines is 2.5MW with reactive power capability of 0.9 lead/lag. Maximum cable amp loadings are based on maximum total turbine MVA output; approximately 49A at 34.5 kV.

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METHODOLOGY

- Thermal analysis of underground cables is conducted with CYME Cymcap software, which uses the Neher-McGrath methodology to determine reduced cable ratings based on project specific thermal constraints.
- CYMCAP analysis is conducted for single and multiple circuit trenches for all of the MV cable sizes and configurations used in the underground collection design.
- CYMCAP analysis is also performed to verify the ampacity of the low voltage cables passing through the turbine foundation.

THERMAL ANALYSIS RESULTS AND CONCLUSION

SINGLE CIRCUIT AMPACITY

- Table 1 shows a summary of the single circuit cable ampacities and maximum number of turbines that can be connected to each cable size without violating its respective ampacity rating.

Cable	Material	Maximum 3PH Fault Current	Phase Conductor SC Withstand	Ampacity & Configuration	
1/0	Al	7814	PASS	142.3	Trefoil
4/0	Al	12637	PASS	212.9	Trefoil
500	Al	8304	PASS	334.7	Trefoil
750	Al	10974	PASS	408.6	Trefoil
1000	Al	9865	PASS	477.1	Trefoil
1250	Al	12101	PASS	540.5	Trefoil
1250*	Al	12101	PASS	570.5	Trefoil

** Increased ampacity based on 90% soil compaction in trenches with 11 turbines on the ckt*

Table 1: Cable Ampacity Summary

- As the final two rows of the above table indicate, for 1250 kCMIL cable with an ampacity rating large enough to accommodate 11 turbines, a soil compaction of at least 90% must be achieved in the trenches, which reduces the soil thermal resistivity closer to the native soil value of 150°C-cm/W. Feeders 2 and 3 require this compaction level for the MV cable trenches from the substation to the first wind turbine on each feeder.

MULTIPLE CIRCUIT TRENCHES

- In several locations, multiple MV circuits will run parallel to one another in the same right of way (ROW). Further thermal analysis was performed on these areas to determine the minimum spacing between circuits required to maintain acceptable operating temperatures.
- The following table summarizes the locations where multiple circuits will occupy the same parallel trench paths. The table indicates the number of turbines and corresponding loading on each cable segment.
- The worst case from a thermal standpoint occurs in the ROW from Turbine 25 to the Substation where all four fully loaded feeders run parallel to one another. To achieve adequate thermal performance from the

cables, a concrete duct bank installation must be used for the four homerun circuits from T-25 to the Sub. The ductbank must be a minimum of 18" thick and 10' long with the cable ducts spaced 2.5' apart.

Table 2: Multiple Circuit Trench Summary

TRENCH SEGMENT FROM	TO	FEEDERS IN TRENCH FDR	TURBINES	AMPS	Cable Sizes	Ckt Spacing (center-to-center)
SUB	T-25	1	10	516.51	1250	1.5' x 10' duct bank rho <= 0.55 C-m/W 2.5' duct spacing
		2	11	568.16	1250	
		3	11	568.16	1250	
		4	10	516.51	1250	
T-25	T-24	1	10	516.51	1250	four 12" trenches; 25' ROW backfill rho <= 1.00 C-m/W 7' FDR1-FDR2, 11' FDR2-FDR3, 3' FDR3-FDR4
		2	11	568.16	1250	
		3	11	568.16	1250	
		4	1	51.65	4/0	
T-24	JB-2/1	1	10	516.51	1250	triple 12" trenches; 50' ROW 23.5' FDR1-FDR2 & 23.5' FDR2-FDR3
		2	11	568.16	1250	
		3	11	568.16	1250	
JB-2/1	T-22	1	10	516.51	1250	triple 12" trenches; 35' ROW w/ 4/0 conductor in center trench; 9.5' FDR1-FDR3 & 21' FDR3-FDR2
		2	11	568.16	1250	
		3	4	206.60	4/0	
T-22	T-23	1	10	516.51	1250	triple 12" trenches; 12' ROW w/ 1/0 conductor in center trench; 4.5' between all circuits
		2	11	568.16	1250	
		3	1	51.65	1/0	
T-23	T-28	1	10	516.51	1250	double 12" trenches; 18' ROW 7.5' FDR1-FDR2
		2	10	516.51	1250	
T-28	T-33	1	10	516.51	1250	double 12" trenches; 15' ROW 6' FDR1-FDR2
		2	7	361.55	750	
T-33	T-34	1	10	516.51	1250	double 12" trenches; 20' ROW 9' FDR1-FD2
		2	4	206.60	4/0	
T-34	T-39	1	10	516.51	1250	single 18" trench; 3' ROW 1' FDR1-FDR2
		2	1	51.65	1/0	

WETLANDS, ROAD AND PIPELINE CROSSINGS

- There are several designated wetland areas, road and gas pipeline crossings throughout the site that require directional drill boring installation. The depth of the borings vary by crossing but are assumed a minimum of 10' depth at the time of this study.

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APPENDIX A: **SINGLE CIRCUIT CYMCAP REPORTS**

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 1_0 - 2_3 CN AL XLPE
Date:	9/18/2017 2:00:06 PM

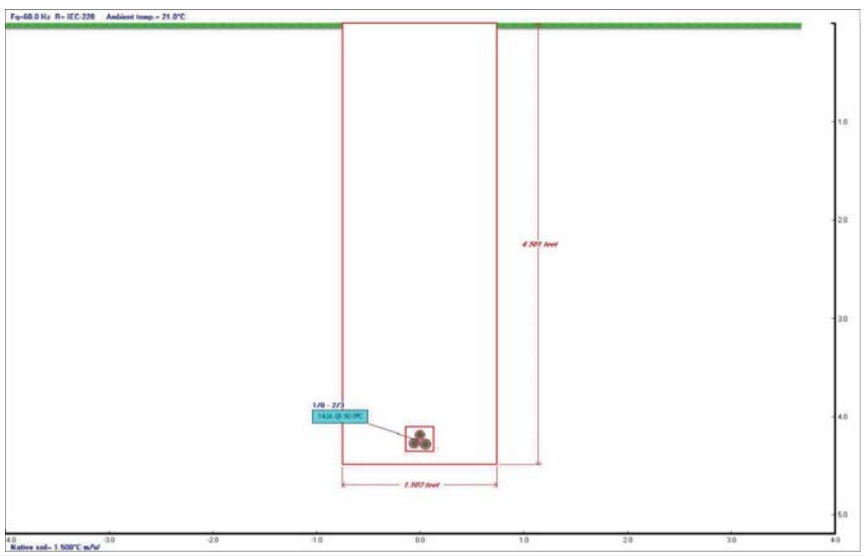
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	1_0 AL - 2_3 CN	1	1_0 - 2_3	A	60.0	1.0	-0.06	4.28	89.7	142.3
2	1_0 AL - 2_3 CN	1	1_0 - 2_3	B	60.0	1.0	0.06	4.28	89.6	142.3
3	1_0 AL - 2_3 CN	1	1_0 - 2_3	C	60.0	1.0	0.0	4.18	90.0	142.3

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 4_0 - 1_2CN AL XLPE
Date:	9/18/2017 12:57:47 PM

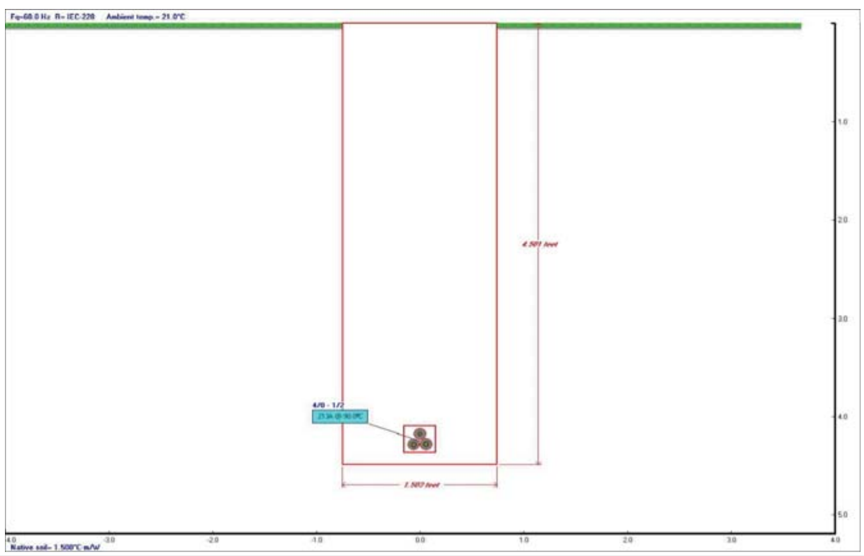
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	4_0 AL - 1_2 CN	1	4_0 - 1_2	A	60.0	1.0	-0.07	4.29	89.4	212.9
2	4_0 AL - 1_2 CN	1	4_0 - 1_2	B	60.0	1.0	0.07	4.29	89.6	212.9
3	4_0 AL - 1_2 CN	1	4_0 - 1_2	C	60.0	1.0	0.0	4.17	90.0	212.9

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 500 - 1_3CN AL XLPE
Date:	9/18/2017 2:06:09 PM

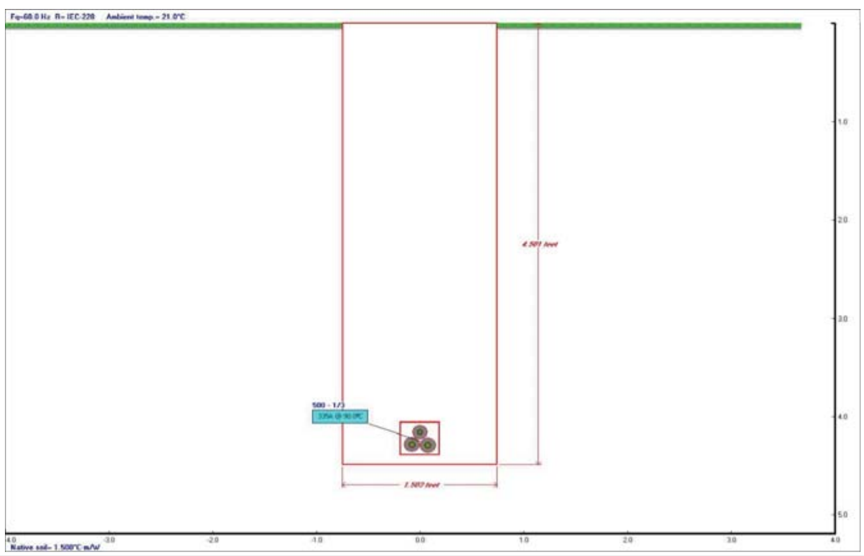
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	500 AL - 1_3 CN	1	500 - 1_3	A	60.0	1.0	-0.08	4.3	89.6	334.7
2	500 AL - 1_3 CN	1	500 - 1_3	B	60.0	1.0	0.08	4.3	89.6	334.7
3	500 AL - 1_3 CN	1	500 - 1_3	C	60.0	1.0	0.0	4.16	90.0	334.7

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 750 - 1_6CN AL XLPE
Date:	9/18/2017 2:11:08 PM

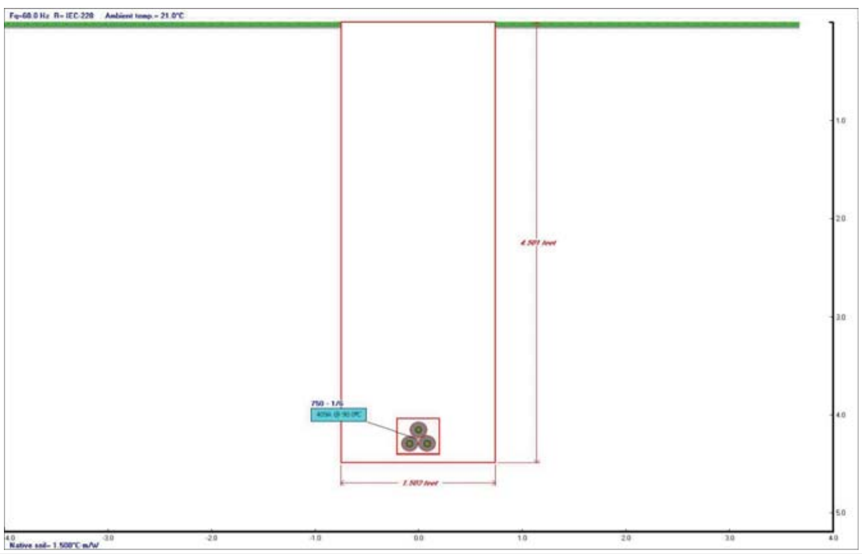
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	750 AL - 1_6 CN	1	750 - 1_6	A	60.0	1.0	-0.09	4.3	89.7	408.6
2	750 AL - 1_6 CN	1	750 - 1_6	B	60.0	1.0	0.09	4.3	89.6	408.6
3	750 AL - 1_6 CN	1	750 - 1_6	C	60.0	1.0	0.0	4.15	90.0	408.6

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 1000 - 1_6CN AL XLPE
Date:	9/18/2017 1:55:04 PM

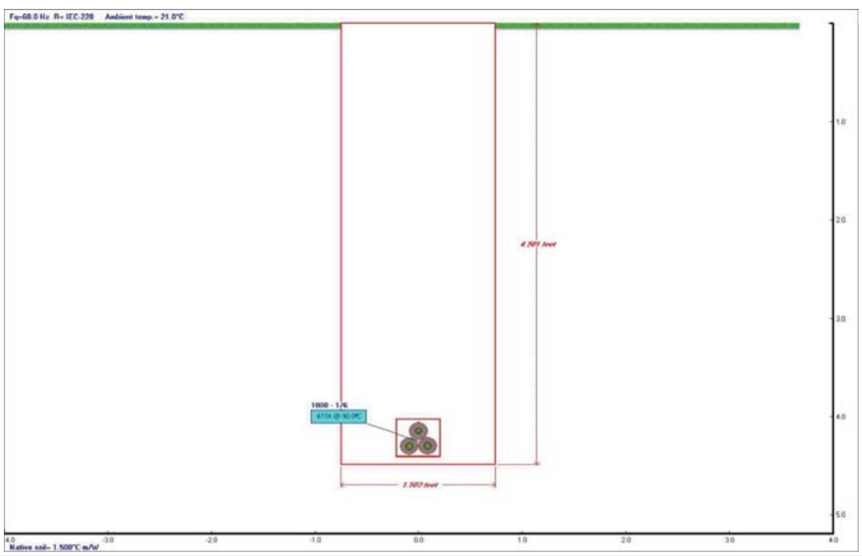
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	000 AL - 1_6 CN	1	1000 - 1_6	A	60.0	1.0	-0.09	4.3	89.7	477.1
2	000 AL - 1_6 CN	1	1000 - 1_6	B	60.0	1.0	0.09	4.3	89.7	477.1
3	000 AL - 1_6 CN	1	1000 - 1_6	C	60.0	1.0	0.0	4.14	90.0	477.1

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 1250 - 1_6CN AL XLPE
Date:	9/18/2017 1:52:28 PM

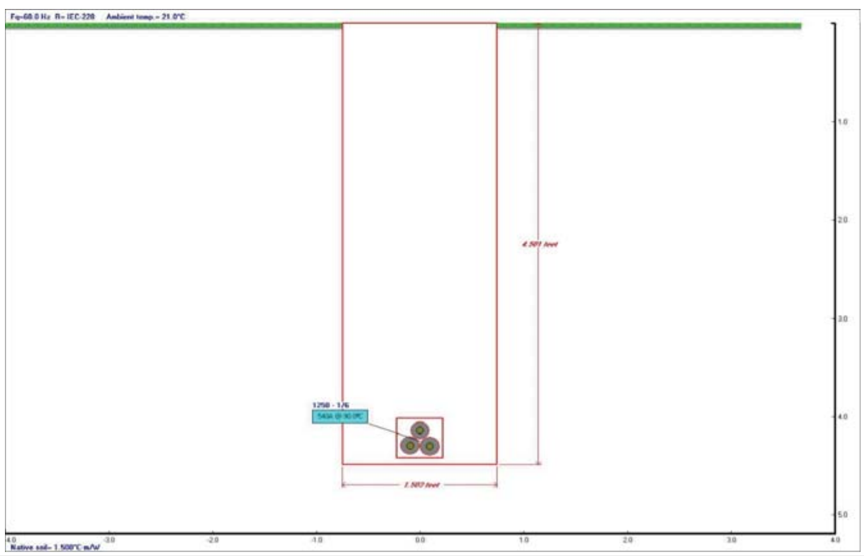
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	2.0



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	250 AL - 1_6 CN	1	1250 - 1_6	A	60.0	1.0	-0.1	4.31	89.7	540.5
2	250 AL - 1_6 CN	1	1250 - 1_6	B	60.0	1.0	0.1	4.31	89.7	540.5
3	250 AL - 1_6 CN	1	1250 - 1_6	C	60.0	1.0	0.0	4.14	90.0	540.5

	Study Summary
CYMCAP Version	7.2 Revision 3
Study:	UG Collector Circuits
Execution:	Single Ckt 1250 - 1_6CN AL XLPE 150rho
Date:	9/18/2017 2:24:58 PM

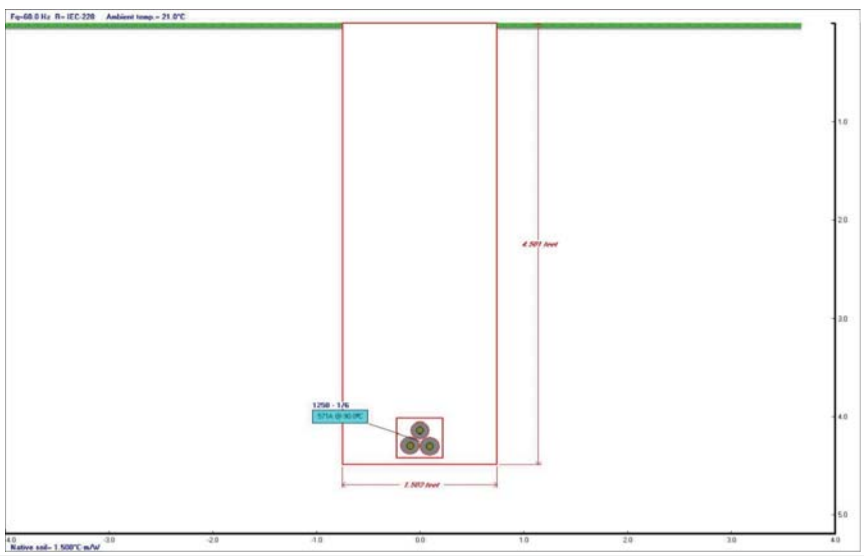
General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	21.0
Native Soil Thermal Resistivity	[K.m/W]	1.5
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
Backfill	0.0	2.25	1.5	4.5	1.5

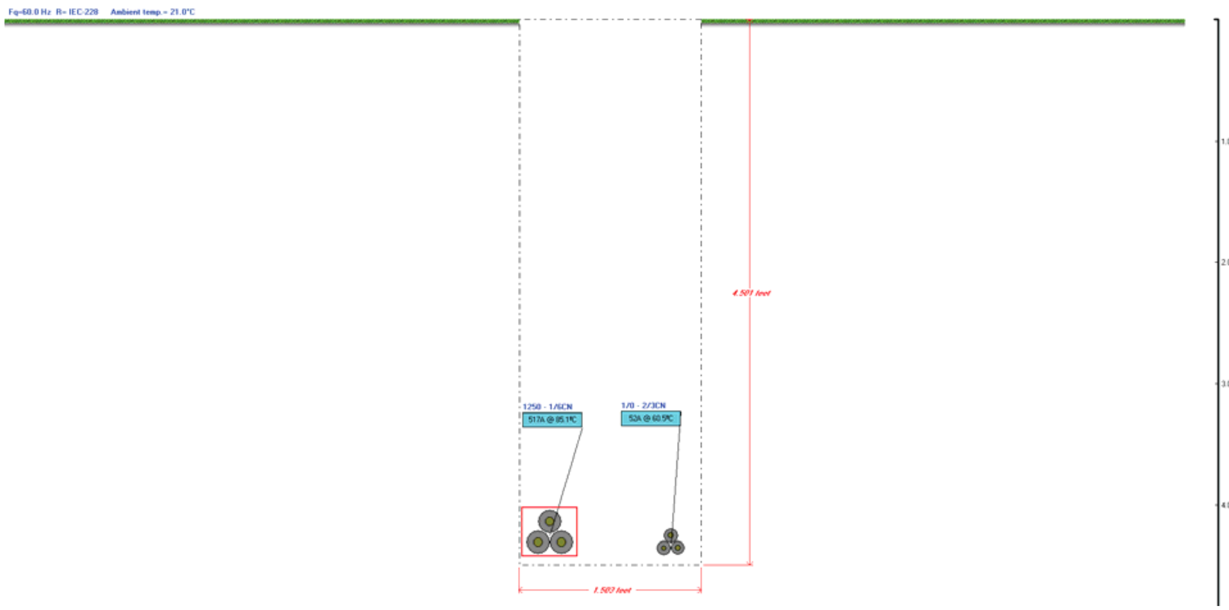


Results Summary

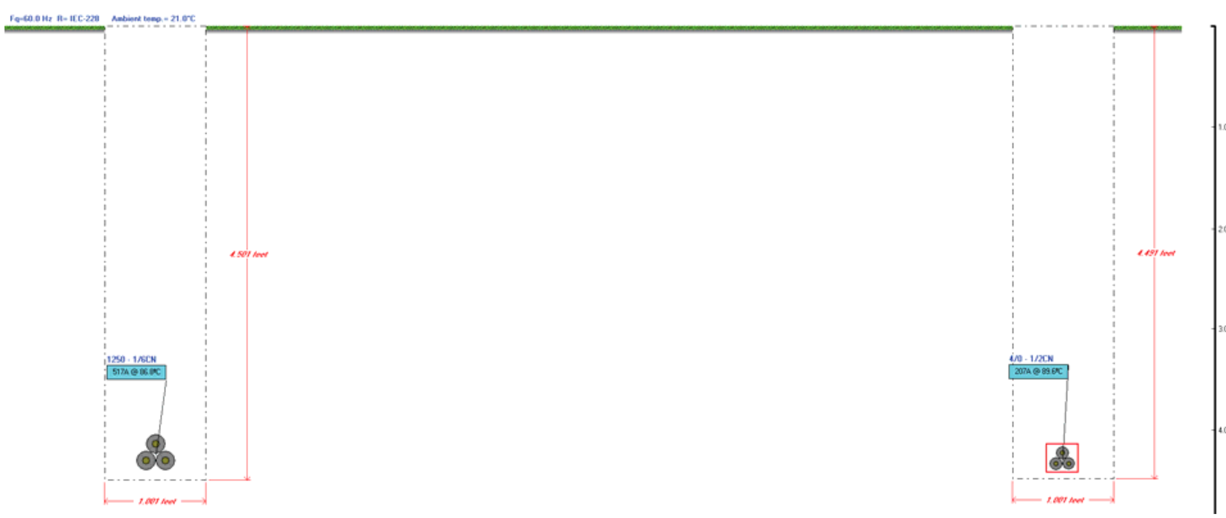
Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	250 AL - 1_6 CN	1	1250 - 1_6	A	60.0	1.0	-0.1	4.31	90.0	570.5
2	250 AL - 1_6 CN	1	1250 - 1_6	B	60.0	1.0	0.1	4.31	90.0	570.5
3	250 AL - 1_6 CN	1	1250 - 1_6	C	60.0	1.0	0.0	4.14	90.0	570.5

APPENDIX B: PARALLEL CIRCUIT CYMCAP REPORTS

ROW: T-34 to T39



ROW: T-33 to T-34



ROW: T-28 to T-33

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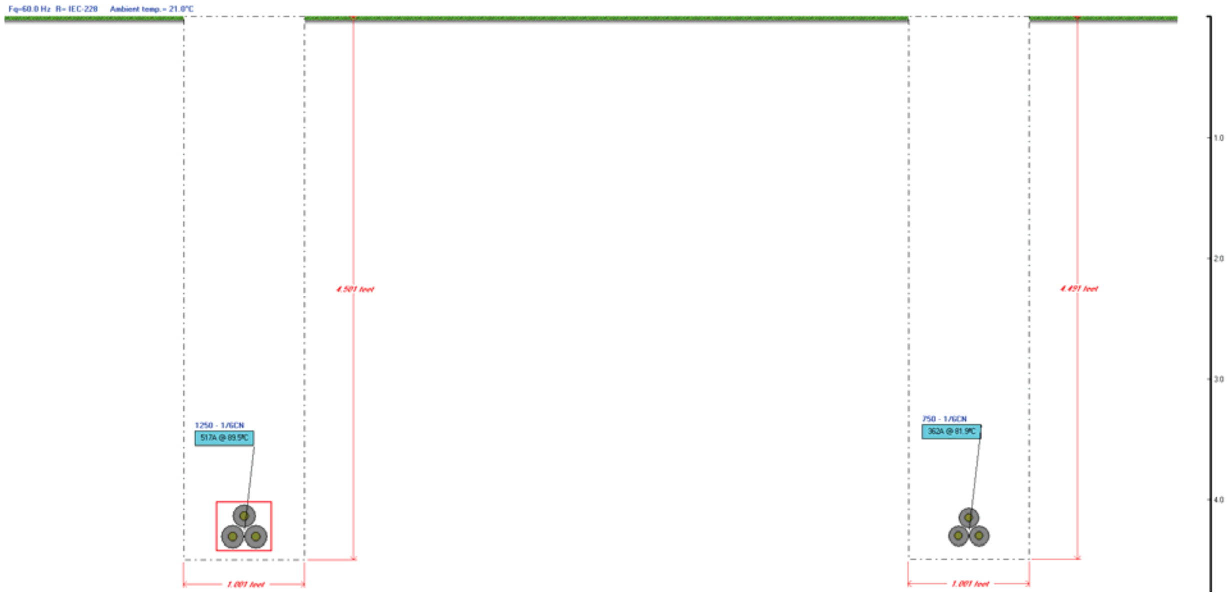
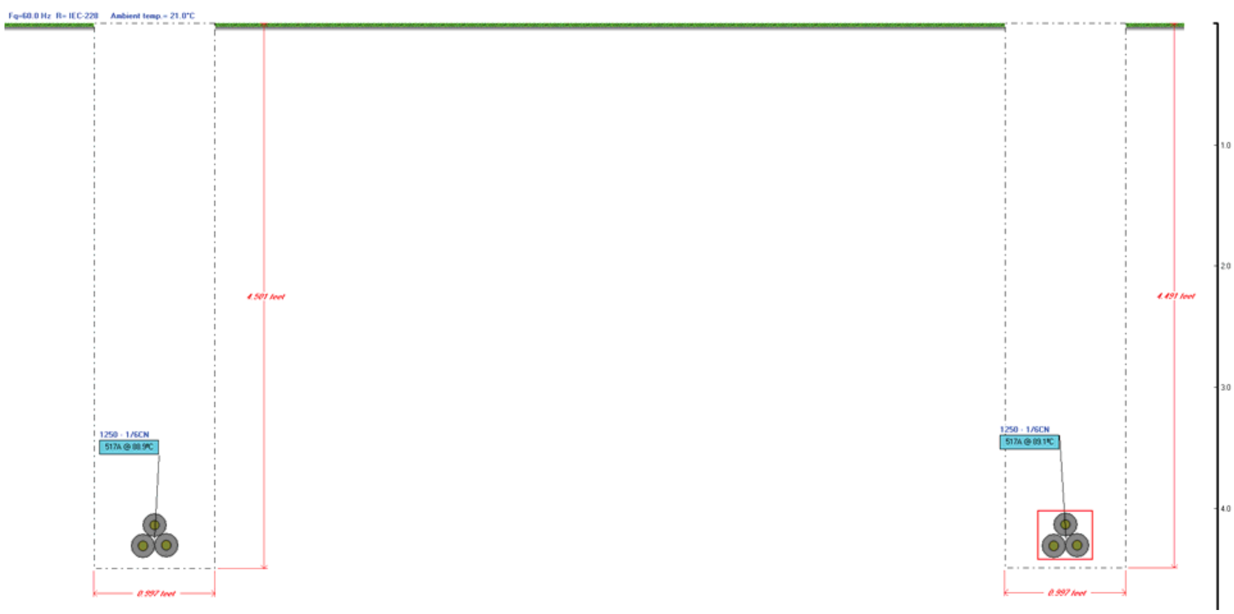
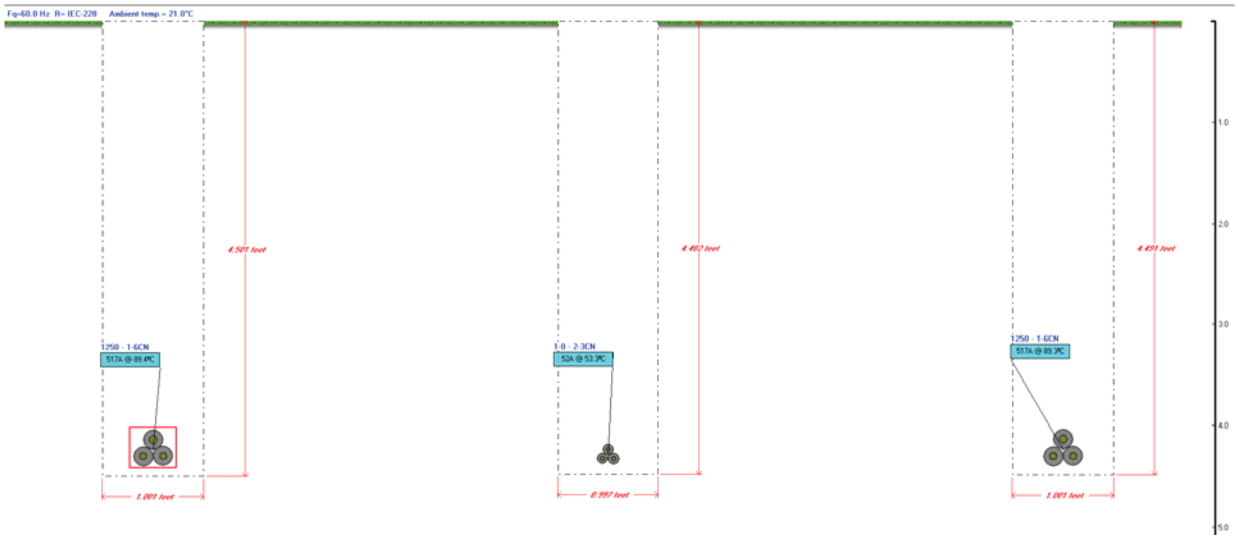


ROW: T-23 to T-28

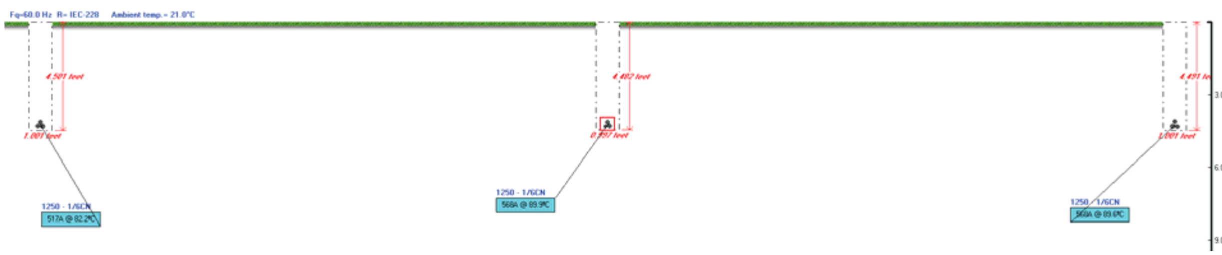


ROW: T-22 to T-23

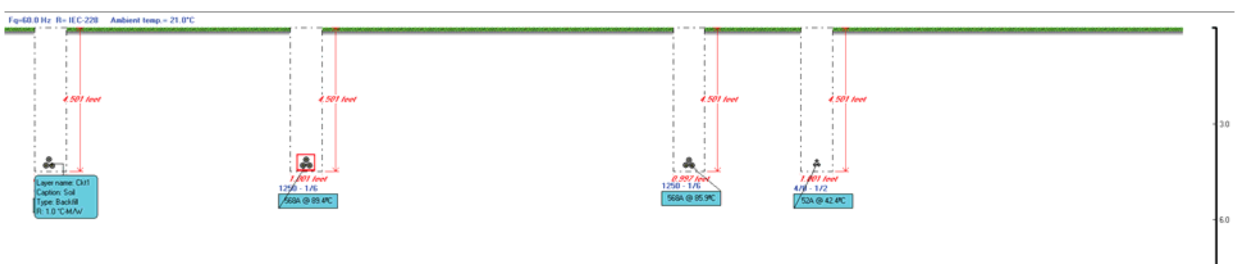
Westwood



ROW: JB-2/1 – T-22

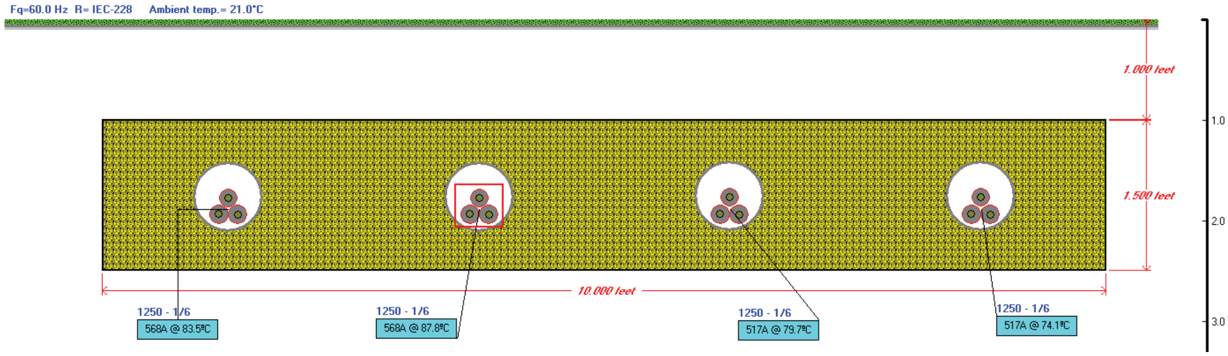


ROW: T-25 to T-25



ROW: T-25 to SUB

Westwood



Fq=60.0 Hz R= IEC-228 Ambient temp.= 21.0°C
1.000 feet
1.500 feet
10.000 feet
1.0
2.0
3.0
1250 - 1/6
568A @ 83.5ºC
1250 - 1/6
568A @ 87.8ºC
1250 - 1/6
517A @ 79.7ºC
1250 - 1/6
517A @ 74.1ºC

ANNUAL AND PEAK LOSSES STUDY

Paulding, Ohio

September 27, 2017

Prepared for:

WHITE an IEA company

Prepared by:

Westwood

Westwood

Project Name: NW OH Wind Project	
Title	**J.O. or W.O. Number**
Annual and Peak Losses Study	0007186.00

Approvals		**Revision Number**	**Date**	**Description**
Preparer(s) Name	**Reviewer(s) Name**			
Abhishek Kulkarni	Drew Szabo	0	09/27/2017	Original Release

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INTRODUCTION

NW OH Wind Project is a 100 MW wind generation installation in Paulding, OH consisting 42 of GE 2.5 MW wind turbines. The turbines are grouped into four medium voltage (MV) feeders with 10 turbines on Feeders 1 and 4 and 11 turbines on Feeders 2 and 3. The feeders are connected to a main power transformer that steps the voltage up to 138kV where it interconnects with the AEP transmission system via a short overhead line segment.

OBJECTIVE

The objective of this report is to determine the peak and annual electrical losses in the wind farm. Language from the draft BOP contract between the owner and Contractors states, *"Contractor shall provide calculations demonstrating the system design loss is less than or equal to two (2) percent annualized, unless otherwise approved by Owner, and shall be based on the wind frequency power curve provided by others as found in Exhibit E-1, Attachment 7 (Energy Production Report). The system losses shall be calculated for the complete electrical system from the WTG controller terminations at the bottom of the WTG to the permanent point of interconnection at the Utility's Switchyard. This shall include the permanent transmission span between the Haviland 138kV Switchyard and the Trishe Wind Substation, the main power transformers, MV collection cable, WTG transformers, and medium voltage cable.."*

This study assess the losses for all components described above based on the design at the 30% Review stage (9/22/2017).

INPUTS & ASSSUMPTIONS

- A data file with the expected typical year output of the 42-turbine wind farm on an hourly basis (8,760 hours) was provided by the owner for use in the loss calculation. The data file had a built-in, fixed loss estimate of 2.5% of production. Since the present study is intended to calculate the losses explicitly, the hourly production estimates from the data file were processed as follows prior to conducting the study:

  $$\frac{1.025 \times raw\ output\ data\ [W]}{42} = gross\ output\ per\ turbine\ before\ electrical\ losses\ [W]$$

  The raw output data provided gives an annual capacity factor for the plant of 35.35%

  Following the pre-processing, the annual capacity factor before losses is 34.65%

- Medium voltage AC collector electrical layout is per the Westwood Professional Services Electrical Drawings, MVAC Collection One-Line Diagrams E.200 & E.210.
- Parameters for equipment such as turbines (WTG), step-up transformers (GSU) and main power transformer (MPT) based on manufacturer data.
- Parameters for MV cables based on thermal analysis using CYME Cymcap Underground Cable Thermal Analysis software.
- Parameters for overhead transmission line data based on values from the Southwire SW Rate software program.
- Parameters used in this study are shown in Appendix A.
- Appendix B shows the MVAC Schedule

METHODOLOGY

- This analysis accounts for all electrical losses between the 690 volt terminals of the low voltage breaker in the WTG tower base and the 138 kV bus of the Haviland substation. Losses consist of no-load and load losses for each cable section and piece of equipment.
- Losses are calculated assuming all wind turbines are rated for 2.5 MW.
- No-load losses are fixed when equipment is energized at a fixed voltage. For the purpose of the study, all components of the system are assumed to be energized at 1.0 pu voltage. Mathematically then, the no-load losses (peak, and annual) can be described as follows:

$$NLL_{peak}\ [kW] = NLL(1.0pu)\ [W] \times \frac{1\ [kW]}{1000\ [W]} \quad \text{(Eq. 1)}$$

$$NLL_{annual}\ [kWh] = NLL(1.0pu)\ [W] \times \frac{1\ [kW]}{1000\ [W]} \times 8760\ [h] \quad \text{(Eq. 2)}$$

- It can then be seen that peak or annual no-load losses for the entire wind farm can be determined by simply adding the losses calculated by Equations 1 and 2 for each piece of equipment.
- Load losses at any operating point are losses related to electrical current flow in conductors or transformers and are therefore proportional to the square of the load current. For conductors, the peak losses (losses when all turbines are operating at their nameplate output, i.e. 2.5 MW) are given by:

$$LL\ Peak_{conductor}\ [kW] = 3 \times I_{peak}^2 \times R \times \frac{1\ [kW]}{1000\ [W]} \quad \text{(Eq. 3)}$$

- For transformers, peak load losses are given by:

$$LL\ Peak_{transformer}\ [kW] = Guaranteed\ Load\ Loss\ [W] \times \left(\frac{I_{peak}}{I_{rated}}\right)^2 \times \frac{1\ [kW]}{1000\ [W]} \quad \text{(Eq. 4)}$$

- Annual load losses for each conductor or transformer are calculated based on the annual distribution of operating points, with the load losses for each hour proportional to the square of the ratio of $I_{operating}/I_{peak}$. Since $I_{operating}/I_{peak}$ can be interpreted as an hourly load factor (or hourly capacity factor), the annual losses are just the peak losses x the sum of squares of the hourly load factor:

$$LL\ Annual_{conductor}\ [kWh] = LL\ \ Peak_{conductor} \times \Sigma HLL^2 \times 8760\ [h] \quad \text{(Eq. 5)}$$

$$LL\ Annual_{transformer}\ [kWh] = LL\ \ Peak_{transformer} \times \Sigma HLL^2 \times 8760\ [h] \quad \text{(Eq. 6)}$$

- Peak losses for each conductor or transformer are calculated based on the equations listed above. The hourly load factor would be 1 assuming that the turbine produces at full capacity which in this case is limited to 2,233.234kW per turbine per hour.

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RESULTS

Based on the 8760 hour production file provided by the owner, the annual capacity factor before is losses is 35.35%. The annual average of sum of squares of hourly load factor is 21.76%.

- Low Voltage cables – The 8 parallel runs of 1000 kcmil Al have a resistance value of 1.14E-04 ohms. No-load losses are very low and neglected in this study. Based on the previous equations, load losses are calculated as:

$$LL\ Peak_{conductor}\ \left[\frac{kW}{turbine}\right] = 3 \times I_{peak}^{2} \times R \times \frac{1\,[kW]}{1000\,[W]} \quad \text{(Eq. 3)}$$

$$Total\ LL_{peak} = 1.49\left[\frac{kW}{turbine}\right] \times 42\ turbines = 62.92\ [kW]$$

Annual load losses per turbine come to:

$$LL\ Peak_{annual} = 2{,}857.38\left[\frac{kWh}{turbine}\right]$$

Total annual losses for low voltage cables are:

$$Total\ LL = 2{,}857.38\left[\frac{kWh}{turbine}\right] \times 42\ turbines = 117.2\ [MWh]$$

Peak load losses per turbine come to:

$$LL\ Peak_{annual} = 13{,}129.25\left[\frac{kWh}{turbine}\right]$$

Total peak losses for low voltage cables are:

$$Total\ LL = 13{,}129.25\left[\frac{kWh}{turbine}\right] \times 42\ turbines = 583.3\ [MWh]$$

- Padmount Transformers – Guaranteed no-load losses (NLL) or Core Losses and load losses (LL) for the 2750 kVA padmount transformers were provided in the form a proposal from the equipment vendor. The guaranteed no-load losses are 3.92 kW and load losses (LL) are 18.72 kW.

$$LL_{Peak}\ [kW] = Guaranteed\ Load\ Loss\ 18720\ [W] \times \left(\frac{I_{peak}}{I_{rated}}\right)^{2} \times \frac{1\,[kW]}{1000\,[W]}$$
$= 15.47\ [kW]$ (Eq. 4)

$$NLL_{peak}\left[\frac{kW}{turbine}\right] = NLL(1.0pu)\ 3920\ [W] \times \frac{1\,[kW]}{1000\,[W]} = 3.92\ [kW] \quad \text{(Eq. 1)}$$

$$NLL_{annual}\left[\frac{kWh}{turbine}\right] = NLL(1.0pu)\ 3920\ [W] \times \frac{1\,[kW]}{1000\,[W]} \times 8760\ [h] = 34339.2\ [kWh] \quad \text{(Eq. 2)}$$

$$LL_{annual}\left[\frac{kWh}{turbine}\right] = 15.47\ LL_{Peak}[\text{kW}] \times \Sigma HLL^{2} \times 8760\ [h] = 29{,}495.3\ [kWh] \quad \text{(Eq. 6)}$$

$$LL_{Peak}\left[\frac{kWh}{turbine}\right] = 15.47\ LL_{Peak}[\text{kW}] \times \Sigma HLL^{2} \times 8760\ [h] = 3{,}762{,}787\ [kWh] \quad \text{(Eq. 7)}$$

Total Annual Losses for Padmount Transformers are:

$$Total\ Losses = (34{,}339.2\ NLL_{annual}\ \left[\frac{kWh}{turbine}\right] + 24{,}495.3\ LL_{annual}\left[\frac{kWh}{turbine}\right])$$
$$\times\ 42\ turbines = 2{,}681.0\ [MWh]$$

Total Peak Losses for Padmount Transformers are:

$$Total\ Losses = (34{,}339.2\ NLL_{annual}\ \left[\frac{kWh}{turbine}\right] + 3{,}762{,}787.64\ LL_{annual}\left[\frac{kWh}{turbine}\right])$$
$$\times\ 42\ turbines = 4{,}165{,}747.64\ [MWh]$$

- Medium voltage cable – No load losses for XLPE insulated MV Cable are quite low and are neglected in this study. Load losses vary in each cable section based on length, loading (number of turbines carried) and conductor cross sectional area.

$$LL\ Peak_{conductor}\ [kW] = 3 \times I_{peak}^2 \times R\ \times \frac{1\ [kW]}{1000\ [W]}\ \text{(Eq. 3)}$$

$$Total\ LL_{peak}\ = 1{,}286.53\ [kW]$$

$$LL\ Annual_{conductor}\ [kWh] = LL\ \ Peak_{conductor}\ \times\ \Sigma HLL^2 \times 8760\ [h] \qquad \text{(Eq. 5)}$$

Annual load losses for all the circuits together come to:

$$LL_{annual}\ = 2{,}476[MWh]$$

Peak load losses for all the circuits together come to:

$$LL_{Peak}\ = 11{,}379.7[MWh]$$

- Substation Main Transformer – Guaranteed no-load losses (NLL) or Core Losses and load losses (LL) for the 70200 kVA padmount transformers were provided in the form a proposal from the equipment vendor. The guaranteed no-load losses are 46 kW and load losses (LL) are 192 kW.

$$LL\ Peak_{transformer}\ [kW] = Guaranteed\ Load\ Loss\ 192000\ [W]\ \times \left(\frac{I_{peak}}{I_{rated}}\right)^2 \times \frac{1\ [kW]}{1000\ [W]}$$
$$= 429.54\ [kW]\ \text{(Eq. 4)}$$

$$NLL_{peak}\ \left[\frac{kW}{turbine}\right] = NLL(1.0pu)\ 46000\ [W] \times \frac{1\ [kW]}{1000\ [W]} = 46\ [kW]\ \text{(Eq. 1)}$$

$$NLL_{annual}\ \left[\frac{kWh}{turbine}\right] = NLL(1.0pu)\ 46000\ [W]\ \times \frac{1\ [kW]}{1000\ [W]} \times\ 8760\ [h] = 402{,}960\ [kWh]\ \text{(Eq. 2)}$$

$$LL_{annual}\ \left[\frac{kWh}{turbine}\right] = 429.54\ LL\ \ Peak_{transformer}[\text{kW}]\ \times\ \Sigma HLL^2 \times\ 8760\ [h]$$

$$= 818{,}913.30\ [kWh]\ \text{(Eq. 6)}$$

Total Annual Losses for Main Power Transformers are:

$$Total\ Losses = \ (402{,}960\ NLL_{annual}\left[\frac{kWh}{turbine}\right] + 818{,}913.3\ LL_{annual}\left[\frac{kWh}{turbine}\right])$$

$$= 1{,}221.9\ [MWh]$$

Total Peak Losses for Main Power Transformers are:

$$Total\ Losses = \ (402{,}960\ NLL_{annual}\left[\frac{kWh}{turbine}\right] + 3{,}762{,}787.64\ LL_{annual}\left[\frac{kWh}{turbine}\right])$$

$$= 4{,}165.7\ [MWh]$$

- 138 kV Transmission line – The 250' section of 954 kcmil ACSR has a resistance value of 0.0052 ohms. No-load losses are very low and neglected in this study. Based on the previous equations, load losses are calculated as:

$$LL\ Peak_{conductor}\ [kW] = 3 \times I_{peak}^2 \times R\ \times \frac{1\ [kW]}{1000\ [W]} \text{(Eq. 3)}$$

$$Total\ LL_{peak}\ = 0.0272\ [kW]$$

$$LL\ Annual_{conductor}\ [kWh] = LL\ \ Peak_{conductor}\ \times\ \Sigma HLL^2 \times 8760\ [h] \qquad \text{(Eq. 5)}$$

Annual load losses for the 138kV overhead transmission line:

$$LL\ Peak_{annual} = 51.94[kWh]$$

Peak load losses for the 138kV overhead transmission line:

$$LL\ Peak_{annual} = 236.88[kWh]$$

- All the above results have been summarized in table 1 and 2.

Table 1: Overall Annual Losses Summary

Collector System Annual Losses Summary						
	No Load Loss (MWh)	%	Load Loss (MWh)	%	TotalLoss (MWh)	%
LV Cable Losses	0.0	0.000%	117.2	0.036%	117.2	0.036%
Pad-Mount Xfrmr Losses	1,238.8	0.381%	1,442.2	0.444%	2,681.0	0.824%
Underground MVAC Cable Losses	0.0	0.000%	2,476.6	0.762%	2,476.6	0.762%
Grounding Xfmr Losses	0.0	0.000%	0.0	0.000%	0.0	0.000%
Substation Main Power Transformer	403.0	0.124%	818.9	0.25	1,221.9	0.376%
T Line Losses	0.000	0.000%	0.052	0.000%	0.052	0.000%
Total Losses	1,641.8	0.505%	4,855.0	1.493%	6,496.8	1.998%
Total Energy	325,176.5	100.00%	325,176.5	100.00%	325,176.5	100.00%
Capacity Factor (Before Losses)					35.35%	
Capacity Factor (After Losses)					34.65%	

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Table 2: Overall Annual Losses Summary

Collector System Peak Losses Summary						
	No Load Loss (MWh)	%	Load Loss (MWh)	%	TotalLoss (MWh)	%
LV Cable Losses	0.0	0.000%	538.3	0.066%	538.3	0.066%
Pad-Mount Xfrmr Losses	5,692.1	0.693%	1,442.2	0.176%	7,134.4	0.868%
Underground MVAC Cable Losses	0.0	0.000%	11,379.7	1.385%	11,379.7	1.385%
Grounding Xfmr Losses	0.0	0.000%	0.0	0.000%	0.0	0.000%
Substation Main Power Transformer	403.0	0.049%	3,762.8	0.458%	4,165.7	0.507%
T Line Losses	0.000	0.000%	0.239	0.000%	0.239	0.000%
Total Losses	6,095.1	0.742%	17,123.3	2.084%	23,218.4	2.826%
Total Energy	821,651.5	100.00%	821,651.5	100.00%	821,651.5	100.00%
Capacity Factor (Before Losses)					89.33%	
Capacity Factor (After Losses)					86.81%	

CONCLUSION

- The overall annual energy losses are calculated to be 6,496.8 MWh which is 1.998% of the total energy production estimated based on the expected annual output file provided by the client.
- The expected losses meet the language from the draft BOP contract between the owner and Contractors states, *"Contractor shall provide calculations demonstrating the system design loss is less than or equal to two (2) percent annualized, unless otherwise approved by Owner, and shall be based on the wind frequency power curve provided by others as found in Exhibit E-1, Attachment 7 (Energy Production Report).*

APPENDIX A: EQUIPMENT PARAMETERS USED IN THE STUDY

Transmission Line Parameters (Assumption)

Cable	R1 ohms per 1000'
954 ACSR 45/7	0.0208

MVAC Cable Parameters Derived in Cymcap Software Program

Cable	R1 ohms per 1000'
1/0 - 2/3	0.2409
4/0 - 1/2	0.1130
500 - 1/3	0.0494
750 - 1/6	0.0343
1000 - 1/6	0.0257
1250 - 1/6	0.0205
1250 - 1/6	0.0205

LVAC Cable Parameters (Assumption)

Cable	R1 ohms per 1000'
1000kCMIL	0.0228

Main Power Transformer Guaranteed Losses (Vendor Quote)

Main Power Transformer	
Xfrmr Rating (kVA)	70200
Load Loss @ rated kVA (kW)	192.0
Core Loss Per Xfmr (kW)	46.0

Pad Mount Transformer Guaranteed Losses (Vendor Quote)

Padmount Transformer	
Xfrmr Rating (kVA)	2750
Load Loss @ rated kVA (kW)	18.720
Core Loss Per Xfmr (kW)	3.92

Ulteig

ELECTRICAL EQUIPMENT
AND MATERIAL SPECIFICATION
ATTACHMENT B – BID FORM

POWER TRANSFORMER
ULTEIG PROJECT NO. R17.01246 **ULTEIG SPECIFICATION NO. 0101-B**

ATTACHMENT B

Quotation Date: 07/19/2017
Quotation Number: X172701A
RFQ Inquiry#: ULTEIG PROJECT # R17.01246
Shipping Location: HAVILAND, OH

Quantity: 01

VENDOR INFORMATION:

Vendor Name:	VIRGINIA TRANSFORMER CORP.
Factory Location:	RINCON, GA, U.S.A
Base Price, FOB Destination (incl shipping)	$ 1,108,186.00 PER UNIT
Field Service Price:	$ Included in Base Price
Spare Parts Price:	$ Included in Base Price
Factory Warranty:	24/30 MONTHS WITH First Year IN/OUT COVERAGE
Delivery of Equipment:	Shipment 30 **Weeks ARO**
Delivery of Review Drawings:	8-9 **Weeks ARO**
Delivery of Certified Drawings:	10-11 **Weeks ARO** (1 - 2 WEEKS APPROVAL TIME)

RATINGS

Continuous Self-Cooled (Base) Capacity:	70.2 MVA
Continuous Capacity with Stage 1 Cooling:	93.6 MVA
Continuous Capacity with Stage 2 Cooling:	117 MVA
Percent Impedance at Self-Cooled Rating:	10.00 % ± 10% ANSI TOLE.
Guaranteed Losses at 100% Rated Voltage and Nominal Tap:	
No-Load Losses:	46.00 KW
Load Losses at Maximum Capacity:	534.00 KW
Auxiliary Losses at Maximum Capacity:	7.50 KW
Total Auxiliary AC Power Requirements:	125 V DC
Total Auxiliary DC Power Requirements:	120 / 240 V
Maximum Sound Level at Maximum Capacity:	82dBA @ ONAF2
X/R Ratio (p.u):	36.55 approx
High Voltage Winding BIL Rating:	650KV BIL
Low Voltage Winding BIL Rating:	200KV BIL
Neutral Voltage Winding BIL Rating:	200KV BIL
Maximum Operation Altitude at Rated BIL:	< 3300 FT
Operating Temperature:	65°C

CONSTRUCTION DETAILS

APPROXIMATE INCH

Overall Height of Transformer:	245
Overall Width of Transformer:	385
Overall Depth of Transformer:	265
Height to Top of Transformer Tank:	155
Height to High Voltage Bushings:	245
Height to Low Voltage Bushings:	175
Total Transformer Weight, Including Oil:	301500
Total Number of Gallons of Oil:	11,000 GAL APPROX.
Type of Oil Preservation System:	CONSERVATOR
Description of Insulating Oil:	TYPE II MINERAL
Voltage Range for Auxiliary AC System:	120 / 240 V
Voltage Phases for Auxiliary AC System:	1 - PHASE
Voltage Range for Auxiliary DC System:	125V DC

ACCESSORIES

Hot Spot Winding Temperature Detector (RTD):	☒ Yes ☐ No
Hot Spot Winding Temperature Indicator Relay:	☒ Yes ☐ No
Top Oil Temperature Detector (RTD):	☒ Yes ☐ No
Top Oil Temperature Indicator Relay:	☒ Yes ☐ No
Transformer Monitoring Device:	☒ Yes ☐ No
Type of Transformer Monitoring Device:	HYDRAN
Annunciator and/or Remote I/O:	☒ Yes ☐ No
Type of Annunciator and/or Remote I/O:	SEL 2411
Automatic Transfer Switch for Power Supplies (ATS):	☐ Yes ☒ No
Type of ATS:	N/A
Load Tap Changer:	☒ Yes ☐ No
Number of Taps of LTC:	± 16 STEPS
Taps Steps of LTC:	5/8% PER STEP
Type of LTC Controller:	BECKWITH
High Voltage MCOV:	☒ Yes ☐ No
High Voltage MCOV Rating:	98KV MCOV
Low Voltage MCOV:	☒ Yes ☐ No
Low Voltage MCOV Rating:	24.4KV MCOV
Bushing CT Quantity on High Side (per phase):	2 / 1
Bushing CT Accuracy Class on High Side:	C800 / 0.3B1.8
Bushing CT BIL Rating on High Side:	STANDARD
Bushing CT Connection Type on High Side:	STANDARD
Bushing CT Quantity on Low Side (per phase):	3
Bushing CT Accuracy Class on Low Side:	C800
Bushing CT BIL Rating on Low Side:	STANDARD
Bushing CT Connection Type on Low Side:	STANDARD
Ability to Add Metering Class CT to High-Side:	☐ Yes ☒ No
Ability to Add Metering Class CT to Low-Side:	☐ Yes ☒ No

ADDITIONAL TESTS

Front-of-Wave Impulse Test:	☐ Yes ☒ No
Switching Impulse Test:	☐ Yes ☒ No
Zero Phase Sequence Impedance Voltage Test:	☒ Yes ☐ No
Partial Discharge Test:	☒ Yes ☐ No
Insulation Power Factor Test:	☒ Yes ☐ No
Insulation Resistance (Megger) Tests:	☒ Yes ☐ No
Audible Noise Test:	☒ Yes ☐ No
Temperature Rise Test:	☒ Yes ☐ No

FIELD SERVICES

Offload:	☒ Yes ☐ No
Assembly and Oil Filling:	☒ Yes ☐ No
Field Inspections and Testing:	☒ Yes ☐ No

SPARE PARTS

Complete Set of Gaskets:	☒ Yes ☐ No
One Gallon of Touch-Up Paint:	☒ Yes ☐ No
One High Voltage Line Bushing:	☒ Yes ☐ No
One Low Voltage Line Bushing:	☒ Yes ☐ No
One Neutral Bushing (Each Type):	☒ Yes ☐ No

STORAGE

Can Storage for the Unit Be Provided:	☒ Yes ☐ No
Cost of Storage:	FREE STORAGE FOR UPTO 2 WEEK. $ 800 PER WEEK AFTER 2nd WEEK WITH ONE TIME CRANE CHARGE OF $ 7,500.00

DRAWINGS

The list below outlines the information required to be included as part of the approval set. Additional drawings may be required and requested. The information can be on a separate drawing or included within one of the drawings in the drawing package.

Outline Drawing:	☒ Yes ☐ No
Detailed Dimensions:	☒ Yes ☐ No
Weight:	☒ Yes ☐ No
Center of Gravity:	☒ Yes ☐ No
Base Detail and Foundation Drawing:	☒ Yes ☐ No
Power and Control Cable Entrance Location:	☒ Yes ☐ No
Installation and Maintenance Clearances:	☐ Yes ☒ No
Bill of Material:	☐ Yes ☒ No
Nameplates:	
Transformer Rating Nameplate:	☒ Yes ☐ No
Bushing CT Nameplate(s):	☒ Yes ☐ No
AC & DC Schematics:	☒ Yes ☐ No
Wiring Diagrams:	☒ Yes ☐ No
Bushing Detail and Outline Drawings:	☒ Yes ☐ No

CT Characteristic Curves: [X] Yes [ ] No
Volt/Hertz Curve: [X] Yes [ ] No

VENDOR CONTACT

Name: SACHIN GUPTA, ASSISTANT SALE MANAGER
Address: 220 GLADE VIEW DRIVE, NE
ROANOKE, VA - 24012
Phone: 540-588-9333
Email: Sachin_Gupta@vatransformer.com

NOTES:

1. **Attach vendor original quotation including any exceptions taken to the specifications or attachments.**
2. **Attached any preliminary outline drawings or associated material that would aid in review of bid.**
3. **If storage for the unit can be provided, please provide terms and details on storage and maintenance during storage for the unit.**

CG Power Systems USA Inc
Registered Office & Plant:
One Pauwels Drive, Washington, Missouri 63090, USA
T: +1 636 239 9300 F: +1 636 239 9395 W: www.cgglobal.com

TECHNICAL SPECS

Date: 8/22/2017
Quotation Number: 95918145
Item Number: 10

Customer Line No.:		**Quantity:**	44
Unit Price:	$30,917.00	**Extended Price:**	$1,360,348.00

Three Phase Pad-Mount Transformer(s)

kVA Rating:	2750 kVA	**Model #:**	
	Mineral Oil Immersed	**Cooling Class:**	ONAN
		Frequency:	60 Hz
		Avg. Winding Temp.	65 °C
Primary Voltage:	34500 Delta volts	**Secondary Voltage:**	690Y/398 volts
Primary BIL Rating:	200 kV	**Secondary BIL Rating:**	30 kV
HV Winding Matl:	Aluminum	**LV Winding Matl:**	Aluminum

High Voltage Taps: B Taps - Two 2.5% Taps below Nominal and Two 2.5% Taps above Nominal

No Load Loss: 3915 Watts **Load Loss:** 18720 Watts **Total Loss:** 22635 Watts

Impedance: 5.75 %

Tank Enclosure:
Welded Cover w/(1) Handhole(s) - 14x24
Cabinet Depth: 24 Inches, Pentahead Security Bolts
Steel HV-LV Barrier

Bushings:
Loop Feed ANSI Minimum Dimensions
Dead Front Primary Terminations: Integral Non-Loadbreak Bushings 600A
Secondary Terminations: Epoxy Bushings w/Non-removable10 Hole Spades, Spade Support

Protection:
PRCLF (38kV OS Shorty 140A), Weak Link Cartridge (34.5kV Curve 10)

Accessories:
Pressure Relief Valve , Drain valve w/Sampler
Liquid Level Gauge, Liquid Temperature Gauge, Pressure Vacuum Gauge

CG WINDPAD Gen II: Stadium Style Stacked Core Construction with Semi-Round Windings, Reduced Flux Density, Increased Cooling, Cover Mounted Pressure Relief Device, Door Gasketing, Hold down anchoring (x4 holes), Drain Valve & Sampler in External Box, Isolated Core Ground, Nitrogen Blanket + Schrader Valve, UL Listed

-200kV BIL HV windings, 150kV accessories
-Gauges are mounted to the tankfront
-(1) IR Viewing window on the LV door
-Externally mounted MV switch in pad lockable enclosure with viewing window
-Losses are at 20C core and 85C winding and are reference values. Quoted losses are subject to ANSI tolerance.

Switching:
L.V. Neutral Bushing with Removable Grounding Strap, One ON/OFF Transformer Switch (300 Amps)

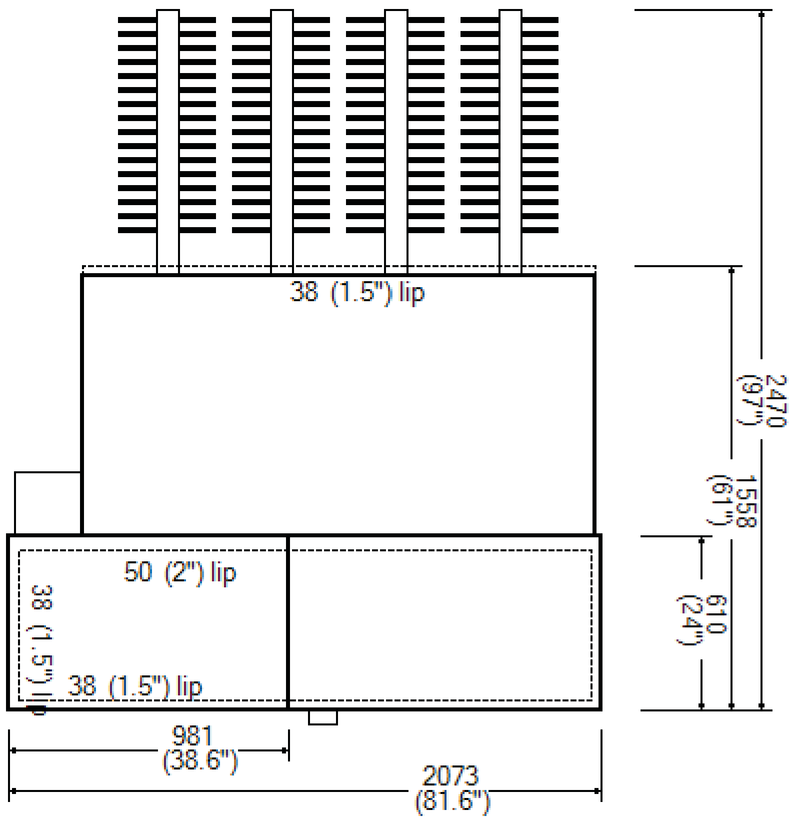
Paint Color:
GREEN (Munsell 7.0GY3.29/1.5), Touch-up Paint Spray Can,

Standards:
Quoted in compliance with the latest applicable ANSI standards unless otherwise specified by the customer.

Shipment: 12 to 14 weeks

Order/Quotation:	495918145-0010		
kVA:	2750	Cabinet Height (mm):	2007 (79")
HV:	34500 Delta	Weight (lbs):	14871
LV:	690Y/398	Coolant (gallons):	575

TRANSFORMER OVERHEAD VIEW



Dimensions are preliminary and not for construction.

Distribution Transformer Configuration	
Phase	3 Phase
kVA	2750
kV	34.5
Transformer Rated Current:	46.0 A
Bolted Secondary Fault Current:	800.4 A
Minimum Imp %	5.75
Primary Connection	DELTA
Secondary Connection	gndY
Preferred Expulsion Fuse	ABB Weak Link

Recommendations

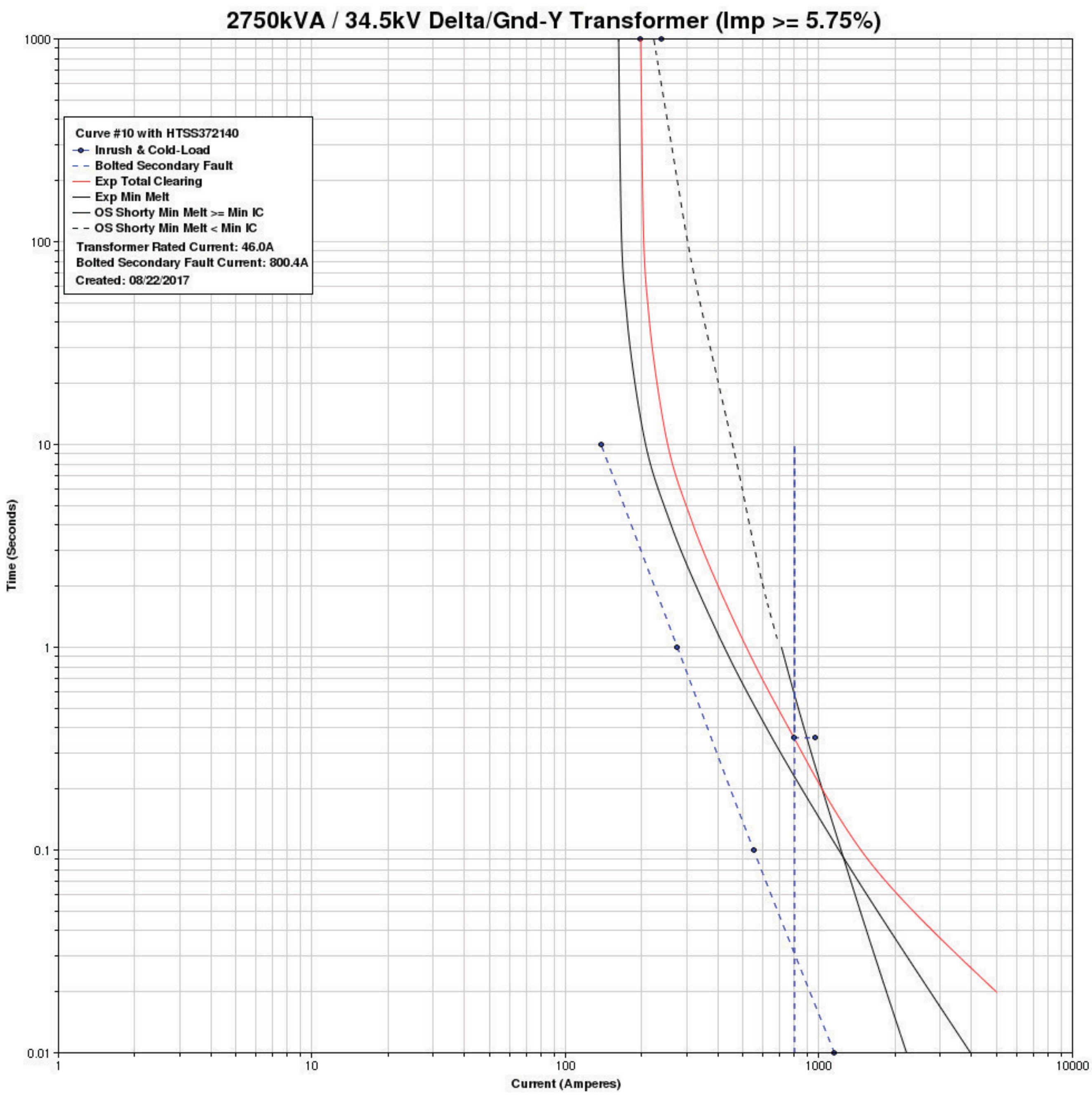
Voltage: 38 kV **Current:** 140 A

Hi-Tech Fuse Part#: HTSS372140

Maximum I^2T: 99,000Amp²-Sec **Min IC:** 715A **Max IC:** 26kA

Expulsion Fuse: Curve #10

- *The expulsion fuses selected is based on expulsion fuse manufacturer recommendations*
- *ABB Transformer Components*



APPENDIX B: MVAC SCHEDULE

MVAC WIRING SCHEDULE

CONDUCTOR LOCATION CODE	ORIGINATING EQUIPMENT	TERMINATING EQUIPMENT	Rated Vac (kV)	Iac (A)	# OF TUBRINES	LENGTH (FT)	CONDUCTOR SIZE	CONDUCTOR MATERIAL	# OF PARALLEL CONDUCTORS	GROUND CONDUCTOR SIZE	GROUND CONDUCTOR MATERIAL	DRAWING REFERENCE	CONDUCTOR SPECIFICS
MV1.SUB-T25	SUB	T25	34.5	460.2067363	10	4616	3#1250 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.T25-10	T25	T10	34.5	368.165389	8	10172	3#1000 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.10-09	T10	T09	34.5	322.1447154	7	2161	3#750 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV1.09-08	T09	T08	34.5	276.1240418	6	3297	3#500 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV1.08-05	T08	T05	34.5	230.1033682	5	2679	3#500 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV1.05-04	T05	T04	34.5	184.0826945	4	1991	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV1.04-03	T04	T03	34.5	138.0620209	3	1777	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV1.03-02	T03	T02	34.5	92.04134726	2	1878	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV1.02-01	T02	T01	34.5	46.02067363	1	2213	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV1.T25-24	T25	T24	34.5	46.02067363	1	1633	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.SUB-JB2/1	SUB	JB2/1	34.5	506.2274099	11	8109	3#1250 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV2.JB2/1-22	JB2/1	T22	34.5	92.04134726	2	2964	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.T22-29	T22	T29	34.5	46.02067363	1	4171	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.22-21	T22	T21	34.5	92.04134726	2	1417	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3), (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.21-20	T21	T20	34.5	46.02067363	1	3551	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3), (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.JB2/1-17	JB2/1	T17	34.5	184.0826945	4	2718	3#750 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV2.17-15	T17	T15	34.5	138.0620209	3	4579	3#500 KCMIL	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV2.15-14	T15	T14	34.5	92.04134726	2	3770	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.14-13	T14	T13	34.5	46.02067363	1	1517	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.15-07	T15	T07	34.5	92.04134726	2	2790	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV2.07-06	T07	T06	34.5	46.02067363	1	1388	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV2.07-16	T07	T16	34.5	46.02067363	1	3068	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.200	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.SUB-T23	SUB	T23	34.5	506.2274099	11	12285	3#1250 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T23-28	T23	T28	34.5	138.0620209	3	2947	3#1250 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T28-27	T28	T27	34.5	92.04134726	2	1703	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T27-26	T27	T26	34.5	46.02067363	1	1780	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T28-33	T28	T33	34.5	138.0620209	3	5853	3#750 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV3.T33-32	T33	T32	34.5	92.04134726	2	1314	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T32-31	T32	T31	34.5	46.02067363	1	5205	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T33-34	T33	T34	34.5	138.0620209	3	1674	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV3.T34-36	T34	T36	34.5	92.04134726	2	3312	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T36-37	T36	T37	34.5	46.02067363	1	1301	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV3.T34-39	T34	T39	34.5	46.02067363	1	5680	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.SUB-T40	SUB	T40	34.5	460.2067363	10	29905	3#1250 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T40-T46	T40	T46	34.5	276.1240418	6	2581	3#1000 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.T46-45	T46	T45	34.5	230.1033682	5	3997	3#1000 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.45-44	T45	T44	34.5	184.0826945	4	2881	3#750 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/6 Cu CN, Type MV-90
MV4.44-JB4/1	T44	JB4/1	34.5	138.0620209	3	3486	3#500 KCMIL	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/3 Cu CN, Type MV-90
MV4.JB4/1-42	JB4/1	T42	34.5	138.0620209	3	30	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV4.42-49	T42	T49	34.5	92.04134726	2	6471	3#4/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 1/2 Cu CN, Type MV-90
MV4.49-48	T49	T48	34.5	46.02067363	1	1717	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.49-50	T49	T50	34.5	46.02067363	1	1661	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.JB4/1-43	JB4/1	T43	34.5	46.02067363	1	1349	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90
MV4.JB4/1-41	JB4/1	T41	34.5	46.02067363	1	1386	3#1/0 AWG	AL	1	7#6	Copper Clad Steel	E.201	35kV, (3) 1/C, 100% Insulation, 2/3 Cu CN, Type MV-90

DESIGN BASIS REPORT FOR
ELECTRICAL COLLECTION SYSTEM

Northwest Ohio Wind Farm

Located in Paulding, Ohio

September 27, 2017

Prepared For:

WHITE
an IEA company

Prepared By:

Westwood

Introduction

This document will serve as a guideline in considering the parameters, design criteria and concepts appropriate to the design of the 34.5 kV collection system of the Northwest Ohio Wind Farm. This Design Basis Report covers the electrical engineering discipline and touches on civil and geotechnical considerations that impact the electrical design.

The material presented herein includes information and methods to assure that the design complies with minimum requirements, applicable standards and codes, industry standards, and local governing authority requirements. The use of the methods presented is not meant to be all-inclusive or restrict the designer from using other means of sound engineering practice or more conservative means to accomplish meeting the project requirements. However, exceptions and/or modifications to the material contained herein shall be well documented and only be made with prior approval of the design engineering group and if required by the client.

REVISIONS			
REV.	**DATE**	**DOCUMENT CHANGES**	**PAGES REVISED**
0	09/27/2017	Version 0	-

Table of Contents

SECTION	DESCRIPTION

1.0 Project Description

White Construction (Client) is contractor selected to construct the Northwest Ohio wind project, with an overall rating of 105 MW-AC. The project will consist of the following:

- 42 GE 2.5-116 wind turbine generators, each with a 2750 kVA GSU transformer.
- 600 A dead-front connections
- 34.5 kV collection system utilizing MV-90 concentric neutral cable
- 1 Substation with 138kV Interconnection to POI at AEP Haviland substation
- Transmission tap: 138 kV line of 270’, 954 (Rail) conductor
- 1 Operation and Maintenance building

2.0 Project Location

The Project is located outside of Paulding, in Paulding County, Ohio.

3.0 Project Contacts

Title	Company	Name	Phone	Email
Engineering Manager	IEA	Al Downes	608-320-2818	Al.downes@iea.net
Project Manager	IEA/White Construction	Michael Kreuzman		Mike.kreuzman@iea.net
Project Executive	IEA/White Construction	Brian Johnston	812-298-4340	Brian.johnston@iea.net
Civil EOR and Project Manager	Westwood	Steve Battaglia	952-906-7405	Steve.battaglia@westwoodps.com
Electrical EOR	Westwood	Josh Venden	608-662-5175	Josh.venden@westwoodps.com
Electrical Project Manager and QC	Westwood	Drew Szabo	608-662-5345	Drew.szabo@westwoodps.com

4.0 Applicable Standards and Interconnecting Authorities

Interconnecting Utility: AEP
Interconnecting ISO: PJM

The design shall meet the requirements detailed in the interconnection agreement as well as all applicable codes and standards, and manufacturer specifications.

The latest locally adopted editions of the following codes and regulations are also applicable and will be taken into account by the engineer during the design of the Project:

- Applicable State, County and Local Codes and Regulations
    - County Regulations
    - Local Codes and Ordinances
- ANSI - American National Standards Institute
- ICEA - Insulated Cable Engineers Association
- IEEE - Institute of Electrical and Electronics Engineers
- NEC - National Electrical Code, 2014 edition, as adopted in the state of Ohio
- NEMA - National Electrical Manufacturers Association
- NESC - National Electrical Safety Code
- UL Underwriters Laboratories
- NFPA – National Fire Protection Agency
- IEC – International Electric Code

5.0 Project Coordinate System

All drawings used for the design of the project will be HARN/OH Ohio State Planes, North Zone, US Foot coordinate system.

6.0 Geotechnical Considerations for Electrical Design

A geotechnical evaluation for the Northwest Ohio site, dated December, 2014, was prepared by Barr Engineering for Starwood Energy Group Global. The geotechnical analysis included select boring locations at the substation and at turbine locations. Field and laboratory tests included soil electrical and thermal resistivity tests, which are used as the basis for grounding analysis and cable thermal analysis.

7.0 Electrical Collection Design Criteria

The medium voltage collection system design is based on the maximum number of turbines that can be grouped on a single feeder; this will determine the total number of feeders required for the collection system. Geographical restrictions such as property easements or access, wetlands, rough terrain or other site specific constraints define the feeder routing.

Below is a list of the criteria used in designing the electrical infrastructure.

34.5 kV circuits will be designed in accordance the following:

Circuit and Trench Layout

- Collection lines will use compacted native backfill material unless design constraints require use of material which has lower thermal resistivity.
- Cable installation will be primarily through open trenching, except where crossings of roads or other features or infrastructure require use of directional boring.
- Trench design will generally consist of a direct buried three phase cable set in triangular arrangement, a bare “trench ground” and a fiber optic cable installed in HDPE duct. Cables will be buried with a minimum cover of 4’ in order to be below the typical depth of drain tile. Code minimum is 3’.
- Trench ground serve dual purpose as an extended grounding electrode between substation and wind turbines, as well as a ground fault return path (equipment grounding conductor). Preliminary trench ground will be 7#8 copperclad steel, to be confirmed by short circuit and grounding analysis.
- 34.5 kV junctions will be achieved through either separate sectionalizing cabinets, or stacked separable connectors on padmount transformer bushings (“piggy-backing”). Stacked connectors will be utilized if the stacked cable can be 750 kcmil or less.

WTG Foundation Conduits and Grounding

Wind turbine generation foundation conduits will be designed in accordance with the following:

- Applicable codes and standards
- GE Renewable Energy document *“Technical Documentation – Wind Turbine Generator Systems – Information on the Design, Detailing and Execution of the Foundation for ON-shore Wind Turbines with Tubular Steel Towers.”, provided by White Construction*

Fiber Optic Communications

Fiber optic lines will be laid out according to medium voltage cable routing per the following:

- Single mode fiber, 12 –strands per cable
- Optical loss calculation will be performed based on supplied equipment data, including optical power budget.
- Field Fiber cable splice panels will be placed where necessary at medium voltage junction boxes and will be above grade type.
- Patch panels at wind turbines have capacity for up to 48 fibers.

8.0 Substation Interface

Key points of substation interface are being coordinated with the substation engineer.

- Per input from White Construction, preference is to maintain original collection system circuit designation. Specifically, collection feeder 1 will be the feeder that enters the substation in the southernmost position at the west side of the substation. Therefore feeders will be numbered 4, 3, 2, 1, North to South. Ulteig substation single line will be modified accordingly.
- Per Ulteig Substation General Arrangement NOW-EQ1-001 Rev. A, collection feeders enter from west of substation. Ulteig will extend min. 8" Sch. 40 PVC conduits 10' past fence at 4' burial depth (below finished grade), perpendicularly out from riser structures. Conduits will need to accommodate 3 x 1250 kcmil 35 kV cables (100% insulation)+ expected 7#8 copper clad steel trench ground.
- Per Ulteig Substation General Arrangement NOW-EQ1-001 Rev. A, equipment enclosure is on northern edge of substation yard. WW has determined that Ulteig will extend PVC conduit(s) 10' north of substation fence, at minimum 24" depth below finished grade, suitable for minimum 6 x 1.25" HDPE innerduct with fiber.
- An O&M building will be located north of the collector substation. Ulteig will provide a conduit extending 10' past the edge of the substation fence to accommodate a fiber run to the O&M building. Westwood will include the trenching route in the collection layout drawings so that it can be included in the underground collection contractor's SOW.

Protective Relaying for Feeders

- Per RFI to Ulteig engineers, the substation feeder settings for phase faults are set at a 5 cycle delay to account for GSU inrush and the settings for ground faults are set to instantaneous w/ approximate clearing times of 8 1/2 cycles for phase faults and 3 1/2 cycles for ground faults.
- Collection circuit conductors and concentric neutrals will be designed to withstand available short circuit currents for a minimum duration of the clearing times previously stated. Available short circuit current will account for future levels provided by AEP and identified in the Westwood Short Circuit Study.

REACTIVE POWER STUDY

Northwest Ohio Wind Project

Paulding, Ohio
October 6, 2017

Prepared for:
WHITE
an IEA company

Prepared by:
Westwood

Westwood

Project Name: NW OH Wind Project	
Title	**J.O. or W.O. Number**
Reactive Power Study	0007186.00

Approvals		**Revision Number**	**Date**	**Description**
Preparer(s) Name	**Reviewer(s) Name**			
Josh Venden	Drew Szabo	0	10/06/2017	Original Release

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INTRODUCTION

NW OH Wind Project is a 100 MW wind generation installation in Paulding, OH consisting 42 of GE 2.5 MW wind turbines. The turbines are grouped into four medium voltage (MV) feeders with 10 turbines on Feeders 1 and 4 and 11 turbines on Feeders 2 and 3. The feeders are connected to a main power transformer that steps the voltage up to 138kV where it interconnects with the AEP transmission system via a short overhead line segment.

OBJECTIVE

The objective of this study is to verify that the Northwest Ohio wind generation plant is capable of operating across the full range of real power while also delivering reactive power to the range of power factors at the Point of Interconnection (POI)required by the interconnection agreement. According to the interconnection agreement, the plant must be able to operate across the power factor range of 0.95 lag (supplying VARs to the POI) to 0.95 lead (absorbing VARs from the POI), at all output levels, independent of voltage. In performing this evalution, the present study determines if there is any need for reactive compensation beside the capability of the wind turbines themselves.

INPUTS & ASSSUMPTIONS

- Power flow analysis performed with ETAP v16.0.0C power system simulation software.
- Medium voltage AC collector electrical layout is per the Westwood Professional Services Electrical Drawings, MVAC Collection One-Line Diagrams E.200 & E.210.
- ETAP model parameters for equipment such as turbines (WTG), step-up transformers (GSU) and main power transformer (MPT) based on manufacturer data. These parameters are documented in Appendix C.
- ETAP model parameters for MV cables based on thermal analysis and electrical parameters derived using CYME Cymcap Underground Cable Thermal Analysis software.
- ETAP model parameters for overhead transmission line data based on ETAP library of standard overhead conductors.
- ETAP model parameters for utility equivalent impedance information provided by AEP.
- The 2.5 MW GE wind turbines are equipped with the extended reactive power option and are capable of delivering a maximum leading or lagging power factor of 0.9. Turbines are also equipped with “Wind Free” Option and are therefore capable of providing or absorbing up to 400 kVAr per turbine when wind is not available.
- The neutral of the main power transformer 34.5 kV secondary wiring is connected to ground through a neutral grounding reactor of 0.6 ohms.
- The MPT has a load tap changer (LTC) on the high side winding consisting of 16 steps above and below nominal, each at 5/8% of the 138 kV nominal voltage. This allows a range of 10% above and below the nominal voltage. The high side LTC will be controlled so as to maintain the 34.5 kV bus voltage as close as possible to 1.0 pu.
- Reactive power direction and power factor are defined as follows:
    - A *leading* power factor at the POI when plant is generating indicates the wind farm is *absorbing* VArs from the utility.
    - A *lagging* power factor at the POI when plant is generating indicates the wind farm is *supplying* VArs to the utility.

METHODOLOGY

- This calculation utilizes the ETAP Load Flow Analysis module, which employs the Newton-Raphson method for power flow iterative solution. See Appendix A for the ETAP Load Flow and Losses output reports.
- 5 different cases were analyzed for each of 5 different real power generation levels. Within the ETAP model, all turbines were set to generate varying levels of rated real power output (0%, 25%, 50%, 75% and 100%). The turbine reactive power contribution was then adjusted to verify the wind plant can meet the required power factor at the POI.

CONCLUSION

- Case 00-1 shows the real and reactive power demand of the wind farm with all turbines offline.
- Cases 00-2 through 00-5 demonstrate the turbines' WindFree capabilities which can provide limited var support in zero wind conditions. A maximum of 400kvar can be supplied or absorbed; for this wind plant, approximately 145kvar is necessary to counteract the cable charging of the collection system.
- The remaining cases show the individual turbine kW and kvar output necessary to achieve the required range of power factors and voltages at the POI.
- Cases 100-2 and 100-3 verify the need for a 4 Mvar capacitor bank at the substation 34.5 kV bus. Even with the turbines at their maximum reactive power output, additional VArs are required to meet the 0.95 lagging pf with 0.95 p.u. voltage at the POI.

Table 1: Load Flow Summary

TURBINE OUTPUT (% of PMAX)	CASE		POI	MPT	2500 kW TURBINES (42)				Total Plant Output MW	CAP BANK (Mvar)	NET AT POI					VOLTAGE SUMMARY			
	#	NAME	p.u. Volt	Tap Chgr	kW per Turbine	kvar per Turbine	kVA per Turbine	Turbine PF			MW	MVAr	MVA	pf		POI (138kV)	MPT Lowside (34.5 kV)	Extreme MV (34.5kV)	Extreme LV (690V)
0%	**00-1**	NO GEN	1.00	+1.25%	0	0	0.0	N/A	0.00	0.00	-0.231	6.116	6.120	1.000	n/a	1.000	1.002	1.004	1.004
	00-2	1PU 1LAG	1.00	nom.	0	-146	146.0	N/A	0.00	0.00	-0.229	0.017	0.229	1.000	n/a	1.000	1.000	1.000	0.997
	00-3	95PU 1LAG	0.95	-5.00%	0	-146	146.0	N/A	0.00	0.00	-0.223	0.004	0.223	1.000	n/a	0.950	1.000	1.000	0.997
	00-4	1PU 1LEAD	1.00	nom.	0	-145	145.0	N/A	0.00	0.00	-0.229	-0.026	0.230	1.000	n/a	1.000	1.000	1.000	0.997
	00-5	105PU 1LEAD	1.05	+5.00%	0	-145	145.0	N/A	0.00	0.00	-0.234	-0.011	0.234	1.000	n/a	1.050	1.000	1.000	0.997
25%	**25-1**	UNITY PF	1.00	+0.625%	625	0	625.0	1.000	26.25	0.00	25.873	4.739	26.303	0.984	Supplying	1.000	1.003	1.010	1.012
	25-2	1PU 95LAG	1.00	+1.25%	625	93	631.9	0.989	26.25	0.00	25.868	8.542	27.242	0.950	Supplying	1.000	1.002	1.011	1.014
	25-3	95PU 95LAG	0.95	-3.75%	625	93	631.9	0.989	26.25	0.00	25.873	8.546	27.248	0.950	Supplying	0.950	1.001	1.010	1.013
	25-4	1PU 95LEAD	1.00	-1.25%	625	-312	698.5	0.895	26.25	0.00	25.856	-8.512	27.221	0.950	Absorbing	1.000	1.002	1.006	0.997
	25-5	105PU 95LEAD	1.05	+3.75%	625	-312	698.5	0.895	26.25	0.00	25.851	-8.536	27.224	0.950	Absorbing	1.050	1.002	1.005	0.997
50%	**50-1**	UNITY PF	1.00	+0.625	1350	0	1350.0	1.000	56.70	0.00	55.802	-0.420	55.804	1.000	Absorbing	1.000	0.999	1.013	1.016
	50-2	1PU 95LAG	1.00	+3.125%	1350	467	1428.5	0.945	56.70	0.00	55.717	18.333	58.656	0.950	Supplying	1.000	1.003	1.023	1.035
	50-3	95PU 95LAG	0.95	-1.875%	1350	467	1428.5	0.945	56.70	0.00	55.721	18.306	58.651	0.950	Supplying	0.950	1.001	1.021	1.033
	50-4	1PU 95LEAD	1.00	-1.875%	1350	-415	1412.3	0.956	56.70	0.00	55.748	-18.325	58.683	0.950	Absorbing	1.000	0.999	1.008	0.993
	50-5	105PU 95LEAD	1.05	+3.125%	1350	-415	1412.3	0.956	56.70	0.00	55.741	-18.366	58.689	0.950	Absorbing	1.050	0.998	1.007	0.992
75%	**75-1**	UNITY PF	1.00	nom.	1875	0	1875.0	1.000	78.75	0.00	77.250	-6.360	77.511	0.997	Absorbing	1.000	1.000	1.019	1.022
	75-2	1PU 95LAG	1.00	+5.00%	1875	810	2042.5	0.918	78.75	0.00	77.030	25.328	81.087	0.950	Supplying	1.000	1.001	1.029	1.049
	75-3	95PU 95LAG	0.95	nom.	1875	810	2042.5	0.918	78.75	0.00	77.029	25.248	81.061	0.950	Supplying	0.950	0.998	1.027	1.047
	75-4	1PU 95LEAD	1.00	-2.50%	1875	-433	1924.3	0.974	78.75	0.00	77.174	-25.241	81.197	0.950	Absorbing	1.000	0.999	1.012	1.007
	75-5	105PU 95LEAD	1.05	+2.50%	1875	-433	1924.3	0.974	78.75	0.00	77.166	-25.308	81.210	0.950	Absorbing	1.050	0.998	1.011	1.006
100%	**100-1**	UNITY PF	1.00	-0.625%	2500	0	2500.0	1.000	105.00	0.00	102.552	-16.056	103.801	0.988	Absorbing	1.000	0.998	1.022	1.027
	100-2	1PU 95LAG	1.00	+7.50%	2500	1210	2777.4	0.900	105.00	4.00	102.115	33.714	107.537	0.950	Supplying	1.000	0.999	1.038	1.066
	100-3	95PU 95LAG	0.95	1.875%	2500	1200	2773.1	0.902	105.00	4.00	102.130	33.511	107.487	0.950	Supplying	0.950	1.001	1.039	1.067
	100-4	105PU 95LAG	1.05	+13.125%	2500	1210	2777.4	0.900	105.00	4.00	102.101	33.571	107.478	0.950	Supplying	1.050	0.997	1.036	1.064
	100-4	1PU 95LEAD	1.00	-3.125%	2500	-400	2531.8	0.987	105.00	0.00	102.475	-33.531	107.821	0.950	Absorbing	1.000	1.000	1.019	1.015
	100-5	95PU 95LEAD	0.95	-7.50%	2500	-395	2531.0	0.988	105.00	0.00	102.459	-33.613	107.832	0.950	Absorbing	0.950	0.994	1.013	1.009
	100-6	105PU 95LEAD	1.05	+1.875%	2500	-400	2531.8	0.987	105.00	0.00	102.463	-33.646	107.846	0.950	Absorbing	1.050	0.998	1.017	1.013

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APPENDIX A: LOAD FLOW SUMMARY REPORTS

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
89F1A	34.500	100.285	0.0	0	0	0	0	MV BUS T-25	0.041	-1.228	20.5	-3.4	
								89T1B	-0.041	1.228	20.5	-3.4	
89F2A	34.500	100.285	0.0	0	0	0	0	JB-2/1	0.046	-1.218	20.3	-3.7	
								89T1B	-0.046	1.218	20.3	-3.7	
89F3A	34.500	100.285	0.0	0	0	0	0	MV BUS T-23	0.046	-1.478	24.7	-3.1	
								89T1B	-0.046	1.478	24.7	-3.1	
89F4A	34.500	100.285	0.0	0	0	0	0	MV BUS T-40	0.043	-2.390	39.9	-1.8	
								89T1B	-0.043	2.390	39.9	-1.8	
89T1A	138.000	100.001	0.0	0	0	0	0	POI	-0.231	6.110	25.6	-3.8	
								HV BUS MPT	0.231	-6.110	25.6	-3.8	
89T1B	34.500	100.285	0.0	0	0	0	0	89F4A	0.043	-2.390	39.9	-1.8	
								89F3A	0.046	-1.478	24.7	-3.1	
								89F2A	0.046	-1.218	20.3	-3.7	
								89F1A	0.041	-1.228	20.5	-3.4	
								MPT~3	-0.176	6.315	105.4	-2.8	
							&	HV BUS MPT					
HV BUS MPT	138.000	100.001	0.0	0	0	0.054	0.147	89T1A	-0.231	6.110	25.6	-3.8	
								89T1B	0.177	-6.257	26.2	-2.8	0.625
							&	MPT~3					
JB-2/1	34.500	100.309	0.0	0	0	0	0	MV BUS T-17	0.029	-0.537	9.0	-5.4	
								MV BUS T-22	0.017	-0.257	4.3	-6.4	
								89F2A	-0.045	0.794	13.3	-5.7	
JB-4/1	34.500	100.447	-0.1	0	0	0	0	MV BUS T-41	0.004	-0.026	0.4	-15.8	
								MV BUS T-42	0.017	-0.229	3.8	-7.2	
								MV BUS T-43	0.004	-0.025	0.4	-16.3	
								MV BUS T-44	-0.025	0.279	4.7	-8.8	
LV BUS T-01	0.690	100.331	-0.1	0	0	0	0	MV BUS T-01	0.000	0.000	0.0	0.0	
LV BUS T-02	0.690	100.331	-0.1	0	0	0	0	MV BUS T-02	0.000	0.000	0.0	0.0	
LV BUS T-03	0.690	100.331	-0.1	0	0	0	0	MV BUS T-03	0.000	0.000	0.0	0.0	
LV BUS T-04	0.690	100.331	0.0	0	0	0	0	MV BUS T-04	0.000	0.000	0.0	0.0	
LV BUS T-05	0.690	100.330	0.0	0	0	0	0	MV BUS T-05	0.000	0.000	0.0	0.0	
LV BUS T-06	0.690	100.319	0.0	0	0	0	0	MV BUS T-06	0.000	0.000	0.0	0.0	
LV BUS T-07	0.690	100.319	0.0	0	0	0	0	MV BUS T-07	0.000	0.000	0.0	0.0	
LV BUS T-08	0.690	100.328	0.0	0	0	0	0	MV BUS T-08	0.000	0.000	0.0	0.0	
LV BUS T-09	0.690	100.325	0.0	0	0	0	0	MV BUS T-09	0.000	0.000	0.0	0.0	
LV BUS T-10	0.690	100.322	0.0	0	0	0	0	MV BUS T-10	0.000	0.000	0.0	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
LV BUS T-13	0.690	100.318	0.0	0	0	0	0	MV BUS T-13	0.000	0.000	0.0	0.0	
LV BUS T-14	0.690	100.318	0.0	0	0	0	0	MV BUS T-14	0.000	0.000	0.0	0.0	
LV BUS T-15	0.690	100.318	0.0	0	0	0	0	MV BUS T-15	0.000	0.000	0.0	0.0	
LV BUS T-16	0.690	100.319	0.0	0	0	0	0	MV BUS T-16	0.000	0.000	0.0	0.0	
LV BUS T-17	0.690	100.313	0.0	0	0	0	0	MV BUS T-17	0.000	0.000	0.0	0.0	
LV BUS T-20	0.690	100.311	0.0	0	0	0	0	MV BUS T-20	0.000	0.000	0.0	0.0	
LV BUS T-21	0.690	100.311	0.0	0	0	0	0	MV BUS T-21	0.000	0.000	0.0	0.0	
LV BUS T-22	0.690	100.311	0.0	0	0	0	0	MV BUS T-22	0.000	0.000	0.0	0.0	
LV BUS T-23	0.690	100.327	0.0	0	0	0	0	MV BUS T-23	0.000	0.000	0.0	0.0	
LV BUS T-24	0.690	100.300	0.0	0	0	0	0	MV BUS T-24	0.000	0.000	0.0	0.0	
LV BUS T-25	0.690	100.300	0.0	0	0	0	0	MV BUS T-25	0.000	0.000	0.0	0.0	
LV BUS T-26	0.690	100.333	0.0	0	0	0	0	MV BUS T-26	0.000	0.000	0.0	0.0	
LV BUS T-27	0.690	100.333	0.0	0	0	0	0	MV BUS T-27	0.000	0.000	0.0	0.0	
LV BUS T-28	0.690	100.333	0.0	0	0	0	0	MV BUS T-28	0.000	0.000	0.0	0.0	
LV BUS T-29	0.690	100.311	0.0	0	0	0	0	MV BUS T-29	0.000	0.000	0.0	0.0	
LV BUS T-31	0.690	100.343	-0.1	0	0	0	0	MV BUS T-31	0.000	0.000	0.0	0.0	
LV BUS T-32	0.690	100.342	-0.1	0	0	0	0	MV BUS T-32	0.000	0.000	0.0	0.0	
LV BUS T-33	0.690	100.342	0.0	0	0	0	0	MV BUS T-33	0.000	0.000	0.0	0.0	
LV BUS T-34	0.690	100.343	-0.1	0	0	0	0	MV BUS T-34	0.000	0.000	0.0	0.0	
LV BUS T-36	0.690	100.343	-0.1	0	0	0	0	MV BUS T-36	0.000	0.000	0.0	0.0	
LV BUS T-37	0.690	100.343	-0.1	0	0	0	0	MV BUS T-37	0.000	0.000	0.0	0.0	
LV BUS T-39	0.690	100.344	-0.1	0	0	0	0	MV BUS T-39	0.000	0.000	0.0	0.0	
LV BUS T-40	0.690	100.426	-0.1	0	0	0	0	MV BUS T-40	0.000	0.000	0.0	0.0	
LV BUS T-41	0.690	100.447	-0.1	0	0	0	0	MV BUS T-41	0.000	0.000	0.0	0.0	
LV BUS T-42	0.690	100.447	-0.1	0	0	0	0	MV BUS T-42	0.000	0.000	0.0	0.0	
LV BUS T-43	0.690	100.447	-0.1	0	0	0	0	MV BUS T-43	0.000	0.000	0.0	0.0	
LV BUS T-44	0.690	100.443	-0.1	0	0	0	0	MV BUS T-44	0.000	0.000	0.0	0.0	
LV BUS T-45	0.690	100.439	-0.1	0	0	0	0	MV BUS T-45	0.000	0.000	0.0	0.0	
LV BUS T-46	0.690	100.432	-0.1	0	0	0	0	MV BUS T-46	0.000	0.000	0.0	0.0	
LV BUS T-48	0.690	100.450	-0.1	0	0	0	0	MV BUS T-48	0.000	0.000	0.0	0.0	
LV BUS T-49	0.690	100.450	-0.1	0	0	0	0	MV BUS T-49	0.000	0.000	0.0	0.0	
LV BUS T-50	0.690	100.450	-0.1	0	0	0	0	MV BUS T-50	0.000	0.000	0.0	0.0	
MV BUS T-01	34.500	100.331	-0.1	0	0	0.004	0.004	MV BUS T-02	-0.004	-0.004	0.1	74.5	
								LV BUS T-01	0.000	0.000	0.0	0.0	
MV BUS T-02	34.500	100.331	-0.1	0	0	0.004	0.004	MV BUS T-01	0.004	-0.043	0.7	-9.5	
								MV BUS T-03	-0.008	0.040	0.7	-20.4	
								LV BUS T-02	0.000	0.000	0.0	0.0	
MV BUS T-03	34.500	100.331	-0.1	0	0	0.004	0.004	MV BUS T-02	0.008	-0.079	1.3	-10.3	
								MV BUS T-04	-0.012	0.076	1.3	-16.1	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								LV BUS T-03	0.000	0.000	0.0	0.0	
MV BUS T-04	34.500	100.331	0.0	0	0	0.004	0.004	MV BUS T-03	0.012	-0.123	2.1	-10.1	
								MV BUS T-05	-0.017	0.119	2.0	-13.8	
								LV BUS T-04	0.000	0.000	0.0	0.0	
MV BUS T-05	34.500	100.330	0.0	0	0	0.004	0.004	MV BUS T-04	0.017	-0.171	2.9	-9.6	
								MV BUS T-08	-0.021	0.168	2.8	-12.2	
								LV BUS T-05	0.000	0.000	0.0	0.0	
MV BUS T-06	34.500	100.319	0.0	0	0	0.004	0.004	MV BUS T-07	-0.004	-0.004	0.1	74.5	
								LV BUS T-06	0.000	0.000	0.0	0.0	
MV BUS T-07	34.500	100.319	0.0	0	0	0.004	0.004	MV BUS T-06	0.004	-0.026	0.4	-15.8	
								MV BUS T-16	0.004	-0.061	1.0	-6.7	
								MV BUS T-15	-0.012	0.083	1.4	-14.7	
								LV BUS T-07	0.000	0.000	0.0	0.0	
MV BUS T-08	34.500	100.328	0.0	0	0	0.004	0.004	MV BUS T-05	0.021	-0.266	4.4	-7.7	
								MV BUS T-09	-0.025	0.262	4.4	-9.4	
								LV BUS T-08	0.000	0.000	0.0	0.0	
MV BUS T-09	34.500	100.325	0.0	0	0	0.004	0.004	MV BUS T-08	0.025	-0.382	6.4	-6.5	
								MV BUS T-10	-0.029	0.379	6.3	-7.6	
								LV BUS T-09	0.000	0.000	0.0	0.0	
MV BUS T-10	34.500	100.322	0.0	0	0	0.004	0.004	MV BUS T-09	0.029	-0.471	7.9	-6.1	
								MV BUS T-25	-0.033	0.467	7.8	-7.1	
								LV BUS T-10	0.000	0.000	0.0	0.0	
MV BUS T-13	34.500	100.318	0.0	0	0	0.004	0.004	MV BUS T-14	-0.004	-0.004	0.1	74.5	
								LV BUS T-13	0.000	0.000	0.0	0.0	
MV BUS T-14	34.500	100.318	0.0	0	0	0.004	0.004	MV BUS T-13	0.004	-0.028	0.5	-14.3	
								MV BUS T-15	-0.008	0.025	0.4	-31.6	
								LV BUS T-14	0.000	0.000	0.0	0.0	
MV BUS T-15	34.500	100.318	0.0	0	0	0.004	0.004	MV BUS T-07	0.012	-0.157	2.6	-7.9	
								MV BUS T-14	0.008	-0.105	1.8	-7.9	
								MV BUS T-17	-0.025	0.258	4.3	-9.6	
								LV BUS T-15	0.000	0.000	0.0	0.0	
MV BUS T-16	34.500	100.319	0.0	0	0	0.004	0.004	MV BUS T-07	-0.004	-0.004	0.1	74.5	
								LV BUS T-16	0.000	0.000	0.0	0.0	
MV BUS T-17	34.500	100.313	0.0	0	0	0.004	0.004	JB-2/1	-0.029	0.422	7.0	-6.8	
								MV BUS T-15	0.025	-0.425	7.1	-5.8	
								LV BUS T-17	0.000	0.000	0.0	0.0	
MV BUS T-20	34.500	100.311	0.0	0	0	0.004	0.004	MV BUS T-21	-0.004	-0.004	0.1	74.5	
								LV BUS T-20	0.000	0.000	0.0	0.0	
MV BUS T-21	34.500	100.311	0.0	0	0	0.004	0.004	MV BUS T-20	0.004	-0.072	1.2	-5.8	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								MV BUS T-22	-0.008	0.068	1.1	-12.1	
								LV BUS T-21	0.000	0.000	0.0	0.0	
MV BUS T-22	34.500	100.311	0.0	0	0	0.004	0.004	JB-2/1	-0.016	0.179	3.0	-9.2	
								MV BUS T-21	0.008	-0.098	1.6	-8.4	
								MV BUS T-29	0.004	-0.085	1.4	-4.9	
								LV BUS T-22	0.000	0.000	0.0	0.0	
MV BUS T-23	34.500	100.327	0.0	0	0	0.004	0.004	89F3A	-0.045	0.838	14.0	-5.4	
								MV BUS T-28	0.041	-0.841	14.0	-4.9	
								LV BUS T-23	0.000	0.000	0.0	0.0	
MV BUS T-24	34.500	100.300	0.0	0	0	0.004	0.004	MV BUS T-25	-0.004	-0.004	0.1	74.5	
								LV BUS T-24	0.000	0.000	0.0	0.0	
MV BUS T-25	34.500	100.300	0.0	0	0	0.004	0.004	89F1A	-0.041	0.987	16.5	-4.2	
								MV BUS T-10	0.033	-0.952	15.9	-3.5	
								MV BUS T-24	0.004	-0.039	0.7	-10.4	
								LV BUS T-25	0.000	0.000	0.0	0.0	
MV BUS T-26	34.500	100.333	0.0	0	0	0.004	0.004	MV BUS T-27	-0.004	-0.004	0.1	74.5	
								LV BUS T-26	0.000	0.000	0.0	0.0	
MV BUS T-27	34.500	100.333	0.0	0	0	0.004	0.004	MV BUS T-26	0.004	-0.034	0.6	-12.0	
								MV BUS T-28	-0.008	0.030	0.5	-26.2	
								LV BUS T-27	0.000	0.000	0.0	0.0	
MV BUS T-28	34.500	100.333	0.0	0	0	0.004	0.004	MV BUS T-23	-0.041	0.687	11.5	-6.0	
								MV BUS T-27	0.008	-0.066	1.1	-12.3	
								MV BUS T-33	0.029	-0.625	10.4	-4.6	
								LV BUS T-28	0.000	0.000	0.0	0.0	
MV BUS T-29	34.500	100.311	0.0	0	0	0.004	0.004	MV BUS T-22	-0.004	-0.004	0.1	74.5	
								LV BUS T-29	0.000	0.000	0.0	0.0	
MV BUS T-31	34.500	100.343	-0.1	0	0	0.004	0.004	MV BUS T-32	-0.004	-0.004	0.1	74.5	
								LV BUS T-31	0.000	0.000	0.0	0.0	
MV BUS T-32	34.500	100.342	-0.1	0	0	0.004	0.004	MV BUS T-31	0.004	-0.107	1.8	-3.9	
								MV BUS T-33	-0.008	0.103	1.7	-8.0	
								LV BUS T-32	0.000	0.000	0.0	0.0	
MV BUS T-33	34.500	100.342	0.0	0	0	0.004	0.004	MV BUS T-28	-0.029	0.375	6.3	-7.7	
								MV BUS T-32	0.008	-0.131	2.2	-6.3	
								MV BUS T-34	0.017	-0.248	4.1	-6.7	
								LV BUS T-33	0.000	0.000	0.0	0.0	
MV BUS T-34	34.500	100.343	-0.1	0	0	0.004	0.004	MV BUS T-33	-0.017	0.204	3.4	-8.1	
								MV BUS T-36	0.008	-0.090	1.5	-9.1	
								MV BUS T-39	0.004	-0.117	1.9	-3.5	
								LV BUS T-34	0.000	0.000	0.0	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
MV BUS T-36	34.500	100.343	-0.1	0	0	0.004	0.004	MV BUS T-34	-0.008	0.020	0.4	-37.8	
								MV BUS T-37	0.004	-0.024	0.4	-17.0	
								LV BUS T-36	0.000	0.000	0.0	0.0	
MV BUS T-37	34.500	100.343	-0.1	0	0	0.004	0.004	MV BUS T-36	-0.004	-0.004	0.1	74.5	
								LV BUS T-37	0.000	0.000	0.0	0.0	
MV BUS T-39	34.500	100.344	-0.1	0	0	0.004	0.004	MV BUS T-34	-0.004	-0.004	0.1	74.5	
								LV BUS T-39	0.000	0.000	0.0	0.0	
MV BUS T-40	34.500	100.426	-0.1	0	0	0.004	0.004	89F4A	-0.041	0.830	13.8	-5.0	
								MV BUS T-46	0.037	-0.833	13.9	-4.5	
								LV BUS T-40	0.000	0.000	0.0	0.0	
MV BUS T-41	34.500	100.447	-0.1	0	0	0.004	0.004	JB-4/1	-0.004	-0.004	0.1	74.5	
								LV BUS T-41	0.000	0.000	0.0	0.0	
MV BUS T-42	34.500	100.447	-0.1	0	0	0.004	0.004	JB-4/1	-0.017	0.228	3.8	-7.2	
								MV BUS T-49	0.012	-0.232	3.9	-5.4	
								LV BUS T-42	0.000	0.000	0.0	0.0	
MV BUS T-43	34.500	100.447	-0.1	0	0	0.004	0.004	JB-4/1	-0.004	-0.004	0.1	74.5	
								LV BUS T-43	0.000	0.000	0.0	0.0	
MV BUS T-44	34.500	100.443	-0.1	0	0	0.004	0.004	JB-4/1	0.025	-0.407	6.8	-6.1	
								MV BUS T-45	-0.029	0.403	6.7	-7.2	
								LV BUS T-44	0.000	0.000	0.0	0.0	
MV BUS T-45	34.500	100.439	-0.1	0	0	0.004	0.004	MV BUS T-44	0.029	-0.527	8.8	-5.5	
								MV BUS T-46	-0.033	0.523	8.7	-6.3	
								LV BUS T-45	0.000	0.000	0.0	0.0	
MV BUS T-46	34.500	100.432	-0.1	0	0	0.004	0.004	MV BUS T-40	-0.037	0.710	11.8	-5.2	
								MV BUS T-45	0.033	-0.714	11.9	-4.6	
								LV BUS T-46	0.000	0.000	0.0	0.0	
MV BUS T-48	34.500	100.450	-0.1	0	0	0.004	0.004	MV BUS T-49	-0.004	-0.004	0.1	74.5	
								LV BUS T-48	0.000	0.000	0.0	0.0	
MV BUS T-49	34.500	100.450	-0.1	0	0	0.004	0.004	MV BUS T-42	-0.012	0.061	1.0	-20.0	
								MV BUS T-48	0.004	-0.033	0.6	-12.5	
								MV BUS T-50	0.004	-0.032	0.5	-13.0	
								LV BUS T-49	0.000	0.000	0.0	0.0	
MV BUS T-50	34.500	100.450	-0.1	0	0	0.004	0.004	MV BUS T-49	-0.004	-0.004	0.1	74.5	
								LV BUS T-50	0.000	0.000	0.0	0.0	
* POI	138.000	100.000	0.0	0.231	-6.116	0	0	89T1A	0.231	-6.116	25.6	-3.8	
MPT~3	13.800	100.372	0.0	0	0	0	0	HV BUS MPT	0.000	0.000	0.0	0.0	
								& 89T1B					

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

\# Indicates a bus with a load mismatch of more than 0.1 MVA

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
89F1A	34.500	100.017	0.0	0	0	0	0	MV BUS T-25	0.042	0.244	4.1	16.9	
								89T1B	-0.042	-0.244	4.1	16.9	
89F2A	34.500	100.017	0.0	0	0	0	0	JB-2/1	0.046	0.401	6.8	11.4	
								89T1B	-0.046	-0.401	6.8	11.4	
89F3A	34.500	100.017	0.0	0	0	0	0	MV BUS T-23	0.046	0.142	2.5	30.8	
								89T1B	-0.046	-0.142	2.5	30.8	
89F4A	34.500	100.017	0.0	0	0	0	0	MV BUS T-40	0.042	-0.911	15.3	-4.6	
								89T1B	-0.042	0.911	15.3	-4.6	
89T1A	138.000	100.000	0.0	0	0	0	0	POI	-0.229	-0.023	1.0	99.5	
								HV BUS MPT	0.229	0.023	1.0	99.5	
89T1B	34.500	100.017	0.0	0	0	0	0	89F4A	0.042	-0.911	15.3	-4.6	
								89F3A	0.046	0.142	2.5	30.8	
								89F2A	0.046	0.401	6.8	11.4	
								89F1A	0.042	0.244	4.1	16.9	
								MPT~3	-0.175	0.124	3.6	-81.5	
							&	HV BUS MPT					
HV BUS MPT	138.000	100.000	0.0	0	0	0.054	0.147	89T1A	-0.229	-0.023	1.0	99.5	
								89T1B	0.175	-0.124	0.9	-81.6	
							&	MPT~3					
JB-2/1	34.500	100.002	0.0	0	0	0	0	MV BUS T-17	0.029	0.491	8.2	5.9	
								MV BUS T-22	0.017	0.330	5.5	5.0	
								89F2A	-0.046	-0.822	13.8	5.6	
JB-4/1	34.500	100.003	0.0	0	0	0	0	MV BUS T-41	0.004	0.121	2.0	3.4	
								MV BUS T-42	0.017	0.359	6.0	4.6	
								MV BUS T-43	0.004	0.122	2.0	3.4	
								MV BUS T-44	-0.025	-0.602	10.1	4.1	
LV BUS T-01	0.690	99.666	0.0	0.000	-0.146	0	0	MV BUS T-01	0.000	-0.146	122.6	0.0	
LV BUS T-02	0.690	99.667	0.0	0.000	-0.146	0	0	MV BUS T-02	0.000	-0.146	122.6	0.0	
LV BUS T-03	0.690	99.669	0.0	0.000	-0.146	0	0	MV BUS T-03	0.000	-0.146	122.6	0.0	
LV BUS T-04	0.690	99.672	0.0	0.000	-0.146	0	0	MV BUS T-04	0.000	-0.146	122.6	0.0	
LV BUS T-05	0.690	99.676	0.0	0.000	-0.146	0	0	MV BUS T-05	0.000	-0.146	122.6	0.0	
LV BUS T-06	0.690	99.679	0.0	0.000	-0.146	0	0	MV BUS T-06	0.000	-0.146	122.6	0.0	
LV BUS T-07	0.690	99.680	0.0	0.000	-0.146	0	0	MV BUS T-07	0.000	-0.146	122.6	0.0	
LV BUS T-08	0.690	99.681	0.0	0.000	-0.146	0	0	MV BUS T-08	0.000	-0.146	122.6	0.0	
LV BUS T-09	0.690	99.688	0.0	0.000	-0.146	0	0	MV BUS T-09	0.000	-0.146	122.5	0.0	
LV BUS T-10	0.690	99.692	0.0	0.000	-0.146	0	0	MV BUS T-10	0.000	-0.146	122.5	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
LV BUS T-13	0.690	99.678	0.0	0.000	-0.146	0	0	MV BUS T-13	0.000	-0.146	122.6	0.0	
LV BUS T-14	0.690	99.679	0.0	0.000	-0.146	0	0	MV BUS T-14	0.000	-0.146	122.6	0.0	
LV BUS T-15	0.690	99.683	0.0	0.000	-0.146	0	0	MV BUS T-15	0.000	-0.146	122.6	0.0	
LV BUS T-16	0.690	99.678	0.0	0.000	-0.146	0	0	MV BUS T-16	0.000	-0.146	122.6	0.0	
LV BUS T-17	0.690	99.692	0.0	0.000	-0.146	0	0	MV BUS T-17	0.000	-0.146	122.5	0.0	
LV BUS T-20	0.690	99.689	0.0	0.000	-0.146	0	0	MV BUS T-20	0.000	-0.146	122.5	0.0	
LV BUS T-21	0.690	99.691	0.0	0.000	-0.146	0	0	MV BUS T-21	0.000	-0.146	122.5	0.0	
LV BUS T-22	0.690	99.693	0.0	0.000	-0.146	0	0	MV BUS T-22	0.000	-0.146	122.5	0.0	
LV BUS T-23	0.690	99.695	0.0	0.000	-0.146	0	0	MV BUS T-23	0.000	-0.146	122.5	0.0	
LV BUS T-24	0.690	99.707	0.0	0.000	-0.146	0	0	MV BUS T-24	0.000	-0.146	122.5	0.0	
LV BUS T-25	0.690	99.708	0.0	0.000	-0.146	0	0	MV BUS T-25	0.000	-0.146	122.5	0.0	
LV BUS T-26	0.690	99.685	0.0	0.000	-0.146	0	0	MV BUS T-26	0.000	-0.146	122.5	0.0	
LV BUS T-27	0.690	99.687	0.0	0.000	-0.146	0	0	MV BUS T-27	0.000	-0.146	122.5	0.0	
LV BUS T-28	0.690	99.689	0.0	0.000	-0.146	0	0	MV BUS T-28	0.000	-0.146	122.5	0.0	
LV BUS T-29	0.690	99.690	0.0	0.000	-0.146	0	0	MV BUS T-29	0.000	-0.146	122.5	0.0	
LV BUS T-31	0.690	99.674	0.0	0.000	-0.146	0	0	MV BUS T-31	0.000	-0.146	122.6	0.0	
LV BUS T-32	0.690	99.677	0.0	0.000	-0.146	0	0	MV BUS T-32	0.000	-0.146	122.6	0.0	
LV BUS T-33	0.690	99.678	0.0	0.000	-0.146	0	0	MV BUS T-33	0.000	-0.146	122.6	0.0	
LV BUS T-34	0.690	99.675	0.0	0.000	-0.146	0	0	MV BUS T-34	0.000	-0.146	122.6	0.0	
LV BUS T-36	0.690	99.671	0.0	0.000	-0.146	0	0	MV BUS T-36	0.000	-0.146	122.6	0.0	
LV BUS T-37	0.690	99.671	0.0	0.000	-0.146	0	0	MV BUS T-37	0.000	-0.146	122.6	0.0	
LV BUS T-39	0.690	99.673	0.0	0.000	-0.146	0	0	MV BUS T-39	0.000	-0.146	122.6	0.0	
LV BUS T-40	0.690	99.723	0.0	0.000	-0.146	0	0	MV BUS T-40	0.000	-0.146	122.5	0.0	
LV BUS T-41	0.690	99.698	0.0	0.000	-0.146	0	0	MV BUS T-41	0.000	-0.146	122.5	0.0	
LV BUS T-42	0.690	99.698	0.0	0.000	-0.146	0	0	MV BUS T-42	0.000	-0.146	122.5	0.0	
LV BUS T-43	0.690	99.698	0.0	0.000	-0.146	0	0	MV BUS T-43	0.000	-0.146	122.5	0.0	
LV BUS T-44	0.690	99.705	0.0	0.000	-0.146	0	0	MV BUS T-44	0.000	-0.146	122.5	0.0	
LV BUS T-45	0.690	99.711	0.0	0.000	-0.146	0	0	MV BUS T-45	0.000	-0.146	122.5	0.0	
LV BUS T-46	0.690	99.718	0.0	0.000	-0.146	0	0	MV BUS T-46	0.000	-0.146	122.5	0.0	
LV BUS T-48	0.690	99.689	0.0	0.000	-0.146	0	0	MV BUS T-48	0.000	-0.146	122.5	0.0	
LV BUS T-49	0.690	99.690	0.0	0.000	-0.146	0	0	MV BUS T-49	0.000	-0.146	122.5	0.0	
LV BUS T-50	0.690	99.689	0.0	0.000	-0.146	0	0	MV BUS T-50	0.000	-0.146	122.5	0.0	
MV BUS T-01	34.500	99.970	0.0	0	0	0.004	0.004	MV BUS T-02	-0.004	-0.150	2.5	2.8	
								LV BUS T-01	0.000	0.146	2.5	0.0	
MV BUS T-02	34.500	99.972	0.0	0	0	0.004	0.004	MV BUS T-01	0.004	0.104	1.7	4.0	
								MV BUS T-03	-0.008	-0.254	4.2	3.3	
								LV BUS T-02	0.000	0.146	2.5	0.0	
MV BUS T-03	34.500	99.974	0.0	0	0	0.004	0.004	MV BUS T-02	0.008	0.214	3.6	3.9	
								MV BUS T-04	-0.012	-0.364	6.1	3.4	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								LV BUS T-03	0.000	0.146	2.5	0.0	
MV BUS T-04	34.500	99.976	0.0	0	0	0.004	0.004	MV BUS T-03	0.012	0.318	5.3	3.9	
								MV BUS T-05	-0.017	-0.468	7.8	3.6	
								LV BUS T-04	0.000	0.146	2.5	0.0	
MV BUS T-05	34.500	99.980	0.0	0	0	0.004	0.004	MV BUS T-04	0.017	0.416	7.0	4.0	
								MV BUS T-08	-0.021	-0.566	9.5	3.7	
								LV BUS T-05	0.000	0.146	2.5	0.0	
MV BUS T-06	34.500	99.983	0.0	0	0	0.004	0.004	MV BUS T-07	-0.004	-0.150	2.5	2.8	
								LV BUS T-06	0.000	0.146	2.5	0.0	
MV BUS T-07	34.500	99.984	0.0	0	0	0.004	0.004	MV BUS T-06	0.004	0.121	2.0	3.4	
								MV BUS T-16	0.004	0.086	1.4	4.9	
								MV BUS T-15	-0.012	-0.356	6.0	3.5	
								LV BUS T-07	0.000	0.146	2.5	0.0	
MV BUS T-08	34.500	99.985	0.0	0	0	0.004	0.004	MV BUS T-05	0.021	0.469	7.9	4.4	
								MV BUS T-09	-0.025	-0.619	10.4	4.0	
								LV BUS T-08	0.000	0.146	2.5	0.0	
MV BUS T-09	34.500	99.992	0.0	0	0	0.004	0.004	MV BUS T-08	0.025	0.499	8.4	5.0	
								MV BUS T-10	-0.029	-0.649	10.9	4.5	
								LV BUS T-09	0.000	0.146	2.5	0.0	
MV BUS T-10	34.500	99.996	0.0	0	0	0.004	0.004	MV BUS T-09	0.029	0.558	9.3	5.2	
								MV BUS T-25	-0.033	-0.708	11.9	4.7	
								LV BUS T-10	0.000	0.146	2.5	0.0	
MV BUS T-13	34.500	99.982	0.0	0	0	0.004	0.004	MV BUS T-14	-0.004	-0.150	2.5	2.8	
								LV BUS T-13	0.000	0.146	2.5	0.0	
MV BUS T-14	34.500	99.983	0.0	0	0	0.004	0.004	MV BUS T-13	0.004	0.118	2.0	3.5	
								MV BUS T-15	-0.008	-0.268	4.5	3.1	
								LV BUS T-14	0.000	0.146	2.5	0.0	
MV BUS T-15	34.500	99.988	0.0	0	0	0.004	0.004	MV BUS T-07	0.012	0.283	4.7	4.4	
								MV BUS T-14	0.008	0.189	3.2	4.4	
								MV BUS T-17	-0.025	-0.622	10.4	4.0	
								LV BUS T-15	0.000	0.146	2.5	0.0	
MV BUS T-16	34.500	99.982	0.0	0	0	0.004	0.004	MV BUS T-07	-0.004	-0.150	2.5	2.8	
								LV BUS T-16	0.000	0.146	2.5	0.0	
MV BUS T-17	34.500	99.997	0.0	0	0	0.004	0.004	JB-2/1	-0.029	-0.606	10.2	4.8	
								MV BUS T-15	0.025	0.456	7.6	5.5	
								LV BUS T-17	0.000	0.146	2.5	0.0	
MV BUS T-20	34.500	99.994	0.0	0	0	0.004	0.004	MV BUS T-21	-0.004	-0.150	2.5	2.8	
								LV BUS T-20	0.000	0.146	2.5	0.0	
MV BUS T-21	34.500	99.996	0.0	0	0	0.004	0.004	MV BUS T-20	0.004	0.075	1.3	5.5	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								MV BUS T-22	-0.008	-0.225	3.8	3.7	
								LV BUS T-21	0.000	0.146	2.5	0.0	
MV BUS T-22	34.500	99.997	0.0	0	0	0.004	0.004	JB-2/1	-0.017	-0.408	6.8	4.1	
								MV BUS T-21	0.008	0.196	3.3	4.2	
								MV BUS T-29	0.004	0.062	1.0	6.7	
								LV BUS T-22	0.000	0.146	2.5	0.0	
MV BUS T-23	34.500	99.999	0.0	0	0	0.004	0.004	89F3A	-0.046	-0.779	13.1	5.9	
								MV BUS T-28	0.042	0.629	10.6	6.6	
								LV BUS T-23	0.000	0.146	2.5	0.0	
MV BUS T-24	34.500	100.011	0.0	0	0	0.004	0.004	MV BUS T-25	-0.004	-0.150	2.5	2.8	
								LV BUS T-24	0.000	0.146	2.5	0.0	
MV BUS T-25	34.500	100.012	0.0	0	0	0.004	0.004	89F1A	-0.042	-0.483	8.1	8.6	
								MV BUS T-10	0.033	0.226	3.8	14.6	
								MV BUS T-24	0.004	0.107	1.8	3.9	
								LV BUS T-25	0.000	0.146	2.5	0.0	
MV BUS T-26	34.500	99.990	0.0	0	0	0.004	0.004	MV BUS T-27	-0.004	-0.150	2.5	2.8	
								LV BUS T-26	0.000	0.146	2.5	0.0	
MV BUS T-27	34.500	99.991	0.0	0	0	0.004	0.004	MV BUS T-26	0.004	0.113	1.9	3.7	
								MV BUS T-28	-0.008	-0.263	4.4	3.2	
								LV BUS T-27	0.000	0.146	2.5	0.0	
MV BUS T-28	34.500	99.993	0.0	0	0	0.004	0.004	MV BUS T-23	-0.042	-0.782	13.1	5.3	
								MV BUS T-27	0.008	0.227	3.8	3.7	
								MV BUS T-33	0.029	0.405	6.8	7.2	
								LV BUS T-28	0.000	0.146	2.5	0.0	
MV BUS T-29	34.500	99.995	0.0	0	0	0.004	0.004	MV BUS T-22	-0.004	-0.150	2.5	2.8	
								LV BUS T-29	0.000	0.146	2.5	0.0	
MV BUS T-31	34.500	99.979	0.0	0	0	0.004	0.004	MV BUS T-32	-0.004	-0.150	2.5	2.8	
								LV BUS T-31	0.000	0.146	2.5	0.0	
MV BUS T-32	34.500	99.981	0.0	0	0	0.004	0.004	MV BUS T-31	0.004	0.041	0.7	10.2	
								MV BUS T-33	-0.008	-0.191	3.2	4.4	
								LV BUS T-32	0.000	0.146	2.5	0.0	
MV BUS T-33	34.500	99.983	0.0	0	0	0.004	0.004	MV BUS T-28	-0.029	-0.653	10.9	4.5	
								MV BUS T-32	0.008	0.163	2.7	5.1	
								MV BUS T-34	0.017	0.340	5.7	4.9	
								LV BUS T-33	0.000	0.146	2.5	0.0	
MV BUS T-34	34.500	99.980	0.0	0	0	0.004	0.004	MV BUS T-33	-0.017	-0.384	6.4	4.3	
								MV BUS T-36	0.008	0.203	3.4	4.1	
								MV BUS T-39	0.004	0.031	0.5	13.5	
								LV BUS T-34	0.000	0.146	2.5	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
MV BUS T-36	34.500	99.976	0.0	0	0	0.004	0.004	MV BUS T-34	-0.008	-0.273	4.6	3.0	
								MV BUS T-37	0.004	0.123	2.1	3.4	
								LV BUS T-36	0.000	0.146	2.5	0.0	
MV BUS T-37	34.500	99.975	0.0	0	0	0.004	0.004	MV BUS T-36	-0.004	-0.150	2.5	2.8	
								LV BUS T-37	0.000	0.146	2.5	0.0	
MV BUS T-39	34.500	99.977	0.0	0	0	0.004	0.004	MV BUS T-34	-0.004	-0.150	2.5	2.8	
								LV BUS T-39	0.000	0.146	2.5	0.0	
MV BUS T-40	34.500	100.027	0.0	0	0	0.004	0.004	89F4A	-0.042	-0.642	10.8	6.5	
								MV BUS T-46	0.038	0.492	8.3	7.6	
								LV BUS T-40	0.000	0.146	2.5	0.0	
MV BUS T-41	34.500	100.002	0.0	0	0	0.004	0.004	JB-4/1	-0.004	-0.150	2.5	2.8	
								LV BUS T-41	0.000	0.146	2.5	0.0	
MV BUS T-42	34.500	100.003	0.0	0	0	0.004	0.004	JB-4/1	-0.017	-0.360	6.0	4.6	
								MV BUS T-49	0.013	0.210	3.5	6.0	
								LV BUS T-42	0.000	0.146	2.5	0.0	
MV BUS T-43	34.500	100.002	0.0	0	0	0.004	0.004	JB-4/1	-0.004	-0.150	2.5	2.8	
								LV BUS T-43	0.000	0.146	2.5	0.0	
MV BUS T-44	34.500	100.010	0.0	0	0	0.004	0.004	JB-4/1	0.025	0.475	8.0	5.3	
								MV BUS T-45	-0.029	-0.625	10.5	4.7	
								LV BUS T-44	0.000	0.146	2.5	0.0	
MV BUS T-45	34.500	100.015	0.0	0	0	0.004	0.004	MV BUS T-44	0.029	0.503	8.4	5.8	
								MV BUS T-46	-0.033	-0.653	10.9	5.1	
								LV BUS T-45	0.000	0.146	2.5	0.0	
MV BUS T-46	34.500	100.022	0.0	0	0	0.004	0.004	MV BUS T-40	-0.038	-0.614	10.3	6.1	
								MV BUS T-45	0.033	0.464	7.8	7.2	
								LV BUS T-46	0.000	0.146	2.5	0.0	
MV BUS T-48	34.500	99.993	0.0	0	0	0.004	0.004	MV BUS T-49	-0.004	-0.150	2.5	2.8	
								LV BUS T-48	0.000	0.146	2.5	0.0	
MV BUS T-49	34.500	99.995	0.0	0	0	0.004	0.004	MV BUS T-42	-0.012	-0.379	6.3	3.3	
								MV BUS T-48	0.004	0.114	1.9	3.6	
								MV BUS T-50	0.004	0.115	1.9	3.6	
								LV BUS T-49	0.000	0.146	2.5	0.0	
MV BUS T-50	34.500	99.993	0.0	0	0	0.004	0.004	MV BUS T-49	-0.004	-0.150	2.5	2.8	
								LV BUS T-50	0.000	0.146	2.5	0.0	
* POI	138.000	100.000	0.0	0.229	0.017	0	0	89T1A	0.229	0.017	1.0	99.7	
MPT~3	13.800	100.019	0.0	0	0	0	0	HV BUS MPT	0.000	0.000	0.0	0.0	
							&	89T1B					

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

\# Indicates a bus with a load mismatch of more than 0.1 MVA

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
2_	pV	k 9 agW	8 ngW	9 F	9 far	9 F	9 far	2_	9 F	9 far	8 j 3	k P.	k ma3
4N 68	5BWGIT	6TTW6v	TW	T	T	T	T	9 V U1 S m7RG	TWBR	TWBB	BW	60WN	
								4Nm6U	7TWBR	7TWBB	BW	60WN	
4N R8	5BWGIT	6TTW6v	TW	T	T	T	T	JU7R6	TWB0	TWBT6	0W	66WB	
								4Nm6U	7TWB0	7TWBT6	0W	66WB	
4N 58	5BWGIT	6TTW6v	TW	T	T	T	T	9 V U1 S m7R5	TWB0	TWBR	RWG	5TW	
								4Nm6U	7TWB0	7TWBR	RWG	5TW	
4N B8	5BWGIT	6TTW6v	TW	T	T	T	T	9 V U1 S m7BT	TWBR	7TW66	6GW	7BW	
								4Nm6U	7TWBR	TW66	6GW	7BW	
4Nm68	654WIT	NGWIT	TW	T	T	T	T	PO2	7TWR5	7TWIN	6W	NNW	
								HV U1 S 9 Pm	TWR5	TWIN	6W	NNW	
4Nm6U	5BWGIT	6TTW6v	TW	T	T	T	T	4N B8	TWBR	7TW66	6GW	7BW	
								4N 58	TWB0	TWBR	RWG	5TW	
								4N R8	TWB0	TWBT6	0W	66WB	
								4N 68	TWBR	TWBB	BW	60WN	
								9 Pm-5	7TW6vG	TWRB	5W	746WG	
							&	HV U1 S 9 Pm					
HV U1 S 9 Pm	654WIT	NGWIT	TW	T	T	TWB4	TW55	4Nm68	7TWR5	7TWIN	6W	NNW	
								4Nm6U	TW6vG	7TWRB	TW	746W	7GWIT
							&	9 Pm-5					
JU7R6	5BWGIT	6TTWIR	TW	T	T	T	T	9 V U1 S m76v	TWRN	TWN6	4W	GW	
								9 V U1 S m7RR	TW6v	TW5T	GWG	GW	
								4N R8	7TWB0	7TWRR	65W	GW	
JU7B6	5BWGIT	6TTWI5	TW	T	T	T	T	9 V U1 S m7B6	TWIB	TWR6	RW	5WB	
								9 V U1 S m7BR	TW6v	TWGN	0W	BW	
								9 V U1 S m7B5	TWIB	TWRR	RW	5WB	
								9 V U1 S m7BB	7TWRG	7TWIR	6TW	BW	
LV U1 S m7I6	TWNT	NNW00	TW	TWIT	7TWB0	T	T	9 V U1 S m7I6	TWIT	7TWB0	6RRW	TW	
LV U1 S m7IR	TWNT	NNW0v	TW	TWIT	7TWB0	T	T	9 V U1 S m7IR	TWIT	7TWB0	6RRW	TW	
LV U1 S m7I5	TWNT	NNW0N	TW	TWIT	7TWB0	T	T	9 V U1 S m7I5	TWIT	7TWB0	6RRW	TW	
LV U1 S m7IB	TWNT	NNWvR	TW	TWIT	7TWB0	T	T	9 V U1 S m7IB	TWIT	7TWB0	6RRW	TW	
LV U1 S m7IG	TWNT	NNWv0	TW	TWIT	7TWB0	T	T	9 V U1 S m7IG	TWIT	7TWB0	6RRW	TW	
LV U1 S m7I0	TWNT	NNWvN	TW	TWIT	7TWB0	T	T	9 V U1 S m7I0	TWIT	7TWB0	6RRW	TW	
LV U1 S m7Iv	TWNT	NNW4T	TW	TWIT	7TWB0	T	T	9 V U1 S m7Iv	TWIT	7TWB0	6RRW	TW	
LV U1 S m7I4	TWNT	NNW46	TW	TWIT	7TWB0	T	T	9 V U1 S m7I4	TWIT	7TWB0	6RRW	TW	
LV U1 S m7IN	TWNT	NNW44	TW	TWIT	7TWB0	T	T	9 V U1 S m7IN	TWIT	7TWB0	6RRWG	TW	
LV U1 S m76T	TWNT	NNW0NR	TW	TWIT	7TWB0	T	T	9 V U1 S m76T	TWIT	7TWB0	6RRWG	TW	

Pro-ect:	DF OH F 2D_	ETAP	Page:	R
Location:	Paulding, OH	60WWC	_ ate:	6T7T07RT6v
Contract:			SD:	F ESmF OO_ P
Engineer:	Josh Venden	Study Case: NGP1 6P.	%efision:	Tk AED
. ilenaj e:	DF I OH		ConMgW	Dorj al

Bus		Voltage		Generation		Load		Load Flow					XFMR
2_	pV	k 9 agW	8 ngW	9 F	9 far	9 F	9 far	2_	9 F	9 far	8j 3	k P.	k ma3
LV U1 S m765	TW0NT	NNW0v4	TW	TWTT	7TW6B0	T	T	9 V U1 S m765	TWTT	7TW6B0	6RRW	TW	
LV U1 S m76B	TW0NT	NNW0vN	TW	TWTT	7TW6B0	T	T	9 V U1 S m76B	TWTT	7TW6B0	6RRW	TW	
LV U1 S m76G	TW0NT	NNW045	TW	TWTT	7TW6B0	T	T	9 V U1 S m76G	TWTT	7TW6B0	6RRW	TW	
LV U1 S m760	TW0NT	NNW0v4	TW	TWTT	7TW6B0	T	T	9 V U1 S m760	TWTT	7TW6B0	6RRW	TW	
LV U1 S m76v	TW0NT	NNW0NR	TW	TWTT	7TW6B0	T	T	9 V U1 S m76v	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7RT	TW0NT	NNW04N	TW	TWTT	7TW6B0	T	T	9 V U1 S m7RT	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7R6	TW0NT	NNW0N6	TW	TWTT	7TW6B0	T	T	9 V U1 S m7R6	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7RR	TW0NT	NNW0N5	TW	TWTT	7TW6B0	T	T	9 V U1 S m7RR	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7R5	TW0NT	NNW0NG	TW	TWTT	7TW6B0	T	T	9 V U1 S m7R5	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7RB	TW0NT	NNWTv	TW	TWTT	7TW6B0	T	T	9 V U1 S m7RB	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7RG	TW0NT	NNWT4	TW	TWTT	7TW6B0	T	T	9 V U1 S m7RG	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7R0	TW0NT	NNW04G	TW	TWTT	7TW6B0	T	T	9 V U1 S m7R0	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7Rv	TW0NT	NNW04v	TW	TWTT	7TW6B0	T	T	9 V U1 S m7Rv	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7R4	TW0NT	NNW04N	TW	TWTT	7TW6B0	T	T	9 V U1 S m7R4	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7RN	TW0NT	NNW0NT	TW	TWTT	7TW6B0	T	T	9 V U1 S m7RN	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m756	TW0NT	NNW0vB	TW	TWTT	7TW6B0	T	T	9 V U1 S m756	TWTT	7TW6B0	6RRW	TW	
LV U1 S m75R	TW0NT	NNW0vv	TW	TWTT	7TW6B0	T	T	9 V U1 S m75R	TWTT	7TW6B0	6RRW	TW	
LV U1 S m755	TW0NT	NNW0v4	TW	TWTT	7TW6B0	T	T	9 V U1 S m755	TWTT	7TW6B0	6RRW	TW	
LV U1 S m75B	TW0NT	NNW0vG	TW	TWTT	7TW6B0	T	T	9 V U1 S m75B	TWTT	7TW6B0	6RRW	TW	
LV U1 S m750	TW0NT	NNW0v6	TW	TWTT	7TW6B0	T	T	9 V U1 S m750	TWTT	7TW6B0	6RRW	TW	
LV U1 S m75v	TW0NT	NNW0v6	TW	TWTT	7TW6B0	T	T	9 V U1 S m75v	TWTT	7TW6B0	6RRW	TW	
LV U1 S m75N	TW0NT	NNW0v5	TW	TWTT	7TW6B0	T	T	9 V U1 S m75N	TWTT	7TW6B0	6RRW	TW	
LV U1 S m7BT	TW0NT	NNWR5	TW	TWTT	7TW6B0	T	T	9 V U1 S m7BT	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7B6	TW0NT	NNW0N4	TW	TWTT	7TW6B0	T	T	9 V U1 S m7B6	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7BR	TW0NT	NNW0N4	TW	TWTT	7TW6B0	T	T	9 V U1 S m7BR	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7B5	TW0NT	NNW0N4	TW	TWTT	7TW6B0	T	T	9 V U1 S m7B5	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7BB	TW0NT	NNWTG	TW	TWTT	7TW6B0	T	T	9 V U1 S m7BB	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7BG	TW0NT	NNW66	TW	TWTT	7TW6B0	T	T	9 V U1 S m7BG	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7B0	TW0NT	NNW64	TW	TWTT	7TW6B0	T	T	9 V U1 S m7B0	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7B4	TW0NT	NNW04N	TW	TWTT	7TW6B0	T	T	9 V U1 S m7B4	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7BN	TW0NT	NNW0NT	TW	TWTT	7TW6B0	T	T	9 V U1 S m7BN	TWTT	7TW6B0	6RRWG	TW	
LV U1 S m7GT	TW0NT	NNW04N	TW	TWTT	7TW6B0	T	T	9 V U1 S m7GT	TWTT	7TW6B0	6RRWG	TW	
9 V U1 S m7T6	5BWGTT	NNWvT	TW	T	T	TWTB	TWTB	9 V U1 S m7TR	7TWTB	7TW6GT	RWG	RW	
								LV U1 S m7T6	TWTT	TW6B0	RWG	TW	
9 V U1 S m7TR	5BWGTT	NNWvR	TW	T	T	TWTB	TWTB	9 V U1 S m7T6	TWTB	TWTB	6W	BW	
								9 V U1 S m7T5	7TWT4	7TWRGB	BWR	5W	
								LV U1 S m7TR	TWTT	TW6B0	RWG	TW	
9 V U1 S m7T5	5BWGTT	NNWvB	TW	T	T	TWTB	TWTB	9 V U1 S m7TR	TWT4	TWR6B	5W	5WN	
								9 V U1 S m7TB	7TW6R	7TW50B	0W	5WB	

Bus		Voltage		Generation		Load		Load Flow					XFMR
2_	pV	k 9 agW	8 ngW	9 F	9 far	9 F	9 far	2_	9 F	9 far	8 j 3	k P.	k ma3
								LV U1 S m7I5	TWIT	TWB0	RWG	TW	
9 V U1 S m7IB	5BWGIT	NNWv0	TW	T	T	TWIB	TWIB	9 V U1 S m7I5	TW6R	TW64	GW	5WW	
								9 V U1 S m7IG	7IW6v	7IW04	vW	5WW	
								LV U1 S m7IB	TWIT	TWB0	RWG	TW	
9 V U1 S m7IG	5BWGIT	NNW4T	TW	T	T	TWIB	TWIB	9 V U1 S m7IB	TW6v	TW60	vW	BW	
								9 V U1 S m7I4	7IWR6	7IW00	NWG	5WW	
								LV U1 S m7IG	TWIT	TWB0	RWG	TW	
9 V U1 S m7I0	5BWGIT	NNW45	TW	T	T	TWIB	TWIB	9 V U1 S m7Iv	7IWIB	7IWGT	RWG	RW	
								LV U1 S m7I0	TWIT	TWB0	RWG	TW	
9 V U1 S m7Iv	5BWGIT	NNW4B	TW	T	T	TWIB	TWIB	9 V U1 S m7I0	TWIB	TWR6	RW	5WB	
								9 V U1 S m760	TWIB	TW40	6WB	BWW	
								9 V U1 S m76G	7IW6R	7IWC0	0W	5WG	
								LV U1 S m7Iv	TWIT	TWB0	RWG	TW	
9 V U1 S m7I4	5BWGIT	NNW4G	TW	T	T	TWIB	TWIB	9 V U1 S m7IG	TWR6	TW0N	vWW	BWB	
								9 V U1 S m7IN	7IWRG	7IW6N	6TWB	BW	
								LV U1 S m7I4	TWIT	TWB0	RWG	TW	
9 V U1 S m7IN	5BWGIT	NNWNR	TW	T	T	TWIB	TWIB	9 V U1 S m7I4	TWRG	TWNN	4WB	GW	
								9 V U1 S m76T	7IWRN	7IWBN	6TWW	BWG	
								LV U1 S m7IN	TWIT	TWB0	RWG	TW	
9 V U1 S m76T	5BWGIT	NNWN0	TW	T	T	TWIB	TWIB	9 V U1 S m7IN	TWRN	TWG4	NW	GWR	
								9 V U1 S m7RG	7IW55	7IWT4	66WW	BW	
								LV U1 S m76T	TWIT	TWB0	RWG	TW	
9 V U1 S m765	5BWGIT	NNW4R	TW	T	T	TWIB	TWIB	9 V U1 S m76B	7IWIB	7IWGT	RWG	RW	
								LV U1 S m765	TWIT	TWB0	RWG	TW	
9 V U1 S m76B	5BWGIT	NNW45	TW	T	T	TWIB	TWIB	9 V U1 S m765	TWIB	TW64	RW	5WG	
								9 V U1 S m76G	7IWT4	7IW04	BWG	5W	
								LV U1 S m76B	TWIT	TWB0	RWG	TW	
9 V U1 S m76G	5BWGIT	NNW44	TW	T	T	TWIB	TWIB	9 V U1 S m7Iv	TW6R	TW45	BW	BWB	
								9 V U1 S m76B	TWT4	TW4N	5WR	BWB	
								9 V U1 S m76v	7IWRG	7IWRR	6TWB	BW	
								LV U1 S m76G	TWIT	TWB0	RWG	TW	
9 V U1 S m760	5BWGIT	NNW4R	TW	T	T	TWIB	TWIB	9 V U1 S m7Iv	7IWIB	7IWGT	RWG	RW	
								LV U1 S m760	TWIT	TWB0	RWG	TW	
9 V U1 S m76v	5BWGIT	NNWNv	TW	T	T	TWIB	TWIB	JU7R6	7IWRN	7IWT0	6TWR	BW	
								9 V U1 S m76G	TWRG	TWC0	vW	GWG	
								LV U1 S m76v	TWIT	TWB0	RWG	TW	
9 V U1 S m7RT	5BWGIT	NNWNB	TW	T	T	TWIB	TWIB	9 V U1 S m7R6	7IWIB	7IWGT	RWG	RW	
								LV U1 S m7RT	TWIT	TWB0	RWG	TW	
9 V U1 S m7R6	5BWGIT	NNWN0	TW	T	T	TWIB	TWIB	9 V U1 S m7RT	TWIB	TWvG	6W	GWG	

Bus		Voltage		Generation		Load		Load Flow					XFMR
2_	pV	k 9 agW	8 ngW	9 F	9 far	9 F	9 far	2_	9 F	9 far	8 j 3	k P.	k ma3
								9 V U1 S m7RR	7IWI4	7IWRG	5W	5W	
								LV U1 S m7R6	TWIT	TWB0	RWG	TW	
9 V U1 S m7RR	5BWGIT	NNWNv	TW	T	T	TWIB	TWIB	JU7R6	7IW6v	7IWI4	0W	BW	
								9 V U1 S m7R6	TWI4	TWN0	5W	BWR	
								9 V U1 S m7RN	TWIB	TW0R	6W	0W	
								LV U1 S m7RR	TWIT	TWB0	RWG	TW	
9 V U1 S m7R5	5BWGIT	NNWNN	TW	T	T	TWIB	TWIB	4N 58	7IWB0	7IWvN	65W	GWN	
								9 V U1 S m7R4	TWBR	TW0RN	6TW	0W	
								LV U1 S m7R5	TWIT	TWB0	RWG	TW	
9 V U1 S m7RB	5BWGIT	6TTW66	TW	T	T	TWIB	TWIB	9 V U1 S m7RG	7IWIB	7IWGT	RWG	RW	
								LV U1 S m7RB	TWIT	TWB0	RWG	TW	
9 V U1 S m7RG	5BWGIT	6TTW6R	TW	T	T	TWIB	TWIB	4N 68	7IWBR	7IW45	4W	4W	
								9 V U1 S m76T	TW55	TWR0	5W	6BW	
								9 V U1 S m7RB	TWIB	TWTv	6W	5WN	
								LV U1 S m7RG	TWIT	TWB0	RWG	TW	
9 V U1 S m7R0	5BWGIT	NNWNT	TW	T	T	TWIB	TWIB	9 V U1 S m7Rv	7IWIB	7IWGT	RWG	RW	
								LV U1 S m7R0	TWIT	TWB0	RWG	TW	
9 V U1 S m7Rv	5BWGIT	NNWN6	TW	T	T	TWIB	TWIB	9 V U1 S m7R0	TWIB	TW65	6WN	5W	
								9 V U1 S m7R4	7IWI4	7IW05	BWB	5WR	
								LV U1 S m7Rv	TWIT	TWB0	RWG	TW	
9 V U1 S m7R4	5BWGIT	NNWN5	TW	T	T	TWIB	TWIB	9 V U1 S m7R5	7IWBR	7IW4R	65W	GW	
								9 V U1 S m7Rv	TWI4	TWRv	5W	5W	
								9 V U1 S m755	TWRN	TWBTG	0W	vWR	
								LV U1 S m7R4	TWIT	TWB0	RWG	TW	
9 V U1 S m7RN	5BWGIT	NNWNG	TW	T	T	TWIB	TWIB	9 V U1 S m7RR	7IWIB	7IWGT	RWG	RW	
								LV U1 S m7RN	TWIT	TWB0	RWG	TW	
9 V U1 S m756	5BWGIT	NNWvN	TW	T	T	TWIB	TWIB	9 V U1 S m75R	7IWIB	7IWGT	RWG	RW	
								LV U1 S m756	TWIT	TWB0	RWG	TW	
9 V U1 S m75R	5BWGIT	NNW46	TW	T	T	TWIB	TWIB	9 V U1 S m756	TWIB	TWB6	TW	6TWR	
								9 V U1 S m755	7IWI4	7IWN6	5WR	BWB	
								LV U1 S m75R	TWIT	TWB0	RWG	TW	
9 V U1 S m755	5BWGIT	NNW45	TW	T	T	TWIB	TWIB	9 V U1 S m7R4	7IWRN	7IW0G5	6TW	BWG	
								9 V U1 S m75R	TWI4	TW05	RW	GW	
								9 V U1 S m75B	TW6v	TWBT	GW	BWN	
								LV U1 S m755	TWIT	TWB0	RWG	TW	
9 V U1 S m75B	5BWGIT	NNW4T	TW	T	T	TWIB	TWIB	9 V U1 S m755	7IW6v	7IW4B	0WB	BW	
								9 V U1 S m750	TWI4	TWRT5	5WB	BW	
								9 V U1 S m75N	TWIB	TW56	TWG	65WG	
								LV U1 S m75B	TWIT	TWB0	RWG	TW	

Bus		Voltage		Generation		Load		Load Flow					XFMR
2_	pV	k 9 agW	8 ngW	9 F	9 far	9 F	9 far	2_	9 F	9 far	8 j 3	k P.	k ma3
9 V U1 S m750	5BWGIT	NWWv0	TW	T	T	TWIB	TWIB	9 V U1 S m75B	7IWIT4	7IWRv5	BW	5W	
								9 V U1 S m75v	TWIB	TW6R5	RW	5WB	
								LV U1 S m750	TWIT	TW6B0	RWG	TW	
9 V U1 S m75v	5BWGIT	NWWvG	TW	T	T	TWIB	TWIB	9 V U1 S m750	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m75v	TWIT	TW6B0	RWG	TW	
9 V U1 S m75N	5BWGIT	NWWvv	TW	T	T	TWIB	TWIB	9 V U1 S m75B	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m75N	TWIT	TW6B0	RWG	TW	
9 V U1 S m7BT	5BWGIT	6TTWRv	TW	T	T	TWIB	TWIB	4N B8	7IWBR	7IW6BR	6TW	0WG	
								9 V U1 S m7B0	TW54	TWBNR	4W	vW	
								LV U1 S m7BT	TWIT	TW6B0	RWG	TW	
9 V U1 S m7B6	5BWGIT	6TTWIR	TW	T	T	TWIB	TWIB	JU7B6	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m7B6	TWIT	TW6B0	RWG	TW	
9 V U1 S m7BR	5BWGIT	6TTWI5	TW	T	T	TWIB	TWIB	JU7B6	7IW6v	7IW0T	0W	BW	
								9 V U1 S m7BN	TW65	TW6T	5WG	0W	
								LV U1 S m7BR	TWIT	TW6B0	RWG	TW	
9 V U1 S m7B5	5BWGIT	6TTWIR	TW	T	T	TWIB	TWIB	JU7B6	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m7B5	TWIT	TW6B0	RWG	TW	
9 V U1 S m7BB	5BWGIT	6TTW6T	TW	T	T	TWIB	TWIB	JU7B6	TWRG	TWBvG	4W	GW	
								9 V U1 S m7BG	7IWRN	7IW6RG	6TWG	BW	
								LV U1 S m7BB	TWIT	TW6B0	RWG	TW	
9 V U1 S m7BG	5BWGIT	6TTW6G	TW	T	T	TWIB	TWIB	9 V U1 S m7BB	TWRN	TWGI5	4WB	GW	
								9 V U1 S m7B0	7IW55	7IW6G5	6TW	GW	
								LV U1 S m7BG	TWIT	TW6B0	RWG	TW	
9 V U1 S m7B0	5BWGIT	6TTWRR	TW	T	T	TWIB	TWIB	9 V U1 S m7BT	7IW54	7IW6B	6TW	0W	
								9 V U1 S m7BG	TW55	TW0B	vW	vW	
								LV U1 S m7B0	TWIT	TW6B0	RWG	TW	
9 V U1 S m7B4	5BWGIT	NWWN5	TW	T	T	TWIB	TWIB	9 V U1 S m7BN	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m7B4	TWIT	TW6B0	RWG	TW	
9 V U1 S m7BN	5BWGIT	NWWNG	TW	T	T	TWIB	TWIB	9 V U1 S m7BR	7IW6R	7IW5vN	0W	5W	
								9 V U1 S m7B4	TWIB	TW6B	6W	5W	
								9 V U1 S m7GT	TWIB	TW6G	6W	5W	
								LV U1 S m7BN	TWIT	TW6B0	RWG	TW	
9 V U1 S m7GT	5BWGIT	NWWN5	TW	T	T	TWIB	TWIB	9 V U1 S m7BN	7IWIB	7IW6GT	RWG	RW	
								LV U1 S m7GT	TWIT	TW6B0	RWG	TW	
* PO2	654WIT	NGWIT	TW	TWR5	TWIB	T	T	4Nm68	TWR5	TWIB	6W	6TTW	
9 Pm-5	65WIT	6TTW6N	TW	T	T	T	T	HV U1 S 9 Pm	TWIT	TWIT	TW	TW	
							&	4Nm6U					

* 2ndicates a foltage regulated bus (foltage controlled or swing ty3e j achine connected to it)

\# 2ndicates a bus with a load j isj atch oMj ore than TW9 V8

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
IF	AV	% p ag.	Mng.	p T	p var	p T	p var	IF	p T	p var	Mm8	%P1	%Da8
931NM	45.B00	N00.025	0.0	0	0	0	0	p V UGS D-2B	0.052	0.245	5.0	N7.6	
								93DNU	-0.052	-0.245	5.0	N7.6	
9312M	45.B00	N00.025	0.0	0	0	0	0	JU-2/N	0.056	0.430	6.6	NN7	
								93DNU	-0.056	-0.430	6.6	NN7	
9314M	45.B00	N00.025	0.0	0	0	0	0	p V UGS D-24	0.056	0.N40	2.4	44.N	
								93DNU	-0.056	-0.N40	2.4	44.N	
9315M	45.B00	N00.025	0.0	0	0	0	0	p V UGS D-50	0.052	-0.32N	NB.5	-5.B	
								93DNU	-0.052	0.32N	NB.5	-5.B	
93DNM	N49.000	N00.000	0.0	0	0	0	0	POI	-0.223	0.020	N0	-33.6	
								HV UGS p PD	0.223	-0.020	N0	-33.6	
93DNU	45.B00	N00.025	0.0	0	0	0	0	9315M	0.052	-0.32N	NB.5	-5.B	
								9314M	0.056	0.N40	2.4	44.N	
								9312M	0.056	0.430	6.6	NN7	
								931NM	0.052	0.245	5.0	N7.6	
								p PD-4	-0.N7B	0.N67	5.N	-72.4	
								& HV UGS p PD					
HV UGS p PD	N49.000	N00.000	0.0	0	0	0.0B5	0.N57	93DNM	-0.223	0.020	N0	-33.6	
								93DNU	0.N7B	-0.N67	N0	-72.4	
								& p PD-4					
JU-2/N	45.B00	N00.009	0.0	0	0	0	0	p V UGS D-N7	0.023	0.595	9.N	6.0	
								p V UGS D-22	0.0N7	0.426	BB	BN	
								9312M	-0.056	-0.9N0	N4.6	B6	
JU-5/N	45.B00	N00.0N0	0.0	0	0	0	0	p V UGS D-5N	0.005	0.N20	2.0	4.B	
								p V UGS D-52	0.0N7	0.4BB	B3	5.7	
								p V UGS D-54	0.005	0.N2N	2.0	4.5	
								p V UGS D-55	-0.02B	-0.B36	N0.0	5.2	
LV UGS D-0N	0.630	33.67B	0.0	0.000	-0.N5B	0	0	p V UGS D-0N	0.000	-0.N5B	N2N7	0.0	
LV UGS D-02	0.630	33.676	0.0	0.000	-0.N5B	0	0	p V UGS D-02	0.000	-0.N5B	N2N7	0.0	
LV UGS D-04	0.630	33.679	0.0	0.000	-0.N5B	0	0	p V UGS D-04	0.000	-0.N5B	N2N7	0.0	
LV UGS D-05	0.630	33.69N	0.0	0.000	-0.N5B	0	0	p V UGS D-05	0.000	-0.N5B	N2N7	0.0	
LV UGS D-0B	0.630	33.69B	0.0	0.000	-0.N5B	0	0	p V UGS D-0B	0.000	-0.N5B	N2N7	0.0	
LV UGS D-06	0.630	33.697	0.0	0.000	-0.N5B	0	0	p V UGS D-06	0.000	-0.N5B	N2N7	0.0	
LV UGS D-07	0.630	33.699	0.0	0.000	-0.N5B	0	0	p V UGS D-07	0.000	-0.N5B	N2N7	0.0	
LV UGS D-09	0.630	33.630	0.0	0.000	-0.N5B	0	0	p V UGS D-09	0.000	-0.N5B	N2N7	0.0	
LV UGS D-03	0.630	33.636	0.0	0.000	-0.N5B	0	0	p V UGS D-03	0.000	-0.N5B	N2N7	0.0	
LV UGS D-N0	0.630	33.70N	0.0	0.000	-0.N5B	0	0	p V UGS D-N0	0.000	-0.N5B	N2N7	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
IF	AV	%p ag.	Mng.	p T	p var	p T	p var	IF	p T	p var	Mm8	%P1	%Da8
LV UGS D-N4	0.630	33.697	0.0	0.000	-0.N5B	0	0	p V UGS D-N4	0.000	-0.N5B	N2N7	0.0	
LV UGS D-N5	0.630	33.699	0.0	0.000	-0.N5B	0	0	p V UGS D-N5	0.000	-0.N5B	N2N7	0.0	
LV UGS D-NB	0.630	33.632	0.0	0.000	-0.N5B	0	0	p V UGS D-NB	0.000	-0.N5B	N2N7	0.0	
LV UGS D-N6	0.630	33.697	0.0	0.000	-0.N5B	0	0	p V UGS D-N6	0.000	-0.N5B	N2N7	0.0	
LV UGS D-N7	0.630	33.70N	0.0	0.000	-0.N5B	0	0	p V UGS D-N7	0.000	-0.N5B	N2N7	0.0	
LV UGS D-20	0.630	33.639	0.0	0.000	-0.N5B	0	0	p V UGS D-20	0.000	-0.N5B	N2N7	0.0	
LV UGS D-2N	0.630	33.700	0.0	0.000	-0.N5B	0	0	p V UGS D-2N	0.000	-0.N5B	N2N7	0.0	
LV UGS D-22	0.630	33.70N	0.0	0.000	-0.N5B	0	0	p V UGS D-22	0.000	-0.N5B	N2N7	0.0	
LV UGS D-24	0.630	33.705	0.0	0.000	-0.N5B	0	0	p V UGS D-24	0.000	-0.N5B	N2N7	0.0	
LV UGS D-25	0.630	33.7NB	0.0	0.000	-0.N5B	0	0	p V UGS D-25	0.000	-0.N5B	N2N7	0.0	
LV UGS D-2B	0.630	33.7N6	0.0	0.000	-0.N5B	0	0	p V UGS D-2B	0.000	-0.N5B	N2N7	0.0	
LV UGS D-26	0.630	33.635	0.0	0.000	-0.N5B	0	0	p V UGS D-26	0.000	-0.N5B	N2N7	0.0	
LV UGS D-27	0.630	33.63B	0.0	0.000	-0.N5B	0	0	p V UGS D-27	0.000	-0.N5B	N2N7	0.0	
LV UGS D-29	0.630	33.639	0.0	0.000	-0.N5B	0	0	p V UGS D-29	0.000	-0.N5B	N2N7	0.0	
LV UGS D-23	0.630	33.633	0.0	0.000	-0.N5B	0	0	p V UGS D-23	0.000	-0.N5B	N2N7	0.0	
LV UGS D-4N	0.630	33.694	0.0	0.000	-0.N5B	0	0	p V UGS D-4N	0.000	-0.N5B	N2N7	0.0	
LV UGS D-42	0.630	33.696	0.0	0.000	-0.N5B	0	0	p V UGS D-42	0.000	-0.N5B	N2N7	0.0	
LV UGS D-44	0.630	33.697	0.0	0.000	-0.N5B	0	0	p V UGS D-44	0.000	-0.N5B	N2N7	0.0	
LV UGS D-45	0.630	33.695	0.0	0.000	-0.N5B	0	0	p V UGS D-45	0.000	-0.N5B	N2N7	0.0	
LV UGS D-46	0.630	33.690	0.0	0.000	-0.N5B	0	0	p V UGS D-46	0.000	-0.N5B	N2N7	0.0	
LV UGS D-47	0.630	33.690	0.0	0.000	-0.N5B	0	0	p V UGS D-47	0.000	-0.N5B	N2N7	0.0	
LV UGS D-43	0.630	33.692	0.0	0.000	-0.N5B	0	0	p V UGS D-43	0.000	-0.N5B	N2N7	0.0	
LV UGS D-50	0.630	33.742	0.0	0.000	-0.N5B	0	0	p V UGS D-50	0.000	-0.N5B	N2N7	0.0	
LV UGS D-5N	0.630	33.707	0.0	0.000	-0.N5B	0	0	p V UGS D-5N	0.000	-0.N5B	N2N7	0.0	
LV UGS D-52	0.630	33.709	0.0	0.000	-0.N5B	0	0	p V UGS D-52	0.000	-0.N5B	N2N7	0.0	
LV UGS D-54	0.630	33.707	0.0	0.000	-0.N5B	0	0	p V UGS D-54	0.000	-0.N5B	N2N7	0.0	
LV UGS D-55	0.630	33.7NB	0.0	0.000	-0.N5B	0	0	p V UGS D-55	0.000	-0.N5B	N2N7	0.0	
LV UGS D-5B	0.630	33.720	0.0	0.000	-0.N5B	0	0	p V UGS D-5B	0.000	-0.N5B	N2N7	0.0	
LV UGS D-56	0.630	33.727	0.0	0.000	-0.N5B	0	0	p V UGS D-56	0.000	-0.N5B	N2N7	0.0	
LV UGS D-59	0.630	33.633	0.0	0.000	-0.N5B	0	0	p V UGS D-59	0.000	-0.N5B	N2N7	0.0	
LV UGS D-53	0.630	33.700	0.0	0.000	-0.N5B	0	0	p V UGS D-53	0.000	-0.N5B	N2N7	0.0	
LV UGS D-B0	0.630	33.633	0.0	0.000	-0.N5B	0	0	p V UGS D-B0	0.000	-0.N5B	N2N7	0.0	
p V UGS D-0N	45.B00	33.377	0.0	0	0	0.005	0.005	p V UGS D-02	-0.005	-0.N53	2.B	2.9	
								LV UGS D-0N	0.000	0.N5B	2.5	0.0	
p V UGS D-02	45.B00	33.373	0.0	0	0	0.005	0.005	p V UGS D-0N	0.005	0.N04	N7	5.0	
								p V UGS D-04	-0.009	-0.2B2	5.2	4.4	
								LV UGS D-02	0.000	0.N5B	2.5	0.0	
p V UGS D-04	45.B00	33.39N	0.0	0	0	0.005	0.005	p V UGS D-02	0.009	0.2N2	4.6	4.3	
								p V UGS D-05	-0.0N2	-0.46N	6.0	4.5	

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
IF	AV	% p ag.	Mng.	p T	p var	p T	p var	IF	p T	p var	Mm8	%P1	%Da8
								LV UGS D-04	0.000	0.N5B	2.5	0.0	
p V UGS D-05	45.B00	33.394	0.0	0	0	0.005	0.005	p V UGS D-04	0.0N2	0.4NB	B.4	5.0	
								p V UGS D-0B	-0.0N7	-0.565	7.9	4.6	
								LV UGS D-05	0.000	0.N5B	2.5	0.0	
p V UGS D-0B	45.B00	33.397	0.0	0	0	0.005	0.005	p V UGS D-05	0.0N7	0.5N2	6.3	5.0	
								p V UGS D-09	-0.02N	-0.B6N	3.5	4.7	
								LV UGS D-0B	0.000	0.N5B	2.5	0.0	
p V UGS D-06	45.B00	33.330	0.0	0	0	0.005	0.005	p V UGS D-07	-0.005	-0.N53	2.B	2.9	
								LV UGS D-06	0.000	0.N5B	2.5	0.0	
p V UGS D-07	45.B00	33.33N	0.0	0	0	0.005	0.005	p V UGS D-06	0.005	0.N20	2.0	4.B	
								p V UGS D-N6	0.005	0.095	N5	5.3	
								p V UGS D-NB	-0.0N2	-0.4B4	B.3	4.B	
								LV UGS D-07	0.000	0.N5B	2.5	0.0	
p V UGS D-09	45.B00	33.332	0.0	0	0	0.005	0.005	p V UGS D-0B	0.02N	0.565	7.9	5.B	
								p V UGS D-03	-0.02B	-0.6N4	N0.4	5.N	
								LV UGS D-09	0.000	0.N5B	2.5	0.0	
p V UGS D-03	45.B00	33.333	0.0	0	0	0.005	0.005	p V UGS D-09	0.02B	0.534	9.4	B.N	
								p V UGS D-N0	-0.023	-0.652	N0.9	5.B	
								LV UGS D-03	0.000	0.N5B	2.5	0.0	
p V UGS D-N0	45.B00	N00.004	0.0	0	0	0.005	0.005	p V UGS D-03	0.023	0.BBN	3.2	B.4	
								p V UGS D-2B	-0.044	-0.700	NN7	5.9	
								LV UGS D-N0	0.000	0.N5B	2.5	0.0	
p V UGS D-N4	45.B00	33.393	0.0	0	0	0.005	0.005	p V UGS D-N5	-0.005	-0.N53	2.B	2.9	
								LV UGS D-N4	0.000	0.N5B	2.5	0.0	
p V UGS D-N5	45.B00	33.330	0.0	0	0	0.005	0.005	p V UGS D-N4	0.005	0.NN7	2.0	4.B	
								p V UGS D-NB	-0.009	-0.266	5.B	4.N	
								LV UGS D-N5	0.000	0.N5B	2.5	0.0	
p V UGS D-NB	45.B00	33.335	0.0	0	0	0.005	0.005	p V UGS D-07	0.0N2	0.290	5.7	5.5	
								p V UGS D-N5	0.009	0.N97	4.N	5.B	
								p V UGS D-N7	-0.02B	-0.6N6	N0.4	5.0	
								LV UGS D-NB	0.000	0.N5B	2.5	0.0	
p V UGS D-N6	45.B00	33.393	0.0	0	0	0.005	0.005	p V UGS D-07	-0.005	-0.N53	2.B	2.9	
								LV UGS D-N6	0.000	0.N5B	2.5	0.0	
p V UGS D-N7	45.B00	N00.004	0.0	0	0	0.005	0.005	JU-2/N	-0.023	-0.B33	N0.0	5.3	
								p V UGS D-NB	0.02B	0.5B0	7.B	B.B	
								LV UGS D-N7	0.000	0.N5B	2.5	0.0	
p V UGS D-20	45.B00	N00.000	0.0	0	0	0.005	0.005	p V UGS D-2N	-0.005	-0.N53	2.B	2.9	
								LV UGS D-20	0.000	0.N5B	2.5	0.0	
p V UGS D-2N	45.B00	N00.002	0.0	0	0	0.005	0.005	p V UGS D-20	0.005	0.075	N2	B.6	

Bus		Voltage		Generation		Load		Load Flow					XFMR
IF	AV	% p ag.	Mng.	p T	p var	p T	p var	IF	p T	p var	Mm8	%P1	%Da8
								p V UGS D-22	-0.009	-0.224	4.7	4.7	
								LV UGS D-2N	0.000	0.N5B	2.5	0.0	
p V UGS D-22	45.B00	N00.005	0.0	0	0	0.005	0.005	JU-2/N	-0.0N7	-0.505	6.9	5.N	
								p V UGS D-2N	0.009	0.N35	4.2	5.4	
								p V UGS D-23	0.005	0.06N	N0	6.9	
								LV UGS D-22	0.000	0.N5B	2.5	0.0	
p V UGS D-24	45.B00	N00.006	0.0	0	0	0.005	0.005	9314M	-0.056	-0.769	N2.3	6.0	
								p V UGS D-29	0.052	0.6N3	N0.5	6.7	
								LV UGS D-24	0.000	0.N5B	2.5	0.0	
p V UGS D-25	45.B00	N00.0N7	0.0	0	0	0.005	0.005	p V UGS D-2B	-0.005	-0.N53	2.B	2.9	
								LV UGS D-25	0.000	0.N5B	2.5	0.0	
p V UGS D-2B	45.B00	N00.0N9	0.0	0	0	0.005	0.005	931NM	-0.052	-0.574	7.3	9.9	
								p V UGS D-N0	0.044	0.2N9	4.7	NB.2	
								p V UGS D-25	0.005	0.N06	N9	4.3	
								LV UGS D-2B	0.000	0.N5B	2.5	0.0	
p V UGS D-26	45.B00	33.337	0.0	0	0	0.005	0.005	p V UGS D-27	-0.005	-0.N53	2.B	2.9	
								LV UGS D-26	0.000	0.N5B	2.5	0.0	
p V UGS D-27	45.B00	33.339	0.0	0	0	0.005	0.005	p V UGS D-26	0.005	0.NN2	N3	4.7	
								p V UGS D-29	-0.009	-0.26N	5.5	4.2	
								LV UGS D-27	0.000	0.N5B	2.5	0.0	
p V UGS D-29	45.B00	N00.000	0.0	0	0	0.005	0.005	p V UGS D-24	-0.052	-0.772	N2.3	B.5	
								p V UGS D-27	0.009	0.22B	4.9	4.7	
								p V UGS D-44	0.023	0.439	6.7	7.4	
								LV UGS D-29	0.000	0.N5B	2.5	0.0	
p V UGS D-23	45.B00	N00.00N	0.0	0	0	0.005	0.005	p V UGS D-22	-0.005	-0.N53	2.B	2.9	
								LV UGS D-23	0.000	0.N5B	2.5	0.0	
p V UGS D-4N	45.B00	33.396	0.0	0	0	0.005	0.005	p V UGS D-42	-0.005	-0.N53	2.B	2.9	
								LV UGS D-4N	0.000	0.N5B	2.5	0.0	
p V UGS D-42	45.B00	33.399	0.0	0	0	0.005	0.005	p V UGS D-4N	0.005	0.043	0.7	N0.B	
								p V UGS D-44	-0.009	-0.N93	4.2	5.5	
								LV UGS D-42	0.000	0.N5B	2.5	0.0	
p V UGS D-44	45.B00	33.393	0.0	0	0	0.005	0.005	p V UGS D-29	-0.023	-0.656	N0.9	5.B	
								p V UGS D-42	0.009	0.N6N	2.7	B.2	
								p V UGS D-45	0.0N7	0.446	B.6	B.0	
								LV UGS D-44	0.000	0.N5B	2.5	0.0	
p V UGS D-45	45.B00	33.397	0.0	0	0	0.005	0.005	p V UGS D-44	-0.0N7	-0.490	6.5	5.5	
								p V UGS D-46	0.009	0.20N	4.5	5.N	
								p V UGS D-43	0.005	0.023	0.B	N5.0	
								LV UGS D-45	0.000	0.N5B	2.5	0.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
IF	AV	% p ag.	Mng.	p T	p var	p T	p var	IF	p T	p var	Mm8	%P1	%Da8
p V UGS D-46	45.B00	33.394	0.0	0	0	0.005	0.005	p V UGS D-45	-0.009	-0.27N	5.B	4.N	
								p V UGS D-47	0.005	0.N22	2.0	4.5	
								LV UGS D-46	0.000	0.N5B	2.5	0.0	
p V UGS D-47	45.B00	33.392	0.0	0	0	0.005	0.005	p V UGS D-46	-0.005	-0.N53	2.B	2.9	
								LV UGS D-47	0.000	0.N5B	2.5	0.0	
p V UGS D-43	45.B00	33.395	0.0	0	0	0.005	0.005	p V UGS D-45	-0.005	-0.N53	2.B	2.9	
								LV UGS D-43	0.000	0.N5B	2.5	0.0	
p V UGS D-50	45.B00	N00.045	0.0	0	0	0.005	0.005	9315M	-0.052	-0.642	N0.6	6.6	
								p V UGS D-56	0.049	0.594	9.N	7.9	
								LV UGS D-50	0.000	0.N5B	2.5	0.0	
p V UGS D-5N	45.B00	N00.003	0.0	0	0	0.005	0.005	JU-5/N	-0.005	-0.N53	2.B	2.9	
								LV UGS D-5N	0.000	0.N5B	2.5	0.0	
p V UGS D-52	45.B00	N00.0N0	0.0	0	0	0.005	0.005	JU-5/N	-0.0N7	-0.4B6	6.0	5.7	
								p V UGS D-53	0.0N4	0.207	4.B	6.0	
								LV UGS D-52	0.000	0.N5B	2.5	0.0	
p V UGS D-54	45.B00	N00.003	0.0	0	0	0.005	0.005	JU-5/N	-0.005	-0.N53	2.B	2.9	
								LV UGS D-54	0.000	0.N5B	2.5	0.0	
p V UGS D-55	45.B00	N00.0N7	0.0	0	0	0.005	0.005	JU-5/N	0.02B	0.563	7.3	B.4	
								p V UGS D-5B	-0.023	-0.6N9	N0.5	5.7	
								LV UGS D-55	0.000	0.N5B	2.5	0.0	
p V UGS D-5B	45.B00	N00.024	0.0	0	0	0.005	0.005	p V UGS D-55	0.023	0.536	9.4	B.3	
								p V UGS D-56	-0.044	-0.65B	N0.9	B.2	
								LV UGS D-5B	0.000	0.N5B	2.5	0.0	
p V UGS D-56	45.B00	N00.040	0.0	0	0	0.005	0.005	p V UGS D-50	-0.047	-0.60B	N0.N	6.2	
								p V UGS D-5B	0.044	0.5B6	7.6	7.4	
								LV UGS D-56	0.000	0.N5B	2.5	0.0	
p V UGS D-59	45.B00	N00.00N	0.0	0	0	0.005	0.005	p V UGS D-53	-0.005	-0.N53	2.B	2.9	
								LV UGS D-59	0.000	0.N5B	2.5	0.0	
p V UGS D-53	45.B00	N00.002	0.0	0	0	0.005	0.005	p V UGS D-52	-0.0N2	-0.476	6.4	4.4	
								p V UGS D-59	0.005	0.NN4	N3	4.7	
								p V UGS D-B0	0.005	0.NN5	N3	4.6	
								LV UGS D-53	0.000	0.N5B	2.5	0.0	
p V UGS D-B0	45.B00	N00.00N	0.0	0	0	0.005	0.005	p V UGS D-53	-0.005	-0.N53	2.B	2.9	
								LV UGS D-B0	0.000	0.N5B	2.5	0.0	
* POI	N49.000	N00.000	0.0	0.223	-0.026	0	0	93DNM	0.223	-0.026	N0	-33.5	
p PD~4	N4.900	N00.026	0.0	0	0	0	0	HV UGS p PD	0.000	0.000	0.0	0.0	
								& 93DNU					

* Indicates a voltage regulated bus (voltage controlled or swing ty8e machine connected to it)

\# Indicates a bus with a load mismatch okmore than 0.Np VM

Project:	TD OH D -Tm	**ETAP**		Page:	N
Location:	Paulding, OH	N0WGWC		mate:	NG2C027GNR
Contract:				ST :	D ESFD OOmP
Engineer:	Josh Venden	Study Case:	NG1P6 NP.	v e%sion:	Gf k ET
. ilena_ e:	T D j OH			ConAgW	T or_ al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
-m	MV	f 8 agW	p ngW	8 D	8 %ar	8 D	8 %ar	-m	8 D	8 %ar	p _ 9	f P.	f Fa9
34. Np	5BWGG	NGGW7B	GWG	C	G	C	C	8 V U6 S F271	GWB7	GW5B	BWG	NRW	
								34FNU	2GWB7	2GW5B	BWG	NRW	
34. 7p	5BWGG	NGGW7B	GWG	C	G	C	C	JU27/N	GWB0	GW4G	0W	NWR	
								34FNU	2GWB0	2GW4G	0W	NWR	
34. 5p	5BWGG	NGGW7B	GWG	C	G	C	C	8 V U6 S F275	GWB0	GW5G	7W	55W	
								34FNU	2GWB0	2GW5G	7W	55W	
34. Bp	5BWGG	NGGW7B	GWG	C	G	C	C	8 V U6 S F2BG	GWB7	2GW7N	N1W	2BW	
								34FNU	2GWB7	GW7N	N1W	2BW	
34FNp	N53WGG	NG1WGG	GWG	C	G	C	C	PO-	2GW5B	GWG1	GW	2NGGWG	
								HV U6 S 8 PF	GW5B	2GWG1	GW	2NGGWG	
34FNU	5BWGG	NGGW7B	GWG	C	G	C	C	34. Bp	GWB7	2GW7N	N1W	2BW	
								34. 5p	GWB0	GW5G	7W	55W	
								34. 7p	GWB0	GW4G	0W	NWR	
								34. Np	GWB7	GW5B	BWG	NRW	
								8 PF~5	2GWR1	GW0R	BW	2R7W	
							&	HV U6 S 8 PF					
HV U6 S 8 PF	N53WGG	NG1WGG	GWG	C	G	GWG14	GW07	34FNp	2GW5B	GWG1	GW	2NGGWG	
								34FNU	GWR1	2GW0R	NWG	2R7W	1WGG
							&	8 PF~5					
JU27/N	5BWGG	NGGWG3	GWG	C	G	C	C	8 V U6 S F2NR	GW74	GW3B	3W	0WG	
								8 V U6 S F277	GWNR	GW70	1W	1W	
								34. 7p	2GWB0	2GWNG	N5W	1W	
JU2B/N	5BWGG	NGGWNG	GWG	C	G	C	C	8 V U6 S F2BN	GWGB	GW7G	7WG	5W	
								8 V U6 S F2B7	GWNR	GW11	1W	BW	
								8 V U6 S F2B5	GWGB	GW7N	7WG	5W	
								8 V U6 S F2BB	2GW71	2GW40	NGWG	BW	
LV U6 S F2GN	GW4G	44WR1	GWG	GWGG	2GWB1	C	C	8 V U6 S F2GN	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G7	GW4G	44WR0	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G7	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G5	GW4G	44WR3	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G5	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2GB	GW4G	44W3N	GWG	GWGG	2GWB1	C	C	8 V U6 S F2GB	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G1	GW4G	44W31	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G1	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G0	GW4G	44W3R	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G0	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2GR	GW4G	44W33	GWG	GWGG	2GWB1	C	C	8 V U6 S F2GR	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G3	GW4G	44W4G	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G3	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2G4	GW4G	44W40	GWG	GWGG	2GWB1	C	C	8 V U6 S F2G4	GWGG	2GWB1	N7NW	GWG	
LV U6 S F2NG	GW4G	44WRGN	GWG	GWGG	2GWB1	C	C	8 V U6 S F2NG	GWGG	2GWB1	N7NW	GWG	

Bus		Voltage		Generation		Load		Load Flow					XFMR
-m	MV	f 8 agW	p ngW	8 D	8 %ar	8 D	8 %ar	-m	8 D	8 %ar	p _ 9	f P.	f Fa9
LV U6 S F2N5	GW4G	44W3R	GWG	GWGG	2GWB1	C	C	8 V U6 S F2N5	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2NB	GW4G	44W33	GWG	GWGG	2GWB1	C	C	8 V U6 S F2NB	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2N1	GW4G	44W47	GWG	GWGG	2GWB1	C	C	8 V U6 S F2N1	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2N0	GW4G	44W3R	GWG	GWGG	2GWB1	C	C	8 V U6 S F2N0	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2NR	GW4G	44WGN	GWG	GWGG	2GWB1	C	C	8 V U6 S F2NR	GWGG	2GWB1	N7NR	GWG	
LV U6 S F27G	GW4G	44W43	GWG	GWGG	2GWB1	C	C	8 V U6 S F27G	GWGG	2GWB1	N7NR	GWG	
LV U6 S F27N	GW4G	44WGG	GWG	GWGG	2GWB1	C	C	8 V U6 S F27N	GWGG	2GWB1	N7NR	GWG	
LV U6 S F277	GW4G	44WGN	GWG	GWGG	2GWB1	C	C	8 V U6 S F277	GWGG	2GWB1	N7NR	GWG	
LV U6 S F275	GW4G	44WGB	GWG	GWGG	2GWB1	C	C	8 V U6 S F275	GWGG	2GWB1	N7NR	GWG	
LV U6 S F27B	GW4G	44WN1	GWG	GWGG	2GWB1	C	C	8 V U6 S F27B	GWGG	2GWB1	N7NR	GWG	
LV U6 S F271	GW4G	44WN0	GWG	GWGG	2GWB1	C	C	8 V U6 S F271	GWGG	2GWB1	N7NR	GWG	
LV U6 S F270	GW4G	44W4B	GWG	GWGG	2GWB1	C	C	8 V U6 S F270	GWGG	2GWB1	N7NR	GWG	
LV U6 S F27R	GW4G	44W41	GWG	GWGG	2GWB1	C	C	8 V U6 S F27R	GWGG	2GWB1	N7NR	GWG	
LV U6 S F273	GW4G	44W43	GWG	GWGG	2GWB1	C	C	8 V U6 S F273	GWGG	2GWB1	N7NR	GWG	
LV U6 S F274	GW4G	44W44	GWG	GWGG	2GWB1	C	C	8 V U6 S F274	GWGG	2GWB1	N7NR	GWG	
LV U6 S F25N	GW4G	44W35	GWG	GWGG	2GWB1	C	C	8 V U6 S F25N	GWGG	2GWB1	N7NR	GWG	
LV U6 S F257	GW4G	44W30	GWG	GWGG	2GWB1	C	C	8 V U6 S F257	GWGG	2GWB1	N7NR	GWG	
LV U6 S F255	GW4G	44W3R	GWG	GWGG	2GWB1	C	C	8 V U6 S F255	GWGG	2GWB1	N7NR	GWG	
LV U6 S F25B	GW4G	44W3B	GWG	GWGG	2GWB1	C	C	8 V U6 S F25B	GWGG	2GWB1	N7NR	GWG	
LV U6 S F250	GW4G	44W3G	GWG	GWGG	2GWB1	C	C	8 V U6 S F250	GWGG	2GWB1	N7NR	GWG	
LV U6 S F25R	GW4G	44W3G	GWG	GWGG	2GWB1	C	C	8 V U6 S F25R	GWGG	2GWB1	N7NR	GWG	
LV U6 S F254	GW4G	44W37	GWG	GWGG	2GWB1	C	C	8 V U6 S F254	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2BG	GW4G	44W57	GWG	GWGG	2GWB1	C	C	8 V U6 S F2BG	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2BN	GW4G	44WGR	GWG	GWGG	2GWB1	C	C	8 V U6 S F2BN	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B7	GW4G	44WG3	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B7	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B5	GW4G	44WGR	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B5	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2BB	GW4G	44WN1	GWG	GWGG	2GWB1	C	C	8 V U6 S F2BB	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B1	GW4G	44W7G	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B1	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B0	GW4G	44W7R	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B0	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B3	GW4G	44W44	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B3	GWGG	2GWB1	N7NR	GWG	
LV U6 S F2B4	GW4G	44WGG	GWG	GWGG	2GWB1	C	C	8 V U6 S F2B4	GWGG	2GWB1	N7NR	GWG	
LV U6 S F21G	GW4G	44W44	GWG	GWGG	2GWB1	C	C	8 V U6 S F21G	GWGG	2GWB1	N7NR	GWG	
8 V U6 S F2GN	5BWGG	44WRR	GWG	C	G	GWGB	GWGB	8 V U6 S F2G7	2GWGB	2GWB4	7W	7W	
								LV U6 S F2GN	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G7	5BWGG	44WR4	GWG	C	G	GWGB	GWGB	8 V U6 S F2GN	GWGB	GWG5	NR	BWG	
								8 V U6 S F2G5	2GWG3	2GW17	BW	5W	
								LV U6 S F2G7	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G5	5BWGG	44W3N	GWG	C	G	GWGB	GWGB	8 V U6 S F2G7	GWG3	GWN7	5W	5W	
								8 V U6 S F2GB	2GWN7	2GW0N	0WG	5WB	

Bus		Voltage		Generation		Load		Load Flow					XFMR
-m	MV	f 8 agW	p ngW	8 D	8 %ar	8 D	8 %ar	-m	8 D	8 %ar	p _ 9	f P.	f Fa9
								LV U6 S F2G5	GWGG	GWB1	7WB	GWG	
8 V U6 S F2GB	5BWGG	44W35	GWG	C	G	GWGB	GWGB	8 V U6 S F2G5	GWN7	GWN1	1W	BWG	
								8 V U6 S F2G1	2GWNR	2GW0B	RW	5W	
								LV U6 S F2GB	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G1	5BWGG	44W3R	GWG	C	G	GWGB	GWGB	8 V U6 S F2GB	GWNR	GWN7	0W	BWG	
								8 V U6 S F2G3	2GW7N	2GW0N	4WB	5WR	
								LV U6 S F2G1	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G0	5BWGG	44W4G	GWG	C	G	GWGB	GWGB	8 V U6 S F2GR	2GWGB	2GWB4	7W	7W	
								LV U6 S F2G0	GWGG	GWB1	7WB	GWG	
8 V U6 S F2GR	5BWGG	44W4N	GWG	C	G	GWGB	GWGB	8 V U6 S F2G0	GWGB	GW7G	7WG	5W	
								8 V U6 S F2N0	GWGB	GW3B	NWB	BW	
								8 V U6 S F2N1	2GWN7	2GW15	1W	5W	
								LV U6 S F2GR	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G3	5BWGG	44W47	GWG	C	G	GWGB	GWGB	8 V U6 S F2G1	GW7N	GW0B	RW	BW	
								8 V U6 S F2G4	2GW71	2GWN5	NGW	BW	
								LV U6 S F2G3	GWGG	GWB1	7WB	GWG	
8 V U6 S F2G4	5BWGG	44W44	GWG	C	G	GWGB	GWGB	8 V U6 S F2G3	GW71	GW45	3W	1W	
								8 V U6 S F2NG	2GW74	2GWB7	NGW	BW	
								LV U6 S F2G4	GWGG	GWB1	7WB	GWG	
8 V U6 S F2NG	5BWGG	NGGWGG5	GWG	C	G	GWGB	GWGB	8 V U6 S F2G4	GW74	GW1N	4W	1W	
								8 V U6 S F271	2GW55	2GWGG	NWR	BW	
								LV U6 S F2NG	GWGG	GWB1	7WB	GWG	
8 V U6 S F2N5	5BWGG	44W34	GWG	C	G	GWGB	GWGB	8 V U6 S F2NB	2GWGB	2GWB4	7W	7W	
								LV U6 S F2N5	GWGG	GWB1	7WB	GWG	
8 V U6 S F2NB	5BWGG	44W4G	GWG	C	G	GWGB	GWGB	8 V U6 S F2N5	GWGB	GWNR	7WG	5W	
								8 V U6 S F2N1	2GWG3	2GW00	BW	5W	
								LV U6 S F2NB	GWGG	GWB1	7WB	GWG	
8 V U6 S F2N1	5BWGG	44W4B	GWG	C	G	GWGB	GWGB	8 V U6 S F2GR	GWN7	GW3G	BW	BW	
								8 V U6 S F2NB	GWG3	GW3R	5W	BW	
								8 V U6 S F2NR	2GW71	2GWN0	NGW	BWG	
								LV U6 S F2N1	GWGG	GWB1	7WB	GWG	
8 V U6 S F2N0	5BWGG	44W34	GWG	C	G	GWGB	GWGB	8 V U6 S F2GR	2GWGB	2GWB4	7W	7W	
								LV U6 S F2N0	GWGG	GWB1	7WB	GWG	
8 V U6 S F2NR	5BWGG	NGGWGG5	GWG	C	G	GWGB	GWGB	JU27/N	2GW74	2GW44	NGW	BW	
								8 V U6 S F2N1	GW71	GW1G	RW	1W	
								LV U6 S F2NR	GWGG	GWB1	7WB	GWG	
8 V U6 S F27G	5BWGG	NGGWGG	GWG	C	G	GWGB	GWGB	8 V U6 S F27N	2GWGB	2GWB4	7W	7W	
								LV U6 S F27G	GWGG	GWB1	7WB	GWG	
8 V U6 S F27N	5BWGG	NGGWGG7	GWG	C	G	GWGB	GWGB	8 V U6 S F27G	GWGB	GWRB	NW	1W	

Prolect:	T D OH D -T m	**ETAP**	Page: B
Location:	Paulding, OH	N0WGWC	mate: NG2C027GNR
Contract:			ST : D ESFD OOmP
Engineer:	Josh Venden	Study Case: NG1P6 NP.	v e%sion: GI' k ET
. ilena_ e:	T D j OH		ConAgW T or_ al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
-m	MV	f 8 agW	p ngW	8 D	8 %ar	8 D	8 %ar	-m	8 D	8 %ar	p _ 9	f P.	f Fa9
								8 V U6 S F277	2GWGB	2GW75	5WR	5WR	
								LV U6 S F27N	GWGG	GWB1	7WB	GWG	
8 V U6 S F277	5BWGG	NGGWGB	GWG	C	G	GWGB	GWGB	JU27/N	2GWNR	2GWGB	0WB	BWN	
								8 V U6 S F27N	GWG3	GW4B	5WW	BWW	
								8 V U6 S F274	GWGB	GW0N	NWG	0WB	
								LV U6 S F277	GWGG	GWB1	7WB	GWG	
8 V U6 S F275	5BWGG	NGGWG0	GWG	C	G	GWGB	GWGB	34. 5p	2GWB0	2GW03	N7WW	0WG	
								8 V U6 S F273	GWB7	GWN4	NGWB	0WR	
								LV U6 S F275	GWGG	GWB1	7WB	GWG	
8 V U6 S F27B	5BWGG	NGGWNR	GWG	C	G	GWGB	GWGB	8 V U6 S F271	2GWGB	2GWB4	7WW	7WB	
								LV U6 S F27B	GWGG	GWB1	7WB	GWG	
8 V U6 S F271	5BWGG	NGGWN3	GWG	C	G	GWGB	GWGB	34. Np	2GWB7	2GWR5	RWW	3WB	
								8 V U6 S F2NG	GW55	GWN3	5WR	N1WW	
								8 V U6 S F27B	GWGB	GWG0	NWB	5WW	
								LV U6 S F271	GWGG	GWB1	7WB	GWG	
8 V U6 S F270	5BWGG	44WW4R	GWG	C	G	GWGB	GWGB	8 V U6 S F27R	2GWGB	2GWB4	7WW	7WB	
								LV U6 S F270	GWGG	GWB1	7WB	GWG	
8 V U6 S F27R	5BWGG	44WW43	GWG	C	G	GWGB	GWGB	8 V U6 S F270	GWGB	GWN7	NWW	5WR	
								8 V U6 S F273	2GWG3	2GW0N	BWB	5WW	
								LV U6 S F27R	GWGG	GWB1	7WB	GWG	
8 V U6 S F273	5BWGG	NGGWGG	GWG	C	G	GWGB	GWGB	8 V U6 S F275	2GWB7	2GWR7	N7WW	1WB	
								8 V U6 S F27R	GWG3	GW71	5WB	5WR	
								8 V U6 S F255	GW74	GW43	0WR	RWW	
								LV U6 S F273	GWGG	GWB1	7WB	GWG	
8 V U6 S F274	5BWGG	NGGWGN	GWG	C	G	GWGB	GWGB	8 V U6 S F277	2GWGB	2GWB4	7WW	7WB	
								LV U6 S F274	GWGG	GWB1	7WB	GWG	
8 V U6 S F25N	5BWGG	44WW30	GWG	C	G	GWGB	GWGB	8 V U6 S F257	2GWGB	2GWB4	7WW	7WB	
								LV U6 S F25N	GWGG	GWB1	7WB	GWG	
8 V U6 S F257	5BWGG	44WW33	GWG	C	G	GWGB	GWGB	8 V U6 S F25N	GWGB	GW54	GWR	NGWW	
								8 V U6 S F255	2GWG3	2GW34	5WW	BWB	
								LV U6 S F257	GWGG	GWB1	7WB	GWG	
8 V U6 S F255	5BWGG	44WW34	GWG	C	G	GWGB	GWGB	8 V U6 S F273	2GW74	2GWB0	NGWB	BWW	
								8 V U6 S F257	GWG3	GW0N	7WR	1WW	
								8 V U6 S F25B	GWNR	GW50	1WW	1WG	
								LV U6 S F255	GWGG	GWB1	7WB	GWG	
8 V U6 S F25B	5BWGG	44WW3R	GWG	C	G	GWGB	GWGB	8 V U6 S F255	2GWNR	2GW3G	0WB	BWB	
								8 V U6 S F250	GWG3	GWGN	5WB	BWN	
								8 V U6 S F254	GWGB	GW74	GWW	NBWG	
								LV U6 S F25B	GWGG	GWB1	7WB	GWG	

ProIect:	T D OH D -T m	**ETAP**		Page:	1
Location:	Paulding, OH	N0 WGWC		mate:	NG2G0 27GNR
Contract:				ST :	D ESFD OOmP
Engineer:	Josh Venden	Study Case:	NG1P6 NP.	v e%ision:	Gr k ET
. ilena_ e:	T D j OH			ConAgW	T or_ al

Bus		Voltage		Generation		Load		Load Flow					XFMR
-m	MV	f 8 agW	p ngW	8 D	8 %ar	8 D	8 %ar	-m	8 D	8 %ar	p _ 9	f P.	f Fa9
8 V U6 S F250	5BWGG	44W35	GWG	C	G	GWGB	GWGB	8 V U6 S F25B	2GWG3	2GW7RN	BW	5W	
								8 V U6 S F25R	GWGB	GW77	7WG	5WB	
								LV U6 S F250	GWGG	GWB1	7WB	GWG	
8 V U6 S F25R	5BWGG	44W37	GWG	C	G	GWGB	GWGB	8 V U6 S F250	2GWGB	2GWB4	7W	7W	
								LV U6 S F25R	GWGG	GWB1	7WB	GWG	
8 V U6 S F254	5BWGG	44W3B	GWG	C	G	GWGB	GWGB	8 V U6 S F25B	2GWGB	2GWB4	7W	7W	
								LV U6 S F254	GWGG	GWB1	7WB	GWG	
8 V U6 S F2BG	5BWGG	NGGW5B	GWG	C	G	GWGB	GWGB	34. Bp	2GWB7	2GW57	NGW	0W	
								8 V U6 S F2B0	GW53	GWB35	3W	RW	
								LV U6 S F2BG	GWGG	GWB1	7WB	GWG	
8 V U6 S F2BN	5BWGG	NGGWG4	GWG	C	G	GWGB	GWGB	JU2B/N	2GWGB	2GWB4	7W	7W	
								LV U6 S F2BN	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B7	5BWGG	NGGWNG	GWG	C	G	GWGB	GWGB	JU2B/N	2GWNR	2GW10	0WG	BWR	
								8 V U6 S F2B4	GWN5	GW7GR	5W	0WG	
								LV U6 S F2B7	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B5	5BWGG	NGGWG4	GWG	C	G	GWGB	GWGB	JU2B/N	2GWGB	2GWB4	7W	7W	
								LV U6 S F2B5	GWGG	GWB1	7WB	GWG	
8 V U6 S F2BB	5BWGG	NGGWNR	GWG	C	G	GWGB	GWGB	JU2B/N	GW71	GW04	RW	1W	
								8 V U6 S F2B1	2GW74	2GWN3	NGW	BWR	
								LV U6 S F2BB	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B1	5BWGG	NGGW75	GWG	C	G	GWGB	GWGB	8 V U6 S F2BB	GW74	GW40	3W	1W	
								8 V U6 S F2B0	2GW55	2GWB1	NGW	1W	
								LV U6 S F2B1	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B0	5BWGG	NGGW5G	GWG	C	G	GWGB	GWGB	8 V U6 S F2BG	2GW5R	2GWG1	NGW	0W	
								8 V U6 S F2B1	GW55	GWB10	RW	RW	
								LV U6 S F2B0	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B3	5BWGG	NGGWGN	GWG	C	G	GWGB	GWGB	8 V U6 S F2B4	2GWGB	2GWB4	7W	7W	
								LV U6 S F2B3	GWGG	GWB1	7WB	GWG	
8 V U6 S F2B4	5BWGG	NGGWG7	GWG	C	G	GWGB	GWGB	8 V U6 S F2B7	2GWN7	2GWR0	0W	5W	
								8 V U6 S F2B3	GWGB	GWN5	NW	5WR	
								8 V U6 S F21G	GWGB	GWNB	NW	5W	
								LV U6 S F2B4	GWGG	GWB1	7WB	GWG	
8 V U6 S F21G	5BWGG	NGGWGN	GWG	C	G	GWGB	GWGB	8 V U6 S F2B4	2GWGB	2GWB4	7W	7W	
								LV U6 S F21G	GWGG	GWB1	7WB	GWG	
* PO-	N53WGG	NG1WGG	GWG	GW5B	2GWNN	C	C	34FNp	GW5B	2GWNN	GW	244W	
8 PF~5	N5WGG	NGGW70	GWG	C	G	C	C	HV U6 S 8 PF	GWGG	GWGG	GWG	GWG	
							&	34FNU					

* -ndicates a %oltage regulated bus (%oltage controlled or swing ty9e _ achine connected to it)

\# -ndicates a bus with a load _ is_ atch oA_ ore than GW8 Vp

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
34YFp	52.G00	F00.7G0	7.F	0	0	0	0	8 V B1 S I -7G	-6.F32	-F.F55	F02.4	43.2	
								34I FB	6.F32	F.F55	F02.4	43.2	
34Y7p	52.G00	F00.7G0	7.F	0	0	0	0	JB-7/F	-6.305	-F.FFG	FFGF	43.R	
								34I FB	6.305	F.FFG	FFGF	43.R	
34Y5p	52.G00	F00.7G0	7.F	0	0	0	0	8 V B1 S I -75	-6.300	-F.5R0	FFG3	43.0	
								34I FB	6.300	F.5R0	FFG3	43.0	
34Y2p	52.G00	F00.7G0	7.F	0	0	0	0	8 V B1 S I -20	-6.F63	-7.7R3	F04.3	45.3	
								34I FB	6.F63	7.7R3	F04.3	45.3	
34I Fp	F53.000	F00.007	0.0	0	0	0	0	PON	7G3R6	2.R5G	FF0.F	43.2	
								HV B1 S 8 PI	-7G3R6	-2.R5G	FF0.F	43.2	
34I FB	52.G00	F00.7G0	7.F	0	0	0	0	34Y2p	-6.F63	-7.7R3	F04.3	45.3	
								34Y5p	-6.300	-F.5R0	FFG3	43.0	
								34Y7p	-6.305	-F.FFG	FFGF	43.R	
								34YFp	-6.F32	-F.F55	F02.4	43.2	
								8 PI ~5	7G4G2	G34R	222.5	4R.G	
								& HV B1 S 8 PI					
HV B1 S 8 PI	F53.000	F00.007	0.0	0	0	0.0G2	0.F2R	34I Fp	7G3R6	2.R5G	FF0.F	43.2	
								34I FB	-7G474	-2.337	FF0.2	43.5	0.67G
								& 8 PI ~5					
JB-7/F	52.G00	F00.566	7.7	0	0	0	0	8 V B1 S I -FR	-2.555	-0.2R3	R7.R	44.2	
								8 V B1 S I -77	-7.2RR	-0.77G	2F.G	44.6	
								34Y7p	6.304	0.R05	FF2.F	44.G	
JB-2/F	52.G00	F00.337	7.G	0	0	0	0	8 V B1 S I -2F	-0.670	-0.0F3	F0.5	F00.0	
								8 V B1 S I -27	-7.2RR	-0.F43	2F.7	44.R	
								8 V B1 S I -25	-0.670	-0.0FR	F0.5	F00.0	
								8 V B1 S I -22	5.RFR	0.752	6F.3	44.3	
LV B1 S I -0F	0.640	F00.323	5.F	0.67G	0.000	0	0	8 V B1 S I -0F	0.67G	0.000	GF3.G	F00.0	
LV B1 S I -07	0.640	F00.37F	5.F	0.67G	0.000	0	0	8 V B1 S I -07	0.67G	0.000	GF3.6	F00.0	
LV B1 S I -05	0.640	F00.RR2	5.F	0.67G	0.000	0	0	8 V B1 S I -05	0.67G	0.000	GF3.4	F00.0	
LV B1 S I -02	0.640	F00.R27	5.F	0.67G	0.000	0	0	8 V B1 S I -02	0.67G	0.000	GF4.0	F00.0	
LV B1 S I -0G	0.640	F00.64G	5.F	0.67G	0.000	0	0	8 V B1 S I -0G	0.67G	0.000	GF4.5	F00.0	
LV B1 S I -06	0.640	F00.63F	5.0	0.67G	0.000	0	0	8 V B1 S I -06	0.67G	0.000	GF4.2	F00.0	
LV B1 S I -0R	0.640	F00.665	5.0	0.67G	0.000	0	0	8 V B1 S I -0R	0.67G	0.000	GF4.2	F00.0	
LV B1 S I -03	0.640	F00.6G4	5.0	0.67G	0.000	0	0	8 V B1 S I -03	0.67G	0.000	GF4.G	F00.0	
LV B1 S I -04	0.640	F00.60G	5.0	0.67G	0.000	0	0	8 V B1 S I -04	0.67G	0.000	GF4.R	F00.0	
LV B1 S I -F0	0.640	F00.GR6	5.0	0.67G	0.000	0	0	8 V B1 S I -F0	0.67G	0.000	GF4.4	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
LV B1 S I -F5	0.640	F00.R7R	5.0	0.67G	0.000	0	0	8 V B1 S I -F5	0.67G	0.000	GF4.F	F00.0	
LV B1 S I -F2	0.640	F00.R03	5.0	0.67G	0.000	0	0	8 V B1 S I -F2	0.67G	0.000	GF4.7	F00.0	
LV B1 S I -FG	0.640	F00.6F5	5.0	0.67G	0.000	0	0	8 V B1 S I -FG	0.67G	0.000	GF4.R	F00.0	
LV B1 S I -F6	0.640	F00.R07	5.0	0.67G	0.000	0	0	8 V B1 S I -F6	0.67G	0.000	GF4.7	F00.0	
LV B1 S I -FR	0.640	F00.G54	5.0	0.67G	0.000	0	0	8 V B1 S I -FR	0.67G	0.000	G70.F	F00.0	
LV B1 S I -70	0.640	F00.6G5	5.0	0.67G	0.000	0	0	8 V B1 S I -70	0.67G	0.000	GF4.G	F00.0	
LV B1 S I -7F	0.640	F00.603	5.0	0.67G	0.000	0	0	8 V B1 S I -7F	0.67G	0.000	GF4.R	F00.0	
LV B1 S I -77	0.640	F00.GR5	5.0	0.67G	0.000	0	0	8 V B1 S I -77	0.67G	0.000	GF4.4	F00.0	
LV B1 S I -75	0.640	F00.G66	5.0	0.67G	0.000	0	0	8 V B1 S I -75	0.67G	0.000	GF4.4	F00.0	
LV B1 S I -72	0.640	F00.2GR	7.4	0.67G	0.000	0	0	8 V B1 S I -72	0.67G	0.000	G70.G	F00.0	
LV B1 S I -7G	0.640	F00.223	7.4	0.67G	0.000	0	0	8 V B1 S I -7G	0.67G	0.000	G70.6	F00.0	
LV B1 S I -76	0.640	F00.664	5.0	0.67G	0.000	0	0	8 V B1 S I -76	0.67G	0.000	GF4.2	F00.0	
LV B1 S I -7R	0.640	F00.626	5.0	0.67G	0.000	0	0	8 V B1 S I -7R	0.67G	0.000	GF4.G	F00.0	
LV B1 S I -73	0.640	F00.602	5.0	0.67G	0.000	0	0	8 V B1 S I -73	0.67G	0.000	GF4.3	F00.0	
LV B1 S I -74	0.640	F00.67G	5.0	0.67G	0.000	0	0	8 V B1 S I -74	0.67G	0.000	GF4.6	F00.0	
LV B1 S I -5F	0.640	F00.R32	5.F	0.67G	0.000	0	0	8 V B1 S I -5F	0.67G	0.000	GF3.3	F00.0	
LV B1 S I -57	0.640	F00.RF3	5.F	0.67G	0.000	0	0	8 V B1 S I -57	0.67G	0.000	GF4.7	F00.0	
LV B1 S I -55	0.640	F00.63G	5.F	0.67G	0.000	0	0	8 V B1 S I -55	0.67G	0.000	GF4.5	F00.0	
LV B1 S I -52	0.640	F00.R7G	5.F	0.67G	0.000	0	0	8 V B1 S I -52	0.67G	0.000	GF4.F	F00.0	
LV B1 S I -56	0.640	F00.303	5.F	0.67G	0.000	0	0	8 V B1 S I -56	0.67G	0.000	GF3.R	F00.0	
LV B1 S I -5R	0.640	F00.372	5.F	0.67G	0.000	0	0	8 V B1 S I -5R	0.67G	0.000	GF3.6	F00.0	
LV B1 S I -54	0.640	F00.R4R	5.F	0.67G	0.000	0	0	8 V B1 S I -54	0.67G	0.000	GF3.3	F00.0	
LV B1 S I -20	0.640	F00.35G	5.F	0.67G	0.000	0	0	8 V B1 S I -20	0.67G	0.000	GF3.6	F00.0	
LV B1 S I -2F	0.640	F0F.052	5.7	0.67G	0.000	0	0	8 V B1 S I -2F	0.67G	0.000	GFRG	F00.0	
LV B1 S I -27	0.640	F0F.0FR	5.7	0.67G	0.000	0	0	8 V B1 S I -27	0.67G	0.000	GFR6	F00.0	
LV B1 S I -25	0.640	F0F.055	5.7	0.67G	0.000	0	0	8 V B1 S I -25	0.67G	0.000	GFRG	F00.0	
LV B1 S I -22	0.640	F00.460	5.7	0.67G	0.000	0	0	8 V B1 S I -22	0.67G	0.000	GFR4	F00.0	
LV B1 S I -2G	0.640	F00.470	5.7	0.67G	0.000	0	0	8 V B1 S I -2G	0.67G	0.000	GF3.F	F00.0	
LV B1 S I -26	0.640	F00.3RF	5.7	0.67G	0.000	0	0	8 V B1 S I -26	0.67G	0.000	GF3.2	F00.0	
LV B1 S I -23	0.640	F0F.FGG	5.5	0.67G	0.000	0	0	8 V B1 S I -23	0.67G	0.000	GF6.4	F00.0	
LV B1 S I -24	0.640	F0F.F55	5.5	0.67G	0.000	0	0	8 V B1 S I -24	0.67G	0.000	GFR0	F00.0	
LV B1 S I -G0	0.640	F0F.FG2	5.5	0.67G	0.000	0	0	8 V B1 S I -G0	0.67G	0.000	GF6.4	F00.0	
8 V B1 S I -0F	52.G00	F00.RF2	7.5	0	0	0.002	0.002	8 V B1 S I -07	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -0F	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -07	52.G00	F00.636	7.5	0	0	0.002	0.002	8 V B1 S I -0F	-0.670	-0.056	F0.5	44.3	
								8 V B1 S I -05	F.720	0.072	70.6	F00.0	
								LV B1 S I -07	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -05	52.G00	F00.654	7.5	0	0	0.002	0.002	8 V B1 S I -07	-F.754	-0.062	70.6	44.4	
								8 V B1 S I -02	F.3G4	0.0G7	50.4	F00.0	

Project:	UW OH WNUD	ETAP	Page:	5
Location:	Paulding, OH	F6.0.0C	Date:	F0-02-70FR
Contract:			SU:	WESI WOODP
Engineer:	Josh Venden	Study Case: 1 UNI T PY	ve%ision:	7GI k EU
Yilename:	UW_OH		ConAg.:	Uormal

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
								LV B1 S I -05	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -02	52.C00	F00.603	7.5	0	0	0.002	0.002	8 V B1 S I -05	-F.3G3	-0.044	5F.0	44.4	
								8 V B1 S I -0G	7.2R3	0.03R	2F.7	44.4	
								LV B1 S I -02	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -0G	52.C00	F00.G60	7.5	0	0	0.002	0.002	8 V B1 S I -02	-7.2RR	-0.F20	2F.5	44.3	
								8 V B1 S I -03	5.04R	0.F73	GF.6	44.4	
								LV B1 S I -0G	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -06	52.C00	F00.G26	7.5	0	0	0.002	0.002	8 V B1 S I -0R	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -06	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -0R	52.C00	F00.G74	7.5	0	0	0.002	0.002	8 V B1 S I -06	-0.670	-0.0F3	F0.5	F00.0	
								8 V B1 S I -F6	-0.670	-0.0G2	F0.2	44.6	
								8 V B1 S I -FG	F.3G4	0.060	5F.0	44.4	
								LV B1 S I -0R	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -03	52.C00	F00.G72	7.5	0	0	0.002	0.002	8 V B1 S I -0G	-5.046	-0.77G	GF.R	44.R	
								8 V B1 S I -04	5.RF6	0.7F2	67.0	44.3	
								LV B1 S I -03	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -04	52.C00	F00.2RF	7.5	0	0	0.002	0.002	8 V B1 S I -03	-5.RF2	-0.555	67.F	44.6	
								8 V B1 S I -F0	2.552	0.57F	R7.2	44.R	
								LV B1 S I -04	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -F0	52.C00	F00.22F	7.5	0	0	0.002	0.002	8 V B1 S I -04	-2.555	-0.2F7	R7.G	44.6	
								8 V B1 S I -7G	2.4G7	0.200	37.3	44.R	
								LV B1 S I -F0	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -F5	52.C00	F00.G45	7.5	0	0	0.002	0.002	8 V B1 S I -F2	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -F5	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -F2	52.C00	F00.GR2	7.5	0	0	0.002	0.002	8 V B1 S I -F5	-0.670	-0.07F	F0.5	44.4	
								8 V B1 S I -FG	F.720	0.004	70.6	F00.0	
								LV B1 S I -F2	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -FG	52.C00	F00.2R4	7.5	0	0	0.002	0.002	8 V B1 S I -0R	-F.3G3	-0.F55	5F.0	44.R	
								8 V B1 S I -F2	-F.753	-0.034	70.R	44.R	
								8 V B1 S I -FR	5.RFR	0.7F0	67.0	44.3	
								LV B1 S I -FG	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -F6	52.C00	F00.G6R	7.5	0	0	0.002	0.002	8 V B1 S I -0R	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -F6	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -FR	52.C00	F00.202	7.7	0	0	0.002	0.002	JB-7/F	2.552	0.562	R7.G	44.6	
								8 V B1 S I -FG	-5.RF2	-0.5R6	67.7	44.G	
								LV B1 S I -FR	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -70	52.C00	F00.GF4	7.7	0	0	0.002	0.002	8 V B1 S I -7F	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -70	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -7F	52.C00	F00.2R2	7.7	0	0	0.002	0.002	8 V B1 S I -70	-0.670	-0.062	F0.2	44.G	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
								8 V B1 S I -77	F.720	0.0G7	70.R	44.4	
								LV B1 S I -7F	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -77	52.G00	F00.253	7.7	0	0	0.002	0.002	JB-7/F	7.2R4	0.F2R	2F.2	44.3	
								8 V B1 S I -7F	-F.754	-0.037	70.R	44.3	
								8 V B1 S I -74	-0.670	-0.0RR	F0.2	44.7	
								LV B1 S I -77	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -75	52.G00	F00.257	7.5	0	0	0.002	0.002	34Y5p	6.3F0	0.R2G	FF2.F	44.2	
								8 V B1 S I -73	-6.F40	-0.RGR	F05.4	44.5	
								LV B1 S I -75	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -72	52.G00	F00.577	7.7	0	0	0.002	0.002	8 V B1 S I -7G	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -72	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -7G	52.G00	F00.5F5	7.7	0	0	0.002	0.002	34YFp	6.F3R	0.343	F02.5	44.0	
								8 V B1 S I -F0	-2.42R	-0.3R3	35.3	43.G	
								8 V B1 S I -72	-0.670	-0.05F	F0.2	44.4	
								LV B1 S I -7G	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -76	52.G00	F00.G52	7.5	0	0	0.002	0.002	8 V B1 S I -7R	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -76	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -7R	52.G00	F00.GF7	7.5	0	0	0.002	0.002	8 V B1 S I -76	-0.670	-0.076	F0.5	44.4	
								8 V B1 S I -73	F.720	0.0F2	70.6	F00.0	
								LV B1 S I -7R	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -73	52.G00	F00.264	7.5	0	0	0.002	0.002	8 V B1 S I -75	6.F47	0.606	F05.6	44.G	
								8 V B1 S I -7R	-F.754	-0.0GF	70.R	44.4	
								8 V B1 S I -55	-2.555	-0.G6R	R7.3	44.7	
								LV B1 S I -73	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -74	52.G00	F00.24F	7.7	0	0	0.002	0.002	8 V B1 S I -77	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -74	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -5F	52.G00	F00.624	7.5	0	0	0.002	0.002	8 V B1 S I -57	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -5F	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -57	52.G00	F00.G35	7.5	0	0	0.002	0.002	8 V B1 S I -5F	-0.6F4	-0.044	F0.2	43.R	
								8 V B1 S I -55	F.754	0.033	70.R	44.3	
								LV B1 S I -57	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -55	52.G00	F00.GG0	7.5	0	0	0.002	0.002	8 V B1 S I -73	2.556	0.570	R7.2	44.R	
								8 V B1 S I -57	-F.754	-0.FFG	70.R	44.6	
								8 V B1 S I -52	-7.2RR	-0.7F6	2F.2	44.6	
								LV B1 S I -55	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -52	52.G00	F00.G40	7.5	0	0	0.002	0.002	8 V B1 S I -55	7.2R3	0.FR7	2F.5	44.3	
								8 V B1 S I -56	-F.754	-0.0RG	70.6	44.3	
								8 V B1 S I -54	-0.6F4	-0.F04	F0.G	43.G	
								LV B1 S I -52	-0.672	0.003	F0.2	F00.0	

Project:	UW OH WNUD	**ETAP**	Page: G
Location:	Paulding, OH	F6.0.0C	Date: F0-02-70FR
Contract:			SU: WESI WOODP
Engineer:	Josh Venden	Study Case: 1 UNT PY	ve%sion: 7GΓ k EU
Yilename:	UW_OH		ConAg.: Uormal

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
8 V B1 S I -56	52.C00	F00.6R2	7.2	0	0	0.002	0.002	8 V B1 S I -52	F.720	0.002	70.6	F00.0	
								8 V B1 S I -5R	-0.670	-0.0F6	F0.5	F00.0	
								LV B1 S I -56	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -5R	52.C00	F00.640	7.2	0	0	0.002	0.002	8 V B1 S I -56	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -5R	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -54	52.C00	F00.667	7.2	0	0	0.002	0.002	8 V B1 S I -52	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -54	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -20	52.C00	F00.R00	7.2	0	0	0.002	0.002	34Y2p	6.F34	0.R2R	F05.6	44.5	
								8 V B1 S I -26	-GC64	-0.RG4	45.2	44.F	
								LV B1 S I -20	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -2F	52.C00	F00.400	7.G	0	0	0.002	0.002	JB-2/F	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -2F	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -27	52.C00	F00.335	7.G	0	0	0.002	0.002	JB-2/F	7.2RR	0.F43	2F.7	44.R	
								8 V B1 S I -24	-F.3GR	-0.704	5F.0	44.2	
								LV B1 S I -27	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -25	52.C00	F00.344	7.G	0	0	0.002	0.002	JB-2/F	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -25	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -22	52.C00	F00.37G	7.G	0	0	0.002	0.002	JB-2/F	-5.RFG	-0.56F	6F.4	44.G	
								8 V B1 S I -2G	2.552	0.524	R7.7	44.R	
								LV B1 S I -22	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -2G	52.C00	F00.R36	7.G	0	0	0.002	0.002	8 V B1 S I -22	-2.555	-0.2RF	R7.2	44.2	
								8 V B1 S I -26	2.4G5	0.260	37.6	44.6	
								LV B1 S I -2G	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -26	52.C00	F00.R5R	7.2	0	0	0.002	0.002	8 V B1 S I -20	GGRF	0.65R	45.F	44.2	
								8 V B1 S I -2G	-2.4GF	-0.624	37.4	44.7	
								LV B1 S I -26	-0.672	0.003	F0.2	F00.0	
8 V B1 S I -23	52.C00	F0F.07F	7.G	0	0	0.002	0.002	8 V B1 S I -24	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -23	-0.672	0.003	F0.5	F00.0	
8 V B1 S I -24	52.C00	F00.444	7.G	0	0	0.002	0.002	8 V B1 S I -27	F.3G4	0.053	50.3	F00.0	
								8 V B1 S I -23	-0.670	-0.07G	F0.5	44.4	
								8 V B1 S I -C0	-0.670	-0.072	F0.5	44.4	
								LV B1 S I -24	-0.672	0.003	F0.5	F00.0	
8 V B1 S I -C0	52.C00	F0F.070	7.G	0	0	0.002	0.002	8 V B1 S I -24	0.670	-0.0F7	F0.5	-F00.0	
								LV B1 S I -C0	-0.672	0.003	F0.5	F00.0	
* PON	F53.000	F00.000	0.0	-7G3RG	-2.R54	0	0	34I Fp	-7G3RG	-2.R54	FF0.F	43.2	
8 PI ~5	F5.300	F00.502	7.5	0	0	0	0	HV B1 S 8 PI	0.000	0.000	0.0	0.0	
								& 34I FB					

* Ndicates a %oltage regulated bus (%oltage controlled or swing ty9e machine connected to it)

\# Ndicates a bus with a load mismatch oAmore than 0.F 8 Vp

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	Rj	3 m	3 Mar	. - 4	p PI	p _a4
51I N	B%6DD	NDDN1W	f TN	[	D	[	[	3 V UGS _vf 6	vWN5B	vf TDWD	ND5T5	1%I	
								51_NU	WN5B	f TDWD	ND5T5	1%I	
51I f .	B%6DD	NDDN1W	f TN	[	D	[	[	JUvf /N	vW5Df	vf TNB6	NN1TN	16T%	
								51_NU	W5Df	f TNB6	NN1TN	16T%	
51I B.	B%6DD	NDDN1W	f TN	[	D	[	[	3 V UGS _vf B	vWk15	vf TB51	Nf DP%	1%B	
								51_NU	Wk15	f TB51	Nf DP%	1%B	
51I %	B%6DD	NDDN1W	f TN	[	D	[	[	3 V UGS _v%D	vWNWW	vBTf DB	NNWD	55Tk	
								51_NU	WNWW	BTf DB	NNWD	55Tk	
51_N	NB5TDDD	NDDIDDf	DID	[	D	[	[	POR	f 6T5W5	5T6B5	NN%D	16TD	
								HV UGS 3 P_	vf 6T5W5	v5T6B5	NN%D	16TD	
51_NU	B%6DD	NDDN1W	f TN	[	D	[	[	51I %	vWNWW	vBTf DB	NNWD	55Tk	
								51I B.	vWk15	vf TB51	Nf DP%	1%B	
								51I f .	vW5Df	vf TNB6	NN1TN	16T%	
								51I N	vWN5B	vf TDWD	ND5T5	1%I	
								3 P_~B	f 6TI%I	1Tk55	%WBTf	1BTW	
								& HV UGS 3 P_					
HV UGS 3 P_	NB5TDDD	NDDIDDf	DID	[	D	DID6%	DIN%k	51_N	f 6T5W5	5T6B5	NN%D	16TD	
								51_NU	vf 6TI f N	v5TW5W	NN%P%	1%5	NIf 6D
								& 3 P_~B					
JUvf /N	B%6DD	NDDIBB5	f Tf	[	D	[	[	3 V UGS _vNk	v%BBf	vNNf 5	k%k	1W5	
								3 V UGS _vf f	vf TP%kk	vDI61W	%f T6	1kTf	
								51I f .	W5DI	NIkf %	NNkTN	1WII	
JUv%N	B%6DD	NDDII B1	f T6	[	D	[	[	3 V UGS _v%N	vDIWD	vDINNN	NDP%	15T%	
								3 V UGS _v%f	vf TP%kk	vDI6kD	%f TN	1kT6	
								3 V UGS _v%B	vDIWD	vDINND	NDP%	15T6	
								3 V UGS _v%%	BIkNW	DIk1N	WBID	1kT5	
LV UGS _vDN	DIWD	NDNID%6	BID	DIW6	DIDIB	[	[	3 V UGS _vDN	DIW6	DIDIB	6f BTf	15TI	
LV UGS _vDf	DIWD	NDNIDNW	BID	DIW6	DIDIB	[	[	3 V UGS _vDf	DIW6	DIDIB	6f BTB	15TI	
LV UGS _vDB	DIWD	NDDII W5	BID	DIW6	DIDIB	[	[	3 V UGS _vDB	DIW6	DIDIB	6f BTW	15TI	
LV UGS _vD%	DIWD	NDDII B%	BID	DIW6	DIDIB	[	[	3 V UGS _vD%	DIW6	DIDIB	6f BT5	15TI	
LV UGS _vD6	DIWD	NDDI55%	BID	DIW6	DIDIB	[	[	3 V UGS _vD6	DIW6	DIDIB	6f %D	15TI	
LV UGS _vDW	DIWD	NDDI5Wf	BID	DIW6	DIDIB	[	[	3 V UGS _vDW	DIW6	DIDIB	6f %N	15TI	
LV UGS _vDk	DIWD	NDDI5%%	BID	DIW6	DIDIB	[	[	3 V UGS _vDk	DIW6	DIDIB	6f %f	15TI	
LV UGS _vD5	DIWD	NDDI5%%	BID	DIW6	DIDIB	[	[	3 V UGS _vD5	DIW6	DIDIB	6f %f	15TI	
LV UGS _vDI	DIWD	NDDIk5%	BID	DIW6	DIDIB	[	[	3 V UGS _vDI	DIW6	DIDIB	6f %6	15TI	
LV UGS _vND	DIWD	NDDIk6D	BID	DIW6	DIDIB	[	[	3 V UGS _vND	DIW6	DIDIB	6f %k	15TI	

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	Rj	3 m	3 Mar	. - 4	p PI	p _a4
LV UGS _vNB	DIWD	NDDIID5	BID	DIW6	DIDIB	[	[	3 V UGS _vNB	DIW6	DIDIB	6f BII	15TI	
LV UGS _vN%	DIWD	NDD555	BID	DIW6	DIDIB	[	[	3 V UGS _vN%	DIW6	DIDIB	6f %ID	15TI	
LV UGS _vN6	DIWD	NDDk1N	BID	DIW6	DIDIB	[	[	3 V UGS _vN6	DIW6	DIDIB	6f %I6	15TI	
LV UGS _vNW	DIWD	NDD55%	BID	DIW6	DIDIB	[	[	3 V UGS _vNW	DIW6	DIDIB	6f %ID	15TI	
LV UGS _vNk	DIWD	NDDkDk	BID	DIW6	DIDIB	[	[	3 V UGS _vNk	DIW6	DIDIB	6f %II	15TI	
LV UGS _vf D	DIWD	NDD5f B	BID	DIW6	DIDIB	[	[	3 V UGS _vf D	DIW6	DIDIB	6f %IB	15TI	
LV UGS _vf N	DIWD	NDDkkk	BID	DIW6	DIDIB	[	[	3 V UGS _vf N	DIW6	DIDIB	6f %IW	15TI	
LV UGS _vf f	DIWD	NDDk%D	BID	DIW6	DIDIB	[	[	3 V UGS _vf f	DIW6	DIDIB	6f %I5	15TI	
LV UGS _vf B	DIWD	NDDk%f	BID	DIW6	DIDIB	[	[	3 V UGS _vf B	DIW6	DIDIB	6f %I5	15TI	
LV UGS _vf %	DIWD	NDDIWDI	f TI	DIW6	DIDIB	[	[	3 V UGS _vf %	DIW6	DIDIB	6f 6T%	15TI	
LV UGS _vf 6	DIWD	NDD511	f TI	DIW6	DIDIB	[	[	3 V UGS _vf 6	DIW6	DIDIB	6f 6T6	15TI	
LV UGS _vf W	DIWD	NDD56%	BID	DIW6	DIDIB	[	[	3 V UGS _vf W	DIW6	DIDIB	6f %If	15TI	
LV UGS _vf k	DIWD	NDD5BN	BID	DIW6	DIDIB	[	[	3 V UGS _vf k	DIW6	DIDIB	6f %IB	15TI	
LV UGS _vf 5	DIWD	NDDk5k	BID	DIW6	DIDIB	[	[	3 V UGS _vf 5	DIW6	DIDIB	6f %I6	15TI	
LV UGS _vf 1	DIWD	NDDk1%	BID	DIW6	DIDIB	[	[	3 V UGS _vf 1	DIW6	DIDIB	6f %I6	15TI	
LV UGS _vBN	DIWD	NDDII5f	BID	DIW6	DIDIB	[	[	3 V UGS _vBN	DIW6	DIDIB	6f BI6	15TI	
LV UGS _vBf	DIWD	NDDIIN6	BID	DIW6	DIDIB	[	[	3 V UGS _vBf	DIW6	DIDIB	6f BII	15TI	
LV UGS _vBB	DIWD	NDD55D	BID	DIW6	DIDIB	[	[	3 V UGS _vBB	DIW6	DIDIB	6f %ID	15TI	
LV UGS _vB%	DIWD	NDDIIf B	BID	DIW6	DIDIB	[	[	3 V UGS _vB%	DIW6	DIDIB	6f BI5	15TI	
LV UGS _vBW	DIWD	NDNIDDI	BID	DIW6	DIDIB	[	[	3 V UGS _vBW	DIW6	DIDIB	6f BI%	15TI	
LV UGS _vBk	DIWD	NDNIDf 6	BID	DIW6	DIDIB	[	[	3 V UGS _vBk	DIW6	DIDIB	6f BIB	15TI	
LV UGS _vBI	DIWD	NDDII1k	BID	DIW6	DIDIB	[	[	3 V UGS _vBI	DIW6	DIDIB	6f BI%	15TI	
LV UGS _v%D	DIWD	NDNID66	BIN	DIW6	DIDIB	[	[	3 V UGS _v%D	DIW6	DIDIB	6f BIN	15TI	
LV UGS _v%N	DIWD	NDNIf 5f	BIf	DIW6	DIDIB	[	[	3 V UGS _v%N	DIW6	DIDIB	6f f TD	15TI	
LV UGS _v%f	DIWD	NDNIf W6	BIf	DIW6	DIDIB	[	[	3 V UGS _v%f	DIW6	DIDIB	6f f TD	15TI	
LV UGS _v%B	DIWD	NDNIf 5f	BIf	DIW6	DIDIB	[	[	3 V UGS _v%B	DIW6	DIDIB	6f f TD	15TI	
LV UGS _v%%	DIWD	NDNIf DN	BIf	DIW6	DIDIB	[	[	3 V UGS _v%%	DIW6	DIDIB	6f f T%	15TI	
LV UGS _v%6	DIWD	NDNIN6W	BIf	DIW6	DIDIB	[	[	3 V UGS _v%6	DIW6	DIDIB	6f f TW	15TI	
LV UGS _v%W	DIWD	NDNID15	BIN	DIW6	DIDIB	[	[	3 V UGS _v%W	DIW6	DIDIB	6f f TI	15TI	
LV UGS _v%5	DIWD	NDNP%ND	BIf	DIW6	DIDIB	[	[	3 V UGS _v%5	DIW6	DIDIB	6f NIB	15TI	
LV UGS _v%I	DIWD	NDNIB55	BIf	DIW6	DIDIB	[	[	3 V UGS _v%I	DIW6	DIDIB	6f NI%	15TI	
LV UGS _v6D	DIWD	NDNP%DI	BIf	DIW6	DIDIB	[	[	3 V UGS _v6D	DIW6	DIDIB	6f NIB	15TI	
3 V UGS _vDN	B%6DD	NDDkNI	f TB	[	D	DIDD%	DIDD%	3 V UGS _vDf	DIWD	DID5N	NDI%	11Tf	
								LV UGS _vDN	vDIW%	vDID56	NDI6	11TN	
3 V UGS _vDf	B%6DD	NDDIWIN	f TB	[	D	DIDD%	DIDD%	3 V UGS _vDN	vDIWD	vDINf 5	NDI6	1kTI	
								3 V UGS _vDB	NIf %D	DIf ND	f DII	15TW	
								LV UGS _vDf	vDIW%	vDID56	NDI6	11TN	
3 V UGS _vDB	B%6DD	NDDIW%f	f TB	[	D	DIDD%	DIDD%	3 V UGS _vDf	vNIf BI	vDIf 6D	f NID	15TD	
								3 V UGS _vD%	NI561	DIBBN	BNI%	15T6	

Pro7ect:	F m OH m RF j		Page: B
Location:	Paulding, OH		j ate: NDAD%f DNk
Contract:			SF : m ES_m OOj P
Engineer:	Josh Venden	Study Case: NPG 16L. 0	AeMsion: f 6p 0 EF
I ilena- e:	F m 2OH		Con8gT F or- al

ETAP

NWDIDC

Bus		Voltage		Generation		Load		Load Flow					XFMR
RJ	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	RJ	3 m	3 Mar	. - 4	p PI	p _a4
								LV UGS _vDB	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vD%	B%5DD	NDDIWD5	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDB	vNI565	vDIBk5	BNI5	15TD	
								3 V UGS _vD6	f TPk5	DIP61	%NII	15TB	
								LV UGS _vD%	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vD6	B%5DD	NDDI565	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vD%	vf TPkk	vDI5NN	%f TN	1kTI	
								3 V UGS _vD5	BIDIk	DI51f	6f T5	15Tf	
								LV UGS _vD6	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vDW	B%5DD	NDDI5B6	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDk	DIWD	DID5N	NDP%	11Tf	
								LV UGS _vDW	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vDk	B%5DD	NDDI5N5	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDW	vDIWD	vDINNN	NDI5	15TP%	
								3 V UGS _vNW	vDIWD	vDIN%W	NDIW	1kTB	
								3 V UGS _vN6	NI561	DIBB5	BNI5	15TP%	
								LV UGS _vDk	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vD5	B%5DD	NDDI5N5	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vD6	vBIDIW	vDIW51	6f T5	1kTW	
								3 V UGS _vDI	BIkNW	DIkkN	WBIf	1kTI	
								LV UGS _vD5	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vDI	B%5DD	NDDIP65	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vD5	vBIkN%	vDI51D	WBIW	1kTf	
								3 V UGS _vND	%BBB	DIIkN	k%D	1kTW	
								LV UGS _vDI	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vND	B%5DD	NDDIPf%	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDI	v%BBf	vNIDW	k%B	1kTN	
								3 V UGS _vf6	%I6f	NIN%B	5%k	1kTP%	
								LV UGS _vND	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vNB	B%5DD	NDDI55f	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vN%	DIWD	DID5N	NDP%	11Tf	
								LV UGS _vNB	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vN%	B%5DD	NDDI5W	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vNB	vDIWD	vDINNB	NDI5	15TP%	
								3 V UGS _vN6	NIf%D	DINI6	f DII	15T5	
								LV UGS _vN%	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vN6	B%5DD	NDDIPAW%	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDk	vNI565	vDIPANf	BNIk	1kTW	
								3 V UGS _vN%	vNIfB5	vDIfk6	f NIN	1kTW	
								3 V UGS _vNk	BIkNk	DIkWk	WBIf	1kTI	
								LV UGS _vN6	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vNW	B%5DD	NDDI56k	f TB	Г	D	DIDD%	DIDD%	3 V UGS _vDk	DIWD	DID5N	NDP%	11Tf	
								LV UGS _vNW	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vNk	B%5DD	NDDIB5N	f Tf	Г	D	DIDD%	DIDD%	JUvf /N	%BB%	NIDN%	k%f	1kTP%	
								3 V UGS _vN6	vBIkN%	vDIIBB	WBI5	1kTD	
								LV UGS _vNk	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vf D	B%5DD	NDDIPAk	f Tf	Г	D	DIDD%	DIDD%	3 V UGS _vf N	DIWD	DID5N	NDP%	11Tf	
								LV UGS _vf D	vDIW%	vDID56	NDI5	11TN	
3 V UGS _vf N	B%5DD	NDDIP6D	f Tf	Г	D	DIDD%	DIDD%	3 V UGS _vf D	vDIWD	vDIN6k	NDIW	1kTD	

Pro7ect:	F m OH m RF j	**ETAP**	Page: %
Location:	Paulding, OH	NWDDC	j ate: NDVD%f DNk
Contract:			SF : m ES_m OOj P
Engineer:	Josh Venden	Study Case: NPG 16L. 0	AeMsion: f 6p 0 EF
I ilena- e:	F m 2OH		Con8gT F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	ID	3 m	3 Mar	. - 4	p PI	p _a4
								3 V UGS _vf f	NfBl	DfB5	f ND	15T	
								LV UGS _vf N	vDW%	vDD56	ND5	11N	
3 V UGS _vf f	B%5DD	NDD%B	fT	Г	D	DDD%	DDD%	JUvf /N	fTk5	D5Nl	%T	1kTl	
								3 V UGS _vf N	vNfBl	vDfW5	f NN	1kTk	
								3 V UGS _vf 1	vDWD	vDNkD	NDk	1W%	
								LV UGS _vf f	vDW%	vDD56	ND5	11N	
3 V UGS _vf B	B%5DD	NDD%6	fB	Г	D	DDD%	DDD%	51l B	W5Dl	NkWW	NNkT	1W5	
								3 V UGS _vf 5	vWN51	vNW56	NDWl	1W5	
								LV UGS _vf B	vDW%	vDD56	ND5	11N	
3 V UGS _vf %	B%5DD	NDDf5f	fT	Г	D	DDD%	DDD%	3 V UGS _vf 6	DWD	DD5N	ND%	11T	
								LV UGS _vf %	vDW%	vDD56	ND5	11N	
3 V UGS _vf 6	B%5DD	NDDfkf	fT	Г	D	DDD%	DDD%	51l N	WN5W	N5f6	NDkTW	16Tl	
								3 V UGS _vND	v%l%W	vNWD	5Wl	16TD	
								3 V UGS _vf %	vDWD	vDN%	ND5	15N	
								LV UGS _vf 6	vDW%	vDD56	ND5	11N	
3 V UGS _vf W	B%5DD	NDD5f 5	fB	Г	D	DDD%	DDD%	3 V UGS _vf k	DWD	DD5N	ND%	11T	
								LV UGS _vf W	vDW%	vDD56	ND5	11N	
3 V UGS _vf k	B%5DD	NDD5D6	fB	Г	D	DDD%	DDD%	3 V UGS _vf W	vDWD	vDNNl	ND5	15T	
								3 V UGS _vf 5	Nf%D	DfDD	f Dl	15Tk	
								LV UGS _vf k	vDW%	vDD56	ND5	11N	
3 V UGS _vf 5	B%5DD	NDD%WN	fB	Г	D	DDD%	DDD%	3 V UGS _vf B	WNlN	N5B%	NDWB	1kN	
								3 V UGS _vf k	vNfBl	vDfBW	f ND	15T	
								3 V UGS _vBB	v%BBf	vNfNk	k6D	1WB	
								LV UGS _vf 5	vDW%	vDD56	ND5	11N	
3 V UGS _vf 1	B%5DD	NDD%W5	fT	Г	D	DDD%	DDD%	3 V UGS _vf f	DWD	DD5N	ND%	11T	
								LV UGS _vf 1	vDW%	vDD56	ND5	11N	
3 V UGS _vBN	B%5DD	NDDW6W	fB	Г	D	DDD%	DDD%	3 V UGS _vBf	DWD	DD5N	ND%	11T	
								LV UGS _vBN	vDW%	vDD56	ND5	11N	
3 V UGS _vBf	B%5DD	NDD551	fB	Г	D	DDD%	DDD%	3 V UGS _vBN	vDWNl	vDNl f	ND5	16T5	
								3 V UGS _vBB	NfBl	DfkB	f NN	1kTk	
								LV UGS _vBf	vDW%	vDD56	ND5	11N	
3 V UGS _vBB	B%5DD	NDD56%	fB	Г	D	DDD%	DDD%	3 V UGS _vf 5	%BBW	DlkD	kBl	1kTW	
								3 V UGS _vBf	vNfBl	vDBDN	f Nf	1kT	
								3 V UGS _vB%	vf Tkk	vD555	%T%	1kB	
								LV UGS _vBB	vDW%	vDD56	ND5	11N	
3 V UGS _vB%	B%5DD	NDD51k	fB	Г	D	DDD%	DDD%	3 V UGS _vBB	fTk5	D5%%	%T	1kTk	
								3 V UGS _vBW	vNfBl	vDfWN	f NN	1kTl	
								3 V UGS _vBl	vDWNl	vDfDf	ND5	16N	
								LV UGS _vB%	vDW%	vDD56	ND5	11N	

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	Rj	3 m	3 Mar	. - 4	p PI	p _a4
3 V UGS _vBW	B%5DD	NDDWB	f TB	Γ	D	DDD%	DDD%	3 V UGS _vB%	NT%D	DNID	f D5	15T5	
								3 V UGS _vBk	vDWD	vDNDI	ND5	15T5	
								LV UGS _vBW	vDW%	vDD56	ND5	11TN	
3 V UGS _vBk	B%5DD	NDDkDD	f TB	Γ	D	DDD%	DDD%	3 V UGS _vBW	DWD	DD5N	ND%	11Tf	
								LV UGS _vBk	vDW%	vDD56	ND5	11TN	
3 V UGS _vBl	B%5DD	NDDWkN	f TB	Γ	D	DDD%	DDD%	3 V UGS _vB%	DWD	DD5N	ND%	11Tf	
								LV UGS _vBl	vDW%	vDD56	ND5	11TN	
3 V UGS _v%D	B%5DD	NDDkf 1	f T%	Γ	D	DDD%	DDD%	511 %	WN55	NWkW	NDW5	1W5	
								3 V UGS _v%W	v6T5W5	vN5 16	1 WT	1 WN	
								LV UGS _v%D	vDW%	vDD56	ND5	11TN	
3 V UGS _v%N	B%5DD	NDDI 6k	f T5	Γ	D	DDD%	DDD%	JUv%N	DWD	DD5N	ND%	11Tf	
								LV UGS _v%N	vDW%	vDD56	ND%	11TN	
3 V UGS _v%f	B%5DD	NDDI %D	f T5	Γ	D	DDD%	DDD%	JUv%N	f Tkk	D5WI	%f TN	1kT5	
								3 V UGS _v%I	vN56k	vDT%55	BN5	1Wk	
								LV UGS _v%f	vDW%	vDD56	ND%	11TN	
3 V UGS _v%B	B%5DD	NDDI 6k	f T5	Γ	D	DDD%	DDD%	JUv%N	DWD	DD5N	ND%	11Tf	
								LV UGS _v%B	vDW%	vDD56	ND%	11TN	
3 V UGS _v%%	B%5DD	NDD5kW	f T5	Γ	D	DDD%	DDD%	JUv%N	vBkN%	vDI N5	WB5	1kTN	
								3 V UGS _v%6	%BB%	DI 11	kB5	1kT%	
								LV UGS _v%%	vDW%	vDD56	ND%	11TN	
3 V UGS _v%6	B%5DD	NDD5BD	f T%	Γ	D	DDD%	DDD%	3 V UGS _v%%	v%BBB	vNNf	k%B	1W5	
								3 V UGS _v%W	%I 6f	NTDB	5%W	1kTf	
								LV UGS _v%6	vDW%	vDD56	ND5	11TN	
3 V UGS _v%W	B%5DD	NDDkkf	f T%	Γ	D	DDD%	DDD%	3 V UGS _v%D	6T5kD	NTkB	16Tk	1Wk	
								3 V UGS _v%6	v%I 6D	vNBI f	56T%	1WB	
								LV UGS _v%W	vDW%	vDD56	ND5	11TN	
3 V UGS _v%5	B%5DD	NDNID56	f T5	Γ	D	DDD%	DDD%	3 V UGS _v%I	DWD	DD5N	NDB	11Tf	
								LV UGS _v%5	vDW%	vDD56	ND%	11TN	
3 V UGS _v%I	B%5DD	NDNIDWB	f T5	Γ	D	DDD%	DDD%	3 V UGS _v%f	N561	DBNW	BNT	15TW	
								3 V UGS _v%5	vDWD	vDNN5	ND%	15Tf	
								3 V UGS _v6D	vDWD	vDNNk	ND%	15TB	
								LV UGS _v%I	vDW%	vDD56	ND%	11TN	
3 V UGS _v6D	B%5DD	NDNID56	f T5	Γ	D	DDD%	DDD%	3 V UGS _v%I	DWD	DD5N	NDB	11Tf	
								LV UGS _v6D	vDW%	vDD56	ND%	11TN	
* POR	NB5TDDD	NDDDDD	DD	vf 6T5W5	v5T5%f	Γ	Γ	51_N	vf 6T5W5	v5T5%f	NN%D	16TD	
3 P_~B	NB5DD	NDDBD%	f T%	Γ	D	Γ	Γ	HV UGS 3 P_	DDDD	DDDD	DD	DD	
								& 51_NU					

* Rdicates a Mltage regulated bus (Mltage controlled or swing ty4e - achine connected to it)

\# Rdicates a bus with a load - is- atch o8- ore than DN3 V.

ProRct:	F m OH m vF j	ETAP		Page:	0
Location:	Paulding, OH	0WDDC		j ate:	0D%DC%D0k
Contract:				SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case:	NGP1 NGL6 .	AeMsion:	f Gp . EF
- ilena2 e:	F m 7OH			Con8gT	F or2 al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
5N- 06	I BTGDD	0DDDI f	f TD	[	D	[	[	3 V U1 S _%G	%WD5I	%TDG5	0D5TN	NBTN	
								5N_0U	WD5I	f TDG5	0D5TN	NBTN	
5N- f 6	I BTGDD	0DDDI f	f TD	[	D	[	[	JU%/0	%W5Df	%TDI I	00ND	NGB	
								5N_0U	W5Df	f TDI I	00ND	NGB	
5N- I 6	I BTGDD	0DDDI f	f TD	[	D	[	[	3 V U1 S _%I	%WkN5	%T 5k	0f DB	NBB	
								5N_0U	WkN5	f T 5k	0f DB	NBB	
5N- B6	I BTGDD	0DDDI f	f TD	[	D	[	[	3 V U1 S _%BD	%WD WW	%Tf DD	00WD	55T5	
								5N_0U	WD WW	I Tf DD	00WD	55T5	
5N_06	0I 5TDDD	NGIDDf	DD	[	D	[	[	POv	f GB kI	5TGBI	0f DD	NGD	
								HV U1 S 3 P_	%GB kI	%5TGBI	0f DD	NGD	
5N_0U	I BTGDD	0DDDI f	f TD	[	D	[	[	5N- B6	%WD WW	%Tf DD	00WD	55T5	
								5N- I 6	%WkN5	%T 5k	0f DB	NBB	
								5N- f 6	%W5Df	%TDI I	00ND	NGB	
								5N- 06	%WD5I	%TDG5	0D5TN	NBTN	
								3 P_~I	f GNBN	NkkN	BWTB	N TW	
								& HV U1 S 3 P_					
HV U1 S 3 P_	0I 5TDDD	NGIDDf	DD	[	D	DDB5	DDI I	5N_06	f GB kI	5TGBI	0f DD	NGD	
								5N_0U	%GNf 0	%5TWkW	0f DB	NB5	%TkGD
								& 3 P_~I					
JU%/0	I BTGDD	0DDf kI	f Tf	[	D	[	[	3 V U1 S _%0k	%BTI f	%0TDf k	kBTk	NW5	
								3 V U1 S _%f	%TBkk	%DTGNW	Bf TG	NkTf	
								5N- f 6	W5DN	0Tkf I	00kTf	NWN	
JU%B/0	I BTGDD	0DD5kG	f TG	[	D	[	[	3 V U1 S _%B0	%DTWf D	%DT00	0DB	N5TB	
								3 V U1 S _%Bf	%TBkk	%DTGkD	Bf Tf	NkTG	
								3 V U1 S _%BI	%DTWf D	%DT0D	0DB	N5TG	
								3 V U1 S _%BB	I Tk0W	DkN0	WTD	NkT5	
LV U1 S _%D0	DTWND	0DDTN50	I TD	DTWf G	DTDN	[	[	3 V U1 S _%D0	DTWf G	DTDN	Gf I TG	N5TN	
LV U1 S _%Df	DTWND	0DDTNGf	I TD	DTWf G	DTDN	[	[	3 V U1 S _%Df	DTWf G	DTDN	Gf I Tk	N5TN	
LV U1 S _%DI	DTWND	0DDTNDB	I TD	DTWf G	DTDN	[	[	3 V U1 S _%DI	DTWf G	DTDN	Gf I TN	N5TN	
LV U1 S _%DB	DTWND	0DD5kD	I TD	DTWf G	DTDN	[	[	3 V U1 S _%DB	DTWf G	DTDN	Gf BTD	N5TN	
LV U1 S _%DG	DTWND	0DD5f D	I TD	DTWf G	DTDN	[	[	3 V U1 S _%DG	DTWf G	DTDN	Gf BTI	N5TN	
LV U1 S _%DW	DTWND	0DDkN5	I TD	DTWf G	DTDN	[	[	3 V U1 S _%DW	DTWf G	DTDN	Gf BTG	N5TN	
LV U1 S _%Dk	DTWND	0DDk5D	I TD	DTWf G	DTDN	[	[	3 V U1 S _%Dk	DTWf G	DTDN	Gf BTW	N5TN	
LV U1 S _%D5	DTWND	0DDk5D	I TD	DTWf G	DTDN	[	[	3 V U1 S _%D5	DTWf G	DTDN	Gf BTW	N5TN	
LV U1 S _%DN	DTWND	0DDkf D	I TD	DTWf G	DTDN	[	[	3 V U1 S _%DN	DTWf G	DTDN	Gf BTN	N5TN	
LV U1 S _%0D	DTWND	0DDTW5W	I TD	DTWf G	DTDN	[	[	3 V U1 S _%0D	DTWf G	DTDN	Gf GD	N5TN	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
LV U1 S _%0I	DIWND	0DD5BB	I TD	DIWG	DIDN	[	[	3 V U1 S _%0I	DIWG	DIDN	GBIf	N5TN	
LV U1 S _%0B	DIWND	0DD5fG	I TD	DIWG	DIDN	[	[	3 V U1 S _%0B	DIWG	DIDN	GBII	N5TN	
LV U1 S _%0G	DIWND	0DDkfk	I TD	DIWG	DIDN	[	[	3 V U1 S _%0G	DIWG	DIDN	GB5	N5TN	
LV U1 S _%0W	DIWND	0DD5fD	I TD	DIWG	DIDN	[	[	3 V U1 S _%0W	DIWG	DIDN	GBIB	N5TN	
LV U1 S _%0k	DIWND	0DDIWBI	I TD	DIWG	DIDN	[	[	3 V U1 S _%0k	DIWG	DIDN	GGII	N5TN	
LV U1 S _%5D	DIWND	0DDkGN	I TD	DIWG	DIDN	[	[	3 V U1 S _%5D	DIWG	DIDN	GBIk	N5TN	
LV U1 S _%50	DIWND	0DDk0I	I TD	DIWG	DIDN	[	[	3 V U1 S _%50	DIWG	DIDN	GBIN	N5TN	
LV U1 S _%5f	DIWND	0DDIWkW	I TD	DIWG	DIDN	[	[	3 V U1 S _%5f	DIWG	DIDN	GGID	N5TN	
LV U1 S _%5I	DIWND	0DDIWk5	I TD	DIWG	DIDN	[	[	3 V U1 S _%5I	DIWG	DIDN	GGID	N5TN	
LV U1 S _%5B	DIWND	0DDIGBG	f TN	DIWG	DIDN	[	[	3 V U1 S _%5B	DIWG	DIDN	GG5	N5TN	
LV U1 S _%5G	DIWND	0DDIGI G	f TN	DIWG	DIDN	[	[	3 V U1 S _%5G	DIWG	DIDN	GG5	N5TN	
LV U1 S _%5W	DIWND	0DDkND	I TD	DIWG	DIDN	[	[	3 V U1 S _%5W	DIWG	DIDN	GBIG	N5TN	
LV U1 S _%5k	DIWND	0DDkWk	I TD	DIWG	DIDN	[	[	3 V U1 S _%5k	DIWG	DIDN	GBIW	N5TN	
LV U1 S _%55	DIWND	0DDkfI	I TD	DIWG	DIDN	[	[	3 V U1 S _%55	DIWG	DIDN	GBIN	N5TN	
LV U1 S _%5N	DIWND	0DDkI D	I TD	DIWG	DIDN	[	[	3 V U1 S _%5N	DIWG	DIDN	GB5	N5TN	
LV U1 S _%b0	DIWND	0DDIN05	I TD	DIWG	DIDN	[	[	3 V U1 S _%b0	DIWG	DIDN	GI T5	N5TN	
LV U1 S _%bf	DIWND	0DD5C0	I TD	DIWG	DIDN	[	[	3 V U1 S _%bf	DIWG	DIDN	GBIf	N5TN	
LV U1 S _%bI	DIWND	0DD50W	I TD	DIWG	DIDN	[	[	3 V U1 S _%bI	DIWG	DIDN	GBIB	N5TN	
LV U1 S _%bB	DIWND	0DD5GN	I TD	DIWG	DIDN	[	[	3 V U1 S _%bB	DIWG	DIDN	GBID	N5TN	
LV U1 S _%bW	DIWND	0DDINBG	I TD	DIWG	DIDN	[	[	3 V U1 S _%bW	DIWG	DIDN	GI Tk	N5TN	
LV U1 S _%bk	DIWND	0DDINW0	I TD	DIWG	DIDN	[	[	3 V U1 S _%bk	DIWG	DIDN	GI TW	N5TN	
LV U1 S _%bN	DIWND	0DDIN I	I TD	DIWG	DIDN	[	[	3 V U1 S _%bN	DIWG	DIDN	GI T5	N5TN	
LV U1 S _%BD	DIWND	0DDIN0	I TD	DIWG	DIDN	[	[	3 V U1 S _%BD	DIWG	DIDN	GI TG	N5TN	
LV U1 S _%B0	DIWND	0D0Tf05	I Tf	DIWG	DIDN	[	[	3 V U1 S _%B0	DIWG	DIDN	Gf f TI	N5TN	
LV U1 S _%Bf	DIWND	0D0TfD0	I Tf	DIWG	DIDN	[	[	3 V U1 S _%Bf	DIWG	DIDN	Gf f TB	N5TN	
LV U1 S _%BI	DIWND	0D0Tf05	I Tf	DIWG	DIDN	[	[	3 V U1 S _%BI	DIWG	DIDN	Gf f TI	N5TN	
LV U1 S _%BB	DIWND	0D0TDI k	I Tf	DIWG	DIDN	[	[	3 V U1 S _%BB	DIWG	DIDN	Gf f Tk	N5TN	
LV U1 S _%BG	DIWND	0D0TDNf	I Tf	DIWG	DIDN	[	[	3 V U1 S _%BG	DIWG	DIDN	Gf f TN	N5TN	
LV U1 S _%BW	DIWND	0D0TDI B	I TD	DIWG	DIDN	[	[	3 V U1 S _%BW	DIWG	DIDN	GI Tf	N5TN	
LV U1 S _%B5	DIWND	0D0TIBW	I Tf	DIWG	DIDN	[	[	3 V U1 S _%B5	DIWG	DIDN	Gf 0TW	N5TN	
LV U1 S _%BN	DIWND	0D0TIfB	I Tf	DIWG	DIDN	[	[	3 V U1 S _%BN	DIWG	DIDN	Gf 0Tk	N5TN	
LV U1 S _%GD	DIWND	0D0TIBG	I Tf	DIWG	DIDN	[	[	3 V U1 S _%GD	DIWG	DIDN	Gf 0TW	N5TN	
3 V U1 S _%b0	I BIGDD	0DDIWGG	f TI	[	D	DIDDB	DIDDB	3 V U1 S _%bf	DIWD	DID50	0DIB	NNf	
								LV U1 S _%b0	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bf	I BIGDD	0DDIWk	f TI	[	D	DIDDB	DIDDB	3 V U1 S _%b0	%DIWD	%DIDf5	0DIG	NkTN	
								3 V U1 S _%bI	0TfBD	DIfDN	fDIN	N5TW	
								LV U1 S _%bf	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bI	I BIGDD	0DDIGk5	f TI	[	D	DIDDB	DIDDB	3 V U1 S _%bf	%0TfI N	%DIfBN	f 0TD	N5TD	
								3 V U1 S _%bB	0T5GN	DII I 0	I 0TB	N5TG	

Project:	F m OH m vF j	ETAP	Page:	I
Location:	Paulding, OH	0WDIDC	j ate:	0D%bC%6D0k
Contract:			SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion:	f Gp . EF
- ilena2 e:	F m 7OH		Con8igT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								LV U1 S _%bI	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bB	IBIGDD	0DDIGBB	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bI	%0T5G5	%DIIkk	I0TW	N5TD	
								3 V U1 S _%bG	fTBk5	DIBG5	B0TN	N5TI	
								LV U1 S _%bB	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bG	IBIGDD	0DDIBNB	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bB	%6TBkk	%DIG00	BfTD	NkTN	
								3 V U1 S _%b5	ITDNk	DIGNf	GfTG	N5Tf	
								LV U1 S _%bG	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bW	IBIGDD	0DDIBk0	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bk	DIWD	DID50	0DIB	NNf	
								LV U1 S _%bW	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bk	IBIGDD	0DDIBGI	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bW	%DIWD	%DI000	0DIG	N5TB	
								3 V U1 S _%0W	%DIWD	%DIDBW	0DIW	NkTI	
								3 V U1 S _%0G	0T5GN	DII I5	I0TG	N5TB	
								LV U1 S _%bk	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%b5	IBIGDD	0DDIBGB	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bG	%6TDNW	%DIW5N	GfT5	NkTW	
								3 V U1 S _%bN	ITk0W	DIkkD	WTf	NkTN	
								LV U1 S _%b5	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bN	IBIGDD	0DDII NB	fT	[	D	DIDDB	DIDDB	3 V U1 S _%b5	%6Tk0B	%DI55N	WTk	NkTI	
								3 V U1 S _%0D	BII I	DINkD	kBTD	NkTW	
								LV U1 S _%bN	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0D	IBIGDD	0DDII WD	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bN	%BII If	%0TDW0	kBTB	NkTD	
								3 V U1 S _%6G	BINGf	0TDBf	5BTk	NkTB	
								LV U1 S _%0D	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0I	IBIGDD	0DDIG05	fT	[	D	DIDDB	DIDDB	3 V U1 S _%0B	DIWD	DID50	0DIB	NNf	
								LV U1 S _%0I	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0B	IBIGDD	0DDIBN5	fT	[	D	DIDDB	DIDDB	3 V U1 S _%0I	%DIWD	%DID0I	0DIG	N5TB	
								3 V U1 S _%0G	0TfBD	DIDNG	fDIN	N5T5	
								LV U1 S _%0B	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0G	IBIGDD	0DDIBDD	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bk	%0T5G5	%DIB00	I0Tk	NkTW	
								3 V U1 S _%0B	%0TfI5	%DIfkB	f0TD	NkTW	
								3 V U1 S _%0k	ITk0k	DIkWk	WTI	NkTN	
								LV U1 S _%0G	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0W	IBIGDD	0DDIBNI	fT	[	D	DIDDB	DIDDB	3 V U1 S _%bk	DIWD	DID50	0DIB	NNf	
								LV U1 S _%0W	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%0k	IBIGDD	0DDII 0k	fTf	[	D	DIDDB	DIDDB	JU%6/0	BII IB	0TD0I	kBTf	NkTB	
								3 V U1 S _%0G	%6Tk0B	%DINI f	WTN	NkTD	
								LV U1 S _%0k	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6D	IBIGDD	0DDIBI f	fTf	[	D	DIDDB	DIDDB	3 V U1 S _%60	DIWD	DID50	0DIB	NNf	
								LV U1 S _%6D	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%60	IBIGDD	0DDII 5W	fTf	[	D	DIDDB	DIDDB	3 V U1 S _%6D	%DIWD	%DIDGW	0DIk	NkTD	

ProRct:	F m OH m vF j	**ETAP**	Page: B
Location:	Paulding, OH	0WDIDC	j ate: 0D%DC%DDk
Contract:			SF : m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion: fGp . EF
- ilena2 e:	F m 7OH		Con8gT F or2 al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								3 V U1 S _%6f	0TfI N	DfI 5	f 0TD	N5Tf	
								LV U1 S _%60	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6f	I BIGDD	0DDIBN	f Tf	D	D	DIDDB	DIDDB	JU%6/0	f TBk5	DIG05	Bf Tf	NkTN	
								3 V U1 S _%60	%0TfI N	%DIf W5	f 0TD	NkTk	
								3 V U1 S _%6N	%DIWD	%DI0kD	0DIk	NWG	
								LV U1 S _%6f	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6I	I BIGDD	0DDIG0	f TI	D	D	DIDDB	DIDDB	5N-I 6	W5DN	0TkWG	00kTI	NW5	
								3 V U1 S _%65	%W05N	%0TW5B	0DkTD	NWG	
								LV U1 S _%6I	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6B	I BIGDD	0DDIf 05	f Tf	D	D	DIDDB	DIDDB	3 V U1 S _%6G	DIWD	DID50	0DIB	NNf	
								LV U1 S _%6B	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6G	I BIGDD	0DDIf D5	f Tf	D	D	DIDDB	DIDDB	5N-06	W05W	0T5f B	0DkTk	NGIN	
								3 V U1 S _%0D	%BTNBW	%0TW0N	5WN	NGID	
								3 V U1 S _%6B	%DIWD	%DI0f B	0DIW	N5TD	
								LV U1 S _%6G	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6W	I BIGDD	0DDIBWB	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%6k	DIWD	DID50	0DIB	NNf	
								LV U1 S _%6W	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6k	I BIGDD	0DDIBB0	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%6W	%DIWD	%DI00N	0DIG	N5Tf	
								3 V U1 S _%65	0TfBD	DIf DD	f DIN	N5Tk	
								LV U1 S _%6k	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%65	I BIGDD	0DDIf Nk	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%6I	W0N0	0TGI I	0DWI	NkTD	
								3 V U1 S _%6k	%0TfI N	%DIf I W	f 0TD	N5Tf	
								3 V U1 S _%bI	%BTI I f	%0Tf 0W	kGID	NWI	
								LV U1 S _%65	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%6N	I BIGDD	0DDIBDB	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%6f	DIWD	DID50	0DIB	NNf	
								LV U1 S _%6N	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%b0	I BIGDD	0DDIGNf	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%bf	DIWD	DID50	0DIB	NNf	
								LV U1 S _%b0	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bf	I BIGDD	0DDIGf B	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%b0	%DIW0N	%DI0Nf	0DI5	NGIG	
								3 V U1 S _%bI	0TfI N	DIf kI	f 0TD	NkTk	
								LV U1 S _%bf	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bI	I BIGDD	0DDIBND	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%65	BTI I W	DINkD	kBID	NkTW	
								3 V U1 S _%bf	%0TfI N	%DIT D0	f 0Tf	NkTf	
								3 V U1 S _%bB	%6TBkk	%DIG5k	Bf TB	NkTI	
								LV U1 S _%bI	%DIWB	%DID5G	0DIG	NND	
3 V U1 S _%bB	I BIGDD	0DDIGI I	f TI	D	D	DIDDB	DIDDB	3 V U1 S _%bI	f TBk5	DIGBB	Bf Tf	NkTk	
								3 V U1 S _%bW	%0TfI N	%DIf WD	f 0TD	NkTN	
								3 V U1 S _%bN	%DIW0N	%DIf Df	0DI5	NGID	
								LV U1 S _%bB	%DIWB	%DID5G	0DIG	NND	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
3 V U1 S _%W	IBTGDD	0DDTW0N	fTI	L	D	DIDDB	DIDDB	3 V U1 S _%B	0TfBD	DDND	fDIN	N5T5	
								3 V U1 S _%k	%DIWD	%D0DN	0DTG	N5TG	
								LV U1 S _%W	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%k	IBTGDD	0DDTWG	fTI	L	D	DIDDB	DIDDB	3 V U1 S _%W	DIWD	DID50	0DIB	NNf	
								LV U1 S _%k	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%N	IBTGDD	0DDTWDk	fTI	L	D	DIDDB	DIDDB	3 V U1 S _%B	DIWD	DID50	0DIB	NNf	
								LV U1 S _%N	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%BD	IBTGDD	0DDTWWG	fTB	L	D	DIDDB	DIDDB	5N-B6	W055	0TWkG	0DWIW	NWG	
								3 V U1 S _%BW	%GTGW5	%0TGNB	NWI	NW0	
								LV U1 S _%BD	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%B0	IBTGDD	0DD5NI	fTG	L	D	DIDDB	DIDDB	JU%B/0	DIWD	DID50	0DIB	NNf	
								LV U1 S _%B0	%DIWB	%DID5G	0DIB	NND	
3 V U1 S _%Bf	IBTGDD	0DD5kW	fTG	L	D	DIDDB	DIDDB	JU%B/0	fTBkk	DTGWN	BfTf	NkTG	
								3 V U1 S _%BN	%0T5Gk	%DIB55	I0TN	NWk	
								LV U1 S _%Bf	%DIWB	%DID5G	0DIB	NND	
3 V U1 S _%BI	IBTGDD	0DD5NI	fTG	L	D	DIDDB	DIDDB	JU%B/0	DIWD	DID50	0DIB	NNf	
								LV U1 S _%BI	%DIWB	%DID5G	0DIB	NND	
3 V U1 S _%BB	IBTGDD	0DD50f	fTG	L	D	DIDDB	DIDDB	JU%B/0	%1Tk0B	%DIN05	WTG	NkTD	
								3 V U1 S _%BG	BII B	DINNN	kI T5	NkTB	
								LV U1 S _%BB	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%BG	IBTGDD	0DDTkWW	fTB	L	D	DIDDB	DIDDB	3 V U1 S _%BB	%BII I	%0TDf0	kBII	NW5	
								3 V U1 S _%BW	BTNGf	0TfDf	5BTW	NkTf	
								LV U1 S _%BG	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%BW	IBTGDD	0DDTkD5	fTB	L	D	DIDDB	DIDDB	3 V U1 S _%BD	GTGkD	0TBkf	NGTk	NWk	
								3 V U1 S _%BG	%BTNGD	%0TI N0	5GIB	NWI	
								LV U1 S _%BW	%DIWB	%DID5G	0DTG	NND	
3 V U1 S _%B5	IBTGDD	0D0TDf0	fTG	L	D	DIDDB	DIDDB	3 V U1 S _%BN	DIWD	DID50	0DIB	NNf	
								LV U1 S _%B5	%DIWB	%DID5G	0DIB	NND	
3 V U1 S _%BN	IBTGDD	0DDTNNN	fTG	L	D	DIDDB	DIDDB	3 V U1 S _%Bf	0T5GN	DII0W	I0Tf	N5TW	
								3 V U1 S _%B5	%DIWD	%D005	0DTG	N5Tf	
								3 V U1 S _%GD	%DIWD	%D00k	0DIB	N5TI	
								LV U1 S _%BN	%DIWB	%DID5G	0DIB	NND	
3 V U1 S _%GD	IBTGDD	0D0TDf0	fTG	L	D	DIDDB	DIDDB	3 V U1 S _%BN	DIWD	DID50	0DIB	NNf	
								LV U1 S _%GD	%DIWB	%DID5G	0DIB	NND	
* POv	0I5TDDD	NGTDDD	DID	%GT5kI	%5TGBW	L	L	5N_06	%GT5kI	%5TGBW	0fDID	NGTD	
3 P_~I	0IT5DD	0DDTfIN	fTB	L	D	L	L	HV U1 S 3 P_	DIDDD	DIDDD	DID	DID	
							&	5N_0U					

* vndicates a Moltage regulated bus (Moltage controlled or swing ty4e 2 achine connected to it)

\# vndicates a bus with a load 2 is2 atch o82 ore than DID 3 V6

Pro2ect:	F m OH m 7F 0	ETAP		Page:	N
Location:	Paulding, OH	NWDIDC		0 ate:	NDRDvR%DNF
Contract:				SF :	m ES_m OO0 P
Engineer:	Josh Venden	Study Case:	NPG 16LE. 0	k eAision:	%6M p EF
j ilenaI e:	F m - OH			Con8gT	F orI al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	70	3 m	3 Aar	. I 4	MPj	M_a4
51j N	BvT6DD	NDDP4BW	%4N	E	D	E	E	3 V UGS _R%6	RWN'1	%4DNB	ND5T6	R16TN	
								51_NU	WN'1	R%DNB	ND5T6	R16TN	
51j %	BvT6DD	NDDP4BW	%4N	E	D	E	E	JUR%N	RWI'15	%4Bv6	N%DN	RvT6	
								51_NU	WI'15	R%Bv6	N%DN	RvT6	
51j B.	BvT6DD	NDDP4BW	%4N	E	D	E	E	3 V UGS _R%B	RWI'16	%4DIB	NN5T'	R16TW	
								51_NU	WI'16	R%DIB	NN5T'	R16TW	
51j v.	BvT6DD	NDDP4BW	%4N	E	D	E	E	3 V UGS _RvD	RWNW	D15ff	NDBTI	R1TD	
								51_NU	WNW	RD5ff	NDBTI	R1TD	
51_N	NB5TDDD	11T11	DID	E	D	E	E	PO7	%6T6W	R5T6NW	NNBTI	R16TD	
								HV UGS 3 P_	R%6T6W	5T6NW	NNBTI	R16TD	
51_NU	BvT6DD	NDDP4BW	%4N	E	D	E	E	51j v.	RWNW	D15ff	NDBTI	R1TD	
								51j B.	RWI'16	%4DIB	NN5T'	R16TW	
								51j %	RWI'15	%4Bv6	N%DN	RvT6	
								51j N	RWN'1	%4DNB	ND5T6	R16TN	
								3 P_~B	%6TIBW	RT'B%5	v6DD	R1W%4	
							&	HV UGS 3 P_					
HV UGS 3 P_	NB5TDDD	11T11	DID	E	D	DID6B	DINvf	51_N	%6T6W	R5T6NW	NNBTI	R16TD	
								51_NU	R%6TIND	5TBWI	NNBTI	R16T%4	RNP%6D
							&	3 P_~B					
JUR%N	BvT6DD	NDDP4WI	%4P%	E	D	E	E	3 V UGS _RNF	RvTBBD	NI'%B	ffT6	R1%TI	
								3 V UGS _R%%	R%6vf6	NDBB	vvT6	R1%TB	
								51j %	W5D6	R%4F66	N%T6	R1%TF	
JURvN	BvT6DD	NDDv1B	%4W	E	D	E	E	3 V UGS _RvN	RDWvD	DP41W	NNv	R1DP%	
								3 V UGS _Rv%	R%6vfW	NDWD	vvTI	R1NTI	
								3 V UGS _RvB	RDWvD	DP41f	NNv	R1DP%	
								3 V UGS _Rvv	BTN6	RNW6v	WT'T	R1Nv	
LV UGS _RDN	DIWD	11T155	BP%	DIW6	RDBN%	E	E	3 V UGS _RDN	DIW6	RDBN%	65vT6	R51T6	
LV UGS _RD%	DIWD	11TIWB	BP%	DIW6	RDBN%	E	E	3 V UGS _RD%	DIW6	RDBN%	65vTF	R51T6	
LV UGS _RDB	DIWD	11TI%N	BP%	DIW6	RDBN%	E	E	3 V UGS _RDB	DIW6	RDBN%	65vTI	R51T6	
LV UGS _RDv	DIWD	11T51W	BP%	DIW6	RDBN%	E	E	3 V UGS _RDv	DIW6	RDBN%	656TN	R51T6	
LV UGS _RD6	DIWD	11T565	BP%	DIW6	RDBN%	E	E	3 V UGS _RD6	DIW6	RDBN%	656TB	R51T6	
LV UGS _RDW	DIWD	11T5fB	BN	DIW6	RDBN%	E	E	3 V UGS _RDW	DIW6	RDBN%	656T%	R51T6	
LV UGS _RDF	DIWD	11T565	BN	DIW6	RDBN%	E	E	3 V UGS _RDF	DIW6	RDBN%	656TB	R51T6	
LV UGS _RD5	DIWD	11T5BW	BN	DIW6	RDBN%	E	E	3 V UGS _RD5	DIW6	RDBN%	656Tv	R51T6	
LV UGS _RDI	DIWD	11T5Dv	BN	DIW6	RDBN%	E	E	3 V UGS _RDI	DIW6	RDBN%	656TW	R51T6	
LV UGS _RND	DIWD	11TF51	BN	DIW6	RDBN%	E	E	3 V UGS _RND	DIW6	RDBN%	656TF	R51T6	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	70	3 m	3 Aar	. I 4	MPj	M_a4
LV UGS _RNB	DIWD	11TI%D	BIN	DIW6	RDBN%	[	[	3 V UGS _RNB	DIW6	RDBN%	65vTI	R51T6	
LV UGS _RNv	DIWD	11TIDB	BIN	DIW6	RDBN%	[	[	3 V UGS _RNv	DIW6	RDBN%	656TD	R51T6	
LV UGS _RN6	DIWD	11T5N5	BIN	DIW6	RDBN%	[	[	3 V UGS _RN6	DIW6	RDBN%	656T6	R51T6	
LV UGS _RNW	DIWD	11T51%	BIN	DIW6	RDBN%	[	[	3 V UGS _RNW	DIW6	RDBN%	656TN	R51T6	
LV UGS _RNf	DIWD	11Tf %	BIN	DIW6	RDBN%	[	[	3 V UGS _RNf	DIW6	RDBN%	656T5	R51T6	
LV UGS _R%D	DIWD	11T55B	BIN	DIW6	RDBN%	[	[	3 V UGS _R%D	DIW6	RDBN%	656TN	R51T6	
LV UGS _R%N	DIWD	11T5vB	BIN	DIW6	RDBN%	[	[	3 V UGS _R%N	DIW6	RDBN%	656Tv	R51T6	
LV UGS _R%%	DIWD	11T5NN	BIN	DIW6	RDBN%	[	[	3 V UGS _R%%	DIW6	RDBN%	656T6	R51T6	
LV UGS _R%B	DIWD	11Tf W	BIN	DIW6	RDBN%	[	[	3 V UGS _R%B	DIW6	RDBN%	656Tf	R51T6	
LV UGS _R%v	DIWD	11Tfv5	BID	DIW6	RDBN%	[	[	3 V UGS _R%v	DIW6	RDBN%	656TI	R51T6	
LV UGS _R%6	DIWD	11TfvD	BID	DIW6	RDBN%	[	[	3 V UGS _R%6	DIW6	RDBN%	65WD	R51T6	
LV UGS _R%W	DIWD	11T5v6	BIN	DIW6	RDBN%	[	[	3 V UGS _R%W	DIW6	RDBN%	656TB	R51T6	
LV UGS _R%f	DIWD	11T5%6	BIN	DIW6	RDBN%	[	[	3 V UGS _R%f	DIW6	RDBN%	656T6	R51T6	
LV UGS _R%5	DIWD	11Tf5W	BIN	DIW6	RDBN%	[	[	3 V UGS _R%5	DIW6	RDBN%	656Tf	R51T6	
LV UGS _R%1	DIWD	11T565	BIN	DIW6	RDBN%	[	[	3 V UGS _R%1	DIW6	RDBN%	656TB	R51T6	
LV UGS _RBN	DIWD	11TIN6	BI%	DIW6	RDBN%	[	[	3 V UGS _RBN	DIW6	RDBN%	65vTI	R51T6	
LV UGS _RB%	DIWD	11T56W	BI%	DIW6	RDBN%	[	[	3 V UGS _RB%	DIW6	RDBN%	656TB	R51T6	
LV UGS _RBB	DIWD	11T5%W	BI%	DIW6	RDBN%	[	[	3 V UGS _RBB	DIW6	RDBN%	656T6	R51T6	
LV UGS _RBv	DIWD	11T565	BI%	DIW6	RDBN%	[	[	3 V UGS _RBv	DIW6	RDBN%	656TB	R51T6	
LV UGS _RBW	DIWD	11TIBB	BI%	DIW6	RDBN%	[	[	3 V UGS _RBW	DIW6	RDBN%	65vT5	R51T6	
LV UGS _RBf	DIWD	11TIv5	BI%	DIW6	RDBN%	[	[	3 V UGS _RBf	DIW6	RDBN%	65vTf	R51T6	
LV UGS _RB1	DIWD	11TI%B	BI%	DIW6	RDBN%	[	[	3 V UGS _RB1	DIW6	RDBN%	65vTI	R51T6	
LV UGS _RvD	DIWD	11T51B	BIB	DIW6	RDBN%	[	[	3 V UGS _RvD	DIW6	RDBN%	656TN	R51T6	
LV UGS _RvN	DIWD	11TI1v	BIv	DIW6	RDBN%	[	[	3 V UGS _RvN	DIW6	RDBN%	65vT6	R51T6	
LV UGS _Rv%	DIWD	11TIf 1	BIv	DIW6	RDBN%	[	[	3 V UGS _Rv%	DIW6	RDBN%	65vTW	R51T6	
LV UGS _RvB	DIWD	11TI1v	BIv	DIW6	RDBN%	[	[	3 V UGS _RvB	DIW6	RDBN%	65vT6	R51T6	
LV UGS _Rvv	DIWD	11TIvv	BIv	DIW6	RDBN%	[	[	3 V UGS _Rvv	DIW6	RDBN%	65vT5	R51T6	
LV UGS _Rv6	DIWD	11TI%6	BIB	DIW6	RDBN%	[	[	3 V UGS _Rv6	DIW6	RDBN%	65vTI	R51T6	
LV UGS _RvW	DIWD	11TIDf	BIB	DIW6	RDBN%	[	[	3 V UGS _RvW	DIW6	RDBN%	656TD	R51T6	
LV UGS _Rv5	DIWD	NDDDI%	BI5	DIW6	RDBN%	[	[	3 V UGS _Rv5	DIW6	RDBN%	65BTI	R51T6	
LV UGS _Rv1	DIWD	NDDDfB	BI5	DIW6	RDBN%	[	[	3 V UGS _Rv1	DIW6	RDBN%	65vTD	R51T6	
LV UGS _R6D	DIWD	NDDDIN	BI5	DIW6	RDBN%	[	[	3 V UGS _R6D	DIW6	RDBN%	65BTI	R51T6	
3 V UGS _RDN	BvT5DD	NDDT5D%	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RD%	DIWvD	RDB%W	NNTf	R55T6	
								LV UGS _RDN	RDIW6v	DIB%6	NNTf	R55TI	
3 V UGS _RD%	BvT5DD	NDDvf f	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RDN	RDIWN1	DI%f 1	NNTB	RINI%	
								3 V UGS _RDB	NI%B1	RDIWD6	%BTD	R51TI	
								LV UGS _RD%	RDIW6v	DIB%6	NNTf	R55TI	
3 V UGS _RDB	BvT5DD	NDDvB6	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RD%	RNI%B5	DI5W6	%%Tf	RINID	
								3 V UGS _RDv	NI565	RDT51N	BvTB	RIDI%	

Project: F m OH m 7F 0

Location: Paulding, OH

Contract:

Engineer: Josh Venden

j ilenaI e: F m - OH

ETAP

NWDDC

Study Case: NPG 16LE. 0

Page: B

0 ate: NDRDvR%DNF

SF : m ES_m OO0 P

k eAision: %6M p EF

Con8gT: F orI al

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	70	3 m	3 Aar	. I 4	MPj	M_a4
								LV UGS _RDB	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _RDv	BvT6DD	NDDIWND	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RDB	RNB6f	DI5vv	BvID	RINID	
								3 V UGS _RD6	%Tvff	RNNFD	v6TI	RIDIv	
								LV UGS _RDv	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _RD6	BvT6DD	NDDIBf%	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RDv	R%Tvf W	NINN5	v6TB	RININ	
								3 V UGS _RD5	BIDI6	RNIvv	6WII	RIDIW	
								LV UGS _RD6	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RDW	BvT6DD	NDDIB55	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RDF	DIWID	RDIB%W	NNIF	RI5T6	
								LV UGS _RDW	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RDF	BvT6DD	NDDIBf%	%TB	[	D	DIDDv	DIDDv	3 V UGS _RDW	RDIWID	DIP1W	NNI6	RIDI%	
								3 V UGS _RNW	RDIWNI	DIPWN	NNIP%	RI%I%	
								3 V UGS _RN6	NI561	RDI55B	BvTB	RIDIB	
								LV UGS _RDF	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RD5	BvT6DD	NDDIB6N	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RD6	RBIDIv	NIBvf	6WIB	RINIF	
								3 V UGS _RDI	BIFNv	RNIWB	WTII	RINIP%	
								LV UGS _RD5	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RDI	BvT6DD	NDDIBNI	%TB	[	D	DIDDv	DIDDv	3 V UGS _RD5	RBIFNN	NI56v	WTN	RI%IP%	
								3 V UGS _RND	vTBBN	RNI55D	f5T5	RINIF	
								LV UGS _RDI	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RND	BvT6DD	NDDIBD6	%TB	[	D	DIDDv	DIDDv	3 V UGS _RDI	RvTBBD	NIF51	f5TP%	RI%Tv	
								3 V UGS _R%6	vTIv1	R%TNN6	51T5	RI%ID	
								LV UGS _RND	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RNB	BvT6DD	NDDIWBv	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RNv	DIWID	RDIB%W	NNIF	RI5T6	
								LV UGS _RNB	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _RNv	BvT6DD	NDDIWNF	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RNB	RDIWID	DIP1v	NNIv	RIDIv	
								3 V UGS _RN6	NIP1BI	RDIWID	%TBN	RI51Tv	
								LV UGS _RNv	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _RN6	BvT6DD	NDDIBB%	%TB	[	D	DIDDv	DIDDv	3 V UGS _RDF	RNB6f	DI5ND	BBT5	RINIF	
								3 V UGS _RNv	RNP1B5	DI6vD	%T%6	RINIF	
								3 V UGS _RNF	BIFN6	RNIWW	W5TD	RINIP%	
								LV UGS _RN6	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _RNW	BvT6DD	NDDIWDF	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RDF	DIWID	RDIB%W	NNIF	RI5T6	
								LV UGS _RNW	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _RNF	BvT6DD	NDDIP5f	%TB	[	D	DIDDv	DIDDv	JUR%N	vTBBN	RNI5BF	f5T6	RI%IN	
								3 V UGS _RN6	RBIFN%	NI5NN	WWII	RI%IW	
								LV UGS _RNF	RDIWv	DIB%%	NNIF	RI5T5	
3 V UGS _R%D	BvT6DD	NDDIB15	%TB	[	D	DIDDv	DIDDv	3 V UGS _R%N	DIWID	RDIB%W	NNIF	RI5T6	
								LV UGS _R%D	RDIWv	DIB%%	NNIF	RI5TI	
3 V UGS _R%N	BvT6DD	NDDIB65	%TB	[	D	DIDDv	DIDDv	3 V UGS _R%D	RDIWNI	DIP6N	NNIN	RI%IF	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	70	3 m	3 Aar	. I 4	MPj	M_a4
								3 V UGS _R%%	NP%B1	RDI6f W	%%I5	RI DIF	
								LV UGS _R%N	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%%	Bv T6DD	NDDB%W	%dB	[	D	DIDDv	DIDDv	JUR%N	%Tvf f	RNNND	v6TB	RI NIB	
								3 V UGS _R%N	RNP%B5	DI6vW	%%dW	RI NI6	
								3 V UGS _R%I	RDIWNI	DP%Bf	NNIN	RI BTv	
								LV UGS _R%%	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%B	Bv T6DD	NDDP%I %	%dB	[	D	DIDDv	DIDDv	51j B.	W5DW	R%dF N6	N%%B	RI %II	
								3 V UGS _R%5	RWN5W	%IB51	NNDIF	RI BIB	
								LV UGS _R%B	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%v	Bv T6DD	NDDP%WB	%P%	[	D	DIDDv	DIDDv	3 V UGS _R%6	DIW%D	RDIB%W	NNIF	R55T6	
								LV UGS _R%v	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%6	Bv T6DD	NDDP%6W	%P%	[	D	DIDDv	DIDDv	51j N	WN5B	R%P%v5	NDI T5	RI vTD	
								3 V UGS _RND	RvTI vB	NIWD	5WII	RI vTI	
								3 V UGS _R%v	RDIW%D	DP%5B	NNIv	RI NID	
								LV UGS _R%6	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%W	Bv T6DD	NDDB61	%Tv	[	D	DIDDv	DIDDv	3 V UGS _R%f	DIW%D	RDIB%W	NNIF	R55T6	
								LV UGS _R%W	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%f	Bv T6DD	NDDBBI	%dB	[	D	DIDDv	DIDDv	3 V UGS _R%W	RDIWNI	DP%55	NNIv	RI DIF	
								3 V UGS _R%5	NP%BI	RDIWNv	%BTN	R5 I TW	
								LV UGS _R%f	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%5	Bv T6DD	NDDBDN	%dB	[	D	DIDDv	DIDDv	3 V UGS _R%B	WN55	R%5BI	NNNIW	RI %T6	
								3 V UGS _R%f	RNP%BI	DI6f 5	%%I5	RI DIW	
								3 V UGS _RBB	RvTBBD	NIWB6	f f T%	RI BT6	
								LV UGS _R%5	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _R%I	Bv T6DD	NDDBf B	%dB	[	D	DIDDv	DIDDv	3 V UGS _R%%	DIW%D	RDIB%W	NNIF	R55T6	
								LV UGS _R%I	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _RBN	Bv T6DD	NDDvBD	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RB%	DIW%D	RDIB%W	NNIF	R55T6	
								LV UGS _RBN	RDIW%v	DIB%%	NNIF	R55TI	
3 V UGS _RB%	Bv T6DD	NDDBf N	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RBN	RDIWNI	DP%N6	NDII	RI vTv	
								3 V UGS _RBB	NP%BI	RDI6vN	%%I6	RI NIW	
								LV UGS _RB%	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _RBB	Bv T6DD	NDDBvN	%Tv	[	D	DIDDv	DIDDv	3 V UGS _R%5	vTBBv	RNI55N	f 5T5	RI NIF	
								3 V UGS _RB%	RNP%B5	DI6Nv	%%Tv	RI %Tv	
								3 V UGS _RBv	R%Tvf W	NDv%	vvT5	RI %P%	
								LV UGS _RBB	RDIW%v	DIB%%	NNIF	R55T5	
3 V UGS _RBv	Bv T6DD	NDDBf B	%Tv	[	D	DIDDv	DIDDv	3 V UGS _RBB	%Tvf f	RNID56	v6TN	RI NIW	
								3 V UGS _RBW	RNP%B5	DI66v	%%dW	RI NIB	
								3 V UGS _RBI	RDIWNI	DP%D6	NDII	RI vTI	
								LV UGS _RBv	RDIW%v	DIB%%	NNIF	R55T5	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	70	3 m	3 Aar	. I 4	MPj	M_a4
3 V UGS _R8W	Bv15DD	NDDIvvf	%6v	D	D	DIDDv	DIDDv	3 V UGS _R8v	NP6B1	RDIW%v	%BTN	R51TB	
								3 V UGS _R8f	RDIW4D	DP415	NNI6	R1DIN	
								LV UGS _R8W	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _R8f	Bv15DD	NDDIvW%	%6	D	D	DIDDv	DIDDv	3 V UGS _R8W	DIW4D	RDIB%W	NNII	R55T6	
								LV UGS _R8f	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _R81	Bv15DD	NDDIvBf	%6v	D	D	DIDDv	DIDDv	3 V UGS _R8v	DIW4D	RDIB%W	NNII	R55T6	
								LV UGS _R81	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _RvD	Bv15DD	NDDIvDf	%6	D	D	DIDDv	DIDDv	51j v.	WN56	R%6vD%	NNDIW	R1BP%	
								3 V UGS _RvW	R515W6	%4Dff	11TD	R1BTf	
								LV UGS _RvD	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _RvN	Bv15DD	NDD15D5	%6W	D	D	DIDDv	DIDDv	JURv/N	DIW4D	RDIB%W	NNII	R55T6	
								LV UGS _RvN	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _Rv%	Bv15DD	NDDIv1B	%6W	D	D	DIDDv	DIDDv	JURv/N	%6fW	RNDWN	vvTI	R1NTI	
								3 V UGS _Rv1	RN56W	DIfB6	BBP%	R1BD	
								LV UGS _Rv%	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _RvB	Bv15DD	NDD15D5	%6W	D	D	DIDDv	DIDDv	JURv/N	DIW4D	RDIB%W	NNII	R55T6	
								LV UGS _RvB	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _Rvv	Bv15DD	NDDIv65	%6W	D	D	DIDDv	DIDDv	JURv/N	RBTfN%	NI6%5	WWTI	R1%T6	
								3 V UGS _Rv6	vTBB%	RN56v	f5T6	R1NTI	
								LV UGS _Rvv	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _Rv6	Bv15DD	NDDIvB1	%6W	D	D	DIDDv	DIDDv	3 V UGS _Rvv	RvTBBD	NIfBB	ffTI	R1%T5	
								3 V UGS _RvW	vTI6D	R%4D61	51TB	R1%TB	
								LV UGS _Rv6	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _RvW	Bv15DD	NDDIv%N	%6	D	D	DIDDv	DIDDv	3 V UGS _RvD	615WI	R%4NIf	11TI	R1BTD	
								3 V UGS _Rv6	RvTIv5	NI5fN	55TN	R1BT6	
								LV UGS _RvW	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _Rv5	Bv15DD	NDDIWD6	%6I	D	D	DIDDv	DIDDv	3 V UGS _Rv1	DIW4D	RDIB%W	NNIW	R55T6	
								LV UGS _Rv5	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _Rv1	Bv15DD	NDD15W	%6I	D	D	DIDDv	DIDDv	3 V UGS _Rv%	NI561	RDITDW	BvTv	R51TI	
								3 V UGS _Rv5	RDIWN1	DIP51	NNIv	R1DIW	
								3 V UGS _R6D	RDIWN1	DIP4D	NNIv	R1DI6	
								LV UGS _Rv1	RDIW%v	DIB%%	NNII	R55TI	
3 V UGS _R6D	Bv15DD	NDDIWD6	%6I	D	D	DIDDv	DIDDv	3 V UGS _Rv1	DIW4D	RDIB%W	NNIW	R55T6	
								LV UGS _R6D	RDIW%v	DIB%%	NNII	R55TI	
* PO7	NB5TDDD	NDDIDDD	DID	R%615W6	515N%	D	D	51_N	R%615W6	515N%	NNBTI	R16TD	
3 P_~B	NB15DD	NDDINDI	%6B	D	D	D	D	HV UGS 3 P_	DIDDD	DIDDD	DID	R%6B	
								& 51_NU					

* 7ndicates a Aoltage regulated bus (Aoltage controlled or swing ty4e I achine connected to it)

\# 7ndicates a bus with a load I isI atch o8I ore than DIN3 V.

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
5. I N0	j BDGG	NGGDNfj	%IDN	C	G	C	C	3 V U6 S _v%I	vTDNf.	%I0GNI	NG5DT	v. 1DN	
								5. _NU	TDNf.	v%I0GNI	NG5DT	v. 1DN	
5. I %0	j BDGG	NGGDNfj	%IDN	C	G	C	C	JUv%N	vTDf. 5	%IjDBf	N%GDN	v. BDD	
								5. _NU	TDf. 5	v%IjDBf	N%GDN	v. BDD	
5. I j 0	j BDGG	NGGDNfj	%IDN	C	G	C	C	3 V U6 S _v%j	vTDf. 1	%I0G 1	NN5D5	v. 1DT	
								5. _NU	TDf. 1	v%I0G 1	NN5D5	v. 1DT	
5. I B0	j BDGG	NGGDNfj	%IDN	C	G	C	C	3 V U6 S _vBG	vTDNTB	GD5G	NGBDG	v. . DG	
								5. _NU	TDNTB	vGD5G	NGBDG	v. . DG	
5. _N0	Nj 5DGG	NGBD. .	GDG	C	G	C	C	POR	%ID51N	v5DBN	NG5DD	v. 1DG	
								HV U6 S 3 P_	v%ID51N	5DBN	NG5DD	v. 1DG	
5. _NU	j BDGG	NGGDNfj	%IDN	C	G	C	C	5. I B0	vTDNTB	GD5G	NGBDG	v. . DG	
								5. I j 0	vTDf. 1	%I0G 1	NN5D5	v. 1DT	
								5. I %0	vTDf. 5	%IjDBf	N%GDN	v. BDD	
								5. I N0	vTDNf.	%I0GNI	NG5DT	v. 1DN	
								3 P_~j	%IDj T	vfDj f	BIGD	v. TD%	
							&	HV U6 S 3 P_					
HV U6 S 3 P_	Nj 5DGG	NGBD. .	GDG	C	G	GDGI.	GDNT%	5. _N0	%ID51N	v5DBN	NG5DD	v. 1DG	
								5. _NU	v%IDNG	5Df.	NG5DD	v. 1DN	j Df1G
							&	3 P_~j					
JUv%N	j BDGG	NGGD%GT	%ID%	C	G	C	C	3 V U6 S _vNf	vBDj G	NDf%B	f fD5	v. %D	
								3 V U6 S _v%%	v%IDf 1	NDj j	BBD5	v. %ID	
								5. I %0	TD5GI	v%ID1f	N%IDT	v. %ID	
JUvB'N	j BDGG	NGGDj G	%IDT	C	G	C	C	3 V U6 S _vBN	vGDT%G	GD% T	NNDB	v. GD%	
								3 V U6 S _vB%	v%IDfT	NDGTN	BBD	v. ND	
								3 V U6 S _vBj	vGDT%G	GD% f	NNDB	v. GD%	
								3 V U6 S _vBB	j DNI	vNDT1B	TfD5	v. NDB	
LV U6 S _vGN	GDT. G	. . D%I	j D%	GDT%I	vGDN%	C	C	3 V U6 S _vGN	GDT%I	vGDN%	15BD	v5. D	
LV U6 S _vG%	GDT. G	. . DGG	j D%	GDT%I	vGDN%	C	C	3 V U6 S _vG%	GDT%I	vGDN%	151DG	v5. D	
LV U6 S _vGj	GDT. G	. . D515	j D%	GDT%I	vGDN%	C	C	3 V U6 S _vGj	GDT%I	vGDN%	151D	v5. D	
LV U6 S _vGB	GDT. G	. . Dj %	j D%	GDT%I	vGDN%	C	C	3 V U6 S _vGB	GDT%I	vGDN%	151DB	v5. D	
LV U6 S _vGI	GDT. G	. . Df. B	j D%	GDT%I	vGDN%	C	C	3 V U6 S _vGI	GDT%I	vGDN%	151DT	v5. D	
LV U6 S _vGT	GDT. G	. . D5NG	j DN	GDT%I	vGDN%	C	C	3 V U6 S _vGT	GDT%I	vGDN%	151DT	v5. D	
LV U6 S _vGf	GDT. G	. . Df. B	j DN	GDT%I	vGDN%	C	C	3 V U6 S _vGf	GDT%I	vGDN%	151DT	v5. D	
LV U6 S _vG5	GDT. G	. . Dfj	j DN	GDT%I	vGDN%	C	C	3 V U6 S _vG5	GDT%I	vGDN%	151D5	v5. D	
LV U6 S _vG	GDT. G	. . DBG	j DN	GDT%I	vGDN%	C	C	3 V U6 S _vG	GDT%I	vGDN%	15TDG	v5. D	
LV U6 S _vNG	GDT. G	. . Df%T	j DN	GDT%I	vGDN%	C	C	3 V U6 S _vNG	GDT%I	vGDN%	15TDG	v5. D	

Pro7ect:	F m OH m RF W	ETAP	Page:	%
Location:	Paulding, OH	NI1D1D1C	Wate:	NGvGl v%GNF
Contract:			SF :	m ES_m OOWj
Engineer:	Josh Venden	Study Case: NGl P6 . 1LE0 W	k eAision:	%l M p EF
I ilena- e:	F m 2OH		Con8gD	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M3 agD	0ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
LV U6 S _vNj	GD. G	. . D1T	j DN	GD%l	vGDN%	C	C	3 V U6 S _vNj	GD%l	vGDN%	151Dj	v5. D	
LV U6 S _vNB	GD. G	. . Dj .	j DN	GD%l	vGDN%	C	C	3 V U6 S _vNB	GD%l	vGDN%	151DB	v5. D	
LV U6 S _vNl	GD. G	. . D1B	j DN	GD%l	vGDN%	C	C	3 V U6 S _vNl	GD%l	vGDN%	151D	v5. D	
LV U6 S _vNT	GD. G	. . D%	j DN	GD%l	vGDN%	C	C	3 V U6 S _vNT	GD%l	vGDN%	151DB	v5. D	
LV U6 S _vNf	GD. G	. . DG	j DN	GD%l	vGDN%	C	C	3 V U6 S _vNf	GD%l	vGDN%	15TDN	v5. D	
LV U6 S _v%G	GD. G	. . D%G	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%G	GD%l	vGDN%	151D	v5. D	
LV U6 S _v%N	GD. G	. . D5G	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%N	GD%l	vGDN%	151D5	v5. D	
LV U6 S _v%%	GD. G	. . DB5	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%%	GD%l	vGDN%	151D	v5. D	
LV U6 S _v%j	GD. G	. . DNj	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%j	GD%l	vGDN%	15TDN	v5. D	
LV U6 S _v%B	GD. G	. . D51	j DG	GD%l	vGDN%	C	C	3 V U6 S _v%B	GD%l	vGDN%	15TDj	v5. D	
LV U6 S _v%l	GD. G	. . Df f	j DG	GD%l	vGDN%	C	C	3 V U6 S _v%l	GD%l	vGDN%	15TDj	v5. D	
LV U6 S _v%T	GD. G	. . D5N	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%T	GD%l	vGDN%	151D5	v5. D	
LV U6 S _v%f	GD. G	. . DTN	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%f	GD%l	vGDN%	151D5	v5. D	
LV U6 S _v%5	GD. G	. . D%j	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%5	GD%l	vGDN%	15TDN	v5. D	
LV U6 S _v%	GD. G	. . D. 1	j DN	GD%l	vGDN%	C	C	3 V U6 S _v%	GD%l	vGDN%	151DT	v5. D	
LV U6 S _vj N	GD. G	. . D1%	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj N	GD%l	vGDN%	151Dj	v5. D	
LV U6 S _vj %	GD. G	. . D. j	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj %	GD%l	vGDN%	151D5	v5. D	
LV U6 S _vj j	GD. G	. . DTj	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj j	GD%l	vGDN%	151D5	v5. D	
LV U6 S _vj B	GD. G	. . D. 1	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj B	GD%l	vGDN%	151DT	v5. D	
LV U6 S _vj T	GD. G	. . Df G	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj T	GD%l	vGDN%	151D%	v5. D	
LV U6 S _vj f	GD. G	. . D5B	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj f	GD%l	vGDN%	151DN	v5. D	
LV U6 S _vj .	GD. G	. . DTG	j D%	GD%l	vGDN%	C	C	3 V U6 S _vj .	GD%l	vGDN%	151Dj	v5. D	
LV U6 S _vBG	GD. G	. . D%	j Dj	GD%l	vGDN%	C	C	3 V U6 S _vBG	GD%l	vGDN%	151DB	v5. D	
LV U6 S _vBN	GD. G	. . Dj N	j DB	GD%l	vGDN%	C	C	3 V U6 S _vBN	GD%l	vGDN%	15BD5	v5. D	
LV U6 S _vB%	GD. G	. . DNT	j DB	GD%l	vGDN%	C	C	3 V U6 S _vB%	GD%l	vGDN%	15BD	v5. D	
LV U6 S _vBj	GD. G	. . Dj G	j DB	GD%l	vGDN%	C	C	3 V U6 S _vBj	GD%l	vGDN%	15BD5	v5. D	
LV U6 S _vBB	GD. G	. . D5N	j DB	GD%l	vGDN%	C	C	3 V U6 S _vBB	GD%l	vGDN%	151DN	v5. D	
LV U6 S _vBl	GD. G	. . DT%	j Dj	GD%l	vGDN%	C	C	3 V U6 S _vBl	GD%l	vGDN%	151D%	v5. D	
LV U6 S _vBT	GD. G	. . DBj	j Dj	GD%l	vGDN%	C	C	3 V U6 S _vBT	GD%l	vGDN%	151DB	v5. D	
LV U6 S _vB5	GD. G	NGGD%	j D	GD%l	vGDN%	C	C	3 V U6 S _vB5	GD%l	vGDN%	15BDj	v5. D	
LV U6 S _vB.	GD. G	NGGDG	j D	GD%l	vGDN%	C	C	3 V U6 S _vB.	GD%l	vGDN%	15BDB	v5. D	
LV U6 S _vl G	GD. G	NGGD5	j D	GD%l	vGDN%	C	C	3 V U6 S _vl G	GD%l	vGDN%	15BDj	v5. D	
3 V U6 S _vGN	j BDGG	NGGDj .	%lD	C	G	GDGB	GDGB	3 V U6 S _vG%	GD%G	vGD%T	NND5	v55D	
								LV U6 S _vGN	vGD%B	GDj%%	NND5	v55D	
3 V U6 S _vG%	j BDGG	NGGDNl	%lDB	C	G	GDGB	GDGB	3 V U6 S _vGN	vGDN	GD%f .	NNDj	v. N%	
								3 V U6 S _vGj	N%j .	vGDGl	%j DG	v5. D	
								LV U6 S _vG%	vGD%B	GDj%%	NND5	v55D	
3 V U6 S _vGj	j BDGG	NGGDf %	%lDB	C	G	GDGB	GDGB	3 V U6 S _vG%	vN%j 5	GDT1	%lD5	v. NG	
								3 V U6 S _vGB	N515	vG5. N	j BDB	v. G%	

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
								LV U6 S _vGj	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vGB	j BDGG	NGGpBf	%DB	C	G	GDGB	GDGB	3 V U6 S _vGj	vN51f	G5BB	j BDG	v. NDG	
								3 V U6 S _vGl	%DBf f	vNDf G	B1Df	v. GDB	
								LV U6 S _vGB	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vGl	j BDGG	NGGpG	%DB	C	G	GDGB	GDGB	3 V U6 S _vGB	v%DBf T	NDN5	B1Dp	v. NDN	
								3 V U6 S _vG5	j DG 1	vNDBBB	1f DG	v. GDT	
								LV U6 S _vGl	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vGT	j BDGG	NGGp%l	%DB	C	G	GDGB	GDGB	3 V U6 S _vGf	GD%G	vGp%T	NNf	v55D	
								LV U6 S _vGT	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vGf	j BDGG	NGGpG	%Dp	C	G	GDGB	GDGB	3 V U6 S _vGT	vGD%G	GD% T	NND	v. GD%	
								3 V U6 S _vNT	vGDN	GD%TN	NND%	v. %D%	
								3 V U6 S _vNl	N51.	vG55j	j BDp	v. GDp	
								LV U6 S _vGf	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vG5	j BDGG	NGGD%55	%DB	C	G	GDGB	GDGB	3 V U6 S _vGl	vj DG B	NpBf	1TDp	v. NDf	
								3 V U6 S _vG	j D5NB	vNDf j	T5DG	v. ND%	
								LV U6 S _vG5	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vG	j BDGG	NGGD%l T	%Dp	C	G	GDGB	GDGB	3 V U6 S _vG5	vj D5NN	ND11	Tf D%	v. %D%	
								3 V U6 S _vNG	BDj N	vN55N	f 5D5	v. NDf	
								LV U6 S _vG	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNG	j BDGG	NGGD%B%	%Dp	C	G	GDGB	GDGB	3 V U6 S _vG	vBDj G	NDf. G	f 5D%	v. %DB	
								3 V U6 S _v%l	BDB.	v%DNT	5. D	v. ND	
								LV U6 S _vNG	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNj	j BDGG	NGGpf N	%DB	C	G	GDGB	GDGB	3 V U6 S _vNB	GD%G	vGp%T	NNf	v55D	
								LV U6 S _vNj	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNB	j BDGG	NGGp1B	%DB	C	G	GDGB	GDGB	3 V U6 S _vNj	vGD%G	GD% B	NNDB	v. GDB	
								3 V U6 S _vNl	ND%j .	vGD%G	%j DN	v5. DB	
								LV U6 S _vNB	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNl	j BDGG	NGGD%f G	%Dp	C	G	GDGB	GDGB	3 V U6 S _vGf	vN51f	G5NG	j j D5	v. NDf	
								3 V U6 S _vNB	vND%j 5	GDBG	%8Dl	v. NDf	
								3 V U6 S _vNf	j D5Nl	vNDf T	T5DG	v. ND%	
								LV U6 S _vNl	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNT	j BDGG	NGGpBB	%DB	C	G	GDGB	GDGB	3 V U6 S _vGf	GD%G	vGp%T	NNf	v55D	
								LV U6 S _vNT	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _vNf	j BDGG	NGGD%8B	%Dp	C	G	GDGB	GDGB	JUv%N	BDj N	vN5j f	f 5DT	v. %DN	
								3 V U6 S _vNl	vj D5N%	NDN%	TTD	v. %DT	
								LV U6 S _vNf	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _v%G	j BDGG	NGGpj 1	%Dp	C	G	GDGB	GDGB	3 V U6 S _v%N	GD%G	vGp%T	NNf	v55D	
								LV U6 S _v%G	vGD%B	Gp%%	NNf	v55D5	
3 V U6 S _v%N	j BDGG	NGGD% 1	%Dp	C	G	GDGB	GDGB	3 V U6 S _v%G	vGDN	GD%l N	NNDN	v. %Df	

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
								3 V U6 S _v%%	N%j .	vGDf f	%%D5	v. GD	
								LV U6 S _v%N	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%%	j BDGG	NGGD%Tj	%D	C	G	GDGB	GDGB	JUv%N	%DBf f	vNDNG	B1 D	v. ND	
								3 V U6 S _v%N	vN%j 5	GDBf	%%DT	v. ND	
								3 V U6 S _v%	vGDN	GD%j 5	NNDN	v. j DB	
								LV U6 S _v%%	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%j	j BDGG	NGGD%%	%D	C	G	GDGB	GDGB	5. I j 0	TD5GT	v%DNT	N%%D	v. %D	
								3 V U6 S _v%5	vTDN5T	%D. N	NNGD	v. j D	
								LV U6 S _v%j	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%B	j BDGG	NGGD%GG	%D%	C	G	GDGB	GDGB	3 V U6 S _v%l	GD%G	vGD%T	NND	v55D	
								LV U6 S _v%B	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%l	j BDGG	NGGDN j	%D%	C	G	GDGB	GDGB	5. I N0	TDN5j	v%D%l G	NG D	v. BDG	
								3 V U6 S _vNG	vBD Bj	NDTBN	5f DG	v. BD	
								3 V U6 S _v%B	vGD%G	GD%5j	NNDB	v. NDG	
								LV U6 S _v%l	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%T	j BDGG	NGGD% T	%DB	C	G	GDGB	GDGB	3 V U6 S _v%f	GD%G	vGD%T	NND	v55D	
								LV U6 S _v%T	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%f	j BDGG	NGGD%f f	%DB	C	G	GDGB	GDGB	3 V U6 S _v%T	vGDN	GD%5 5	NNDB	v. GD	
								3 V U6 S _v%5	N%j .	vGDNB	%j DN	v5. DT	
								LV U6 S _v%f	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%5	j BDGG	NGGD%j 5	%D	C	G	GDGB	GDGB	3 V U6 S _v%j	TDN55	v%DBG	NNND	v. %D	
								3 V U6 S _v%f	vN%j .	GDf 5	%%D5	v. GDT	
								3 V U6 S _vj j	vBDj G	NDj T	f f D	v. j D	
								LV U6 S _v%5	vGD%B	GD%%	NND	v55D5	
3 V U6 S _v%	j BDGG	NGGDNG	%D	C	G	GDGB	GDGB	3 V U6 S _v%%	GD%G	vGD%T	NND	v55D	
								LV U6 S _v%	vGD%B	GD%%	NND	v55D5	
3 V U6 S _vj N	j BDGG	NGGDTf	%DB	C	G	GDGB	GDGB	3 V U6 S _vj %	GD%G	vGD%T	NND	v55D	
								LV U6 S _vj N	vGD%B	GD%%	NND	v55D5	
3 V U6 S _vj %	j BDGG	NGGDG5	%DB	C	G	GDGB	GDGB	3 V U6 S _vj N	vGDN	GD%NT	NGD	v. BDB	
								3 V U6 S _vj j	N%j .	vGDBN	%%DT	v. NDT	
								LV U6 S _vj %	vGD%B	GD%%	NND	v55D5	
3 V U6 S _vj j	j BDGG	NGGD%f 5	0 %DB	C	G	GDGB	GDGB	3 V U6 S _v%5	BDj B	vN55N	f 5D	v. ND	
								3 V U6 S _vj %	vN%j 5	GDNB	%%DB	v. %DB	
								3 V U6 S _vj B	v%DBf T	NDB%	BBD	v. %D%	
								LV U6 S _vj j	vGD%B	GD%%	NND	v55D5	
3 V U6 S _vj B	j BDGG	NGGDNG	%DB	C	G	GDGB	GDGB	3 V U6 S _vj j	%DBf f	vND5 1	B1 DN	v. NDT	
								3 V U6 S _vj T	vN%j 5	GD1 B	%%DT	v. ND	
								3 V U6 S _vj .	vGDN	GD%Gl	NGD	v. BD	
								LV U6 S _vj B	vGD%B	GD%%	NND	v55D5	

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
3 V U6 S _vj T	j BD0GG	NGGD 5B	%1D	C	G	GD0GB	GD0GB	3 V U6 S _vj B	NDj .	vGDT%B	%j DN	v5. D	
								3 V U6 S _vj f	vGDT%G	GD% 5	NND	v. GDN	
								LV U6 S _vj T	vGDT%B	GD%%	NND	v55D5	
3 V U6 S _vj f	j BD0GG	NGGD. .	%1D	C	G	GD0GB	GD0GB	3 V U6 S _vj T	GDT%G	vGD%T	NND	v55D	
								LV U6 S _vj f	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vj .	j BD0GG	NGGDf 1	%1DB	C	G	GD0GB	GD0GB	3 V U6 S _vj B	GDT%G	vGD%T	NND	v55D	
								LV U6 S _vj .	vGDT%B	GD%%	NND	v55D5	
3 V U6 S _vBG	j BD0GG	NGGDBB	%1D	C	G	GD0GB	GD0GB	5. I B0	TDN51	v%1DGB	NNGD	v. j D%	
								3 V U6 S _vBT	v1DT1	%1Df 5	. . DN	v. j D	
								LV U6 S _vBG	vGDT%B	GD%%	NND	v55D5	
3 V U6 S _vBN	j BD0GG	NGGDBB1	%1DT	C	G	GD0GB	GD0GB	JUvB/N	GDT%G	vGD%T	NND	v55D	
								LV U6 S _vBN	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vB%	j BD0GG	NGGDBj G	%1DT	C	G	GD0GB	GD0GB	JUvB/N	%1DBf T	vNDGTN	BBD	v. ND	
								3 V U6 S _vB.	vND51T	GDj T	j j D	v. j DG	
								LV U6 S _vB%	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vBj	j BD0GG	NGGDBB1	%1DT	C	G	GD0GB	GD0GB	JUvB/N	GDT%G	vGD%T	NND	v55D	
								LV U6 S _vBj	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vBB	j BD0GG	NGGD. 1	%1DT	C	G	GD0GB	GD0GB	JUvB/N	vj DN%	ND%	TTD	v. %1D	
								3 V U6 S _vB1	BDj %	vND511	f 5DT	v. ND	
								LV U6 S _vBB	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vB1	j BD0GG	NGGDf T	%1DT	C	G	GD0GB	GD0GB	3 V U6 S _vBB	vBDj G	NDj B	f f D5	v. %1D5	
								3 V U6 S _vBT	BD 1G	v%1DG1.	5. DB	v. %1D	
								LV U6 S _vB1	vGDT%B	GD%%	NND	v55D5	
3 V U6 S _vBT	j BD0GG	NGGD15	%1D	C	G	GD0GB	GD0GB	3 V U6 S _vBG	1DTf	v%1DN 5	. . D5	v. j DG	
								3 V U6 S _vB1	vBDB5	ND5f %	55D%	v. j D	
								LV U6 S _vBT	vGDT%B	GD%%	NND	v55D5	
3 V U6 S _vB5	j BD0GG	NGGDB%	%1D5	C	G	GD0GB	GD0GB	3 V U6 S _vB.	GDT%G	vGD%T	NND	v55D	
								LV U6 S _vB5	vGDT%B	GD%%	NND	v55D	
3 V U6 S _vB.	j BD0GG	NGGD%j	%1D5	C	G	GD0GB	GD0GB	3 V U6 S _vB%	ND51.	vGDGT	j BDB	v5. D	
								3 V U6 S _vB5	vGDN	GD%5.	NNDB	v. GDT	
								3 V U6 S _v1G	vGDN	GD% N	NNDB	v. GD	
								LV U6 S _vB.	vGDT%B	GD%%	NND	v55D	
3 V U6 S _v1G	j BD0GG	NGGDB%	%1D5	C	G	GD0GB	GD0GB	3 V U6 S _vB.	GDT%G	vGD%T	NND	v55D	
								LV U6 S _v1G	vGDT%B	GD%%	NND	v55D	
* POR	Nj 5D0GG	NG1D0GG	GDG	v%1D51N	5Dj T	C	C	5. _N0	v%1D51N	5Dj T	NG5D	v. 1DG	
3 P_~j	Nj D5GG	NGGD0BT	%1D	C	G	C	C	HV U6 S 3 P_	GD0GG	GD0GG	GDG	GDG	
								& 5. _NU					

* Rndicates a Aoltage regulated bus (Aoltage controlled or swing ty4e - achine connected to it)

\# Rndicates a bus with a load - is- atch o8- ore than GDN3 V0

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
34YFp	52.G00	44.364	2.R	0	0	0	0	8 V B1 S I -7G	-F5.522	-0.RR0	772.0	44.3	
								34I FB	F5.522	0.RR0	772.0	44.3	
34Y7p	52.G00	44.364	2.R	0	0	0	0	JB-7/F	-F2.63F	-0.R76	726.5	44.4	
								34I FB	F2.63F	0.R76	726.5	44.4	
34Y5p	52.G00	44.364	2.R	0	0	0	0	8 V B1 S I -75	-F2.66R	-0.4GF	726.5	44.3	
								34I FB	F2.66R	0.4GF	726.5	44.3	
34Y2p	52.G00	44.364	2.R	0	0	0	0	8 V B1 S I -20	-F5.7R6	-F.37G	772.6	44.F	
								34I FB	F5.7R6	F.37G	772.6	44.F	
34I Fp	F53.000	F00.00F	0.0	0	0	0	0	PON	GG307	-0.270	755.G	F00.0	
								HV B1 S 8 PI	-GG307	0.270	755.G	F00.0	
34I FB	52.G00	44.364	2.R	0	0	0	0	34Y2p	-F5.7R6	-F.37G	772.6	44.F	
								34Y5p	-F2.66R	-0.4GF	726.5	44.3	
								34Y7p	-F2.63F	-0.R76	726.5	44.4	
								34YFp	-F5.522	-0.RR0	772.0	44.3	
								8 PI ~5	GG463	2.7R7	420.6	44.R	
							&	HV B1 S 8 PI					
HV B1 S 8 PI	F53.000	F00.00F	0.0	0	0	0.0G2	0.F2R	34I Fp	GG307	-0.270	755.G	F00.0	
								34I FB	-GG3G6	0.7R5	755.R	F00.0	0.67G
							&	8 PI ~5					
JB-7/F	52.G00	F00.03R	2.3	0	0	0	0	8 V B1 S I -FR	-4.5G4	-0.7GG	FG6.G	F00.0	
								8 V B1 S I -77	-G5G5	-0.F05	34.G	F00.0	
								34Y7p	F2.RFF	0.5G3	726.F	F00.0	
JB-2/F	52.G00	F0F.0F5	GG	0	0	0	0	8 V B1 S I -2F	-F.52F	0.0FF	77.7	F00.0	
								8 V B1 S I -27	-G5GG	-0.03F	33.R	F00.0	
								8 V B1 S I -25	-F.52F	0.0F7	77.7	F00.0	
								8 V B1 S I -22	3.056	0.0G3	F55.F	F00.0	
LV B1 S I -0F	0.640	F0F.0R7	6.R	F.5G0	0.000	0	0	8 V B1 S I -0F	F.5G0	0.000	FFFR5	F00.0	
LV B1 S I -07	0.640	F0F.0F5	6.R	F.5G0	0.000	0	0	8 V B1 S I -07	F.5G0	0.000	FFF3.0	F00.0	
LV B1 S I -05	0.640	F00.4F7	6.R	F.5G0	0.000	0	0	8 V B1 S I -05	F.5G0	0.000	FFF4.F	F00.0	
LV B1 S I -02	0.640	F00.322	6.R	F.5G0	0.000	0	0	8 V B1 S I -02	F.5G0	0.000	FFF4.3	F00.0	
LV B1 S I -0G	0.640	F00.R22	6.R	F.5G0	0.000	0	0	8 V B1 S I -0G	F.5G0	0.000	FF7F.0	F00.0	
LV B1 S I -06	0.640	F00.R74	6.6	F.5G0	0.000	0	0	8 V B1 S I -06	F.5G0	0.000	FF7F.F	F00.0	
LV B1 S I -0R	0.640	F00.647	6.6	F.5G0	0.000	0	0	8 V B1 S I -0R	F.5G0	0.000	FF7F.G	F00.0	
LV B1 S I -03	0.640	F00.6R0	6.6	F.5G0	0.000	0	0	8 V B1 S I -03	F.5G0	0.000	FF7F.3	F00.0	
LV B1 S I -04	0.640	F00.G60	6.6	F.5G0	0.000	0	0	8 V B1 S I -04	F.5G0	0.000	FF75.0	F00.0	
LV B1 S I -F0	0.640	F00.G00	6.G	F.5G0	0.000	0	0	8 V B1 S I -F0	F.5G0	0.000	FF75.R	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
LV B1 S I -F5	0.640	F00.350	6.6	F.5C0	0.000	0	0	8 V B1 S I -F5	F.5C0	0.000	FF70.0	F00.0	
LV B1 S I -F2	0.640	F00.R34	6.6	F.5C0	0.000	0	0	8 V B1 S I -F2	F.5C0	0.000	FF70.G	F00.0	
LV B1 S I -FG	0.640	F00.G36	6.6	F.5C0	0.000	0	0	8 V B1 S I -FG	F.5C0	0.000	FF77.R	F00.0	
LV B1 S I -F6	0.640	F00.RRG	6.6	F.5C0	0.000	0	0	8 V B1 S I -F6	F.5C0	0.000	FF70.6	F00.0	
LV B1 S I -FR	0.640	F00.257	6.G	F.5C0	0.000	0	0	8 V B1 S I -FR	F.5C0	0.000	FF72.2	F00.0	
LV B1 S I -70	0.640	F00.63F	6.G	F.5C0	0.000	0	0	8 V B1 S I -70	F.5C0	0.000	FF7F.R	F00.0	
LV B1 S I -7F	0.640	F00.G3G	6.G	F.5C0	0.000	0	0	8 V B1 S I -7F	F.5C0	0.000	FF77.R	F00.0	
LV B1 S I -77	0.640	F00.C04	6.G	F.5C0	0.000	0	0	8 V B1 S I -77	F.5C0	0.000	FF75.6	F00.0	
LV B1 S I -75	0.640	F00.2R2	6.G	F.5C0	0.000	0	0	8 V B1 S I -75	F.5C0	0.000	FF72.0	F00.0	
LV B1 S I -72	0.640	F00.7R6	6.2	F.5C0	0.000	0	0	8 V B1 S I -72	F.5C0	0.000	FF76.7	F00.0	
LV B1 S I -7G	0.640	F00.7CG	6.2	F.5C0	0.000	0	0	8 V B1 S I -7G	F.5C0	0.000	FF76.2	F00.0	
LV B1 S I -76	0.640	F00.632	6.6	F.5C0	0.000	0	0	8 V B1 S I -76	F.5C0	0.000	FF7F.6	F00.0	
LV B1 S I -7R	0.640	F00.65R	6.6	F.5C0	0.000	0	0	8 V B1 S I -7R	F.5C0	0.000	FF77.7	F00.0	
LV B1 S I -73	0.640	F00.C2G	6.6	F.5C0	0.000	0	0	8 V B1 S I -73	F.5C0	0.000	FF75.7	F00.0	
LV B1 S I -74	0.640	F00.67F	6.G	F.5C0	0.000	0	0	8 V B1 S I -74	F.5C0	0.000	FF77.5	F00.0	
LV B1 S I -5F	0.640	F00.4F3	6.R	F.5C0	0.000	0	0	8 V B1 S I -5F	F.5C0	0.000	FFF4.0	F00.0	
LV B1 S I -57	0.640	F00.RRR	6.R	F.5C0	0.000	0	0	8 V B1 S I -57	F.5C0	0.000	FF70.6	F00.0	
LV B1 S I -55	0.640	F00.R06	6.R	F.5C0	0.000	0	0	8 V B1 S I -55	F.5C0	0.000	FF7F.2	F00.0	
LV B1 S I -52	0.640	F00.R4F	6.R	F.5C0	0.000	0	0	8 V B1 S I -52	F.5C0	0.000	FF70.2	F00.0	
LV B1 S I -56	0.640	F00.464	6.R	F.5C0	0.000	0	0	8 V B1 S I -56	F.5C0	0.000	FFF3.G	F00.0	
LV B1 S I -5R	0.640	F0F.002	6.R	F.5C0	0.000	0	0	8 V B1 S I -5R	F.5C0	0.000	FFF3.F	F00.0	
LV B1 S I -54	0.640	F00.42G	6.R	F.5C0	0.000	0	0	8 V B1 S I -54	F.5C0	0.000	FFF3.R	F00.0	
LV B1 S I -20	0.640	F00.477	6.4	F.5C0	0.000	0	0	8 V B1 S I -20	F.5C0	0.000	FFF4.0	F00.0	
LV B1 S I -2F	0.640	F0F.5F4	RF	F.5C0	0.000	0	0	8 V B1 S I -2F	F.5C0	0.000	FFF2.6	F00.0	
LV B1 S I -27	0.640	F0F.732	RF	F.5C0	0.000	0	0	8 V B1 S I -27	F.5C0	0.000	FFFG0	F00.0	
LV B1 S I -25	0.640	F0F.5F3	RF	F.5C0	0.000	0	0	8 V B1 S I -25	F.5C0	0.000	FFF2.6	F00.0	
LV B1 S I -22	0.640	F0F.F66	R0	F.5C0	0.000	0	0	8 V B1 S I -22	F.5C0	0.000	FFF6.5	F00.0	
LV B1 S I -2G	0.640	F0F.03R	R0	F.5C0	0.000	0	0	8 V B1 S I -2G	F.5C0	0.000	FFFR7	F00.0	
LV B1 S I -26	0.640	F00.447	6.4	F.5C0	0.000	0	0	8 V B1 S I -26	F.5C0	0.000	FFF3.7	F00.0	
LV B1 S I -23	0.640	F0F.GR2	RF	F.5C0	0.000	0	0	8 V B1 S I -23	F.5C0	0.000	FFFF.3	F00.0	
LV B1 S I -24	0.640	F0F.G73	RF	F.5C0	0.000	0	0	8 V B1 S I -24	F.5C0	0.000	FFF7.5	F00.0	
LV B1 S I -C0	0.640	F0F.GR7	RF	F.5C0	0.000	0	0	8 V B1 S I -C0	F.5C0	0.000	FFFF.3	F00.0	
8 V B1 S I -0F	52.C00	F00.305	GF	0	0	0.002	0.002	8 V B1 S I -07	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -0F	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -07	52.C00	F00.R25	GF	0	0	0.002	0.002	8 V B1 S I -0F	-F.52F	-0.006	77.5	F00.0	
								8 V B1 S I -05	7.637	-0.052	22.6	F00.0	
								LV B1 S I -07	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -05	52.C00	F00.627	GF	0	0	0.002	0.002	8 V B1 S I -07	-7.6R4	-0.00G	22.6	F00.0	
								8 V B1 S I -02	2.07F	-0.056	66.4	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
								LV B1 S I -05	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -02	52.C00	F00.GRG	GF	0	0	0.002	0.002	8 V B1 S I -05	-2.0F3	-0.0F0	66.4	F00.0	
								8 V B1 S I -0G	G5G4	-0.05F	34.7	F00.0	
								LV B1 S I -02	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -0G	52.C00	F00.2R2	GF	0	0	0.002	0.002	8 V B1 S I -02	-G5G2	-0.070	34.7	F00.0	
								8 V B1 S I -03	6.64G	-0.07F	FFF.G	F00.0	
								LV B1 S I -0G	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -06	52.C00	F00.260	G0	0	0	0.002	0.002	8 V B1 S I -0R	F.52F	-0.02F	77.2	-F00.0	
								LV B1 S I -06	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -0R	52.C00	F00.277	G0	0	0	0.002	0.002	8 V B1 S I -06	-F.52F	0.0F7	77.5	F00.0	
								8 V B1 S I -F6	-F.520	-0.072	77.5	F00.0	
								8 V B1 S I -FG	2.075	-0.074	6R0	F00.0	
								LV B1 S I -0R	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -03	52.C00	F00.200	G0	0	0	0.002	0.002	8 V B1 S I -0G	-6.640	-0.0R5	FFF.G	F00.0	
								8 V B1 S I -04	3.057	0.057	F55.4	F00.0	
								LV B1 S I -03	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -04	52.C00	F00.734	G0	0	0	0.002	0.002	8 V B1 S I -03	-3.075	-0.F2G	F55.4	F00.0	
								8 V B1 S I -F0	4.562	0.F02	FG6.5	F00.0	
								LV B1 S I -04	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -F0	52.C00	F00.750	2.4	0	0	0.002	0.002	8 V B1 S I -04	-4.5G4	-0.F40	FG6.5	F00.0	
								8 V B1 S I -7G	F0.R00	0.F24	FR3.R	F00.0	
								LV B1 S I -F0	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -F5	52.C00	F00.G60	G0	0	0	0.002	0.002	8 V B1 S I -F2	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -F5	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -F2	52.C00	F00.G70	G0	0	0	0.002	0.002	8 V B1 S I -F5	-F.52F	0.004	77.5	F00.0	
								8 V B1 S I -FG	7.637	-0.0C0	22.R	-F00.0	
								LV B1 S I -F2	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -FG	52.C00	F00.5F6	G0	0	0	0.002	0.002	8 V B1 S I -0R	-2.0F3	-0.025	6R0	F00.0	
								8 V B1 S I -F2	-7.6RR	-0.074	22.R	F00.0	
								8 V B1 S I -FR	3.056	0.05F	F52.F	F00.0	
								LV B1 S I -FG	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -F6	52.C00	F00.C0G	G0	0	0	0.002	0.002	8 V B1 S I -0R	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -F6	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -FR	52.C00	F00.F67	2.4	0	0	0.002	0.002	JB-7/F	4.566	0.F2R	FG6.G	F00.0	
								8 V B1 S I -FG	-3.072	-0.F33	F52.F	F00.0	
								LV B1 S I -FR	-F.52G	0.053	77.G	-F00.0	
8 V B1 S I -70	52.C00	F00.2FF	2.4	0	0	0.002	0.002	8 V B1 S I -7F	F.52F	-0.02F	77.2	-F00.0	
								LV B1 S I -70	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -7F	52.C00	F00.5FG	2.4	0	0	0.002	0.002	8 V B1 S I -70	-F.520	-0.052	77.2	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
								8 V B1 S I -77	7.63F	-0.00R	22.R	F00.0	
								LV B1 S I -7F	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -77	52.C00	F00.753	2.4	0	0	0.002	0.002	JB-7/F	G56F	0.073	34.G	F00.0	
								8 V B1 S I -7F	-7.6R4	-0.075	22.R	F00.0	
								8 V B1 S I -74	-F.520	-0.02R	77.2	44.4	
								LV B1 S I -77	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -75	52.C00	F00.702	2.4	0	0	0.002	0.002	34Y5p	F2.RF5	0.547	72G3	F00.0	
								8 V B1 S I -73	-F5.RF	-0.255	775.2	44.4	
								LV B1 S I -75	-F.52G	0.05R	77.G	-F00.0	
8 V B1 S I -72	52.C00	F00.00G	2.3	0	0	0.002	0.002	8 V B1 S I -7G	F.52F	-0.02F	77.G	-F00.0	
								LV B1 S I -72	-F.52G	0.053	77.G	-F00.0	
8 V B1 S I -7G	52.C00	44.432	2.3	0	0	0.002	0.002	34YFp	F5.5G3	0.CCG	775.3	44.4	
								8 V B1 S I -F0	-F0.6RG	-0.G4G	FR4.0	44.3	
								8 V B1 S I -72	-F.52F	-0.00F	77.2	F00.0	
								LV B1 S I -7G	-F.52G	0.053	77.G	-F00.0	
8 V B1 S I -76	52.C00	F00.2FG	G0	0	0	0.002	0.002	8 V B1 S I -7R	F.52F	-0.02F	77.2	-F00.0	
								LV B1 S I -76	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -7R	52.C00	F00.56R	G0	0	0	0.002	0.002	8 V B1 S I -76	-F.52F	0.005	77.2	F00.0	
								8 V B1 S I -73	7.637	-0.022	22.R	-F00.0	
								LV B1 S I -7R	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -73	52.C00	F00.7RG	G0	0	0	0.002	0.002	8 V B1 S I -75	F5.530	0.74G	775.2	F00.0	
								8 V B1 S I -7R	-7.630	0.004	22.R	F00.0	
								8 V B1 S I -55	-4.5G4	-0.52G	FG6.5	44.4	
								LV B1 S I -73	-F.526	0.05R	77.G	-F00.0	
8 V B1 S I -74	52.C00	F00.5GF	2.4	0	0	0.002	0.002	8 V B1 S I -77	F.52F	-0.02F	77.2	-F00.0	
								LV B1 S I -74	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -5F	52.C00	F00.623	GF	0	0	0.002	0.002	8 V B1 S I -57	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -5F	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -57	52.C00	F00.C03	GF	0	0	0.002	0.002	8 V B1 S I -5F	-F.520	-0.0R0	77.5	44.4	
								8 V B1 S I -55	7.63F	0.074	22.6	F00.0	
								LV B1 S I -57	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -55	52.C00	F00.25R	GF	0	0	0.002	0.002	8 V B1 S I -73	4.5R2	0.FF7	FG6.7	F00.0	
								8 V B1 S I -57	-7.6R4	-0.0G6	22.6	F00.0	
								8 V B1 S I -52	-G5G2	-0.04R	34.7	F00.0	
								LV B1 S I -55	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -52	52.C00	F00.G77	GF	0	0	0.002	0.002	8 V B1 S I -55	G5G3	0.0G2	34.7	F00.0	
								8 V B1 S I -56	-7.6R3	-0.0F6	22.6	F00.0	
								8 V B1 S I -54	-F.554	-0.030	77.5	44.3	
								LV B1 S I -52	-F.526	0.05R	77.2	-F00.0	

Project:	UW OH WNUD		
Location:	Paulding, OH		
Contract:			
Engineer:	Josh Venden		
Yilename:	UW_OH		

ETAP

F6.0.0C

Study Case: 1 UNT PY

Page:	G
Date:	F0-02-70FR
SU:	WESI WOODP
ve%ision:	C0f k EU
ConAg.:	Uormal

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 %ar	8 W	8 %ar	ND	8 W	8 %ar	p m9	f PY	f I a9
8 V B1 S I -56	52.C00	F00.R00	G7	0	0	0.002	0.002	8 V B1 S I -52	7.637	-0.0C2	22.6	-F00.0	
								8 V B1 S I -5R	-F.52F	0.0F5	77.5	F00.0	
								LV B1 S I -56	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -5R	52.C00	F00.R5G	G7	0	0	0.002	0.002	8 V B1 S I -56	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -5R	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -54	52.C00	F00.6RG	G7	0	0	0.002	0.002	8 V B1 S I -52	F.52F	-0.02F	77.5	-F00.0	
								LV B1 S I -54	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -20	52.C00	F00.6C5	G5	0	0	0.002	0.002	34Y2p	F5.563	0.275	777.2	44.4	
								8 V B1 S I -26	-F7.076	-0.262	700.F	44.4	
								LV B1 S I -20	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -2F	52.C00	F0F.0C0	GG	0	0	0.002	0.002	JB-2/F	F.52F	-0.02F	77.7	-F00.0	
								LV B1 S I -2F	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -27	52.C00	F0F.0FG	GG	0	0	0.002	0.002	JB-2/F	G5CG	0.030	33.R	F00.0	
								8 V B1 S I -24	-2.0F5	-0.F7F	66.G	F00.0	
								LV B1 S I -27	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -25	52.C00	F0F.024	GG	0	0	0.002	0.002	JB-2/F	F.52F	-0.02F	77.7	-F00.0	
								LV B1 S I -25	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -22	52.C00	F00.34R	GG	0	0	0.002	0.002	JB-2/F	-3.07R	-0.FR4	F55.7	F00.0	
								8 V B1 S I -2G	4.564	0.F54	FCG2	F00.0	
								LV B1 S I -22	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -2G	52.C00	F00.3F3	G2	0	0	0.002	0.002	8 V B1 S I -22	-4.56F	-0.7CG	FCG2	F00.0	
								8 V B1 S I -26	F0.R05	0.7F2	FRRR	F00.0	
								LV B1 S I -2G	-F.526	0.05R	77.5	-F00.0	
8 V B1 S I -26	52.C00	F00.R75	G5	0	0	0.002	0.002	8 V B1 S I -20	F7.052	0.5C7	700.0	F00.0	
								8 V B1 S I -2G	-F0.645	-0.547	FRR3	44.4	
								LV B1 S I -26	-F.526	0.05R	77.2	-F00.0	
8 V B1 S I -23	52.C00	F0F.506	G6	0	0	0.002	0.002	8 V B1 S I -24	F.52F	-0.020	77.7	-F00.0	
								LV B1 S I -23	-F.526	0.05R	77.7	-F00.0	
8 V B1 S I -24	52.C00	F0F.760	G6	0	0	0.002	0.002	8 V B1 S I -27	2.075	-0.024	66.G	F00.0	
								8 V B1 S I -23	-F.52F	0.005	77.7	F00.0	
								8 V B1 S I -C0	-F.52F	0.00G	77.7	F00.0	
								LV B1 S I -24	-F.526	0.05R	77.7	-F00.0	
8 V B1 S I -C0	52.C00	F0F.502	G6	0	0	0.002	0.002	8 V B1 S I -24	F.52F	-0.020	77.7	-F00.0	
								LV B1 S I -C0	-F.526	0.05R	77.7	-F00.0	
* PON	F53.000	F00.000	0.0	-CG307	0.270	0	0	34I Fp	-CG307	0.270	755.G	F00.0	
8 PI ~5	F5.300	44.3R7	GF	0	0	0	0	HV B1 S 8 PI	0.000	0.000	0.0	0.0	
								& 34I FB					

* Ndicates a %oltage regulated bus (%oltage controlled or swing ty9e machine connected to it)

\# Ndicates a bus with a load mismatch oAmore than 0.F 8 Vp

ProRct:	F m OH m vF j	**ETAP**		Page:	N
Location:	Paulding, OH	NWDIDC		j ate:	ND%6%DNk
Contract:				SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case:	NPG 16L. 0	AeMsion:	6Dp 0 EF
- ilena2 e:	F m 7OH			Con8gT	F or2 al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
51- N	I B6DD	NDDf 65	Bk	[	D	[	[	3 V UGS _%66	%N T I N	%6 BND	f BDN	1f k	
								51_NU	N T I N	6 BND	f BDN	1f k	
51- f .	I B6DD	NDDf 65	Bk	[	D	[	[	JU%6/N	%NBTWW5	%6 T5I D	f W T6	1f T	
								51_NU	NBTWW5	6 T5I D	f W T6	1f T	
51- I .	I B6DD	NDDf 65	Bk	[	D	[	[	3 V UGS _%6I	%NBTW6N	%WD66	f WBTW	1f B	
								51_NU	NBTW6N	WD66	f WBTW	1f B	
51- B.	I B6DD	NDDf 65	Bk	[	D	[	[	3 V UGS _%BD	%N T 6f	%WBW5	f BWN	51 T	
								51_NU	N T 6f	WBW5	f BWN	51 T	
51_N	N 5 DDD	NDDDD6	DD	[	D	[	[	POv	66 kN5	N5 T I B	f B6 B	16 D	
								HV UGS 3 P_	%66 kN5	%N5 T I B	f B6 B	16 D	
51_NU	I B6DD	NDDf 65	Bk	[	D	[	[	51- B.	%N T 6f	%WBW5	f BWN	51 T	
								51- I .	%NBTW6N	%WD66	f WBTW	1f B	
								51- f .	%NBTWW5	%6 T5I D	f W T6	1f T	
								51- N	%N T I N	%6 BND	f BDN	1f k	
								3 P_~I	66 T Df	f I kW	NDN T	1f D	
								& HV UGS 3 P_					
HV UGS 3 P_	N 5 DDD	NDDDD6	DD	[	D	DD6B	DNBk	51_N	66 kN5	N5 T I B	f B6 B	16 D	
								51_NU	%66 kkN	%N5 B5f	f B6 5	1B T	I N6
								& 3 P_~I					
JU%6/N	I B6DD	NDD61k	B T	[	D	[	[	3 V UGS _%Nk	%1 T 6f	%1 6D6	NWWN	1I TW	
								3 V UGS _%6f	%6 T 6D	%N T WD	1B 5	1I T	
								51- f .	NBkDf	6 BW6	f WD T	1I k	
JU%B/N	I B6DD	NDN T B6	6 B	[	D	[	[	3 V UGS _%BN	%N T BD	%D B6B	f I T	1Bk	
								3 V UGS _%Bf	%6 T 6f	%N T BN	1I 6	1BD	
								3 V UGS _%BI	%N T BD	%D B6I	f I T	1Bk	
								3 V UGS _%BB	5 DI I	f 5B5	N 1 T	1B T	
LV UGS _%DN	DTWD	NDf TWN	W6	N T 6D	DBWk	[	[	3 V UGS _%DN	N T 6D	DBWk	NWW k	1B6	
LV UGS _%Df	DTWD	NDf TW5	W6	N T 6D	DBWk	[	[	3 V UGS _%Df	N T 6D	DBWk	NWB B	1B6	
LV UGS _%DI	DTWD	NDf 6f N	W6	N T 6D	DBWk	[	[	3 V UGS _%DI	N T 6D	DBWk	NW6 TW	1B6	
LV UGS _%DB	DTWD	NDf BBW	W6	N T 6D	DBWk	[	[	3 V UGS _%DB	N T 6D	DBWk	NWW6	1B6	
LV UGS _%D6	DTWD	NDf T I I	W6	N T 6D	DBWk	[	[	3 V UGS _%D6	N T 6D	DBWk	NWk 5	1B6	
LV UGS _%DW	DTWD	NDf f kW	WB	N T 6D	DBWk	[	[	3 V UGS _%DW	N T 6D	DBWk	NW5 B	1B6	
LV UGS _%Dk	DTWD	NDf f I k	WB	N T 6D	DBWk	[	[	3 V UGS _%Dk	N T 6D	DBWk	NW5 T	1B6	
LV UGS _%D5	DTWD	NDf f I 1	W6	N T 6D	DBWk	[	[	3 V UGS _%D5	N T 6D	DBWk	NW5 5	1B6	
LV UGS _%D1	DTWD	NDf D1 1	WB	N T 6D	DBWk	[	[	3 V UGS _%D1	N T 6D	DBWk	NkDB	1B6	
LV UGS _%ND	DTWD	NDf DN5	WB	N T 6D	DBWk	[	[	3 V UGS _%ND	N T 6D	DBWk	NkNB	1B6	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
LV UGS _%bI	DIWD	NDfTk6	WB	NI6D	DBWk	[	[	3 V UGS _%bI	NI6D	DBWk	NNWkT	1B6	
LV UGS _%bB	DIWD	NDfTIf	WB	NI6D	DBWk	[	[	3 V UGS _%bB	NI6D	DBWk	NNWk5	1B6	
LV UGS _%b6	DIWD	NDfTNNk	WB	NI6D	DBWk	[	[	3 V UGS _%b6	NI6D	DBWk	NNkDf	1B6	
LV UGS _%bW	DIWD	NDfTIfB	WB	NI6D	DBWk	[	[	3 V UGS _%bW	NI6D	DBWk	NNWkTI	1B6	
LV UGS _%bk	DIWD	NDNIIfI	WB	NI6D	DBWk	[	[	3 V UGS _%bk	NI6D	DBWk	NNkfT6	1B6	
LV UGS _%6D	DIWD	NDfTNkI	WI	NI6D	DBWk	[	[	3 V UGS _%6D	NI6D	DBWk	NNWITW	1B6	
LV UGS _%6N	DIWD	NDfTDkf	WB	NI6D	DBWk	[	[	3 V UGS _%6N	NI6D	DBWk	NNkDk	1B6	
LV UGS _%6f	DIWD	NDNII1N	WB	NI6D	DBWk	[	[	3 V UGS _%6f	NI6D	DBWk	NNkNk	1B6	
LV UGS _%6I	DIWD	NDNII15	WB	NI6D	DBWk	[	[	3 V UGS _%6I	NI6D	DBWk	NNkNIW	1B6	
LV UGS _%6B	DIWD	NDNIW5B	WI	NI6D	DBWk	[	[	3 V UGS _%6B	NI6D	DBWk	NNk6Tf	1B6	
LV UGS _%66	DIWD	NDNIWWN	WI	NI6D	DBWk	[	[	3 V UGS _%66	NI6D	DBWk	NNk6T6	1B6	
LV UGS _%6W	DIWD	NDfTf66	W6	NI6D	DBWk	[	[	3 V UGS _%6W	NI6D	DBWk	NNW5TW	1B6	
LV UGS _%6k	DIWD	NDfTDB	W6	NI6D	DBWk	[	[	3 V UGS _%6k	NI6D	DBWk	NNWTf	1B6	
LV UGS _%65	DIWD	NDfTNDk	W6	NI6D	DBWk	[	[	3 V UGS _%65	NI6D	DBWk	NNkDI	1B6	
LV UGS _%61	DIWD	NDfTNND	WB	NI6D	DBWk	[	[	3 V UGS _%61	NI6D	DBWk	NNkDI	1B6	
LV UGS _%bN	DIWD	NDfT66D	W6	NI6D	DBWk	[	[	3 V UGS _%bN	NI6D	DBWk	NNW6T	1B6	
LV UGS _%bf	DIWD	NDfTBDf	W6	NI6D	DBWk	[	[	3 V UGS _%bf	NI6D	DBWk	NNWkTD	1B6	
LV UGS _%bI	DIWD	NDfTIfk	W6	NI6D	DBWk	[	[	3 V UGS _%bI	NI6D	DBWk	NNWkT5	1B6	
LV UGS _%bB	DIWD	NDfTBff	W6	NI6D	DBWk	[	[	3 V UGS _%bB	NI6D	DBWk	NNWWk	1B6	
LV UGS _%bW	DIWD	NDfTWND	W6	NI6D	DBWk	[	[	3 V UGS _%bW	NI6D	DBWk	NNWBTW	1B6	
LV UGS _%bk	DIWD	NDfTWBk	W6	NI6D	DBWk	[	[	3 V UGS _%bk	NI6D	DBWk	NNWBTf	1B6	
LV UGS _%b1	DIWD	NDfT65B	W6	NI6D	DBWk	[	[	3 V UGS _%b1	NI6D	DBWk	NNWBII	1B6	
LV UGS _%BD	DIWD	NDfTWWD	Wk	NI6D	DBWk	[	[	3 V UGS _%BD	NI6D	DBWk	NNWBD	1B6	
LV UGS _%BN	DIWD	NDITNIf	W5	NI6D	DBWk	[	[	3 V UGS _%BN	NI6D	DBWk	NN65TD	1B6	
LV UGS _%Bf	DIWD	NDITN66	W5	NI6D	DBWk	[	[	3 V UGS _%Bf	NI6D	DBWk	NN65T6	1B6	
LV UGS _%BI	DIWD	NDITNIN	W5	NI6D	DBWk	[	[	3 V UGS _%BI	NI6D	DBWk	NN65TD	1B6	
LV UGS _%BB	DIWD	NDITDDW	W5	NI6D	DBWk	[	[	3 V UGS _%BB	NI6D	DBWk	NNWDIN	1B6	
LV UGS _%B6	DIWD	NDfT511	W5	NI6D	DBWk	[	[	3 V UGS _%B6	NI6D	DBWk	NNWNI	1B6	
LV UGS _%BW	DIWD	NDfTkWN	Wk	NI6D	DBWk	[	[	3 V UGS _%BW	NI6D	DBWk	NNWTI	1B6	
LV UGS _%B5	DIWD	NDITBk5	W5	NI6D	DBWk	[	[	3 V UGS _%B5	NI6D	DBWk	NN6B5	1B6	
LV UGS _%B1	DIWD	NDITBf1	W5	NI6D	DBWk	[	[	3 V UGS _%B1	NI6D	DBWk	NN66TB	1B6	
LV UGS _%6D	DIWD	NDITBkW	W5	NI6D	DBWk	[	[	3 V UGS _%6D	NI6D	DBWk	NN6BII	1B6	
3 V UGS _%DN	IB6DD	NDNBkk	6TD	[	D	DIDDB	DIDDB	3 V UGS _%Df	NIBN	DBfI	fITf	16TB	
								LV UGS _%DN	%NIB6	%DBfk	fIT	16T	
3 V UGS _%Df	IB6DD	NDNBNB	6TD	[	D	DIDDB	DIDDB	3 V UGS _%DN	%NIBD	%DBkN	fITB	1BT	
								3 V UGS _%DI	fTW5N	D51B	BWIW	1BII	
								LV UGS _%Df	%NIB6	%DBfk	fIT	16T	
3 V UGS _%DI	IB6DD	NDNIDW	6TD	[	D	DIDDB	DIDDB	3 V UGS _%Df	%6TWk5	%DIIIB	BWII	1BIB	
								3 V UGS _%DB	BDNI	NI6k	kDIN	1BTk	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								LV UGS _%bI	%NIB6	%DBfk	fIT	16T	
3 V UGS _%bB	IB6DD	NDNIff1	6TD	[	D	DIDDB	DIDDB	3 V UGS _%bI	%BDNW	%NBDI	kDI	1BB	
								3 V UGS _%b6	6T6k	N5fW	1ITW	1Bk	
								LV UGS _%bB	%NIB6	%DBfk	fIT	16T	
3 V UGS _%b6	IB6DD	NDNINN6	6TD	[	D	DIDDB	DIDDB	3 V UGS _%bB	%6T6N	%N5kk	1IT	1BB	
								3 V UGS _%b5	WWf	fTDD	NNkTN	1BTW	
								LV UGS _%b6	%NIB6	%DBfk	fIB	16T	
3 V UGS _%bW	IB6DD	NDNID65	BII	[	D	DIDDB	DIDDB	3 V UGS _%bk	NIBN	DBfI	fIT	16B	
								LV UGS _%bW	%NIB6	%DBfW	fIB	16T	
3 V UGS _%bk	IB6DD	NDNIDN5	BII	[	D	DIDDB	DIDDB	3 V UGS _%bW	%NIBD	%DB6f	fIB	1Bk	
								3 V UGS _%NW	%NIBD	%DB51	fITW	1IT	
								3 V UGS _%N6	BDfN	NIWB	kDI	1Bk	
								LV UGS _%bk	%NIB6	%DBfW	fIB	16T	
3 V UGS _%b5	IB6DD	NDNIDfD	6TD	[	D	DIDDB	DIDDB	3 V UGS _%b6	%WW5k	%6T16	NNkTk	1BN	
								3 V UGS _%bI	5Df5	f5Nk	NBDI	1BB	
								LV UGS _%b5	%NIB6	%DBfW	fIB	16T	
3 V UGS _%bI	IB6DD	NDD5k1	BII	[	D	DIDDB	DIDDB	3 V UGS _%b5	%5DN5	%6TIN	NBNW	1IT	
								3 V UGS _%ND	1T61	IT6B	NWBI	1BN	
								LV UGS _%bI	%NIB6	%DBfW	fIB	16T	
3 V UGS _%ND	IB6DD	NDDk1k	BII	[	D	DIDDB	DIDDB	3 V UGS _%bI	%T6I	%TBBD	NW6B	1IT	
								3 V UGS _%66	NDWB	I5W	N55T5	1BN	
								LV UGS _%ND	%NIB6	%DBfW	fIB	16T	
3 V UGS _%NI	IB6DD	NDNIN65	BII	[	D	DIDDB	DIDDB	3 V UGS _%NB	NIBN	DBfI	fIT	16B	
								LV UGS _%NI	%NIB6	%DBfk	fIT	16T	
3 V UGS _%NB	IB6DD	NDNINNB	BII	[	D	DIDDB	DIDDB	3 V UGS _%NI	%NIBD	%DB66	fIB	1Bk	
								3 V UGS _%N6	fW5N	D5k5	BWk	16D	
								LV UGS _%NB	%NIB6	%DBfk	fIB	16T	
3 V UGS _%N6	IB6DD	NDD51k	BII	[	D	DIDDB	DIDDB	3 V UGS _%bk	%BDNW	%NBIW	kDk	1Bf	
								3 V UGS _%NB	%6TWk6	%DI65	BkTN	1BN	
								3 V UGS _%Nk	5DII	f5Nk	NBNI	1BB	
								LV UGS _%N6	%NIB6	%DBfW	fIB	16T	
3 V UGS _%NW	IB6DD	NDNINDW	BII	[	D	DIDDB	DIDDB	3 V UGS _%bk	NIBN	DBfI	fIT	16B	
								LV UGS _%NW	%NIB6	%DBfk	fIB	16T	
3 V UGS _%Nk	IB6DD	NDDkDD	BII	[	D	DIDDB	DIDDB	JU%6/N	1TWD	IT1k	NW6T5	1BD	
								3 V UGS _%N6	%5DNI	%6TIkB	NBfTN	1IT5	
								LV UGS _%Nk	%NIB6	%DBfW	fIB	16T	
3 V UGS _%6D	IB6DD	NDDI6B	B5	[	D	DIDDB	DIDDB	3 V UGS _%6N	NIBN	DBfI	fIT	16B	
								LV UGS _%6D	%NIB6	%DBfW	fIB	16T	
3 V UGS _%6N	IB6DD	NDD56N	BII	[	D	DIDDB	DIDDB	3 V UGS _%6D	%NIBD	%DB11	fIk	1Ik	

ProRct:	F m OH m vF j	Page:	B
Location:	Paulding, OH	j ate:	ND%b6%bDNk
Contract:		SF :	m ES_m OOj I
Engineer:	Josh Venden	AeMsion:	6Dp 0 EF
- ilena2 e:	F m 7OH	Con8igT:	F or2 al

ETAP

NWDIDC

Study Case: NPG 16L. 0

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								3 V UGS _%bf	f TW5N	DII f N	BkTD	1BTW	
								LV UGS _%bN	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%bf	I BT6DD	NDDkWI	BTI	L	D	DIDDB	DIDDB	JU%b/N	6TI 61	N556	1BTI	1BTI	
								3 V UGS _%bN	%6TWk5	%DII 6N	BkTf	1BTf	
								3 V UGS _%b1	%NI I 1	%D6Nf	f I T5	1I TB	
								LV UGS _%bf	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%bI	I BT6DD	NDDkkW	BTI	L	D	DIDDB	DIDDB	51- I .	NBkDI	6T6DN	f WDk	1I Tk	
								3 V UGS _%b5	%NI TWf	%6TDk5	f I kTB	1I T6	
								LV UGS _%bI	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%bB	I BT6DD	NDDB61	BT5	L	D	DIDDB	DIDDB	3 V UGS _%b6	NI BN	DBf f	f I TB	16TB	
								LV UGS _%bB	%NI B6	%DBf W	f I T6	16TI	
3 V UGS _%b6	I BT6DD	NDDBI W	BT5	L	D	DIDDB	DIDDB	51- N	N TBk	6TNI k	f I 5Tk	1I Tf	
								3 V UGS _%bD	%DTWW6	%BTI DI	NI Nk	1f Tk	
								3 V UGS _%bB	%NI BN	%DBW6	f I TW	1BT6	
								LV UGS _%b6	%NI B6	%DBf W	f I T6	16TI	
3 V UGS _%bW	I BT6DD	NDNDI W	6TD	L	D	DIDDB	DIDDB	3 V UGS _%bk	NI BN	DBf I	f I TI	16TB	
								LV UGS _%bW	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%bk	I BT6DD	NDDI 56	6TD	L	D	DIDDB	DIDDB	3 V UGS _%bW	%NI BD	%DBWN	f I T6	1BTW	
								3 V UGS _%b5	f TW5N	D55B	BW5	16TD	
								LV UGS _%bk	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%b5	I BT6DD	ND55k	6TD	L	D	DIDDB	DIDDB	3 V UGS _%bI	N TkI	BTI BD	f I W6	1I T5	
								3 V UGS _%bk	%6TWk1	%DII NI	BkTD	1BTW	
								3 V UGS _%bI	%bT 6I	%bT615	NWWf	1I TI	
								LV UGS _%b5	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%b1	I BT6DD	ND51D	BTI	L	D	DIDDB	DIDDB	3 V UGS _%bf	NI BN	DBf I	f I TI	16TB	
								LV UGS _%b1	%NI B6	%DBf W	f I TB	16TI	
3 V UGS _%bN	I BT6DD	NDNI I 6	6TD	L	D	DIDDB	DIDDB	3 V UGS _%bf	NI BN	DBf I	f I Tf	16TB	
								LV UGS _%bN	%NI B6	%DBf k	f I TI	16TI	
3 V UGS _%bf	I BT6DD	NDNN56	6TD	L	D	DIDDB	DIDDB	3 V UGS _%bN	%NI I 1	%D6I 6	f I T5	1f TI	
								3 V UGS _%bI	f TW5D	DII 65	BkTN	1BTf	
								LV UGS _%bf	%NI B6	%DBf k	f I TI	16TI	
3 V UGS _%bI	I BT6DD	NDNND1	6TN	L	D	DIDDB	DIDDB	3 V UGS _%b5	1TkD	I TWB	NWB5	1BTN	
								3 V UGS _%bf	%6TWk5	%DII 5W	BkTf	1I T5	
								3 V UGS _%bB	%6TI 6N	%NI 66	1BTI	1I TI	
								LV UGS _%bI	%NI B6	%DBf k	f I TB	16TI	
3 V UGS _%bB	I BT6DD	NDNf DW	6TN	L	D	DIDDB	DIDDB	3 V UGS _%bI	6TI 6W	NI N	1BTD	1BTf	
								3 V UGS _%bW	%6TWkW	%DII B6	BWI	1BTI	
								3 V UGS _%b1	%NI I 1	%D6B6	f I TI	1f TW	
								LV UGS _%bB	%NI B6	%DBf k	f I TI	16TI	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
3 V UGS _%bW	I B%bDD	NDNI 1W	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _%bB	f TW5N	D5kB	BW6	16TN	
								3 V UGS _%bk	%NI BD	%DB6N	f I T	1BT5	
								LV UGS _%bW	%NI B6	%DBf k	f I T	16TI	
3 V UGS _%bk	I B%bDD	NDNBI I	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _%bW	NI BN	DBf I	f I T	16TB	
								LV UGS _%bk	%NI B6	%DBf k	f I T	16TI	
3 V UGS _%b1	I B%bDD	NDNI kD	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _%bB	NI BN	DBf I	f I T	16TB	
								LV UGS _%b1	%NI B6	%DBf k	f I T	16TI	
3 V UGS _%BD	I B%bDD	NDNBBW	6Tf	Ľ	D	DIDDB	DIDDB	51- B.	N I T 61	6TDkI	f I 6Tk	1I T5	
								3 V UGS _%BW	%Nf TDN5	%BTW6D	f Nf TW	1I TI	
								LV UGS _%BD	%NI B6	%DBf k	f I T	16TI	
3 V UGS _%BN	I B%bDD	NDNI I 5B	6TB	Ľ	D	DIDDB	DIDDB	JU%B/N	NI BN	DBf I	f I TN	16TB	
								LV UGS _%BN	%NI B6	%DBf k	f I Tf	16TI	
3 V UGS _%Bf	I B%bDD	NDNI I BW	6TB	Ľ	D	DIDDB	DIDDB	JU%B/N	6T I 6f	NI I BD	1I TB	1BTD	
								3 V UGS _%B1	%BTDNN	%NT5Nk	kDTB	1I T5	
								LV UGS _%Bf	%NI B6	%DBf k	f I Tf	16TI	
3 V UGS _%BI	I B%bDD	NDNI I 5I	6TB	Ľ	D	DIDDB	DIDDB	JU%B/N	NI BN	DBf I	f I TN	16TB	
								LV UGS _%BI	%NI B6	%DBf k	f I Tf	16TI	
3 V UGS _%BB	I B%bDD	NDNk 1W	6TI	Ľ	D	DIDDB	DIDDB	JU%B/N	%5TDf I	%6TIkD	NBDTW	1I T5	
								3 V UGS _%B6	1T WB	I T 1B	NWTk	1BTD	
								LV UGS _%BB	%NI B6	%DBf k	f I Tf	16TI	
3 V UGS _%B6	I B%bDD	NDNTW55	6TI	Ľ	D	DIDDB	DIDDB	3 V UGS _%BB	%bT 6W	%bT5NN	NWBTB	1I TW	
								3 V UGS _%BW	NDTWIk	I TI I B	N5kTW	1I TI	
								LV UGS _%B6	%NI B6	%DBf k	f I Tf	16TI	
3 V UGS _%BW	I B%bDD	NDN6B5	6Tf	Ľ	D	DIDDB	DIDDB	3 V UGS _%BD	Nf TDf k	BT6I k	f NNT5	1I TW	
								3 V UGS _%B6	%NDTW5W	%BTNNB	N55Tk	1I TI	
								LV UGS _%BW	%NI B6	%DBf k	f I TI	16TI	
3 V UGS _%B5	I B%bDD	NDf Tf kI	6TB	Ľ	D	DIDDB	DIDDB	3 V UGS _%B1	NI BN	DBf B	f I TD	16TB	
								LV UGS _%B5	%NI B6	%DBf k	f I TN	16TI	
3 V UGS _%B1	I B%bDD	NDf Tf f B	6TB	Ľ	D	DIDDB	DIDDB	3 V UGS _%Bf	BTDf f	NI B6	WTB	1BT5	
								3 V UGS _%B5	%NI BD	%DBWN	f I Tf	1BTW	
								3 V UGS _%6D	%NI BD	%DBWD	f I Tf	1BTW	
								LV UGS _%B1	%NI B6	%DBf k	f I TN	16TI	
3 V UGS _%6D	I B%bDD	NDf Tf kN	6TB	Ľ	D	DIDDB	DIDDB	3 V UGS _%B1	NI BN	DBf B	f I TD	16TB	
								LV UGS _%6D	%NI B6	%DBf k	f I TN	16TI	
* POv	N 5TDDD	NDDIDDD	DID	%66Tk Nk	%N5T I I	Ľ	Ľ	51_N	%66Tk Nk	%N5T I I	f B6TB	16TD	
3 P_~I	N T5DD	NDD6f k	6TN	Ľ	D	Ľ	Ľ	HV UGS 3 P_	DIDDD	DIDDD	DID	DID	
								& 51_NU					

* vndicates a Mbltage regulated bus (Mbltage controlled or swing ty4e 2 achine connected to it)

\# vndicates a bus with a load 2 is2 atch o82 ore than DTN3 V.

Pro7ect:	F m OH m RF j	ETAP	Page:	0
Location:	Paulding, OH	0WDDC	j ate:	0DvD%fD0k
Contract:			SF :	m ES_m OOj P
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion:	GDp . EF
I ilena- e:	F m 2OH		Con8gT	F or- al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	Rj	3 m	3 Mar	6 - 4	p PI	p _a4
5N 06	B%GDD	0DDDD%	%k	[	D	[	[	3 V U1 S _vfG	v0BBB0	vGP%DG	f%DG	NTk	
								5N_0U	0BBB0	GP%DG	f%DG	NTk	
5N f6	B%GDD	0DDDD%	%k	[	D	[	[	JUvf/0	v0%WW5	vG5fG	fWB5	NTN	
								5N_0U	0%WW5	G5fG	fWB5	NTN	
5N B6	B%GDD	0DDDD%	%k	[	D	[	[	3 V U1 S _vfB	v0%WG0	vWD%N	fWGD	NT%	
								5N_0U	0%WG0	WD%N	fWGD	NT%	
5N %6	B%GDD	0DDDD%	%k	[	D	[	[	3 V U1 S _v%D	v0BfGf	vWP%GN	f%WP%	5NN	
								5N_0U	0BfGf	WP%GN	f%WP%	5NN	
5N_06	0B5TDDD	NGDDG	DD	[	D	[	[	POR	GGkff	05TBD5	fG5TB	NGD	
								HV U1 S 3 P_	vGGkff	v05TBD5	fG5TB	NGD	
5N_0U	B%GDD	0DDDD%	%k	[	D	[	[	5N %6	v0BfGf	vWP%GN	f%WP%	5NN	
								5N B6	v0%WG0	vWD%N	fWGD	NT%	
								5N f6	v0%WW5	vG5fG	fWB5	NTN	
								5N 06	v0BBB0	vGP%DG	f%DG	NTk	
								3 P_~B	GGND0	fBkBk	0D0GB	NTD	
							&	HV U1 S 3 P_					
HV U1 S 3 P_	0B5TDDD	NGDDG	DD	[	D	DD%5	D0BB	5N_06	GGkff	05TBD5	fG5TB	NGD	
								5N_0U	vGGkkD	v05TP%f	fG5Tk	N%N	v0T5kG
							&	3 P_~B					
JUvf/0	B%GDD	0DDP%%	%N	[	D	[	[	3 V U1 S _v0k	vNBGf	vBTDf	0WWP%	NBW	
								3 V U1 S _vff	vGBGD	v0TNGN	N%N	NBN	
								5N f6	0%kDf	GP%W0	fW0TB	NBk	
JUv%0	B%GDD	0D0TkNB	GP%	[	D	[	[	3 V U1 S _v%0	v0TB%D	vDP%GB	fBB	N%k	
								3 V U1 S _v%f	vGBGf	v0TN%D	NBW	N%D	
								3 V U1 S _v%B	v0TB%D	vDP%GB	fBB	N%k	
								3 V U1 S _v%%	5TDBB	fT5%W	0%DD	N%B	
LV U1 S _vD0	DWND	0DfTCP%D	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vD0	0TBGD	DP%Wk	00WGP%	N%G	
LV U1 S _vDf	DWND	0DfTP%k5	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vDf	0TBGD	DP%Wk	00WWD	N%G	
LV U1 S _vDB	DWND	0DfTBk0	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vDB	0TBGD	DP%Wk	00WkTB	N%G	
LV U1 S _vD%	DWND	0DfTfNG	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vD%	0TBGD	DP%Wk	00W5Tf	N%G	
LV U1 S _vDG	DWND	0DfTD5f	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vDG	0TBGD	DP%Wk	00WNG	N%G	
LV U1 S _vDW	DWND	0DfTDfG	WP%	0TBGD	DP%Wk	[	[	3 V U1 S _vDW	0TBGD	DP%Wk	00kDD	N%G	
LV U1 S _vDk	DWND	0DfTD5W	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vDk	0TBGD	DP%Wk	00kDW	N%G	
LV U1 S _vD5	DWND	0DfTD55	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vD5	0TBGD	DP%Wk	00kDW	N%G	
LV U1 S _vDN	DWND	0D0TN%5	WG	0TBGD	DP%Wk	[	[	3 V U1 S _vDN	0TBGD	DP%Wk	00kfTf	N%G	
LV U1 S _v0D	DWND	0D0T5Wk	WP%	0TBGD	DP%Wk	[	[	3 V U1 S _v0D	0TBGD	DP%Wk	00kBD	N%G	

Project:	F m OH m RF j	ETAP	Page:	f
Location:	Paulding, OH	0WDDC	j ate:	0DMD%fD0k
Contract:			SF :	m ES_m OOj P
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion:	GDp . EF
I ilena- e:	F m 2OH		ConSgT	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
R	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	R	3 m	3 Mar	6 - 4	p PI	p _a4
LV U1 S _v0B	DWND	0DfTff%	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _v0B	0TBGD	DP/WK	00WND	N%G	
LV U1 S _v0%	DWND	0DfTD50	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _v0%	0TBGD	DP/WK	00WNG	N%G	
LV U1 S _v0G	DWND	0D0TNWW	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _v0G	0TBGD	DP/WK	00kfTD	N%G	
LV U1 S _v0W	DWND	0DfTDkB	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _v0W	0TBGD	DP/WK	00WNW	N%G	
LV U1 S _v0k	DWND	0D0Tkk0	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _v0k	0TBGD	DP/WK	00k%Tf	N%G	
LV U1 S _vfD	DWND	0DfTDff	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _vfD	0TBGD	DP/WK	00k0TB	N%G	
LV U1 S _vf0	DWND	0D0TNf0	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _vf0	0TBGD	DP/WK	00kfTG	N%G	
LV U1 S _vff	DWND	0D0T5BN	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _vff	0TBGD	DP/WK	00kBP%	N%G	
LV U1 S _vfB	DWND	0D0T5%W	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vfB	0TBGD	DP/WK	00kBB	N%G	
LV U1 S _vf%	DWND	0D0TGBB	WB	0TBGD	DP/WK	Г	Г	3 V U1 S _vf%	0TBGD	DP/WK	00kkTD	N%G	
LV U1 S _vfG	DWND	0D0TGDN	WB	0TBGD	DP/WK	Г	Г	3 V U1 S _vfG	0TBGD	DP/WK	00kkTf	N%G	
LV U1 S _vfW	DWND	0DfTDD%	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vfW	0TBGD	DP/WK	00kDP%	N%G	
LV U1 S _vfk	DWND	0DfTDGB	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vfk	0TBGD	DP/WK	00k0TD	N%G	
LV U1 S _vf5	DWND	0D0TNGW	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vf5	0TBGD	DP/WK	00kfTD	N%G	
LV U1 S _vfN	DWND	0D0TNGN	WP%	0TBGD	DP/WK	Г	Г	3 V U1 S _vfN	0TBGD	DP/WK	00kfTD	N%G	
LV U1 S _vB0	DWND	0DfTP/DD	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vB0	0TBGD	DP/WK	00WkTD	N%G	
LV U1 S _vBf	DWND	0DfTfG0	WW	0TBGD	DP/WK	Г	Г	3 V U1 S _vBf	0TBGD	DP/WK	00W5Tk	N%G	
LV U1 S _vBB	DWND	0DfTDkW	WW	0TBGD	DP/WK	Г	Г	3 V U1 S _vBB	0TBGD	DP/WK	00WNW	N%G	
LV U1 S _vB%	DWND	0DfTfk0	WW	0TBGD	DP/WK	Г	Г	3 V U1 S _vB%	0TBGD	DP/WK	00W5TG	N%G	
LV U1 S _vBW	DWND	0DfTP/WD	WW	0TBGD	DP/WK	Г	Г	3 V U1 S _vBW	0TBGD	DP/WK	00WWB	N%G	
LV U1 S _vBk	DWND	0DfTP/Nk	WG	0TBGD	DP/WK	Г	Г	3 V U1 S _vBk	0TBGD	DP/WK	00WGN	N%G	
LV U1 S _vBN	DWND	0DfTP/B%	WW	0TBGD	DP/WK	Г	Г	3 V U1 S _vBN	0TBGD	DP/WK	00WWW	N%G	
LV U1 S _v%D	DWND	0DfTGDN	Wk	0TBGD	DP/WK	Г	Г	3 V U1 S _v%D	0TBGD	DP/WK	00WGk	N%G	
LV U1 S _v%0	DWND	0DBTD%f	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%0	0TBGD	DP/WK	00GNk	N%G	
LV U1 S _v%f	DWND	0DBTDDG	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%f	0TBGD	DP/WK	00WDD	N%G	
LV U1 S _v%B	DWND	0DBTD%0	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%B	0TBGD	DP/WK	00GNk	N%G	
LV U1 S _v%%	DWND	0DfT5GW	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%%	0TBGD	DP/WK	00W0T5	N%G	
LV U1 S _v%G	DWND	0DfTk%N	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%G	0TBGD	DP/WK	00WBD	N%G	
LV U1 S _v%W	DWND	0DfTW0D	Wk	0TBGD	DP/WK	Г	Г	3 V U1 S _v%W	0TBGD	DP/WK	00W%W	N%G	
LV U1 S _v%5	DWND	0DBTBf5	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%5	0TBGD	DP/WK	00GWG	N%G	
LV U1 S _v%N	DWND	0DBTf5D	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _v%N	0TBGD	DP/WK	00GkTD	N%G	
LV U1 S _vGD	DWND	0DBTBfW	W5	0TBGD	DP/WK	Г	Г	3 V U1 S _vGD	0TBGD	DP/WK	00GWG	N%G	
3 V U1 S _vD0	B%GDD	0D0TBfG	GD	Г	D	DDD%	DDD%	3 V U1 S _vDf	0TB%0	DP/fB	fBTf	NGP%	
								LV U1 S _vD0	v0TB%G	vDP/fk	fBTB	NGTB	
3 V U1 S _vDf	B%GDD	0D0TfW	GD	Г	D	DDD%	DDD%	3 V U1 S _vD0	v0TB%D	vDP/k0	fBTG	N%P%	
								3 V U1 S _vDB	fTW50	DT5NB	%WK	N%N	
								LV U1 S _vDf	v0TB%G	vDP/fk	fBTB	NGTB	
3 V U1 S _vDB	B%GDD	0D0TDG%	GD	Г	D	DDD%	DDD%	3 V U1 S _vDf	vfTW5	vDTNBB	%WN	N%P%	
								3 V U1 S _vD%	%TD0N	0TBGW	kDTf	N%5	

Pro7ect:	F m OH m RF j	**ETAP**		Page:	B
Location:	Paulding, OH	0WDIDC		j ate:	0DvD%f D0k
Contract:				SF :	m ES_m OOj P
Engineer:	Josh Venden	Study Case:	NGP1 NGL6 .	AeMsion:	GDp . EF
I ilena- e:	F m 2OH			Con8gT	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	Rj	3 m	3 Mar	6 - 4	p PI	p _a4
								LV U1 S _vDB	v0TB%G	vDP4f k	f BIB	NGIB	
3 V U1 S _vD%	B%GDD	0D0TDkk	GID	Г	D	DIDD%	DIDD%	3 V U1 S _vDB	v%4D0W	v0TP4Df	kDP%	N%P%	
								3 V U1 S _vDG	GIBGk	0T5f G	NBK	N%K	
								LV U1 S _vD%	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vDG	B%GDD	0DDNWB	GID	Г	D	DIDD%	DIDD%	3 V U1 S _vD%	vGIBG0	v0T5kW	N%4D	N%P%	
								3 V U1 S _vD5	WWNf	f TfNN	00kTB	N%W	
								LV U1 S _vDG	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vDW	B%GDD	0DDNDG	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vDk	0TB%0	DP4f B	f BIB	NGP%	
								LV U1 S _vDW	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vDk	B%GDD	0DD5WG	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vDW	v0TB%D	vDP4Gf	f BIG	N%5	
								3 V U1 S _v0W	v0TB%D	vDP455	f BK	N%D	
								3 V U1 S _v0G	%4Df 0	0TBWB	kDP%	N%K	
								LV U1 S _vDk	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vD5	B%GDD	0DD5Wk	GID	Г	D	DIDD%	DIDD%	3 V U1 S _vDG	vWW5k	vf TBNB	00kT5	N%f	
								3 V U1 S _vDN	5TDf 5	f T50W	0%0TD	N%P%	
								LV U1 S _vD5	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vDN	B%GDD	0DDkf W	GID	Г	D	DIDD%	DIDD%	3 V U1 S _vD5	v5TD05	vf TNN	0%0T5	NBN	
								3 V U1 S _v0D	NBGN	BIBGf	0WGf	N%D	
								LV U1 S _vDN	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _v0D	B%GDD	0DDW%	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vDN	vNBGB	vBP4B5	0WGk	NBN	
								3 V U1 S _vf G	0DW%	B5WD	05ND	N%D	
								LV U1 S _v0D	v0TB%G	vDP4f W	f BIG	NGIB	
3 V U1 S _v0B	B%GDD	0D0TDDW	%N	Г	D	DIDD%	DIDD%	3 V U1 S _v0%	0TB%0	DP4f B	f BIB	NGP%	
								LV U1 S _v0B	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _v0%	B%GDD	0DDNW	%N	Г	D	DIDD%	DIDD%	3 V U1 S _v0B	v0TB%D	vDP4GG	f BIG	N%K	
								3 V U1 S _v0G	f TW0	D5k5	%W5	NGD	
								LV U1 S _v0%	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _v0G	B%GDD	0DDK%%	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vDk	v%4D0W	v0TP4BG	kDN	N%f	
								3 V U1 S _v0%	vf TWkG	vDNGk	%kTf	N%f	
								3 V U1 S _v0k	5TDBB	f T50G	0%0T%	N%P%	
								LV U1 S _v0G	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _v0W	B%GDD	0DDNG%	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vDk	0TB%0	DP4f B	f BIB	NGP%	
								LV U1 S _v0W	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _v0k	B%GDD	0DDDP4k	%N	Г	D	DIDD%	DIDD%	JUvf /0	NBWD	BBNG	0WGk	N%D	
								3 V U1 S _v0G	v5TD0N	vf TNkf	0%f TB	NB5	
								LV U1 S _v0k	v0TB%G	vDP4f W	f BIG	NGIB	
3 V U1 S _vf D	B%GDD	0DD5D0	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vf 0	0TB%0	DP4f B	f BIB	NGP%	
								LV U1 S _vf D	v0TB%G	vDP4f W	f BP%	NGIB	
3 V U1 S _vf 0	B%GDD	0DDWW5	%N	Г	D	DIDD%	DIDD%	3 V U1 S _vf D	v0TB%D	vDP4N5	f B5	NBK	

Bus		Voltage		Generation		Load		Load Flow					XFMR
Bj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	Bj	3 m	3 Mar	6 - 4	p PI	p _a4
								3 V U1 S _vf f	f TW50	DN'0	%kTD	N%W	
								LV U1 S _vf 0	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vf f	B%GDD	0DDW0W	%N	Ľ	D	DIDD%	DIDD%	JUvf /0	GBGN	0'55%	N%G	N%B	
								3 V U1 S _vf 0	vf TWk5	vDNGD	%kTB	N%f	
								3 V U1 S _vf N	v0TBBN	vDIC00	f B5	NBP%	
								LV U1 S _vf f	v0TB%G	vDP4f W	f BG	NGB	
3 V U1 S _vf B	B%GDD	0DDW B	GD	Ľ	D	DIDD%	DIDD%	5N B6	0%kDB	GP%k	f W0D	NBk	
								3 V U1 S _vf 5	v0BBW	vGDk%	f Bk'k	NBG	
								LV U1 S _vf B	v0TB%G	vDP4f W	f BG	NGB	
3 V U1 S _vf %	B%GDD	0DDBDW	%5	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf G	0TB%0	DP4f f	f BG	NGP%	
								LV U1 S _vf %	v0TB%G	vDP4f W	f BG	NGB	
3 V U1 S _vf G	B%GDD	0DDf 5f	%5	Ľ	D	DIDD%	DIDD%	5N 06	0BB%k	GDNB	f BND	NBf	
								3 V U1 S _v0D	v0DWWG	v%BDG	0N0'N	N'k	
								3 V U1 S _vf %	v0TB%0	vDP4WG	f Bk	N%G	
								LV U1 S _vf G	v0TB%G	vDP4f W	f BG	NGB	
3 V U1 S _vf W	B%GDD	0DD55%	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf k	0TB%0	DP4f B	f BB	NGP%	
								LV U1 S _vf W	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vf k	B%GDD	0DD5Bf	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf W	v0TB%D	vDP4W0	f BG	N%W	
								3 V U1 S _vf 5	f TW50	D55B	%WN	NGD	
								LV U1 S _vf k	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vf 5	B%GDD	0DDkB%	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf B	0BBkB	%Nk	f BW5	NB5	
								3 V U1 S _vf k	vf TWkN	vDN0N	%kTD	N%W	
								3 V U1 S _vBB	vNBGB	vBDNG	0WWG	NBB	
								LV U1 S _vf 5	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vf N	B%GDD	0DDkBk	%N	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf f	0TB%0	DP4f B	f BP%	NGP%	
								LV U1 S _vf N	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vB0	B%GDD	0D0'D5B	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vBf	0TB%0	DP4f B	f BB	NGP%	
								LV U1 S _vB0	v0TB%G	vDP4f k	f BB	NGB	
3 V U1 S _vBf	B%GDD	0D0'DBf	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vB0	v0TBBN	vDGB%	f BN	N'N	
								3 V U1 S _vBB	f TW5D	DNGk	%kTD	N%f	
								LV U1 S _vBf	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vBB	B%GDD	0DDNGW	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vf 5	NBkD	BBW	0WGD	N%D	
								3 V U1 S _vBf	vf TWk5	vDN5G	%kTB	NBN	
								3 V U1 S _vB%	vGBG0	v0TNP%	N%P%	NBN	
								LV U1 S _vBB	v0TB%G	vDP4f W	f BP%	NGB	
3 V U1 S _vB%	B%GDD	0D0'DGB	GD	Ľ	D	DIDD%	DIDD%	3 V U1 S _vBB	GBGW	0'N00	N%f	N%f	
								3 V U1 S _vBW	vf TWkW	vDN%%	%kTD	N%B	
								3 V U1 S _vBN	v0TBBN	vDCP%G	f BN	N'TW	
								LV U1 S _vB%	v0TB%G	vDP4f W	f BP%	NGB	

Pro7ect:	F m OH m RF j		Page: G
Location:	Paulding, OH	**ETAP**	j ate: 0DΛD%f D0k
Contract:		0WDIDC	SF : m ES_m OOj P
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion: GDp . EF
I ilena- e:	F m 2OH		Con8gT F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
Ð	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	Ð	3 m	3 Mar	6 - 4	p PI	p _a4
3 V U1 S _vBW	B%GDD	0D0T%%	GD	Г	D	DDD%	DDD%	3 V U1 S _vB%	f TW50	D5k%	%WW	NGD	
								3 V U1 S _vBk	v0TB%D	vDP%D	f BP%	N%5	
								LV U1 S _vBW	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _vBk	B%GDD	0D0T50	GD	Г	D	DDD%	DDD%	3 V U1 S _vBW	0TB%0	DP%B	f BT	NGP%	
								LV U1 S _vBk	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _vBN	B%GDD	0D0T0k	GD	Г	D	DDD%	DDD%	3 V U1 S _vB%	0TB%0	DP%B	f BT	NGP%	
								LV U1 S _vBN	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _v%D	B%GDD	0D0TN%	GT	Г	D	DDD%	DDD%	5N %6	0BBG5	GDWN	f BWD	NBG	
								3 V U1 S _v%W	v0f TD05	v%WW	f 0f TN	NBB	
								LV U1 S _v%D	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _v%0	B%GDD	0D0T5BB	GP%	Г	D	DDD%	DDD%	JUv%0	0TB%0	DP%B	f BD	NGP%	
								LV U1 S _v%0	v0TB%G	vDP%fk	f BT	NGB	
3 V U1 S _v%f	B%GDD	0D0TkNG	GP%	Г	D	DDD%	DDD%	JUv%0	GBG	0TNBN	NBW	N%D	
								3 V U1 S _v%N	v%D00	v0TDW	kDG	NBG	
								LV U1 S _v%f	v0TB%G	vDP%fk	f BT	NGB	
3 V U1 S _v%B	B%GDD	0D0T5B0	GP%	Г	D	DDD%	DDD%	JUv%0	0TB%0	DP%B	f BD	NGP%	
								LV U1 S _v%B	v0TB%G	vDP%fk	f BT	NGB	
3 V U1 S _v%%	B%GDD	0D0TW%	GB	Г	D	DDD%	DDD%	JUv%0	v5TDf f	vf TW5	0%D5	NB5	
								3 V U1 S _v%G	NBWB	BBNf	0WD	N%D	
								LV U1 S _v%%	v0TB%G	vDP%fk	f BT	NGB	
3 V U1 S _v%G	B%GDD	0D0TGBW	GB	Г	D	DDD%	DDD%	3 V U1 S _v%%	vNBGG	vBDN	0W%k	NBW	
								3 V U1 S _v%W	0DWW	BNBf	05kT5	NBN	
								LV U1 S _v%G	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _v%W	B%GDD	0D0TBNW	GB	Г	D	DDD%	DDD%	3 V U1 S _v%D	0f TDf W	%GB%	f 0f TD	NBW	
								3 V U1 S _v%G	v0DW5W	v%D00	05ND	NBB	
								LV U1 S _v%W	v0TB%G	vDP%fk	f BB	NGB	
3 V U1 S _v%5	B%GDD	0DfTDf 0	GP%	Г	D	DDD%	DDD%	3 V U1 S _v%N	0TB%0	DP%B	f BD	NGP%	
								LV U1 S _v%5	v0TB%G	vDP%fk	f BD	NGB	
3 V U1 S _v%N	B%GDD	0DfTDkB	GP%	Г	D	DDD%	DDD%	3 V U1 S _v%f	%Df f	0TB%%	WG	N%5	
								3 V U1 S _v%5	v0TB%D	vDP%0	f BT	N%W	
								3 V U1 S _vGD	v0TB%D	vDP%D	f BT	N%W	
								LV U1 S _v%N	v0TB%G	vDP%fk	f BD	NGB	
3 V U1 S _vGD	B%GDD	0DfTDf D	GP%	Г	D	DDD%	DDD%	3 V U1 S _v%N	0TB%0	DP%B	f BD	NGP%	
								LV U1 S _vGD	v0TB%G	vDP%fk	f BD	NGB	
* POR	0B5TDDD	NGDDD	DD	vGGkf 0	v05TBDW	Г	Г	5N_06	vGGkf 0	v05TBDW	f G5B	NGD	
3 P_~B	0B5DD	0DDBkB	GT	Г	D	Г	Г	HV U1 S 3 P_	DDDD	DDDD	DD	DD	
								& 5N_0U					

* Rdicates a Mltage regulated bus (Mltage controlled or swing ty4e - achine connected to it)

\# Rdicates a bus with a load - is- atch o8- ore than DD 3 V6

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
51I N	j BI6DD	11T56B	BTW	[	D	[	[	3 V UGS _v%6	vNj Tj j j	j TBj B	%j DIf	vl W5	
								51_NU	Nj Tj j j	vj TBj B	%j DIf	vl W5	
51I %	j BI6DD	11T56B	BTW	[	D	[	[	JUv%N	vNBTWD	j T51f	%6BTB	vl WW	
								51_NU	NBTWD	vj T51f	%6BTB	vl WW	
51I j .	j BI6DD	11T56B	BTW	[	D	[	[	3 V UGS _v%j	vNBTW66	j TWf	%6j T%	vl f TD	
								51_NU	NBTW66	vj TWf	%6j T%	vl f TD	
51I B.	j BI6DD	11T56B	BTW	[	D	[	[	3 V UGS _vBD	vNj T%Wj	%Tj 1f	%%6TI	vl 5TB	
								51_NU	Nj T%Wj	v%Tj 1f	%%6TI	vl 5TB	
51_N	Nj 5TDDD	11TI15	DTD	[	D	[	[	POR	66TfBl	vN5Tj %B	%B6T6	vl 6TD	
								HV UGS 3 P_	v66TfBl	N5Tj %B	%B6T6	vl 6TD	
51_NU	j BI6DD	11T56B	BTW	[	D	[	[	51I B.	vNj T%Wj	%Tj 1f	%%6TI	vl 5TB	
								51I j .	vNBTW66	j TWf	%6j T%	vl f TD	
								51I %	vNBTWD	j T51f	%6BTB	vl WW	
								51I N	vNj Tj j j	j TBj B	%j DIf	vl W5	
								3 P_~j	66TI%D	vNj TBDW	1WjTf	vl f T%	
								& HV UGS 3 P_					
HV UGS 3 P_	Nj 5TDDD	11TI15	DTD	[	D	DTD6j	DTNBf	51_N	66TfBl	vN5Tj %B	%B6T6	vl 6TD	
								51_NU	v66T5D%	N5TNf f	%B6T6	vl 6TN	vN5f 6
								& 3 P_~j					
JUv%N	j BI6DD	11TI WN	BT5	[	D	[	[	3 V UGS _vNf	vl Tj 6j	%TW66	NW%TI	vl WN	
								3 V UGS _v%%	v6Tj 6D	N6f W	1j TB	vl 6TI	
								51I %	NBTf D%	vBT%WN	%6 WTj	vl WD	
JUvB/N	j BI6DD	NDDTB1 W	6TW	[	D	[	[	3 V UGS _vBN	vNTj BD	DTBj N	%j TB	vl 6T%	
								3 V UGS _vB%	v6Tj 6%	NTWDN	1j TD	vl 6T5	
								3 V UGS _vBj	vNTj BD	DTBj %	%j TB	vl 6T%	
								3 V UGS _vBB	5TDj %	v%TBWj	Nj 1TI	vl 6TW	
LV UGS _vDN	DTWD	11TI%l	WI	NTj 6D	vDTBN6	[	[	3 V UGS _vDN	NTj 6D	vDTBN6	NN5%Tj	vl 6TW	
LV UGS _vD%	DTWD	11T5f j	W5	NTj 6D	vDTBN6	[	[	3 V UGS _vD%	NTj 6D	vDTBN6	NN5j TD	vl 6TW	
LV UGS _vDj	DTWD	11Tf f 5	W5	NTj 6D	vDTBN6	[	[	3 V UGS _vDj	NTj 6D	vDTBN6	NN5BTN	vl 6TW	
LV UGS _vDB	DTWD	11TfNl	W5	NTj 6D	vDTBN6	[	[	3 V UGS _vDB	NTj 6D	vDTBN6	NN5BT5	vl 6TW	
LV UGS _vD6	DTWD	11TWj N	W5	NTj 6D	vDTBN6	[	[	3 V UGS _vD6	NTj 6D	vDTBN6	NN56TI	vl 6TW	
LV UGS _vDW	DTWD	11TW66	Wf	NTj 6D	vDTBN6	[	[	3 V UGS _vDW	NTj 6D	vDTBN6	NN56TW	vl 6TW	
LV UGS _vDf	DTWD	11TW%D	Wf	NTj 6D	vDTBN6	[	[	3 V UGS _vDf	NTj 6D	vDTBN6	NN5WD	vl 6TW	
LV UGS _vD5	DTWD	11T6f 6	Wf	NTj 6D	vDTBN6	[	[	3 V UGS _vD5	NTj 6D	vDTBN6	NN5W6	vl 6TW	
LV UGS _vDl	DTWD	11TBl j	WW	NTj 6D	vDTBN6	[	[	3 V UGS _vDl	NTj 6D	vDTBN6	NN5f T6	vl 6TW	
LV UGS _vND	DTWD	11TB6B	WW	NTj 6D	vDTBN6	[	[	3 V UGS _vND	NTj 6D	vDTBN6	NN55TD	vl 6TW	

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
LV UGS _vNj	DIWID	11Tf6f	Wf	Nj6D	vDIBN6	[	[	3 V UGS _vNj	Nj6D	vDIBN6	NN5BTB	v16TW	
LV UGS _vNB	DIWID	11TfN5	Wf	Nj6D	vDIBN6	[	[	3 V UGS _vNB	Nj6D	vDIBN6	NN5BT5	v16TW	
LV UGS _vN6	DIWID	11T6%f	WW	Nj6D	vDIBN6	[	[	3 V UGS _vN6	Nj6D	vDIBN6	NN5fTN	v16TW	
LV UGS _vNW	DIWID	11TWI5	Wf	Nj6D	vDIBN6	[	[	3 V UGS _vNW	Nj6D	vDIBN6	NN56TN	v16TW	
LV UGS _vNf	DIWID	11TBN%	W6	Nj6D	vDIBN6	[	[	3 V UGS _vNf	Nj6D	vDIBN6	NN55T6	v16TW	
LV UGS _v%D	DIWID	11TW65	WW	Nj6D	vDIBN6	[	[	3 V UGS _v%D	Nj6D	vDIBN6	NN56T6	v16TW	
LV UGS _v%N	DIWID	11T6Wf	WW	Nj6D	vDIBN6	[	[	3 V UGS _v%N	Nj6D	vDIBN6	NN5WW	v16TW	
LV UGS _v%%	DIWID	11TB16	W6	Nj6D	vDIBN6	[	[	3 V UGS _v%%	Nj6D	vDIBN6	NN5fT6	v16TW	
LV UGS _v%j	DIWID	11TB%%	WW	Nj6D	vDIBN6	[	[	3 V UGS _v%j	Nj6D	vDIBN6	NN55TB	v16TW	
LV UGS _v%B	DIWID	11TjjN	WB	Nj6D	vDIBN6	[	[	3 V UGS _v%B	Nj6D	vDIBN6	NN51TB	v16TW	
LV UGS _v%6	DIWID	11TjNj	WB	Nj6D	vDIBN6	[	[	3 V UGS _v%6	Nj6D	vDIBN6	NN51Tf	v16TW	
LV UGS _v%W	DIWID	11T655	Wf	Nj6D	vDIBN6	[	[	3 V UGS _v%W	Nj6D	vDIBN6	NN5WB	v16TW	
LV UGS _v%f	DIWID	11T6Bj	Wf	Nj6D	vDIBN6	[	[	3 V UGS _v%f	Nj6D	vDIBN6	NN5WI	v16TW	
LV UGS _v%5	DIWID	11TB6f	Wf	Nj6D	vDIBN6	[	[	3 V UGS _v%5	Nj6D	vDIBN6	NN5fTI	v16TW	
LV UGS _v%I	DIWID	11TWDN	WW	Nj6D	vDIBN6	[	[	3 V UGS _v%I	Nj6D	vDIBN6	NN5W%	v16TW	
LV UGS _vjN	DIWID	11TfWj	WI	Nj6D	vDIBN6	[	[	3 V UGS _vjN	Nj6D	vDIBN6	NN5BTj	v16TW	
LV UGS _vj%	DIWID	11TWjN	W5	Nj6D	vDIBN6	[	[	3 V UGS _vj%	Nj6D	vDIBN6	NN56TI	v16TW	
LV UGS _vjj	DIWID	11T6WB	W5	Nj6D	vDIBN6	[	[	3 V UGS _vjj	Nj6D	vDIBN6	NN5Wf	v16TW	
LV UGS _vjB	DIWID	11TWj1	W5	Nj6D	vDIBN6	[	[	3 V UGS _vjB	Nj6D	vDIBN6	NN56T5	v16TW	
LV UGS _vjW	DIWID	11T5DW	WI	Nj6D	vDIBN6	[	[	3 V UGS _vjW	Nj6D	vDIBN6	NN5jT5	v16TW	
LV UGS _vjf	DIWID	11T5j1	WI	Nj6D	vDIBN6	[	[	3 V UGS _vjf	Nj6D	vDIBN6	NN5jTB	v16TW	
LV UGS _vj1	DIWID	11Tf5j	WI	Nj6D	vDIBN6	[	[	3 V UGS _vj1	Nj6D	vDIBN6	NN5BTN	v16TW	
LV UGS _vBD	DIWID	11TWW5	fTD	Nj6D	vDIBN6	[	[	3 V UGS _vBD	Nj6D	vDIBN6	NN56TB	v16TW	
LV UGS _vBN	DIWID	11TIjf	fTj	Nj6D	vDIBN6	[	[	3 V UGS _vBN	Nj6D	vDIBN6	NN5%I%	v16TW	
LV UGS _vB%	DIWID	11TIDj	fTj	Nj6D	vDIBN6	[	[	3 V UGS _vB%	Nj6D	vDIBN6	NN5%IW	v16TW	
LV UGS _vBj	DIWID	11TIjW	fTj	Nj6D	vDIBN6	[	[	3 V UGS _vBj	Nj6D	vDIBN6	NN5%I%	v16TW	
LV UGS _vBB	DIWID	11T5N6	fT%	Nj6D	vDIBN6	[	[	3 V UGS _vBB	Nj6D	vDIBN6	NN5jTf	v16TW	
LV UGS _vB6	DIWID	11TfW%	fT%	Nj6D	vDIBN6	[	[	3 V UGS _vB6	Nj6D	vDIBN6	NN5BTj	v16TW	
LV UGS _vBW	DIWID	11TfD5	fTN	Nj6D	vDIBN6	[	[	3 V UGS _vBW	Nj6D	vDIBN6	NN5BTI	v16TW	
LV UGS _vB5	DIWID	NDDINW%	fTB	Nj6D	vDIBN6	[	[	3 V UGS _vB5	Nj6D	vDIBN6	NNf1TW	v16TW	
LV UGS _vB1	DIWID	NDDINN1	fTB	Nj6D	vDIBN6	[	[	3 V UGS _vB1	Nj6D	vDIBN6	NN5DIN	v16TW	
LV UGS _v6D	DIWID	NDDINWN	fTB	Nj6D	vDIBN6	[	[	3 V UGS _v6D	Nj6D	vDIBN6	NNf1TW	v16TW	
3 V UGS _vDN	jBT6DD	NDDT6%j	6T%	[	D	DIDDB	DIDDB	3 V UGS _vD%	NjBN	vDIBWD	%jTW	v1BTW	
								LV UGS _vDN	vNjB6	DIB6W	%jTW	v1BTf	
3 V UGS _vD%	jBT6DD	NDDIBW5	6T%	[	D	DIDDB	DIDDB	3 V UGS _vDN	vNjBD	DIBNj	%jTB	v16TW	
								3 V UGS _vDj	%IW5N	vDT5fB	BfTD	v16TN	
								LV UGS _vD%	vNjB6	DIB6f	%jTf	v1BTf	
3 V UGS _vDj	jBT6DD	NDDTjfj	6T%	[	D	DIDDB	DIDDB	3 V UGS _vD%	v%IWf5	DT5jB	BW5	v16T6	
								3 V UGS _vDB	BIDN1	vNP/I6	fDIB	v16T%	

Project:	F m OH m RF 0	ETAP	Page:	j
Location:	Paulding, OH	NWDIDC	0 ate:	NDAD6v%DNf
Contract:			SF :	m ES_m OO0 j
Engineer:	Josh Venden	Study Case: NPG 16LE. 0	k eAision:	6DM p EF
I ilena- e:	F m 2OH		Con8gT	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
								LV UGS _vDj	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vDB	j B6DD	NDDfj N6	6TN	Ľ	D	DIDDB	DIDDB	3 V UGS _vDj	vBIDNW	NP/B1	f DP%	v1 6T6	
								3 V UGS _vD6	6Tj 6f	vNfDI	1j T6	v1 6Tj	
								LV UGS _vDB	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vD6	j B6DD	NDDP/8/6f	6TN	Ľ	D	DIDDB	DIDDB	3 V UGS _vDB	v6Tj 6N	NIW61	1j T6	v1 6T6	
								3 V UGS _vD5	WWI%	v%dN%D	NNfTP%	v1 6Tj	
								LV UGS _vD6	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vDW	j B6DD	NDDP/6N	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vDf	Nfj BN	vDBWD	%j Tf	v1 BTW	
								LV UGS _vDW	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vDf	j B6DD	NDDP/Nf	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vDW	vNfj BD	DBj N	%j T6	v1 6TP%	
								3 V UGS _vNW	vNfj BD	Dfj 1W	%j Tj	v1 6TI	
								3 V UGS _vN6	BD%N	vNP/5f	f DT6	v1 6TP%	
								LV UGS _vDf	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vD5	j B6DD	NDDNf%	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vD6	vWW5W	%dD/6	NNWf	v1 6Tf	
								3 V UGS _vDI	5TD/6	v%B5f	NBDB	v1 6T6	
								LV UGS _vD5	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vDI	j B6DD	NDDDI D	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vD5	v5TDN5	%Tj f6	Nj 1T6	v1 6TI	
								3 V UGS _vND	1Tj 61	v%5j W	NWjT6	v1 6Tf	
								LV UGS _vDI	vNfj B6	DB6f	%j T6	v1 BTf	
3 V UGS _vND	j B6DD	NDDD6N	BTI	Ľ	D	DIDDB	DIDDB	3 V UGS _vDI	v1 Tj 6j	%Tf 6N	NWjTN	v1 6TI	
								3 V UGS _v%6	NDIWB	vj TP/N	N5W5	v1 6T6	
								LV UGS _vND	vNfj B6	DB6f	%j T6	v1 BTf	
3 V UGS _vNj	j B6DD	NDDfj 6%	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vNB	Nfj BN	vDBWD	%j TW	v1 BTW	
								LV UGS _vNj	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vNB	j B6DD	NDDfj NB	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vNj	vNfj BD	DB%5	%j T6	v1 6Tj	
								3 V UGS _vN6	%TW5N	vD551	BfTN	v1 BTI	
								LV UGS _vNB	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vN6	j B6DD	NDDN%B	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vDf	vBIDNW	NP/NW	f DIN	v1 6Tf	
								3 V UGS _vNB	v%TW6	D5ND	BWf	v1 6Tf	
								3 V UGS _vNf	5TDj %	v%B5f	NBDT6	v1 6T6	
								LV UGS _vN6	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vNW	j B6DD	NDDP/d B	6TD	Ľ	D	DIDDB	DIDDB	3 V UGS _vDf	Nfj BN	vDBWD	%j Tf	v1 BTW	
								LV UGS _vNW	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _vNf	j B6DD	NDDDND	BTI	Ľ	D	DIDDB	DIDDB	JUv%N	1Tj WD	v%Tf 1%	NWjTB	v1 6T6	
								3 V UGS _vN6	v5TDNI	%Tj j N	Nj 1Tf	v1 WD	
								LV UGS _vNf	vNfj B6	DB6f	%j T6	v1 BTf	
3 V UGS _v%D	j B6DD	NDDP/6B	BTI	Ľ	D	DIDDB	DIDDB	3 V UGS _v%N	Nfj BN	vDBWD	%j Tf	v1 BTW	
								LV UGS _v%D	vNfj B6	DB6f	%j Tf	v1 BTf	
3 V UGS _v%N	j B6DD	NDDNWB	BTI	Ľ	D	DIDDB	DIDDB	3 V UGS _v%D	vNfj 1	Dfj 5W	%j Tj	v1 WN	

Pro7ect:	F m OH m RF 0	Page:	B
Location:	Paulding, OH	0 ate:	NDMD6v%DNF
Contract:		SF :	m ES_m OO0 j
Engineer:	Josh Venden	k eAision:	6DM p EF
I ilena- e:	F m 2OH	Con8gT	F or- al

ETAP

NWDDC

Study Case: NPG 16LE. 0

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
								3 V UGS _v%%	%TW5D	vDB5BW	BfTD	v16TB	
								LV UGS _v%N	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _v%%	j B6DD	NDDD1%	BTl	[	D	DDDB	DDDB	JUv%N	6J65	vNTW6D	1jTf	v16TW	
								3 V UGS _v%N	v%TW5	DB5Nf	BW5	v16Tf	
								3 V UGS _v%l	vNJj 1	DJf j	%jT%	v1 WJ	
								LV UGS _v%%	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _v%j	j B6DD	NDDD%D	BTl	[	D	DDDB	DDDB	511j .	NBTfDB	vBT%l	%6WD	v1WN	
								3 V UGS _v%5	vNJ TWJ	j TW	%j%J	v1W%	
								LV UGS _v%j	vNJB6	DB6f	%jT5	v1BTf	
3 V UGS _v%B	j B6DD	11Tl%l	BTf	[	D	DDDB	DDDB	3 V UGS _v%6	NJBN	vDBWN	%jTf	v1BTW	
								LV UGS _v%B	vNJB6	DB6f	%jT5	v1BTf	
3 V UGS _v%6	j B6DD	11TlNN	BTf	[	D	DDDB	DDDB	511N	NJ TB5	vj TWBf	%jN5	v1W6	
								3 V UGS _vND	vNDTWf	%f W5	N5BTW	v1W5	
								3 V UGS _v%B	vNJBN	DBN5	%jT6	v16T6	
								LV UGS _v%6	vNJB6	DB6f	%jT5	v1BTf	
3 V UGS _v%W	j B6DD	NDDN56	6TD	[	D	DDDB	DDDB	3 V UGS _v%f	NJBN	vDBWD	%jTf	v1BTW	
								LV UGS _v%W	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _v%f	j B6DD	NDDNBD	6TD	[	D	DDDB	DDDB	3 V UGS _v%W	vNJBD	DB%j	%jT6	v16TB	
								3 V UGS _v%5	%TW5N	vDB5j	BfT%	v16TD	
								LV UGS _v%f	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _v%5	j B6DD	NDDD6B	6TD	[	D	DDDB	DDDB	3 V UGS _v%j	NJ f j	vj TlD6	%jj D	v1WD	
								3 V UGS _v%f	v%TW5	DB5B5	BfTD	v16TJ	
								3 V UGS _vj j	v1J6j	%T51W	NWTB	v1WB	
								LV UGS _v%5	vNJB6	DB6f	%jT5	v1BTf	
3 V UGS _v%l	j B6DD	NDDN15	BTl	[	D	DDDB	DDDB	3 V UGS _v%%	NJBN	vDBWD	%jTf	v1BTW	
								LV UGS _v%l	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _vj N	j B6DD	NDDJ61	6T%	[	D	DDDB	DDDB	3 V UGS _vj %	NJBN	vDBWD	%jTW	v1BTW	
								LV UGS _vj N	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _vj %	j B6DD	NDD%f	6T%	[	D	DDDB	DDDB	3 V UGS _vj N	vNJj 1	DJ6D	%jTN	v1Wf	
								3 V UGS _vj j	%TW5D	vDB5NN	BWf	v16Tf	
								LV UGS _vj %	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _vj j	j B6DD	NDDNWD	6TN	[	D	DDDB	DDDB	3 V UGS _v%5	1J W	v%T5%f	NWJ6	v16Tf	
								3 V UGS _vj %	v%TW5	DJ5B	BWW	v1WD	
								3 V UGS _vj B	v6J6N	NB5j	1jT%	v16Tl	
								LV UGS _vj j	vNJB6	DB6f	%jTf	v1BTf	
3 V UGS _vj B	j B6DD	NDD%j 6	6T%	[	D	DDDB	DDDB	3 V UGS _vj j	6J6W	vNTW6	1jTB	v16Tf	
								3 V UGS _vj W	v%TWW	DB%B	BWf	v16TW	
								3 V UGS _vj 1	vNJj 1	DJBD	%jTN	v1Wl	
								LV UGS _vj B	vNJB6	DB6f	%jTf	v1BTf	

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
3 V UGS _vj W	j BT6DD	NDDIBDN	6T%	I	D	DIDDB	DIDDB	3 V UGS _vj B	%TW5N	vDT51j	BfTN	vl BTI	
								3 V UGS _vj f	vNTj BD	DIBj j	%j T6	vl 6T%	
								LV UGS _vj W	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vj f	j BT6DD	NDDIBj B	6T%	I	D	DIDDB	DIDDB	3 V UGS _vj W	NTj BN	vDIBWD	%j TW	vl BTW	
								LV UGS _vj f	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vj 1	j BT6DD	NDDTj f5	6T%	I	D	DIDDB	DIDDB	3 V UGS _vj B	NTj BN	vDIBWD	%j TW	vl BTW	
								LV UGS _vj 1	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vBD	j BT6DD	NDDT%WB	6Tj	I	D	DIDDB	DIDDB	51I B.	Nj Tj 61	vj Tf56	%j NTf	vl WT%	
								3 V UGS _vBW	vN%DN5	j Tj %6	%D5TN	vl WB	
								LV UGS _vBD	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vBN	j BT6DD	NDDT6j N	6TW	I	D	DIDDB	DIDDB	JUvB/N	NTj BN	vDIBWD	%j TW	vl BTW	
								LV UGS _vBN	vNTj B6	DIB6W	%j TW	vl BTf	
3 V UGS _vB%	j BT6DD	NDDIB15	6TW	I	D	DIDDB	DIDDB	JUvB/N	6Tj 6%	vNIWDN	1j TD	vl 6T5	
								3 V UGS _vBl	vBIDNN	NINBN	WTB	vl WT%	
								LV UGS _vB%	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vBj	j BT6DD	NDDT6j D	6TW	I	D	DIDDB	DIDDB	JUvB/N	NTj BN	vDIBWD	%j TW	vl BTW	
								LV UGS _vBj	vNTj B6	DIB6W	%j TW	vl BTf	
3 V UGS _vBB	j BT6DD	NDDIBND	6TW	I	D	DIDDB	DIDDB	JUvB/N	v5TD%%	%Tj BB	Nj 1Tj	vl WD	
								3 V UGS _vB6	1Tj Wj	v%T5DB	NW%I	vl 6T5	
								LV UGS _vBB	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vB6	j BT6DD	NDDTj 65	6T5	I	D	DIDDB	DIDDB	3 V UGS _vBB	vl Tj 66	%TWID	NW%j	vl WN	
								3 V UGS _vBW	NDTWIW	vj TN6D	N56TI	vl 6TI	
								LV UGS _vB6	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vBW	j BT6DD	NDDTj DB	6TB	I	D	DIDDB	DIDDB	3 V UGS _vBD	N%D%f	vj TBj 6	%D5Tf	vl WT%	
								3 V UGS _vB6	vNDTW5W	%If6	N56TN	vl Wj	
								LV UGS _vBW	vNTj B6	DIB6f	%j Tf	vl BTf	
3 V UGS _vB5	j BT6DD	NDDTf66	6Tf	I	D	DIDDB	DIDDB	3 V UGS _vBl	NTj BN	vDIBWD	%j T6	vl BTW	
								LV UGS _vB5	vNTj B6	DIB6W	%j TW	vl BTf	
3 V UGS _vBl	j BT6DD	NDDTfN%	6Tf	I	D	DIDDB	DIDDB	3 V UGS _vB%	BID%N	vNTj D5	f DTj	vl 6TN	
								3 V UGS _vB5	vNTj BD	DIB%j	%j TB	vl 6TB	
								3 V UGS _v6D	vNTj BD	DIB%6	%j TB	vl 6Tj	
								LV UGS _vBl	vNTj B6	DIB6W	%j TW	vl BTf	
3 V UGS _v6D	j BT6DD	NDDTf6B	6Tf	I	D	DIDDB	DIDDB	3 V UGS _vBl	NTj BN	vDIBWD	%j T6	vl BTW	
								LV UGS _v6D	vNTj B6	DIB6W	%j TW	vl BTf	
* POR	Nj 5TDDD	NDDIDDD	DID	v66TfB5	N5Tj %6	I	I	51_N	v66TfB5	N5Tj %6	%B6T6	vl 6TD	
3 P_~j	Nj T5DD	11TWNB	6TD	I	D	I	I	HV UGS 3 P_	DIDDD	DIDDD	DID	DID	
							&	51_NU					

* Rndicates a Aoltage regulated bus (Aoltage controlled or swing ty4e - achine connected to it)

\# Rndicates a bus with a load - is- atch o8- ore than DIN3 V.

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
4. j N0	5BDGG	. . D%T	BD'	C	G	C	C	9 V U6 S _Rv1	RN5D55	5DB54	v5N0G	R TD4	
								4. _NU	N5D55	R5DB54	v5N0G	R TD4	
4. j v0	5BDGG	. . D%T	BD'	C	G	C	C	JURv/N	RNBD'T.	5DGG	v1BD'	R TD'	
								4. _NU	NBD'T.	R5DGG	v1BD'	R TD'	
4. j 50	5BDGG	. . D%T	BD'	C	G	C	C	9 V U6 S _Rv5	RNBD'11	5D'4N	v15D	R %40G	
								4. _NU	NBD'11	R5D'4N	v15D	R %40G	
4. j B0	5BDGG	. . D%T	BD'	C	G	C	C	9 V U6 S _RBG	RN5D'T5	vDBG5	vvTDN	R 4DB	
								4. _NU	N5D'T5	RvDBG5	vvTDN	R 4DB	
4. _N0	N54D0GG	NGBD. 4	G0G	C	G	C	C	PO7	11D%Bv	RN4D5TT	v55D	R 1D0G	
								HV U6 S 9 P_	R11D%Bv	N4D5TT	v55D	R 1D0G	
4. _NU	5BDGG	. . D%T	BD'	C	G	C	C	4. j B0	RN5D'T5	vDBG5	vvTDN	R 4DB	
								4. j 50	RNBD'11	5D'4N	v15D	R %40G	
								4. j v0	RNBD'T.	5DGG	v1BD'	R TD'	
								4. j N0	RN5D55	5DB54	v5N0G	R TD4	
								9 P_~5	11DN	RN5D%vv	. TBD%	R %D	
								& HV U6 S 9 P_					
HV U6 S 9 P_	N54D0GG	NGBD. 4	G0G	C	G	G0G1.	GDNTv	4. _N0	11D%Bv	RN4D5TT	v55D	R 1D0G	
								4. _NU	R11D4GN	N4DGB	v55D	R 1DN	5DNv1
								& 9 P_~5					
JURv/N	5BDGG	. . D4T5	BD4	C	G	C	C	9 V U6 S _RN%	R D51v	vD'4%	NT5DN	R TDN	
								9 V U6 S _Rvv	RD5B.	ND%%	. 5D	R 1D	
								4. j v0	NBD%Gv	RBD'T5	v1TD	R TD0G	
JURB/N	5BDGG	NGGD5. .	1D'	C	G	C	C	9 V U6 S _RBN	RN5DBG	GDB5N	v5D	R 1D	
								9 V U6 S _RBv	RD51v	NDGN	. 5DN	R 1D4	
								9 V U6 S _RB5	RN5DBG	GDB5v	v5D	R 1D	
								9 V U6 S _RBB	4D05v	RvDBTB	NBG0G	R 1D'	
LV U6 S _RGN	GD'. G	. . D45N	TD	N51G	RGDBNI	C	C	9 V U6 S _RGN	N51G	RGDBNI	NN45D	R 1D'	
LV U6 S _RGv	GD'. G	. . D%1	TD	N51G	RGDBNI	C	C	9 V U6 S _RGv	N51G	RGDBNI	NN4BDN	R 1D'	
LV U6 S _RG5	GD'. G	. . D'4G	TD4	N51G	RGDBNI	C	C	9 V U6 S _RG5	N51G	RGDBNI	NN41D5	R 1D'	
LV U6 S _RGB	GD'. G	. . D'vN	TD4	N51G	RGDBNI	C	C	9 V U6 S _RGB	N51G	RGDBNI	NN4TD0G	R 1D'	
LV U6 S _RGI	GD'. G	. . D55	TD4	N51G	RGDBNI	C	C	9 V U6 S _RGI	N51G	RGDBNI	NN4%40G	R 1D'	
LV U6 S _RGT	GD'. G	. . D14	TD%	N51G	RGDBNI	C	C	9 V U6 S _RGT	N51G	RGDBNI	NN4TD%	R 1D'	
LV U6 S _RG%	GD'. G	. . Dvv	TD%	N51G	RGDBNI	C	C	9 V U6 S _RG%	N51G	RGDBNI	NN4%D	R 1D'	
LV U6 S _RG4	GD'. G	. . DB%%	TD%	N51G	RGDBNI	C	C	9 V U6 S _RG4	N51G	RGDBNI	NN4%D%	R 1D'	
LV U6 S _RG	GD'. G	. . D5. 1	TD'	N51G	RGDBNI	C	C	9 V U6 S _RG	N51G	RGDBNI	NN44D%	R 1D'	
LV U6 S _RNG	GD'. G	. . D51T	TD'	N51G	RGDBNI	C	C	9 V U6 S _RNG	N51G	RGDBNI	NN4. DN	R 1D'	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
LV U6 S _R5	GD. G	. . DT1.	TD%	N51G	RGDN1	C	C	9 V U6 S _R5	N51G	RGDN1	NN41D	R 1D	
LV U6 S _RB	GD. G	. . DvN	TD%	N51G	RGDN1	C	C	9 V U6 S _RB	N51G	RGDN1	NN4TDG	R 1D	
LV U6 S _R1	GD. G	. . Dv.	TD	N51G	RGDN1	C	C	9 V U6 S _R1	N51G	RGDN1	NN44D	R 1D	
LV U6 S _RT	GD. G	. . DGG	TD%	N51G	RGDN1	C	C	9 V U6 S _RT	N51G	RGDN1	NN4TD	R 1D	
LV U6 S _R%	GD. G	. . D5NB	TD	N51G	RGDN1	C	C	9 V U6 S _R%	N51G	RGDN1	NN4. D	R 1D	
LV U6 S _RvG	GD. G	. . DTG	TD	N51G	RGDN1	C	C	9 V U6 S _RvG	N51G	RGDN1	NN4TD%	R 1D	
LV U6 S _RvN	GD. G	. . DT.	TD	N51G	RGDN1	C	C	9 V U6 S _RvN	N51G	RGDN1	NN4%44	R 1D	
LV U6 S _Rvv	GD. G	. . D5. %	TD	N51G	RGDN1	C	C	9 V U6 S _Rvv	N51G	RGDN1	NN44D%	R 1D	
LV U6 S _Rv5	GD. G	. . D5vB	TD	N51G	RGDN1	C	C	9 V U6 S _Rv5	N51G	RGDN1	NN4. D	R 1D	
LV U6 S _RvB	GD. G	. . D55	TDB	N51G	RGDN1	C	C	9 V U6 S _RvB	N51G	RGDN1	NN GD	R 1D	
LV U6 S _Rv1	GD. G	. . DN1	TDB	N51G	RGDN1	C	C	9 V U6 S _Rv1	N51G	RGDN1	NN G4	R 1D	
LV U6 S _RvT	GD. G	. . D. G	TD%	N51G	RGDN1	C	C	9 V U6 S _RvT	N51G	RGDN1	NN4%D	R 1D	
LV U6 S _Rv%	GD. G	. . DB1	TD%	N51G	RGDN1	C	C	9 V U6 S _Rv%	N51G	RGDN1	NN44DN	R 1D	
LV U6 S _Rv4	GD. G	. . D51.	TD%	N51G	RGDN1	C	C	9 V U6 S _Rv4	N51G	RGDN1	NN4. DN	R 1D	
LV U6 S _Rv.	GD. G	. . DGB	TD	N51G	RGDN1	C	C	9 V U6 S _Rv.	N51G	RGDN1	NN4%4DB	R 1D	
LV U6 S _R5N	GD. G	. . DT1	TD	N51G	RGDN1	C	C	9 V U6 S _R5N	N51G	RGDN1	NN41D	R 1D	
LV U6 S _R5v	GD. G	. . D55	TD	N51G	RGDN1	C	C	9 V U6 S _R5v	N51G	RGDN1	NN4%4DG	R 1D	
LV U6 S _R55	GD. G	. . DT	TD	N51G	RGDN1	C	C	9 V U6 S _R55	N51G	RGDN1	NN4%44	R 1D	
LV U6 S _R5B	GD. G	. . DBN	TD	N51G	RGDN1	C	C	9 V U6 S _R5B	N51G	RGDN1	NN4TD	R 1D	
LV U6 S _R5T	GD. G	. . D%G	TD	N51G	RGDN1	C	C	9 V U6 S _R5T	N51G	RGDN1	NN4BD	R 1D	
LV U6 S _R5%	GD. G	. . D%BN	TD	N51G	RGDN1	C	C	9 V U6 S _R5%	N51G	RGDN1	NN4BD	R 1D	
LV U6 S _R5.	GD. G	. . D41	TD	N51G	RGDN1	C	C	9 V U6 S _R5.	N51G	RGDN1	NN41D	R 1D	
LV U6 S _RBG	GD. G	. . D%G	%DG	N51G	RGDN1	C	C	9 V U6 S _RBG	N51G	RGDN1	NN4TD	R 1D	
LV U6 S _RBN	GD. G	. . D5.	%D	N51G	RGDN1	C	C	9 V U6 S _RBN	N51G	RGDN1	NN45DB	R 1D	
LV U6 S _RBv	GD. G	. . DG1	%D	N51G	RGDN1	C	C	9 V U6 S _RBv	N51G	RGDN1	NN45D	R 1D	
LV U6 S _RB5	GD. G	. . D54	%D	N51G	RGDN1	C	C	9 V U6 S _RB5	N51G	RGDN1	NN45DB	R 1D	
LV U6 S _RBB	GD. G	. . D%N%	%D	N51G	RGDN1	C	C	9 V U6 S _RBB	N51G	RGDN1	NN4BD	R 1D	
LV U6 S _RB1	GD. G	. . DTB	%D	N51G	RGDN1	C	C	9 V U6 S _RB1	N51G	RGDN1	NN41D	R 1D	
LV U6 S _RBT	GD. G	. . DNG	%DN	N51G	RGDN1	C	C	9 V U6 S _RBT	N51G	RGDN1	NN4TDN	R 1D	
LV U6 S _RB4	GD. G	NGGD6T1	%DB	N51G	RGDN1	C	C	9 V U6 S _RB4	N51G	RGDN1	NN4GD%	R 1D	
LV U6 S _RB.	GD. G	NGGD6vN	%DB	N51G	RGDN1	C	C	9 V U6 S _RB.	N51G	RGDN1	NN4ND	R 1D	
LV U6 S _R1G	GD. G	NGGD6T5	%DB	N51G	RGDN1	C	C	9 V U6 S _R1G	N51G	RGDN1	NN4GD%	R 1D	
9 V U6 S _RGN	5BDGG	NGGDvT	1D	C	G	GD0GB	GD0GB	9 V U6 S _RGv	N5BN	RGDTG	v5D	R BD	
								LV U6 S _RGN	RN5B1	GD1%	v5D%	R BD%	
9 V U6 S _RGv	5BDGG	NGG5%N	1D	C	G	GD0GB	GD0GB	9 V U6 S _RGN	RN5BG	GDN5	v5DB	R 1D	
								9 V U6 S _RG5	vD4N	RG4%B	B%DG	R 1DN	
								LV U6 S _RGv	RN5B1	GD1%	v5D%	R BD%	
9 V U6 S _RG5	5BDGG	NGG%T	1D	C	G	GD0GB	GD0GB	9 V U6 S _RGv	RvD%4	G451	BTD	R 1D	
								9 V U6 S _RGB	BDN	RND. 1	%GD	R 1D	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
								LV U6 S _RG5	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RGB	5BDGG	NGGDN%	1DN	C	G	GD0GB	GD0GB	9 V U6 S _RG5	RB0NT	NDB.	%GD	R 1D	
								9 V U6 S _RG1	1D51%	RND%NG	. 5D	R 1D5	
								LV U6 S _RGB	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RG1	5BDGG	NGGDv.	1DN	C	G	GD0GB	GD0GB	9 V U6 S _RGB	R1D51N	NDTG	. 5DT	R 1D	
								9 V U6 S _RG4	TDT. v	RvDvN	NN%D5	R 1D5	
								LV U6 S _RG1	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RGT	5BDGG	NGGDN1B	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RG%	N5BN	RGDBTG	v5D%	R BDT	
								LV U6 S _RGT	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RG%	5BDGG	NGGDNN	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RGT	RN5BG	GD5N	v5D	R 1D	
								9 V U6 S _RNT	RN5BG	GD. T	v5D5	R 1D	
								9 V U6 S _RN1	BD0vN	RND44	%GDT	R 1D	
								LV U6 S _RG%	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RG4	5BDGG	NGGD0%B	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RG1	RTD4T	vD0v4	NNTD4	R 1D%	
								9 V U6 S _RG	4D0v%	RvDB44	NBGD	R 1D	
								LV U6 S _RG4	RN5B1	GD31%	v5D4	R BD%	
9 V U6 S _RG	5BDGG	. . D. v	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RG4	R1D0N4	vD5%T	NBGD0	R 1D	
								9 V U6 S _RNG	. D51.	RvD45%	NT5D%	R 1D%	
								LV U6 S _RG	RN5B1	GD31%	v5D4	R BD%	
9 V U6 S _RNG	5BDGG	. . D1B	BD	C	G	GD0GB	GD0GB	9 V U6 S _RG	R D515	vD%1 v	NT5D	R 1D	
								9 V U6 S _Rv1	NGDT. B	R5DN5	N4TD	R 1D4	
								LV U6 S _RNG	RN5B1	GD31%	v5D4	R BD%	
9 V U6 S _RN5	5BDGG	NGGD11	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RNB	N5BN	RGDBTG	v5D%	R BDT	
								LV U6 S _RN5	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RNB	5BDGG	NGGDN%	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RN5	RN5BG	GDv4	v5D	R 1D5	
								9 V U6 S _RN1	vDT4N	RGD4.	B%D	R BD	
								LV U6 S _RNB	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RN1	5BDGG	NGGD0v%	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RG%	RB0NT	NDNT	%GD	R 1D%	
								9 V U6 S _RNB	RvDT%1	GD4NN	BTD4	R 1D%	
								9 V U6 S _RN%	4D05v	RvDB44	NBGD%	R 1D	
								LV U6 S _RN1	RN5B1	GD31%	v5D4	R BD%	
9 V U6 S _RNT	5BDGG	NGGDN %	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RG%	N5BN	RGDBTG	v5D%	R BDT	
								LV U6 S _RNT	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RN%	5BDGG	. . DNv	BD	C	G	GD0GB	GD0GB	JURv/N	. D5TG	RvD% 5	NT5DT	R 1D4	
								9 V U6 S _RN1	R1D0N	vD555	N5. D	R TD0	
								LV U6 S _RN%	RN5B1	GD31%	v5D4	R BD%	
9 V U6 S _RvG	5BDGG	NGGDN1T	BD	C	G	GD0GB	GD0GB	9 V U6 S _RvN	N5BN	RGDBTG	v5D%	R BDT	
								LV U6 S _RvG	RN5B1	GD31%	v5D%	R BD%	
9 V U6 S _RvN	5BDGG	NGGD0T%	BD	C	G	GD0GB	GD0GB	9 V U6 S _RvG	RN55.	GD54T	v5D5	R TDN	

Project:	F m OH m 7F W	ETAP	Page:	B
Location:	Paulding, OH	NI10I0IC	Wate:	NGRGTRvGN%
Contract:			SF :	m ES_m OOWP
Engineer:	Josh Venden	Study Case: NGI P6 . 1LE0 W	f ekision:	1GA MEF
j ilenaI e:	F m - OH		ConpigD	F orI al

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
								9 V U6 S _Rvv	vD4G	RG4BT	B%0G	R 1DB	
								LV U6 S _RvN	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rvv	5BDCG	. . D. 1	BD	C	G	GD0GB	GD0GB	JURv/N	1D514	RND1N	. 5D4	R 1DT	
								9 V U6 S _RvN	RvDT%4	GD4N%	BTD	R 1DT	
								9 V U6 S _Rv.	RN55.	GD5%5	v5D5	R TD5	
								LV U6 S _Rvv	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rv5	5BDCG	. . Dvv	BD	C	G	GD0GB	GD0GB	4. j 50	NBD%GB	RBD5v	v1TD	R TDN	
								9 V U6 S _Rv4	RN5D5T5	5D%N	v5vD	R TD	
								LV U6 S _Rv5	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _RvB	5BDCG	. . D45v	BD%	C	G	GD0GB	GD0GB	9 V U6 S _Rv1	N5BN	RGDBTN	v5D4	R BDT	
								LV U6 S _RvB	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rv1	5BDCG	. . D4NB	BD%	C	G	GD0GB	GD0GB	4. j N0	N5D5B4	R5D1G	v5vD0G	R TD	
								9 V U6 S _RNG	RNGDTT	vD%N	N4BD4	R TD4	
								9 V U6 S _RvB	RN5BN	GDBN4	v5D	R 1D	
								LV U6 S _Rv1	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _RvT	5BDCG	NGGD0G4%	1DN	C	G	GD0GB	GD0GB	9 V U6 S _Rv%	N5BN	RGDBTN	v5D%	R BDT	
								LV U6 S _RvT	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rv%	5BDCG	NGGD0B5	1DG	C	G	GD0GB	GD0GB	9 V U6 S _RvT	RN5BG	GDBv5	v5D	R 1DB	
								9 V U6 S _Rv4	vD4N	RGD44B	B%D	R 1DG	
								LV U6 S _Rv%	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rv4	5BDCG	. . D1%	1DG	C	G	GD0GB	GD0GB	9 V U6 S _Rv5	N5D%5	R5DG%	v55D	R TDG	
								9 V U6 S _Rv%	RvDT%4	GD4B4	B%0G	R 1D5	
								9 V U6 S _R55	R D515	vD. 4	NTvD	R TDB	
								LV U6 S _Rv4	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _Rv.	5BDCG	NGGDNGN	BD	C	G	GD0GB	GD0GB	9 V U6 S _Rvv	N5BN	RGDBTN	v5D%	R BDT	
								LV U6 S _Rv.	RN5B1	GDB1%	v5D%	R BD%	
9 V U6 S _R5N	5BDCG	NGGDvTN	1D	C	G	GD0GB	GD0GB	9 V U6 S _R5v	N5BN	RGDBTG	v5D%	R BDT	
								LV U6 S _R5N	RN5B1	GDB1%	v5D%	R BD%	
9 V U6 S _R5v	5BDCG	NGGDN5G	1D	C	G	GD0GB	GD0GB	9 V U6 S _R5N	RN55.	GD51N	v5DN	R TD%	
								9 V U6 S _R55	vD4G	RGD4NN	BTD4	R 1D%	
								LV U6 S _R5v	RN5B1	GDB1%	v5D%	R BD%	
9 V U6 S _R55	5BDCG	NGGD0GT5	1DN	C	G	GD0GB	GD0GB	9 V U6 S _Rv4	. D5T.	RvD4v4	NT5D%	R 1D%	
								9 V U6 S _R5v	RvDT%4	GD%4B	BTD%	R TDG	
								9 V U6 S _R5B	RD51N	ND4B	. 5D5	R 1D	
								LV U6 S _R55	RN5B1	GDB1%	v5D4	R BD%	
9 V U6 S _R5B	5BDCG	NGGDN5%	1D	C	G	GD0GB	GD0GB	9 V U6 S _R55	1D51T	RNDv1	. 5D	R 1D%	
								9 V U6 S _R5T	RvDT%T	GD4vB	BTD4	R 1DT	
								9 V U6 S _R5.	RN55.	GD5BN	v5DN	R TD	
								LV U6 S _R5B	RN5B1	GDB1%	v5D%	R BD%	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A _a3
9 V U6 S _R5T	5BD0GG	NGG15GB	1D0	C	G	G00GB	G00GB	9 V U6 S _R5B	vDT4N	RG14. 5	B%D	R BD	
								9 V U6 S _R5%	RN15BG	GD855	v5D	R 1D0	
								LV U6 S _R5T	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R5%	5BD0GG	NGG155%	1D0	C	G	G00GB	G00GB	9 V U6 S _R5T	N15BN	RGD8TG	v5DT	R BDT	
								LV U6 S _R5%	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R5.	5BD0GG	NGGD4N	1D0	C	G	G00GB	G00GB	9 V U6 S _R5B	N15BN	RGD8TG	v5D%	R BDT	
								LV U6 S _R5.	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R8G	5BD0GG	NGGDNT%	1D5	C	G	G00GB	G00GB	4. j B0	N5D1.	R5D%44	v5vDG	R TD0	
								9 V U6 S _R8T	RNvD0N4	5D5v%	vG4D5	R TD8	
								LV U6 S _R8G	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R8N	5BD0GG	NGGD85B	1D%	C	G	G00GB	G00GB	JURB/N	N15BN	RGD8TG	v5DT	R BDT	
								LV U6 S _R8N	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R8v	5BD0GG	NGGD8GG	1DT	C	G	G00GB	G00GB	JURB/N	1D51v	RNDTGv	. 5DN	R 1D4	
								9 V U6 S _R8.	R8D0NN	NDN8v	T. D	R TD0	
								LV U6 S _R8v	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R85	5BD0GG	NGGD855	1D%	C	G	G00GB	G00GB	JURB/N	N15BN	RGD8TG	v5DT	R BDT	
								LV U6 S _R85	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R8B	5BD0GG	NGG15Nv	1DT	C	G	G00GB	G00GB	JURB/N	R4D0vv	vD5B1	N5. D8	R TD0G	
								9 V U6 S _R81	. D5T5	RvD4G1	NT5DN	R 1D4	
								LV U6 S _R8B	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R81	5BD0GG	NGGD0TG	1D0	C	G	G00GB	G00GB	9 V U6 S _R8B	R D511	vDT. N	NTvD0	R TDN	
								9 V U6 S _R8T	NGDT. T	R5DNv	N4TDN	R 1D	
								LV U6 S _R81	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R8T	5BD0GG	NGGD0GT	1D8	C	G	G00GB	G00GB	9 V U6 S _R8G	NvD0vT	R5D85%	vG4D	R TDN	
								9 V U6 S _R81	RNGD4T	vD%%	N41D0	R TD5	
								LV U6 S _R8T	RN15B1	GD81%	v5D%	R BD%	
9 V U6 S _R84	5BD0GG	NGGDT14	1D4	C	G	G00GB	G00GB	9 V U6 S _R8.	N15BN	RGD8TG	v5DT	R BDT	
								LV U6 S _R84	RN15B1	GD81T	v5DT	R BD%	
9 V U6 S _R8.	5BD0GG	NGGDTN1	1D%	C	G	G00GB	G00GB	9 V U6 S _R8v	B0vN	RN15G	%GD5	R 1DN	
								9 V U6 S _R84	RN15BG	GD8vB	v5D8	R 1D8	
								9 V U6 S _R1G	RN15BG	GD8v1	v5D8	R 1D5	
								LV U6 S _R8.	RN15B1	GD81T	v5DT	R BD%	
9 V U6 S _R1G	5BD0GG	NGGDT1T	1D4	C	G	G00GB	G00GB	9 V U6 S _R8.	N15BN	RGD8TG	v5DT	R BDT	
								LV U6 S _R1G	RN15B1	GD81T	v5DT	R BD%	
* PO7	N54D0GG	NG1D0GG	G0G	R11D%8N	N4D5TT	C	C	4. _N0	R11D%8N	N4D5TT	v55D4	R 1D0G	
9 P_~5	N5D4GG	. . DNT	1D0G	C	G	C	C	HV U6 S 9 P_	G00GG	G00GG	G0G	G0G	
								& 4. _NU					

* 7ndicates a koltage regulated bus (koltage controlled or swing ty3e I achine connected to it)

\# 7ndicates a bus with a load I isI atch opI ore than GDN9 V0

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 Gar	8 W	8 Gar	ND	8 W	8 Gar	p _ 9	f PY	f I a9
34YFp	m5.700	F00.006	6.5	0	0	0	0	8 V B1 S I 2R7	2F3.540	20.m60	m04.7	F00.0	
								34I FB	F3.540	0.m60	m04.7	F00.0	
34YRp	m5.700	F00.006	6.5	0	0	0	0	JB2R/F	2R0.m56	20.R37	m50.7	F00.0	
								34I FB	R0.m56	0.R37	m50.7	F00.0	
34Ymp	m5.700	F00.006	6.5	0	0	0	0	8 V B1 S I 2Rm	2R0.mF4	20.5v4	m50.F	F00.0	
								34I FB	R0.mF4	0.5v4	m50.F	F00.0	
34Y5p	m5.700	F00.006	6.5	0	0	0	0	8 V B1 S I 250	2F3.m65	2F.mRR	m03.F	44.v	
								34I FB	F3.m65	F.mRR	m03.F	44.v	
34I Fp	Fm3.000	F00.00F	0.0	0	0	0	0	PON	vv.R7F	26.m77	mR5.m	244.v	
								HV B1 S 8 PI	2vv.R7F	6.m77	mR5.m	244.v	
34I FB	m5.700	F00.006	6.5	0	0	0	0	34Y5p	2F3.m65	2F.mRR	m03.F	44.v	
								34Ymp	2R0.mF4	20.5v4	m50.F	F00.0	
								34YRp	2R0.m56	20.R37	m50.7	F00.0	
								34YFp	2F3.540	20.m60	m04.7	F00.0	
								8 PI ~m	vv.7F4	R.556	FR4v.3	F00.0	
								& HV B1 S 8 PI					
HV B1 S 8 PI	Fm3.000	F00.00F	0.0	0	0	0.075	0.F5v	34I Fp	vv.R7F	26.m77	mR5.m	244.v	
								34I FB	2vv.m07	6.R0v	mR5.7	244.v	
								& 8 PI ~m					
JB2R/F	m5.700	F00.R4m	6.v	0	0	0	0	8 V B1 S I 2Fv	2FR.4v3	0.000	RF6.6	F00.0	
								8 V B1 S I 2RR	2v.5R7	0.0mv	FRm4	F00.0	
								34YRp	R0.50m	20.0mv	m50.5	F00.0	
JB25/F	m5.700	F0F.547	v.6	0	0	0	0	8 V B1 S I 25F	2F.36R	0.055	m0.v	2F00.0	
								8 V B1 S I 25R	2v.5R4	0.075	FRR.7	F00.0	
								8 V B1 S I 25m	2F.36R	0.057	m0.v	2F00.0	
								8 V B1 S I 255	FF.F7R	20.F5m	F3m4	F00.0	
LV B1 S I 20F	0.640	F0F.6Fv	4.R	F.3v7	0.000	0	0	8 V B1 S I 20F	F.3v7	0.000	F75m7	F00.0	
LV B1 S I 20R	0.640	F0F.7m7	4.R	F.3v7	0.000	0	0	8 V B1 S I 20R	F.3v7	0.000	F755.3	F00.0	
LV B1 S I 20m	0.640	F0F.m4v	4.R	F.3v7	0.000	0	0	8 V B1 S I 20m	F.3v7	0.000	F756.4	F00.0	
LV B1 S I 205	0.640	F0F.m05	4.R	F.3v7	0.000	0	0	8 V B1 S I 205	F.3v7	0.000	F753.m	F00.0	
LV B1 S I 207	0.640	F0F.F66	4.R	F.3v7	0.000	0	0	8 V B1 S I 207	F.3v7	0.000	F770.5	F00.0	
LV B1 S I 206	0.640	F0F.F7m	4.F	F.3v7	0.000	0	0	8 V B1 S I 206	F.3v7	0.000	F770.6	F00.0	
LV B1 S I 20v	0.640	F0F.F0R	4.F	F.3v7	0.000	0	0	8 V B1 S I 20v	F.3v7	0.000	F77F.5	F00.0	
LV B1 S I 203	0.640	F0F.067	4.F	F.3v7	0.000	0	0	8 V B1 S I 203	F.3v7	0.000	F77R.0	F00.0	
LV B1 S I 204	0.640	F00.4F6	4.F	F.3v7	0.000	0	0	8 V B1 S I 204	F.3v7	0.000	F775.m	F00.0	
LV B1 S I 2F0	0.640	F00.3m6	4.0	F.3v7	0.000	0	0	8 V B1 S I 2F0	F.3v7	0.000	F777.7	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 Gar	8 W	8 Gar	ND	8 W	8 Gar	p _ 9	f PY	f I a9
LV B1 S I 2Fm	0.640	F0F.R4R	4.F	F.3v7	0.000	0	0	8 V B1 S I 2Fm	F.3v7	0.000	F753.7	F00.0	
LV B1 S I 2F5	0.640	F0F.Rm6	4.F	F.3v7	0.000	0	0	8 V B1 S I 2F5	F.3v7	0.000	F754.5	F00.0	
LV B1 S I 2F7	0.640	F00.476	4.F	F.3v7	0.000	0	0	8 V B1 S I 2F7	F.3v7	0.000	F77m6	F00.0	
LV B1 S I 2F6	0.640	F0F.RF7	4.F	F.3v7	0.000	0	0	8 V B1 S I 2F6	F.3v7	0.000	F754.v	F00.0	
LV B1 S I 2Fv	0.640	F00.v5v	4.0	F.3v7	0.000	0	0	8 V B1 S I 2Fv	F.3v7	0.000	F776.4	F00.0	
LV B1 S I 2R0	0.640	F0F.04F	4.0	F.3v7	0.000	0	0	8 V B1 S I 2R0	F.3v7	0.000	F77F.6	F00.0	
LV B1 S I 2RF	0.640	F00.474	3.4	F.3v7	0.000	0	0	8 V B1 S I 2RF	F.3v7	0.000	F77m6	F00.0	
LV B1 S I 2RR	0.640	F00.375	3.4	F.3v7	0.000	0	0	8 V B1 S I 2RR	F.3v7	0.000	F777.R	F00.0	
LV B1 S I 2Rm	0.640	F00.v43	4.0	F.3v7	0.000	0	0	8 V B1 S I 2Rm	F.3v7	0.000	F776.F	F00.0	
LV B1 S I 2R5	0.640	F00.7m4	3.3	F.3v7	0.000	0	0	8 V B1 S I 2R5	F.3v7	0.000	F760.F	F00.0	
LV B1 S I 2R7	0.640	F00.7FF	3.3	F.3v7	0.000	0	0	8 V B1 S I 2R7	F.3v7	0.000	F760.7	F00.0	
LV B1 S I 2R6	0.640	F0F.035	4.F	F.3v7	0.000	0	0	8 V B1 S I 2R6	F.3v7	0.000	F77F.v	F00.0	
LV B1 S I 2Rv	0.640	F0F.0F3	4.F	F.3v7	0.000	0	0	8 V B1 S I 2Rv	F.3v7	0.000	F77Rv	F00.0	
LV B1 S I 2R3	0.640	F00.34F	4.F	F.3v7	0.000	0	0	8 V B1 S I 2R3	F.3v7	0.000	F775.v	F00.0	
LV B1 S I 2R4	0.640	F0F.004	4.0	F.3v7	0.000	0	0	8 V B1 S I 2R4	F.3v7	0.000	F77R3	F00.0	
LV B1 S I 2mF	0.640	F0F.m44	4.m	F.3v7	0.000	0	0	8 V B1 S I 2mF	F.3v7	0.000	F756.4	F00.0	
LV B1 S I 2mR	0.640	F0F.R06	4.m	F.3v7	0.000	0	0	8 V B1 S I 2mR	F.3v7	0.000	F754.3	F00.0	
LV B1 S I 2mm	0.640	F0F.F03	4.m	F.3v7	0.000	0	0	8 V B1 S I 2mm	F.3v7	0.000	F77F.m	F00.0	
LV B1 S I 2m5	0.640	F0F.RR7	4.m	F.3v7	0.000	0	0	8 V B1 S I 2m5	F.3v7	0.000	F754.7	F00.0	
LV B1 S I 2m6	0.640	F0F.5v0	4.m	F.3v7	0.000	0	0	8 V B1 S I 2m6	F.3v7	0.000	F757.3	F00.0	
LV B1 S I 2mv	0.640	F0F.7F3	4.m	F.3v7	0.000	0	0	8 V B1 S I 2mv	F.3v7	0.000	F757.F	F00.0	
LV B1 S I 2m4	0.640	F0F.5m6	4.m	F.3v7	0.000	0	0	8 V B1 S I 2m4	F.3v7	0.000	F756.m	F00.0	
LV B1 S I 250	0.640	F0F.m67	4.7	F.3v7	0.000	0	0	8 V B1 S I 250	F.3v7	0.000	F75v.5	F00.0	
LV B1 S I 25F	0.640	F0F.343	4.3	F.3v7	0.000	0	0	8 V B1 S I 25F	F.3v7	0.000	F7m4.m	F00.0	
LV B1 S I 25R	0.640	F0F.354	4.3	F.3v7	0.000	0	0	8 V B1 S I 25R	F.3v7	0.000	F750.0	F00.0	
LV B1 S I 25m	0.640	F0F.346	4.3	F.3v7	0.000	0	0	8 V B1 S I 25m	F.3v7	0.000	F7m4.m	F00.0	
LV B1 S I 255	0.640	F0F.634	4.v	F.3v7	0.000	0	0	8 V B1 S I 255	F.3v7	0.000	F75R5	F00.0	
LV B1 S I 257	0.640	F0F.73m	4.v	F.3v7	0.000	0	0	8 V B1 S I 257	F.3v7	0.000	F755.F	F00.0	
LV B1 S I 256	0.640	F0F.57v	4.6	F.3v7	0.000	0	0	8 V B1 S I 256	F.3v7	0.000	F756.0	F00.0	
LV B1 S I 253	0.640	F0RR5v	4.4	F.3v7	0.000	0	0	8 V B1 S I 253	F.3v7	0.000	F7m5.0	F00.0	
LV B1 S I 254	0.640	F0RF35	4.4	F.3v7	0.000	0	0	8 V B1 S I 254	F.3v7	0.000	F7m7.0	F00.0	
LV B1 S I 270	0.640	F0RR57	4.4	F.3v7	0.000	0	0	8 V B1 S I 270	F.3v7	0.000	F7m5.F	F00.0	
8 V B1 S I 20F	m5.700	F0F.R67	v.F	0	0	0.005	0.005	8 V B1 S I 20R	F.36m	20.0v5	m0.3	244.4	
								LV B1 S I 20F	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 20R	m5.700	F0F.F3m	v.F	0	0	0.005	0.005	8 V B1 S I 20F	2F.36F	0.0Rv	m0.3	2F00.0	
								8 V B1 S I 20m	mvRm	20.F0R	6F.6	2F00.0	
								LV B1 S I 20R	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 20m	m5.700	F0F.055	v.0	0	0	0.005	0.005	8 V B1 S I 20R	2mvF3	0.06R	6F.6	2F00.0	
								8 V B1 S I 205	7.73F	20.Fmv	4R7	2F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 Gar	8 W	8 Gar	ND	8 W	8 Gar	p _ 9	f PY	f I a9
								LV B1 S I 20m	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 205	m5.700	F00.47R	v.0	0	0	0.005	0.005	8 V B1 S I 20m	27.7v6	0.04R	4R5	2F00.0	
								8 V B1 S I 207	v.5m3	20.F6v	FRmm	2F00.0	
								LV B1 S I 205	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 207	m5.700	F00.3F5	v.0	0	0	0.005	0.005	8 V B1 S I 205	2v.5R3	0.FF3	FRmm	2F00.0	
								8 V B1 S I 203	4.R40	20.F4m	F75.m	2F00.0	
								LV B1 S I 207	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 206	m5.700	F00.300	6.4	0	0	0.005	0.005	8 V B1 S I 20v	F.36R	20.0v7	m0.4	244.4	
								LV B1 S I 206	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 20v	m5.700	F00.v54	6.4	0	0	0.005	0.005	8 V B1 S I 206	2F.36R	0.056	m0.4	2F00.0	
								8 V B1 S I 2F6	2F.360	0.0F0	m0.4	F00.0	
								8 V B1 S I 2F7	7.735	20.FmF	4R3	2F00.0	
								LV B1 S I 20v	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 203	m5.700	F00.vFR	6.4	0	0	0.005	0.005	8 V B1 S I 207	24.R3F	0.F0R	F75.R	F00.0	
								8 V B1 S I 204	FF.F5m	20.Fvv	F37.R	2F00.0	
								LV B1 S I 203	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 204	m5.700	F00.76R	6.4	0	0	0.005	0.005	8 V B1 S I 203	2FF.FRv	0.0v0	F37.R	F00.0	
								8 V B1 S I 2F0	FR434	20.F57	RF6.R	F00.0	
								LV B1 S I 204	2F.36v	0.0vR	mF.F	244.4	
8 V B1 S I 2F0	m5.700	F00.53m	6.3	0	0	0.005	0.005	8 V B1 S I 204	2FR4v4	0.067	RF6.R	F00.0	
								8 V B1 S I 2R7	F5.35F	20.F50	R5v.R	F00.0	
								LV B1 S I 2F0	2F.36v	0.0vR	mF.F	244.4	
8 V B1 S I 2Fm	m5.700	F00.4m4	6.4	0	0	0.005	0.005	8 V B1 S I 2F5	F.36R	20.0v7	m0.4	244.4	
								LV B1 S I 2Fm	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 2F5	m5.700	F00.33m	6.4	0	0	0.005	0.005	8 V B1 S I 2Fm	2F.36F	0.05m	m0.4	2F00.0	
								8 V B1 S I 2F7	mvR5	20.FF3	6F.3	2F00.0	
								LV B1 S I 2F5	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 2F7	m5.700	F00.60m	6.4	0	0	0.005	0.005	8 V B1 S I 20v	27.7v6	0.060	4R3	F00.0	
								8 V B1 S I 2F5	2mvF5	0.0m4	6F.3	F00.0	
								8 V B1 S I 2Fv	FF.F7R	20.Fv5	F37.7	2F00.0	
								LV B1 S I 2F7	2F.36v	0.0vR	mF.F	244.4	
8 V B1 S I 2F6	m5.700	F00.36m	6.4	0	0	0.005	0.005	8 V B1 S I 20v	F.36R	20.0v7	m0.4	244.4	
								LV B1 S I 2F6	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 2Fv	m5.700	F00.m45	6.3	0	0	0.005	0.005	JB2R/F	FR44F	20.F0R	RF6.6	F00.0	
								8 V B1 S I 2F7	2FF.FR4	0.0R6	F37.7	F00.0	
								LV B1 S I 2Fv	2F.36v	0.0vR	mF.F	244.4	
8 V B1 S I 2R0	m5.700	F00.vm3	6.3	0	0	0.005	0.005	8 V B1 S I 2RF	F.36R	20.0v7	mF.0	244.4	
								LV B1 S I 2R0	2F.36v	0.0vF	mF.0	244.4	
8 V B1 S I 2RF	m5.700	F00.606	6.3	0	0	0.005	0.005	8 V B1 S I 2R0	2F.360	0.000	m0.4	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 Gar	8 W	8 Gar	ND	8 W	8 Gar	p _ 9	f PY	f I a9
								8 V B1 S I 2RR	mvRR	20.0v7	6F.4	2F00.0	
								LV B1 S I 2RF	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2RR	m5.700	F00.700	6.v	0	0	0.005	0.005	JB2R/F	v.55F	20.F03	FRm4	2F00.0	
								8 V B1 S I 2RF	2mvF4	0.056	6F.4	F00.0	
								8 V B1 S I 2R4	2F.360	20.0Fm	nF.0	F00.0	
								LV B1 S I 2RR	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2Rm	m5.700	F00.555	6.3	0	0	0.005	0.005	34Ymp	R0.506	20.0FF	m50.0	F00.0	
								8 V B1 S I 2R3	2F3.755	20.067	m04.0	F00.0	
								LV B1 S I 2Rm	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2R5	m5.700	F00.F37	6.6	0	0	0.005	0.005	8 V B1 S I 2R7	F.36R	20.0v6	nF.F	244.4	
								LV B1 S I 2R5	2F.36v	0.0vR	nF.R	244.4	
8 V B1 S I 2R7	m5.700	F00.F76	6.6	0	0	0.005	0.005	34YFp	F3.7F3	0.F6v	m04.5	F00.0	
								8 V B1 S I 2F0	2F5.v4m	20.Rv6	R5v.R	F00.0	
								8 V B1 S I 2R5	2F.36R	0.0mm	nF.F	2F00.0	
								LV B1 S I 2R7	2F.36v	0.0vR	nF.R	244.4	
8 V B1 S I 2R6	m5.700	F00.vnF	6.4	0	0	0.005	0.005	8 V B1 S I 2Rv	F.36R	20.0v7	nF.0	244.4	
								LV B1 S I 2R6	2F.36v	0.0vF	nF.0	244.4	
8 V B1 S I 2Rv	m5.700	F00.665	6.4	0	0	0.005	0.005	8 V B1 S I 2R6	2F.36F	0.0mv	n0.4	2F00.0	
								8 V B1 S I 2R3	mvR5	20.FFm	6F.4	2F00.0	
								LV B1 S I 2Rv	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2R3	m5.700	F00.7m3	6.4	0	0	0.005	0.005	8 V B1 S I 2Rm	F3.76F	20.060	m04.0	F00.0	
								8 V B1 S I 2Rv	2mvF4	0.0vv	6F.4	2F00.0	
								8 V B1 S I 2mm	2FR430	20.04m	RF6.F	F00.0	
								LV B1 S I 2R3	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2R4	m5.700	F00.676	6.3	0	0	0.005	0.005	8 V B1 S I 2RR	F.36R	20.0v7	nF.0	244.4	
								LV B1 S I 2R4	2F.36v	0.0vR	nF.F	244.4	
8 V B1 S I 2mF	m5.700	F0F.05v	v.F	0	0	0.005	0.005	8 V B1 S I 2mR	F.36R	20.0v7	n0.4	244.4	
								LV B1 S I 2mF	2F.36v	0.0vF	n0.4	244.4	
8 V B1 S I 2mR	m5.700	F00.37m	v.F	0	0	0.005	0.005	8 V B1 S I 2mF	2F.374	20.0n6	n0.4	F00.0	
								8 V B1 S I 2mm	mvRF	20.0n4	6F.3	F00.0	
								LV B1 S I 2mR	2F.36v	0.0vF	nF.0	244.4	
8 V B1 S I 2mm	m5.700	F00.v77	v.F	0	0	0.005	0.005	8 V B1 S I 2R3	Fm003	20.FR6	RF6.F	F00.0	
								8 V B1 S I 2mR	2mvF3	0.0FF	6F.3	F00.0	
								8 V B1 S I 2m5	2v.5Rv	0.050	FRm5	F00.0	
								LV B1 S I 2mm	2F.36v	0.0vF	nF.0	244.4	
8 V B1 S I 2m5	m5.700	F00.3vR	v.F	0	0	0.005	0.005	8 V B1 S I 2mm	v.5n6	20.03F	FRm5	F00.0	
								8 V B1 S I 2m6	2mvF7	0.07R	6F.6	F00.0	
								8 V B1 S I 2m4	2F.374	20.056	n0.3	F00.0	
								LV B1 S I 2m5	2F.36v	0.0vF	nF.0	244.4	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	MV	f 8 ag.	p ng.	8 W	8 Gar	8 W	8 Gar	ND	8 W	8 Gar	p _ 9	f PY	f I a9
8 V B1 S I 2m6	m5.700	F0F.FFv	v.F	0	0	0.005	0.005	8 V B1 S I 2m5	mvR5	20.FRF	6F.v	244.4	
								8 V B1 S I 2mv	2F.36R	0.05v	m0.3	2F00.0	
								LV B1 S I 2m6	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 2mv	m5.700	F0F.F66	v.F	0	0	0.005	0.005	8 V B1 S I 2m6	F.36R	20.0v7	m0.3	244.4	
								LV B1 S I 2mv	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 2m4	m5.700	F0F.03m	v.F	0	0	0.005	0.005	8 V B1 S I 2m5	F.36R	20.0v7	m0.4	244.4	
								LV B1 S I 2m4	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 250	m5.700	F0F.0FR	v.m	0	0	0.005	0.005	34Y5p	F3.7m3	0.075	m0v.F	F00.0	
								8 V B1 S I 256	2F6.6v7	20.FR4	Rv6.m	F00.0	
								LV B1 S I 250	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 25F	m5.700	F0F.756	v.6	0	0	0.005	0.005	JB25/F	F.36m	20.0v5	m0.v	244.4	
								LV B1 S I 25F	2F.36v	0.0v0	m0.3	244.4	
8 V B1 S I 25R	m5.700	F0F.54v	v.6	0	0	0.005	0.005	JB25/F	v.5R4	20.075	FRR7	F00.0	
								8 V B1 S I 254	27.76v	20.0R0	4F.3	F00.0	
								LV B1 S I 25R	2F.36v	0.0v0	m0.3	244.4	
8 V B1 S I 25m	m5.700	F0F.757	v.6	0	0	0.005	0.005	JB25/F	F.36m	20.0v5	m0.v	244.4	
								LV B1 S I 25m	2F.36v	0.0v0	m0.3	244.4	
8 V B1 S I 255	m5.700	F0F.mmv	v.6	0	0	0.005	0.005	JB25/F	2FF.Fm7	0.0Rv	F3m4	F00.0	
								8 V B1 S I 257	FR44v	20.F0R	RF5.6	F00.0	
								LV B1 S I 255	2F.36v	0.0vF	m0.3	244.4	
8 V B1 S I 257	m5.700	F0F.RmF	v.7	0	0	0.005	0.005	8 V B1 S I 255	2FR435	20.003	RF5.6	F00.0	
								8 V B1 S I 256	F5.356	20.066	R57.5	F00.0	
								LV B1 S I 257	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 256	m5.700	F0F.F07	v.5	0	0	0.005	0.005	8 V B1 S I 250	F6.640	0.0R6	Rv6.m	F00.0	
								8 V B1 S I 257	2F5.3R3	20.F0F	R57.5	F00.0	
								LV B1 S I 256	2F.36v	0.0vF	m0.4	244.4	
8 V B1 S I 253	m5.700	F0F.346	v.v	0	0	0.005	0.005	8 V B1 S I 254	F.36m	20.0v5	m0.6	244.4	
								LV B1 S I 253	2F.36v	0.0v0	m0.v	244.4	
8 V B1 S I 254	m5.700	F0F.3mm	v.v	0	0	0.005	0.005	8 V B1 S I 25R	7.737	20.F53	4F.3	2F00.0	
								8 V B1 S I 253	2F.36F	0.0m6	m0.6	2F00.0	
								8 V B1 S I 270	2F.36F	0.0m3	m0.6	2F00.0	
								LV B1 S I 254	2F.36v	0.0v0	m0.v	244.4	
8 V B1 S I 270	m5.700	F0F.345	v.v	0	0	0.005	0.005	8 V B1 S I 254	F.36m	20.0v5	m0.6	244.4	
								LV B1 S I 270	2F.36v	0.0v0	m0.v	244.4	
* PON	Fm3.000	F00.000	0.0	2vv.R70	6.m60	0	0	34I Fp	2vv.R70	6.m60	mR5.m	244.v	
8 PI ~m	Fm300	44.465	v.0	0	0	0	0	HV B1 S 8 PI	0.000	0.000	0.0	0.0	
								& 34I FB					

* Nidicates a Goltage regulated bus (Goltage controlled or swing ty9e _ achine connected to it)

\# Nidicates a bus with a load _ is_ atch oA_ ore than 0.F 8 Vp

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
51- N	I BT6DD	NDDTD6N	WW	D	D	D	D	3 V UGS _%6	%N5TB6W	%5TI 5	I I 5Tk	1NN	
								51_NU	N5TB6W	5TI 5	I I 5Tk	1NN	
51- f .	I BT6DD	NDDTD6N	WW	D	D	D	D	JU%6/N	%6DTI D5	%1TDWB	I kf TD	1NT	
								51_NU	f DTI D5	1TDWB	I kf TD	1NT	
51- I .	I BT6DD	NDDTD6N	WW	D	D	D	D	3 V UGS _%6I	%6DTf kk	%1Tf 6N	I kf T5	1ND	
								51_NU	f DTf kk	1Tf 6N	I kf T5	1ND	
51- B.	I BT6DD	NDDTD6N	WW	D	D	D	D	3 V UGS _%BD	%N5TI DI	%1Tf 5I	I BI T	51Tf	
								51_NU	N5TI DI	1Tf 5I	I BI T	51Tf	
51_N	N 5TDDD	NDDTDDk	DD	D	D	D	D	POv	kkTDI f	f 6TI 16	I I 1Tf	16TD	
								HV UGS 3 P_	%kkTDI f	%f 6TI 16	I I 1Tf	16TD	
51_NU	I BT6DD	NDDTD6N	WW	D	D	D	D	51- B.	%N5TI DI	%1Tf 5I	I BI T	51Tf	
								51- I .	%6DTf kk	%1Tf 6N	I kf T5	1ND	
								51- f .	%6DTI D5	%1TDWB	I kf TD	1NT	
								51- N	%N5TB6W	%5TI 5	I I 5Tk	1NN	
								3 P_~I	kkTI BB	I 6TI I W	NBf W5	1DTk	
								& HV UGS 3 P_					
HV UGS 3 P_	N 5TDDD	NDDTDDk	DD	D	D	DD6B	DNBk	51_N	kkTDI f	f 6TI 16	I I 1Tf	16TD	
								51_NU	%kkTD56	%f 6TB5f	I I 1TW	1BTI	6TDDD
								& 3 P_~I					
JU%6/N	I BT6DD	NDDT6B5	W5	D	D	D	D	3 V UGS _%k	%NfTI WD	%6T61W	f 16TD	1N5	
								3 V UGS _%6f	%kTBNW	%5TNW	N BTf	1f TD	
								51- f .	f DTI kk	5Tk61	I WTN	1NI	
JU%B/N	I BT6DD	NDfTBkW	kT5	D	D	D	D	3 V UGS _%BN	%N5WD	%DTk6k	I f T5	1f TW	
								3 V UGS _%Bf	%kTBf f	%5TN6B	N NTk	1f TD	
								3 V UGS _%BI	%N5WD	%DTk6W	I f T5	1f TW	
								3 V UGS _%BB	NNTNBI	BTWW5	NI kTI	1f Tf	
LV UGS _%DN	DTWD	NDI Tk5N	1TD	N5k6	D5ND	D	D	3 V UGS _%DN	N5k6	D5ND	NWBWB	1N5	
LV UGS _%Df	DTWD	NDI TWB	1TD	N5k6	D5ND	D	D	3 V UGS _%Df	N5k6	D5ND	NWBkT5	1N5	
LV UGS _%DI	DTWD	NDI T6B6	1TD	N5k6	D5ND	D	D	3 V UGS _%DI	N5k6	D5ND	NW6DTf	1N5	
LV UGS _%DB	DTWD	NDI TBI 5	1TD	N5k6	D5ND	D	D	3 V UGS _%DB	N5k6	D5ND	NW6NI	1N5	
LV UGS _%D6	DTWD	NDI Tk1	1TN	N5k6	D5ND	D	D	3 V UGS _%D6	N5k6	D5ND	NW6BTB	1N5	
LV UGS _%DW	DTWD	NDI TNI B	1TD	N5k6	D5ND	D	D	3 V UGS _%DW	N5k6	D5ND	NW66T5	1N5	
LV UGS _%Dk	DTWD	NDI TN 1	1TD	N5k6	D5ND	D	D	3 V UGS _%Dk	N5k6	D5ND	NW6WTk	1N5	
LV UGS _%D5	DTWD	NDI TNBB	1TD	N5k6	D5ND	D	D	3 V UGS _%D5	N5k6	D5ND	NW6WW	1N5	
LV UGS _%DI	DTWD	NDfTI B6	1TD	N5k6	D5ND	D	D	3 V UGS _%DI	N5k6	D5ND	NW61T5	1N5	
LV UGS _%ND	DTWD	NDfT5f 1	1TD	N5k6	D5ND	D	D	3 V UGS _%ND	N5k6	D5ND	NWWNTk	1N5	

ProRct:	F m OH m vF j	ETAP	Page:	f
Location:	Paulding, OH	NWDIDC	j ate:	ND%D6%6DNk
Contract:			SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case: NPG 16L. 0	AeMsion:	k6p 0 EF
- ilena2 e:	F m 7OH		Con8gT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
LV UGS _%NI	DIWD	NDITID	5TI	N5k6	D5ND	[	[	3 V UGS _%NI	N5k6	D5ND	NW6ITW	1N5	
LV UGS _%NB	DIWD	NDITkD	5TI	N5k6	D5ND	[	[	3 V UGS _%NB	N5k6	D5ND	NW6BTW	1N5	
LV UGS _%N6	DIWD	NDfTIkN	1TD	N5k6	D5ND	[	[	3 V UGS _%N6	N5k6	D5ND	NW61TB	1N5	
LV UGS _%NW	DIWD	NDITfWN	1TD	N5k6	D5ND	[	[	3 V UGS _%NW	N5k6	D5ND	NW6BTk	1N5	
LV UGS _%Nk	DIWD	NDfTWIf	5TI	N5k6	D5ND	[	[	3 V UGS _%Nk	N5k6	D5ND	NWWfTI	1N5	
LV UGS _%fD	DIWD	NDITDI1	5TI	N5k6	D5ND	[	[	3 V UGS _%fD	N5k6	D5ND	NW65TI	1N5	
LV UGS _%fN	DIWD	NDfT515	5TI	N5k6	D5ND	[	[	3 V UGS _%fN	N5k6	D5ND	NWWDTW	1N5	
LV UGS _%ff	DIWD	NDfTk56	5TI	N5k6	D5ND	[	[	3 V UGS _%ff	N5k6	D5ND	NWWfTB	1N5	
LV UGS _%fI	DIWD	NDfTk11	1TD	N5k6	D5ND	[	[	3 V UGS _%fI	N5k6	D5ND	NWWfTN	1N5	
LV UGS _%fB	DIWD	NDfTIB6	5T5	N5k6	D5ND	[	[	3 V UGS _%fB	N5k6	D5ND	NWWIT6	1N5	
LV UGS _%f6	DIWD	NDfTINf	5T5	N5k6	D5ND	[	[	3 V UGS _%f6	N5k6	D5ND	NWkDTN	1N5	
LV UGS _%fW	DIWD	NDITNW6	1TD	N5k6	D5ND	[	[	3 V UGS _%fW	N5k6	D5ND	NW6WTf	1N5	
LV UGS _%fk	DIWD	NDITDI6	1TD	N5k6	D5ND	[	[	3 V UGS _%fk	N5k6	D5ND	NW6kTB	1N5	
LV UGS _%f5	DIWD	NDfTI61	1TN	N5k6	D5ND	[	[	3 V UGS _%f5	N5k6	D5ND	NW61TW	1N5	
LV UGS _%f1	DIWD	NDfTI6N	5TI	N5k6	D5ND	[	[	3 V UGS _%f1	N5k6	D5ND	NW61Tk	1N5	
LV UGS _%IN	DIWD	NDIT65W	1TN	N5k6	D5ND	[	[	3 V UGS _%IN	N5k6	D5ND	NWB1T6	1N5	
LV UGS _%If	DIWD	NDITk1	1TN	N5k6	D5ND	[	[	3 V UGS _%If	N5k6	D5ND	NW6fT6	1N5	
LV UGS _%II	DIWD	NDITk6	1TN	N5k6	D5ND	[	[	3 V UGS _%II	N5k6	D5ND	NW6BT6	1N5	
LV UGS _%IB	DIWD	NDITBDI	1TN	N5k6	D5ND	[	[	3 V UGS _%IB	N5k6	D5ND	NW6fTI	1N5	
LV UGS _%IW	DIWD	NDITWkN	1TN	N5k6	D5ND	[	[	3 V UGS _%IW	N5k6	D5ND	NWB5Tf	1N5	
LV UGS _%Ik	DIWD	NDITkfI	1TN	N5k6	D5ND	[	[	3 V UGS _%Ik	N5k6	D5ND	NWBkTI	1N5	
LV UGS _%I1	DIWD	NDITW6	1TN	N5k6	D5ND	[	[	3 V UGS _%I1	N5k6	D5ND	NWB5Tk	1N5	
LV UGS _%BD	DIWD	NDITkIN	1TI	N5k6	D5ND	[	[	3 V UGS _%BD	N5k6	D5ND	NWBkTf	1N5	
LV UGS _%BN	DIWD	NDBTB1B	1T6	N5k6	D5ND	[	[	3 V UGS _%BN	N5k6	D5ND	NWf6Tf	1N5	
LV UGS _%Bf	DIWD	NDBTBBf	1T6	N5k6	D5ND	[	[	3 V UGS _%Bf	N5k6	D5ND	NWfWD	1N5	
LV UGS _%BI	DIWD	NDBTBII	1T6	N5k6	D5ND	[	[	3 V UGS _%BI	N5k6	D5ND	NWf6Tf	1N5	
LV UGS _%BB	DIWD	NDBTfID	1T6	N5k6	D5ND	[	[	3 V UGS _%BB	N5k6	D5ND	NWf1TI	1N5	
LV UGS _%B6	DIWD	NDBTDkk	1TB	N5k6	D5ND	[	[	3 V UGS _%B6	N5k6	D5ND	NWBNTk	1N5	
LV UGS _%BW	DIWD	NDIT5kk	1TB	N5k6	D5ND	[	[	3 V UGS _%BW	N5k6	D5ND	NWBBTI	1N5	
LV UGS _%B5	DIWD	NDBT51B	1T6	N5k6	D5ND	[	[	3 V UGS _%B5	N5k6	D5ND	NWf1TD	1N5	
LV UGS _%B1	DIWD	NDBT5fk	1T6	N5k6	D5ND	[	[	3 V UGS _%B1	N5k6	D5ND	NWfDTD	1N5	
LV UGS _%6D	DIWD	NDBT51f	1T6	N5k6	D5ND	[	[	3 V UGS _%6D	N5k6	D5ND	NWf1TD	1N5	
3 V UGS _%DN	IBT6DD	NDNT5DW	kTD	[	D	DIDDB	DIDDB	3 V UGS _%Df	N5TWN	DTkfW	IfT6	1ITf	
								LV UGS _%DN	%N5TWW	%DTkID	IfTI	1ITN	
3 V UGS _%Df	IBT6DD	NDNTkNk	kTD	[	D	DIDDB	DIDDB	3 V UGS _%DN	%N5TWD	%DTkkB	IITN	1fTI	
								3 V UGS _%DI	ITkfN	NTBI1	WWTD	1fT6	
								LV UGS _%Df	%N5TWW	%DTkf1	IITD	1ITN	
3 V UGS _%DI	IBT6DD	NDNT6WW	kTD	[	D	DIDDB	DIDDB	3 V UGS _%Df	%ITkN6	%NT6I1	WWTI	1fTB	
								3 V UGS _%DB	6T6kW	fTTWB	11Tf	1fTk	

Project:	F m OH m vF j		ETAP		Page:	I
Location:	Paulding, OH		NWDIDC		j ate:	ND%b6%bDNk
Contract:					SF :	m ES_m OOj I
Engineer:	Josh Venden		Study Case:	NPG 16L. 0	AeMsion:	k6p 0 EF
- ilena2 e:	F m 7OH				Con8igT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								LV UGS _%bI	%N5WW	%DIkf 1	I I TD	1I TN	
3 V UGS _%bB	I B%DD	NDNB6k	kTD	Γ	D	DIDDB	DIDDB	3 V UGS _%bI	%6T6kN	%fT ND	1 1 T6	1f TB	
								3 V UGS _%b6	kTBI f	I TDI 6	NI f TB	1f TW	
								LV UGS _%bB	%N5WW	%DIkf 1	I I TD	1I TN	
3 V UGS _%b6	I B%DD	NDNf 16	kTD	Γ	D	DIDDB	DIDDB	3 V UGS _%bB	%kTBfD	%bTD5B	NI f Tk	1f TI	
								3 V UGS _%b5	1Tf 5N	I T5DI	NW6Tk	1f T6	
								LV UGS _%b6	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%bW	I B%DD	NDNf D5	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%bk	N5WN	DIkf 6	I I TD	1I Tf	
								LV UGS _%bW	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%bk	I B%DD	NDNN6f	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%bW	%N5WD	%DIk66	I I Tf	1f Tk	
								3 V UGS _%NW	%N561	%DIk1N	I I TB	1f TD	
								3 V UGS _%N6	6T65D	f TfkD	1 1 Tk	1f TW	
								LV UGS _%bk	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%b5	I B%DD	NDNN65	kTD	Γ	D	DIDDB	DIDDB	3 V UGS _%b6	%bTfkD	%bT511	NWWB	1f Tf	
								3 V UGS _%bI	NNNf	BTWB	NI 1TB	1f TI	
								LV UGS _%b5	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%bI	I B%DD	NDII66	kTD	Γ	D	DIDDB	DIDDB	3 V UGS _%b5	%NNNf	%BkI D	f DDf	1f TD	
								3 V UGS _%ND	NTIkB	6TB6B	f I I TI	1f Tf	
								LV UGS _%bI	%N5W6	%DIkf 5	I I Tf	1I Tf	
3 V UGS _%ND	I B%DD	NDD5I k	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%bI	%NTIWN	%6T6I B	f I I TI	1f TD	
								3 V UGS _%66	NB5f I	WTf 65	f WkTD	1f TN	
								LV UGS _%ND	%N5W6	%DIkf 5	I I Tf	1I Tf	
3 V UGS _%NI	I B%DD	NDNI Bk	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%NB	N5WN	DIkf 6	I I TD	1I Tf	
								LV UGS _%NI	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%NB	I B%DD	NDNf 5W	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%NI	%N5WD	%DIk65	I I Tf	1f TW	
								3 V UGS _%N6	I Tkf N	NB5I	WWf	1f TI	
								LV UGS _%NB	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%N6	I B%DD	NDII 5N	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%bk	%6T6kN	%fT BN	NDDN	1f Tf	
								3 V UGS _%NB	%bTkDI	%N5WN	WWk	1f Tf	
								3 V UGS _%Nk	NNNBf	BTWf W	NI 1TI	1f TB	
								LV UGS _%N6	%N5W6	%DIkf 5	I I Tf	1I Tf	
3 V UGS _%NW	I B%DD	NDNf kW	WII	Γ	D	DIDDB	DIDDB	3 V UGS _%bk	N5WN	DIkf 6	I I TD	1I Tf	
								LV UGS _%NW	%N5WW	%DIkf 1	I I TN	1I TN	
3 V UGS _%Nk	I B%DD	NDDWI 5	WII	Γ	D	DIDDB	DIDDB	JU%6/N	NTIkW	6TBI k	f I BTf	1f TN	
								3 V UGS _%N6	%NNN6	%BkkI	f DND	1NII	
								LV UGS _%Nk	%N5W6	%DIkf 5	I I Tf	1I Tf	
3 V UGS _%6D	I B%DD	NDNI D6N	W5	Γ	D	DIDDB	DIDDB	3 V UGS _%6N	N5WN	DIkf 6	I I TN	1I Tf	
								LV UGS _%6D	%N5WW	%DIkf 5	I I Tf	1I Tf	
3 V UGS _%6N	I B%DD	NDDII Dk	W5	Γ	D	DIDDB	DIDDB	3 V UGS _%6D	%N565	%D5DD	I I TW	1N5	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								3 V UGS _%f	I TkfD	Nbf6	WWk	1fT6	
								LV UGS _%N	%NBW6	%DIkf5	IIT	1IT	
3 V UGS _%f	IBT6DD	NDDk1f	W5	[	D	DIDDB	DIDDB	JU%6/N	kTBIB	ITDIf	NITk	1fTI	
								3 V UGS _%N	%bTkN6	%N66B	WWI	1fTI	
								3 V UGS _%1	%NB65	%DBN	IITk	1NTW	
								LV UGS _%f	%NBW6	%DIkf5	IIT	1IT	
3 V UGS _%I	IBT6DD	NDD5Dk	WI	[	D	DIDDB	DIDDB	51- I .	fDI5D	5Tk5k	IW5TB	1N5	
								3 V UGS _%5	%N5T6NI	%5TDW	II6TI	1Nk	
								LV UGS _%I	%NBW6	%DIkf5	IIT	1IT	
3 V UGS _%B	IBT6DD	NDDIBB	Wk	[	D	DIDDB	DIDDB	3 V UGS _%6	NBWN	DIkfB	IITI	1IT	
								LV UGS _%B	%NBW6	%DIkfk	IITB	1IT	
3 V UGS _%6	IBT6DD	NDDIND	Wk	[	D	DIDDB	DIDDB	51- N	N5TB55	5TN6B	IIkTN	1N6	
								3 V UGS _%ND	%NBTkWW	%WWWB	fkDI	1NN	
								3 V UGS _%B	%NBWN	%DIkWW	IITW	1fT6	
								LV UGS _%6	%NBW6	%DIkfk	IITB	1IT	
3 V UGS _%W	IBT6DD	NDNNk1	kTD	[	D	DIDDB	DIDDB	3 V UGS _%k	NBWN	DIkf6	IITD	1IT	
								LV UGS _%W	%NBWW	%DIkf1	IITN	1ITN	
3 V UGS _%k	IBT6DD	NDNNDk	kTD	[	D	DIDDB	DIDDB	3 V UGS _%W	%NBWD	%DIkW	IITI	1fT6	
								3 V UGS _%5	I TkfN	NB55	WWI	1fTI	
								LV UGS _%k	%NBWW	%DIkf5	IITN	1ITN	
3 V UGS _%5	IBT6DD	NDDIWI	kTD	[	D	DIDDB	DIDDB	3 V UGS _%I	N5T6I1	kTIBf	IIBTI	1NI	
								3 V UGS _%k	%bTkNW	%N6fI	WWW	1fT6	
								3 V UGS _%I	%NfTIW	%6TW6	fIBTk	1NTW	
								LV UGS _%5	%NBW6	%DIkf5	IIT	1IT	
3 V UGS _%1	IBT6DD	NDDIWN	W5	[	D	DIDDB	DIDDB	3 V UGS _%f	NBWN	DIkfB	IITN	1IT	
								LV UGS _%1	%NBW6	%DIkf5	IIT	1IT	
3 V UGS _%N	IBT6DD	NDNWD5	kTN	[	D	DIDDB	DIDDB	3 V UGS _%f	NBWN	DIkf6	IfTI	1IT	
								LV UGS _%N	%NBWW	%DIkf1	IITD	1ITN	
3 V UGS _%f	IBT6DD	NDNI1k	kTN	[	D	DIDDB	DIDDB	3 V UGS _%N	%N66k	%DBI5	IITW	1NT	
								3 V UGS _%I	I TkNI	N6W	WWW	1fT	
								LV UGS _%f	%NBWW	%DIkf1	IITN	1ITN	
3 V UGS _%I	IBT6DD	NDNf1N	kTN	[	D	DIDDB	DIDDB	3 V UGS _%5	NfTI16	6TBk5	fIITD	1fTN	
								3 V UGS _%f	%bTkNB	%N61D	WW5	1NI	
								3 V UGS _%B	%kTBNI	%bTNW	NIIT	1fTD	
								LV UGS _%I	%NBWW	%DIkf1	IITN	1ITN	
3 V UGS _%B	IBT6DD	NDNBf5	kTN	[	D	DIDDB	DIDDB	3 V UGS _%I	kTBf1	I TNf f	NITD	1fT	
								3 V UGS _%W	%bTkNN	%N6BI	WWB	1fTI	
								3 V UGS _%1	%N66k	%DBB5	IITk	1ND	
								LV UGS _%B	%NBWW	%DIkf1	IITD	1ITN	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
3 V UGS _%W	I B6DD	NDNWB	kN	D	D	DDDB	DDDB	3 V UGS _%B	I kff	NBk1	W6I	1fI	
								3 V UGS _%k	%N5WD	%Dk6B	I I D	1fk	
								LV UGS _%W	%N5WW	%Dkf 1	I I D	1I N	
3 V UGS _%k	I B6DD	NDNkBk	kN	D	D	DDDB	DDDB	3 V UGS _%W	N5WN	DkfW	I fI	1I f	
								LV UGS _%k	%N5WW	%Dkf 1	I fI	1I N	
3 V UGS _%1	I B6DD	NDNW6k	kN	D	D	DDDB	DDDB	3 V UGS _%B	N5WN	DkfW	I fI	1I f	
								LV UGS _%1	%N5WW	%Dkf 1	I I D	1I N	
3 V UGS _%BD	I B6DD	NDNk66	kI	D	D	DDDB	DDDB	51- B.	N5 6NI	5 DWB	I I f N	1Nk	
								3 V UGS _%BW	%NWW6N	%kI I 1	f 11I	1N6	
								LV UGS _%BD	%N5WW	%Dkf 1	I fI	1I N	
3 V UGS _%BN	I B6DD	NDf 6I f	k6	D	D	DDDB	DDDB	JU%B/N	N5WN	Dkfk	I f W	1I f	
								LV UGS _%BN	%N5WW	%DkI N	I fk	1I N	
3 V UGS _%Bf	I B6DD	NDf Bk1	k6	D	D	DDDB	DDDB	JU%B/N	kBff	I N6I	N Nk	1fD	
								3 V UGS _%B1	%6 6WN	%6 Bfk	11N	1Nk	
								LV UGS _%Bf	%N5WW	%DkI N	I fk	1I N	
3 V UGS _%BI	I B6DD	NDf 6I D	k6	D	D	DDDB	DDDB	JU%B/N	N5WN	Dkfk	I f W	1I f	
								LV UGS _%BI	%N5WW	%DkI N	I fk	1I N	
3 V UGS _%BB	I B6DD	NDf f W	k6	D	D	DDDB	DDDB	JU%B/N	%NNf	%Bk5I	N 5 N	1NI	
								3 V UGS _%B6	N I 5B	6 6ND	f I D6	1fN	
								LV UGS _%BB	%N5WW	%DkI D	I f6	1I N	
3 V UGS _%B6	I B6DD	NDf NDk	kB	D	D	DDDB	DDDB	3 V UGS _%BB	%f I W6	%6 WNI	f I NW	1N6	
								3 V UGS _%BW	NB6f 1	WI BW	f WBB	1NI	
								LV UGS _%B6	%N5WW	%DkI D	I f6	1I N	
3 V UGS _%BW	I B6DD	NDNI DI	kB	D	D	DDDB	DDDB	3 V UGS _%BD	NWWWI	kI I k	f 15B	1Nk	
								3 V UGS _%B6	%NB6D5	%W6NN	f W6W	1N6	
								LV UGS _%BW	%N5WW	%DkI D	I fI	1I N	
3 V UGS _%B5	I B6DD	NDf I I 5	k6	D	D	DDDB	DDDB	3 V UGS _%B1	N5WN	Dkfk	I f6	1I N	
								LV UGS _%B5	%N5WW	%DkI N	I f W	1I N	
3 V UGS _%B1	I B6DD	NDf 6kD	k6	D	D	DDDB	DDDB	3 V UGS _%Bf	6 65f	f 6k	1kI	1fk	
								3 V UGS _%B5	%N5WD	%DkW6	I fk	1f6	
								3 V UGS _%D	%N5WD	%DkWB	I fk	1f6	
								LV UGS _%B1	%N5WW	%DkI N	I f W	1I N	
3 V UGS _%D	I B6DD	NDf I I W	k6	D	D	DDDB	DDDB	3 V UGS _%B1	N5WN	Dkfk	I f6	1I N	
								LV UGS _%D	%N5WW	%DkI N	I f W	1I N	
* POv	N 5DDD	NDDDDD	DD	%kDI D	%6I f 5	D	D	51_N	%kDI D	%6I f 5	I I 1I	16D	
3 P_~I	N 5DD	NDDBWk	kI	D	D	D	D	HV UGS 3 P_	DDDD	DDDD	DD	DD	
								& 51_NU					

* vndicates a Mltage regulated bus (Mltage controlled or swing ty4e 2 achine connected to it)

vndicates a bus with a load 2 is2 atch o82 ore than DN3 V.

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
5N- 06	I BTGDD	NN50G	Wk	Γ	D	Γ	Γ	3 V U1 S _%G	%05TBGG	%5Tf 5	I I NG	N0TD	
								5N_0U	05TBGG	5Tf 5	I I NG	N0TD	
5N- f6	I BTGDD	NN50G	Wk	Γ	D	Γ	Γ	JU%/0	%DTIDk	%NDGB	I kf T5	N0T	
								5N_0U	f DTIDk	NDGB	I kf T5	N0T	
5N- I6	I BTGDD	NN50G	Wk	Γ	D	Γ	Γ	3 V U1 S _%I	%DTf kG	%NTf I N	I kI TW	N0TD	
								5N_0U	f DTf kG	NTf I N	I kI TW	N0TD	
5N- B6	I BTGDD	NN50G	Wk	Γ	D	Γ	Γ	3 V U1 S _%BD	%05TI Df	%NTf WW	I BI TN	5NTf	
								5N_0U	05TI Df	NTf WW	I BI TN	5NTf	
5N_06	0I 5TDDD	NGTDDk	DTD	Γ	D	Γ	Γ	POv	kkTDI 0	f GTf Gk	I GkTD	NGTD	
								HV U1 S 3 P_	%kkTDI 0	%GTf Gk	I GkTD	NGTD	
5N_0U	I BTGDD	NN50G	Wk	Γ	D	Γ	Γ	5N- B6	%05TI Df	%NTf WW	I BI TN	5NTf	
								5N- I6	%DTf kG	%NTf I N	I kI TW	N0TD	
								5N- f6	%DTIDk	%NDGB	I kf T5	N0T	
								5N- 06	%05TBGG	%5Tf 5	I I NG	N0TD	
								3 P_~I	kkTI BD	I G55k	0Bf NG	NDk	
								& HV U1 S 3 P_					
HV U1 S 3 P_	0I 5TDDD	NGTDDk	DTD	Γ	D	DTDB5	DTDI I	5N_06	kkTDI 0	f GTf Gk	I GkTD	NGTD	
								5N_0U	%kkTD5D	%GTI ND	I GkTB	NGTD	
								& 3 P_~I					
JU%/0	I BTGDD	0DDTI 0I	WN	Γ	D	Γ	Γ	3 V U1 S _%0k	%0f TNWD	%GTGN0	f I GTG	N0T5	
								3 V U1 S _%f	%TB0W	%TDWD	0I BTG	NTD	
								5N- f6	f DTI kW	5TkG0	I kDTD	N0TN	
JU%B/0	I BTGDD	0Df TfBB	kTG	Γ	D	Γ	Γ	3 V U1 S _%B0	%0T5WD	%DTkGk	I f TN	NTW	
								3 V U1 S _%Bf	%TBf f	%TDGf	0I f TD	NTD	
								3 V U1 S _%BI	%0T5WD	%DTkGW	I f TN	NTW	
								3 V U1 S _%BB	00TDBf	BTWWB	0NkTk	NTf	
LV U1 S _%D0	DTWND	0DI TGGf	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%D0	0T5kG	DT50D	0WGDTD	N0T5	
LV U1 S _%Df	DTWND	0DI TBWG	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%Df	0T5kG	DT50D	0WG0TG	N0T5	
LV U1 S _%DI	DTWND	0DI TI 0W	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%DI	0T5kG	DT50D	0WGI T5	N0T5	
LV U1 S _%DB	DTWND	0DI TfDN	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%DB	0T5kG	DT50D	0WGGTG	N0T5	
LV U1 S _%DG	DTWND	0DI TDBN	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%DG	0T5kG	DT50D	0WG5TD	N0T5	
LV U1 S _%DW	DTWND	0Df TNWB	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%DW	0T5kG	DT50D	0WGNTG	N0T5	
LV U1 S _%Dk	DTWND	0Df TNDN	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%Dk	0T5kG	DT50D	0WWDTB	N0T5	
LV U1 S _%D5	DTWND	0Df TN0G	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%D5	0T5kG	DT50D	0WWDTI	N0T5	
LV U1 S _%DN	DTWND	0Df Tk0B	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%DN	0T5kG	DT50D	0WWI TG	N0T5	
LV U1 S _%0D	DTWND	0Df TGN5	NTD	0T5kG	DT50D	Γ	Γ	3 V U1 S _%0D	0T5kG	DT50D	0WWGTB	N0T5	

ProRct:	F m OH m vF j	ETAP		Page:	f
Location:	Paulding, OH	0WDIDC		j ate:	0D%DC%DOk
Contract:				SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case:	NGP1 NGL6 .	AeMsion:	kCp . EF
- ilena2 e:	F m 7OH			Con8gT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
LV U1 S _%0I	DIWND	0DIIDD0	ND	0T5kG	DI50D	[	[	3 V U1 S _%0I	0T5kG	DI50D	0WCkTI	N0T5	
LV U1 S _%0B	DIWND	0DIIDB0	ND	0T5kG	DI50D	[	[	3 V U1 S _%0B	0T5kG	DI50D	0WG5TI	N0T5	
LV U1 S _%0G	DIWND	0DIIkBD	ND	0T5kG	DI50D	[	[	3 V U1 S _%0G	0T5kG	DI50D	0WWTD	N0T5	
LV U1 S _%0W	DIWND	0DIIDI0	ND	0T5kG	DI50D	[	[	3 V U1 S _%0W	0T5kG	DI50D	0WG5TB	N0T5	
LV U1 S _%0k	DIWND	0DIIBW0	ND	0T5kG	DI50D	[	[	3 V U1 S _%0k	0T5kG	DI50D	0WWkTW	N0T5	
LV U1 S _%5D	DIWND	0DIT5DN	5TN	0T5kG	DI50D	[	[	3 V U1 S _%5D	0T5kG	DI50D	0WWTD	N0T5	
LV U1 S _%50	DIWND	0DITWWk	5TN	0T5kG	DI50D	[	[	3 V U1 S _%50	0T5kG	DI50D	0WWBTI	N0T5	
LV U1 S _%5f	DIWND	0DITGGB	5TN	0T5kG	DI50D	[	[	3 V U1 S _%5f	0T5kG	DI50D	0WWWD	N0T5	
LV U1 S _%5I	DIWND	0DITGWN	ND	0T5kG	DI50D	[	[	3 V U1 S _%5I	0T5kG	DI50D	0WWGTN	N0T5	
LV U1 S _%5B	DIWND	0DITD0I	5TN	0T5kG	DI50D	[	[	3 V U1 S _%5B	0T5kG	DI50D	0WkITI	N0T5	
LV U1 S _%5G	DIWND	0DITD5D	5TN	0T5kG	DI50D	[	[	3 V U1 S _%5G	0T5kG	DI50D	0WkITN	N0T5	
LV U1 S _%5W	DIWND	0DITNG	ND	0T5kG	DI50D	[	[	3 V U1 S _%5W	0T5kG	DI50D	0WGNIN	N0T5	
LV U1 S _%5k	DIWND	0DIT5WB	ND	0T5kG	DI50D	[	[	3 V U1 S _%5k	0T5kG	DI50D	0WW0TD	N0T5	
LV U1 S _%55	DIWND	0DITkfN	ND	0T5kG	DI50D	[	[	3 V U1 S _%55	0T5kG	DI50D	0WWTI	N0T5	
LV U1 S _%5N	DIWND	0DITkf0	5TN	0T5kG	DI50D	[	[	3 V U1 S _%5N	0T5kG	DI50D	0WWTB	N0T5	
LV U1 S _%I0	DIWND	0DIITGk	ND	0T5kG	DI50D	[	[	3 V U1 S _%I0	0T5kG	DI50D	0WGITI	N0T5	
LV U1 S _%If	DIWND	0DIIDGD	NfI	0T5kG	DI50D	[	[	3 V U1 S _%If	0T5kG	DI50D	0WGWG	N0T5	
LV U1 S _%II	DIWND	0DIIDBG	NfI	0T5kG	DI50D	[	[	3 V U1 S _%II	0T5kG	DI50D	0WG5TI	N0T5	
LV U1 S _%IB	DIWND	0DIID5D	NfI	0T5kG	DI50D	[	[	3 V U1 S _%IB	0T5kG	DI50D	0WGWD	N0T5	
LV U1 S _%IW	DIWND	0DIIBBf	ND	0T5kG	DI50D	[	[	3 V U1 S _%IW	0T5kG	DI50D	0WG0T5	N0T5	
LV U1 S _%Ik	DIWND	0DIIBNB	ND	0T5kG	DI50D	[	[	3 V U1 S _%Ik	0T5kG	DI50D	0WG0TD	N0T5	
LV U1 S _%IN	DIWND	0DIIBDW	ND	0T5kG	DI50D	[	[	3 V U1 S _%IN	0T5kG	DI50D	0WGTB	N0T5	
LV U1 S _%BD	DIWND	0DIIGD0	NB	0T5kG	DI50D	[	[	3 V U1 S _%BD	0T5kG	DI50D	0WGDIN	N0T5	
LV U1 S _%B0	DIWND	0DBIfWW	NG	0T5kG	DI50D	[	[	3 V U1 S _%B0	0T5kG	DI50D	0WI5T5	N0T5	
LV U1 S _%Bf	DIWND	0DBIf0B	NG	0T5kG	DI50D	[	[	3 V U1 S _%Bf	0T5kG	DI50D	0WINIW	N0T5	
LV U1 S _%BI	DIWND	0DBIfWG	NG	0T5kG	DI50D	[	[	3 V U1 S _%BI	0T5kG	DI50D	0WI5T5	N0T5	
LV U1 S _%BB	DIWND	0DBIDDf	NG	0T5kG	DI50D	[	[	3 V U1 S _%BB	0T5kG	DI50D	0WBfTN	N0T5	
LV U1 S _%BG	DIWND	0DIT5B5	NG	0T5kG	DI50D	[	[	3 V U1 S _%BG	0T5kG	DI50D	0WBGIB	N0T5	
LV U1 S _%BW	DIWND	0DITWB5	NB	0T5kG	DI50D	[	[	3 V U1 S _%BW	0T5kG	DI50D	0WB5TG	N0T5	
LV U1 S _%B5	DIWND	0DBIWWk	NG	0T5kG	DI50D	[	[	3 V U1 S _%B5	0T5kG	DI50D	0WIfTG	N0T5	
LV U1 S _%BN	DIWND	0DBIWDD	NG	0T5kG	DI50D	[	[	3 V U1 S _%BN	0T5kG	DI50D	0WIITG	N0T5	
LV U1 S _%GD	DIWND	0DBIWWG	NG	0T5kG	DI50D	[	[	3 V U1 S _%GD	0T5kG	DI50D	0WIfTG	N0T5	
3 V U1 S _%D0	IBIGDD	0D0TkI	kTD	[	D	DIDDB	DIDDB	3 V U1 S _%Df	0T5W0	DIkfG	IfTN	NIT	
								LV U1 S _%D0	%0T5WW	%DIkfN	IIITD	NITD	
3 V U1 S _%Df	IBIGDD	0D0TB5B	kTD	[	D	DIDDB	DIDDB	3 V U1 S _%D0	%0T5WD	%DIkkI	IIITI	NITI	
								3 V U1 S _%DI	ITkf0	0TBN5	WWD	NIT5	
								LV U1 S _%Df	%0T5WW	%DIkfN	IIITD	NITD	
3 V U1 S _%DI	IBIGDD	0D0TII	kTD	[	D	DIDDB	DIDDB	3 V U1 S _%Df	%1T0G	%0TGI5	WWB	NITB	
								3 V U1 S _%DB	GIkW	fTW	NNB	NITk	

Project:	F m OH m vF j	ETAP	Page:	I
Location:	Paulding, OH	0WDDC	j ate:	0D%DC%D0k
Contract:			SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion:	kGp . EF
- ilena2 e:	F m 7OH		Con8gT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								LV U1 S _%DI	%0T5WW	%DKfN	I I D	N D	
3 V U1 S _%DB	I BGDD	0D0TffB	kD	[	D	DDDB	DDDB	3 V U1 S _%DI	%GTkD	%TID5	NNk	N TB	
								3 V U1 S _%DG	kTBIf	I DII	0I f Tk	N TW	
								LV U1 S _%DB	%0T5WW	%DKfN	I I D	N D	
3 V U1 S _%DG	I BGDD	0D0TDW0	kD	[	D	DDDB	DDDB	3 V U1 S _%DB	%kTBfD	%TD50	0I I TD	N TB	
								3 V U1 S _%D5	NIf50	I T5DW	0WWD	N TG	
								LV U1 S _%DG	%0T5WW	%DKf5	I I Tf	N Tf	
3 V U1 S _%DW	I BGDD	0DDNkG	kD	[	D	DDDB	DDDB	3 V U1 S _%Dk	0T5W0	DKfG	I I D	N Tf	
								LV U1 S _%DW	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%Dk	I BGDD	0DDN05	kD	[	D	DDDB	DDDB	3 V U1 S _%DW	%0T5WD	%DKGB	I I T	N Tk	
								3 V U1 S _%0W	%0T5GN	%DKND	I I TG	N TD	
								3 V U1 S _%0G	GTG5D	f TfWN	NNN	N TW	
								LV U1 S _%Dk	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%D5	I BGDD	0DDNfB	kD	[	D	DDDB	DDDB	3 V U1 S _%DG	%NIfkD	%T5NW	0WWk	N Tf	
								3 V U1 S _%DN	00TDI0	BTWfD	0NN5	N TB	
								LV U1 S _%D5	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%DN	I BGDD	0DDKfD	kD	[	D	DDDB	DDDB	3 V U1 S _%D5	%00TD0f	%BKfW	f DDTW	N TD	
								3 V U1 S _%0D	0f TNkI	GBGD	f I I T5	N Tf	
								LV U1 S _%DN	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%0D	I BGDD	0DDTWDf	kD	[	D	DDDB	DDDB	3 V U1 S _%DN	%0f TNW0	%GTGTN	f I BTB	N TD	
								3 V U1 S _%6G	0BT5ff	WTGI	f WkTW	N TD	
								LV U1 S _%0D	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%0I	I BGDD	0D0TD0B	WN	[	D	DDDB	DDDB	3 V U1 S _%0B	0T5W0	DKfG	I I D	N Tf	
								LV U1 S _%0I	%0T5WW	%DKf5	I I D	N D	
3 V U1 S _%0B	I BGDD	0D0TDGf	WN	[	D	DDDB	DDDB	3 V U1 S _%0I	%0T5WD	%DKGk	I I T	N TW	
								3 V U1 S _%0G	I Tkf0	0TB5f	WWI	N TN	
								LV U1 S _%0B	%0T5WW	%DKf5	I I Tf	N Tf	
3 V U1 S _%0G	I BGDD	0DDKBk	kD	[	D	DDDB	DDDB	3 V U1 S _%Dk	%GTGk0	%TI I N	0DDB	N Tf	
								3 V U1 S _%0B	%TKDN	%0TGWD	WW5	N Tf	
								3 V U1 S _%0k	00TDBf	BTWI	f DDB	N TB	
								LV U1 S _%0G	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%0W	I BGDD	0D0TDBI	kD	[	D	DDDB	DDDB	3 V U1 S _%Dk	0T5W0	DKfG	I I D	N Tf	
								LV U1 S _%0W	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%0k	I BGDD	0DDBWf	WN	[	D	DDDB	DDDB	JU%6/0	0f TNkG	GBNf	f I BK	N TD	
								3 V U1 S _%0G	%00TD0B	%BKW5	f D0TG	N0TN	
								LV U1 S _%0k	%0T5WG	%DKfk	I I TB	N Tf	
3 V U1 S _%6D	I BGDD	0DD50k	WN	[	D	DDDB	DDDB	3 V U1 S _%60	0T5W0	DKfB	I I Tf	N Tf	
								LV U1 S _%6D	%0T5WG	%DKf5	I I Tf	N Tf	
3 V U1 S _%60	I BGDD	0DDWkI	WN	[	D	DDDB	DDDB	3 V U1 S _%6D	%0T5G5	%D5DD	I I TW	N0TN	

ProRct:	F m OH m vF j	**ETAP**	Page: B
Location:	Paulding, OH	0WDDDC	j ate: 0D%DC%5D0k
Contract:			SF : m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion: kGp . EF
- ilena2 e:	F m 7OH		Con8gT F or2 al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								3 V U1 S _%f	I TkfD	0TGTB	WW5	N'TG	
								LV U1 S _%0	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%f	I BTGDD	0DDTGk	WN	D	D	DDDB	DDDB	JU%/0	kTBI B	I TD5N	0I BTD	N'T	
								3 V U1 S _%0	%5Tk0G	%0TGI	WkTD	N'T	
								3 V U1 S _%N	%0T5G5	%D50f	I I Tk	N0TW	
								LV U1 S _%f	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%I	I BTGDD	0DDTkf	kTD	D	D	DDDB	DDDB	5N-I 6	f DII 5D	5TkkN	I WNT	N0T5	
								3 V U1 S _%5	%05TD05	%5TDGG	I I WD	N0Tk	
								LV U1 S _%I	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%B	I BTGDD	0DDDD5	W5	D	D	DDDB	DDDB	3 V U1 S _%G	0T5W0	DKf I	I I TB	N T	
								LV U1 S _%B	%0T5WG	%DKf k	I I TG	N T	
3 V U1 S _%G	I BTGDD	0DDTkG	W5	D	D	DDDB	DDDB	5N-06	05TB5k	5TDBG	I I kT5	N0TG	
								3 V U1 S _%0D	%0BTkWG	%WWGW	f kD5	N0T	
								3 V U1 S _%B	%0T5W0	%DKWW	I I TW	N'TG	
								LV U1 S _%G	%0T5WG	%DKf k	I I TG	N T	
3 V U1 S _%W	I BTGDD	0DDNBG	kTD	D	D	DDDB	DDDB	3 V U1 S _%k	0T5W0	DKf B	I I TD	N T	
								LV U1 S _%W	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%k	I BTGDD	0DD5kI	kTD	D	D	DDDB	DDDB	3 V U1 S _%W	%0T5WD	%DKW	I I T	N'TG	
								3 V U1 S _%5	I Tkf0	0TB5k	WWG	N'TN	
								LV U1 S _%k	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%5	I BTGDD	0DDkI G	kTD	D	D	DDDB	DDDB	3 V U1 S _%I	05TGI N	kTNG	I I GD	N0TN	
								3 V U1 S _%k	%5Tk0W	%0TGf	WWk	N'TG	
								3 V U1 S _%I	%0f TNW	%GTN5N	f I G	N0TW	
								LV U1 S _%5	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%N	I BTGDD	0DDkf k	WN	D	D	DDDB	DDDB	3 V U1 S _%f	0T5W0	DKf B	I I T	N T	
								LV U1 S _%N	%0T5WG	%DKf 5	I I T	N T	
3 V U1 S _%0	I BTGDD	0D0TkB	kTD	D	D	DDDB	DDDB	3 V U1 S _%f	0T5W0	DKf G	I I TD	N T	
								LV U1 S _%0	%0T5WW	%DKf N	I I TD	N TD	
3 V U1 S _%f	I BTGDD	0D0TDWB	kTD	D	D	DDDB	DDDB	3 V U1 S _%0	%0T5Gk	%D5I k	I I Tk	N0T	
								3 V U1 S _%I	I Tk05	0TGW0	WWk	N'T	
								LV U1 S _%f	%0T5WW	%DKf N	I I TD	N TD	
3 V U1 S _%I	I BTGDD	0D0TDGk	kTD	D	D	DDDB	DDDB	3 V U1 S _%5	0f TNNG	GBkB	f I I TG	N'T	
								3 V U1 S _%f	%5Tk0B	%0TG5N	WWN	N0TN	
								3 V U1 S _%B	%kTB0N	%5TDWD	0I I TG	N'TD	
								LV U1 S _%I	%0T5WW	%DKf 5	I I T	N T	
3 V U1 S _%B	I BTGDD	0D0TDNB	kTD	D	D	DDDB	DDDB	3 V U1 S _%I	kTBf N	I TDf D	0I I T	N'T	
								3 V U1 S _%W	%5Tk00	%0TGB5	WWG	N'T	
								3 V U1 S _%N	%0T5Gk	%D5Bk	I I T5	N0TD	
								LV U1 S _%B	%0T5WW	%DKf N	I I TD	N TD	

ProRct:	F m OH m vF j	
Location:	Paulding, OH	
Contract:		
Engineer:	Josh Venden	
- ilena2 e:	F m 7OH	

ETAP

0WDIDC

Study Case: NGP1 NGL6 .

Page:	G
j ate:	0D%DC%D0k
SF :	m ES_m OOj I
AeMsion:	kGp . EF
Con8gT	F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
3 V U1 S _%W	I BIGDD	0D0TBW0	kTD	Γ	D	DIDDB	DIDDB	3 V U1 S _%B	I Tkff	0TBkN	WWD	NTN	
								3 V U1 S _%k	%0T5WD	%DIkGI	I I TD	NTk	
								LV U1 S _%W	%0T5WW	%DIkfN	I I TD	N TD	
3 V U1 S _%k	I BIGDD	0D0TC0B	kTD	Γ	D	DIDDB	DIDDB	3 V U1 S _%W	0T5W0	DIkfG	I f TN	N TI	
								LV U1 S _%k	%0T5WW	%DIkfN	I I TD	N TD	
3 V U1 S _%N	I BIGDD	0D0TBfB	kTD	Γ	D	DIDDB	DIDDB	3 V U1 S _%B	0T5W0	DIkfG	I I TD	N TI	
								LV U1 S _%N	%0T5WW	%DIkfN	I I TD	N TD	
3 V U1 S _%BD	I BIGDD	0D0TGf0	kTI	Γ	D	DIDDB	DIDDB	5N-B6	05TC0f	5TDGW	I I f T5	N0Tk	
								3 V U1 S _%BW	%0WWC0	%kTI I 0	fNNN	N0TG	
								LV U1 S _%BD	%0T5WW	%DIkfN	I I TD	N TD	
3 V U1 S _%B0	I BIGDD	0DfTI DD	kTG	Γ	D	DIDDB	DIDDB	JU%B0	0T5W0	DIkfW	I f Tk	N TI	
								LV U1 S _%B0	%0T5WW	%DIkI D	I f T5	N TD	
3 V U1 S _%Bf	I BIGDD	0DfTBk	kTG	Γ	D	DIDDB	DIDDB	JU%B0	kTBff	I TDG0	0I f TD	NTD	
								3 V U1 S _%BN	%GIGWD	%5TBfB	NNI	N0Tk	
								LV U1 S _%Bf	%0T5WW	%DIkI D	I f T5	N TD	
3 V U1 S _%BI	I BIGDD	0DfTfN5	kTG	Γ	D	DIDDB	DIDDB	JU%B0	0T5W0	DIkfW	I f Tk	N TI	
								LV U1 S _%BI	%0T5WW	%DIkI D	I f T5	N TD	
3 V U1 S _%BB	I BIGDD	0DfTDI 0	kTG	Γ	D	DIDDB	DIDDB	JU%B0	%0 0TDff	%BIkkN	0N5TW	N0TN	
								3 V U1 S _%BG	0fTN5I	GIGDG	fI0TI	NTD	
								LV U1 S _%BB	%0T5WW	%DIkI D	I f TN	N TD	
3 V U1 S _%BG	I BIGDD	0D0T5kB	kTG	Γ	D	DIDDB	DIDDB	3 V U1 S _%BB	%0fTNW5	%GIW0B	fI f TD	N0T5	
								3 V U1 S _%BW	0B5T5fN	WI BD	fWBN	N0TN	
								LV U1 S _%BG	%0T5WW	%DIkI D	I f TN	N TD	
3 V U1 S _%BW	I BIGDD	0D0TWkD	kTB	Γ	D	DIDDB	DIDDB	3 V U1 S _%BD	0WWWN	kTI I 0	fNND	N0Tk	
								3 V U1 S _%BG	%0B5TDk	%WGDG	fWWI	N0TW	
								LV U1 S _%BW	%0T5WW	%DIkfN	I I TD	N TD	
3 V U1 S _%B5	I BIGDD	0DfTkDk	kTG	Γ	D	DIDDB	DIDDB	3 V U1 S _%BN	0T5W0	DIkfk	I f TW	N TD	
								LV U1 S _%B5	%0T5WW	%DIkI 0	I f TW	N TD	
3 V U1 S _%BN	I BIGDD	0DfTWfN	kTG	Γ	D	DIDDB	DIDDB	3 V U1 S _%Bf	GIG5f	fTGG	N5TI	NTk	
								3 V U1 S _%B5	%0T5WD	%DIkWG	I f T5	NTG	
								3 V U1 S _%GD	%0T5WD	%DIkWB	I f T5	NTG	
								LV U1 S _%BN	%0T5WW	%DIkI 0	I f Tk	N TD	
3 V U1 S _%GD	I BIGDD	0DfTkDG	kTG	Γ	D	DIDDB	DIDDB	3 V U1 S _%BN	0T5W0	DIkfk	I f TW	N TD	
								LV U1 S _%GD	%0T5WW	%DIkI 0	I f Tk	N TD	
* POv	0I 5TDDD	NGIDDD	DID	%kTDfN	%GIfB5	Γ	Γ	5N_06	%kTDfN	%GIfB5	I GkTD	NGID	
3 P_~I	0I T5DD	0DDTI 0	kTI	Γ	D	Γ	Γ	HV U1 S 3 P_	DIDDD	DIDDD	DID	DID	
								& 5N_0U					

* vndicates a Moltage regulated bus (Moltage controlled or swing ty4e 2 achine connected to it)

\# vndicates a bus with a load 2 is2 atch o82 ore than DID 3 V6

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
51I N	j B6DD	11TIDI	Wj	Γ	D	Γ	Γ	3 V UGS _v%6	vN5TBfW	BDB%	j NW5	vI f T	
								51_NU	N5TBfW	vBDB%	j NW5	vI f T	
51I %	j B6DD	11TIDI	Wj	Γ	D	Γ	Γ	JUv%N	v%DfjD	B6j	j BI TD	vI f TW	
								51_NU	%Dfj D	vB6j	j BI TD	vI f TW	
51I j .	j B6DD	11TIDI	Wj	Γ	D	Γ	Γ	3 V UGS _v%j	v%DfD%	BfW5	j BfT5	vI f T5	
								51_NU	%DfD%	vBfW5	j BfT5	vI f T5	
51I B	j B6DD	11TIDI	Wj	Γ	D	Γ	Γ	3 V UGS _vBD	vN5fjBB	j TNDW	j NNTW	vI 5TW	
								51_NU	N5fjBB	vj TNDW	j NNTW	vI 5TW	
51_N	Nj 5TDDD	11TI1f	DD	Γ	D	Γ	Γ	POR	f f TNfW	v%6T%jB	j j 1T	vI 6TD	
								HV UGS 3 P_	vf f TNfW	%6T%jB	j j 1T	vI 6TD	
51_NU	j B6DD	11TIDI	Wj	Γ	D	Γ	Γ	51I B	vN5fjBB	j TNDW	j NNTW	vI 5TW	
								51I j .	v%DfD%	BfW5	j BfT5	vI f T5	
								51I %	v%DfjD	B6j	j BI TD	vI f TW	
								51I N	vN5TBfW	BDB%	j NW5	vI f T	
								3 P_~j	f f TB6j	vNWDW5	Nj %6TD	vI f TI	
								& HV UGS 3 P_					
HV UGS 3 P_	Nj 5TDDD	11TI1f	DD	Γ	D	DD6j	DNBf	51_N	f f TNfW	v%6T%jB	j j 1T	vI 6TD	
								51_NU	vf f T%jD	%6TD5f	j j 1T	vI 6TN	v%6DD
								& 3 P_~j					
JUv%N	j B6DD	NDDD5D	WW	Γ	D	Γ	Γ	3 V UGS _vNf	vN%IfD	j TDfW	%8%I	vI f Tj	
								3 V UGS _v%%	vf TB%N	NI 1j	N%T	vI f T%	
								51I %	%Dfj 1N	vB5WI	j 6DTW	vI f Tj	
JUvB/N	j B6DD	NDD5f 6	f T	Γ	D	Γ	Γ	3 V UGS _vBN	vN5WN	DB5B	j NII	vI W5	
								3 V UGS _vB%	vf TB%6	N5Nj	N%W5	vI f TN	
								3 V UGS _vBj	vN5WN	DB5B	j NII	vI W5	
								3 V UGS _vBB	NNNBf	v%If 5N	NI DTW	vI f TD	
LV UGS _vDN	DWD	NDDfB5	1TB	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDN	N5f 6	vDBj j	NWDBT%	vI f TB	
LV UGS _vD%	DWD	NDDT%D	1TB	N5f 6	vDBj j	Γ	Γ	3 V UGS _vD%	N5f 6	vDBj j	NWD6T5	vI f TB	
LV UGS _vDj	DWD	NDDNj W	1Tj	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDj	N5f 6	vDBj j	NWDfTW	vI f TB	
LV UGS _vDB	DWD	NDDD6%	1Tj	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDB	N5f 6	vDBj j	NWDI TD	vI f TB	
LV UGS _vD6	DWD	11TI%W	1Tj	N5f 6	vDBj j	Γ	Γ	3 V UGS _vD6	N5f 6	vDBj j	NWNND	vI f TB	
LV UGS _vDW	DWD	11TI6B	1T%	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDW	N5f 6	vDBj j	NWND6	vI f TB	
LV UGS _vDf	DWD	11TIDI6	1T%	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDf	N5f 6	vDBj j	NWNNj	vI f TB	
LV UGS _vD5	DWD	11T5BB	1T%	N5f 6	vDBj j	Γ	Γ	3 V UGS _vD5	N5f 6	vDBj j	NWN%j	vI f TB	
LV UGS _vDI	DWD	11TI%j	1TN	N5f 6	vDBj j	Γ	Γ	3 V UGS _vDI	N5f 6	vDBj j	NWNBfj	vI f TB	
LV UGS _vND	DWD	11TWWB	1TN	N5f 6	vDBj j	Γ	Γ	3 V UGS _vND	N5f 6	vDBj j	NWN6T%	vI f TB	

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
LV UGS _vNj	DIWD	NDDID1B	1T%	N5f 6	vDBj j	[	[	3 V UGS _vNj	N5f 6	vDBj j	NWD5Tj	v1 f TB	
LV UGS _vNB	DIWD	NDDIDBD	1T%	N5f 6	vDBj j	[	[	3 V UGS _vNB	N5f 6	vDBj j	NWD1T%	v1 f TB	
LV UGS _vN6	DIWD	11Tf f %	1TN	N5f 6	vDBj j	[	[	3 V UGS _vN6	N5f 6	vDBj j	NWj T6	v1 f TB	
LV UGS _vNW	DIWD	NDDIDNB	1T%	N5f 6	vDBj j	[	[	3 V UGS _vNW	N5f 6	vDBj j	NWD1TW	v1 f TB	
LV UGS _vNf	DIWD	11TWDj	1TD	N5f 6	vDBj j	[	[	3 V UGS _vNf	N5f 6	vDBj j	NWNWT%	v1 f TB	
LV UGS _v%D	DIWD	11T1B6	1TD	N5f 6	vDBj j	[	[	3 V UGS _v%D	N5f 6	vDBj j	NWNDTf	v1 f TB	
LV UGS _v%N	DIWD	11T5N5	1TD	N5f 6	vDBj j	[	[	3 V UGS _v%N	N5f 6	vDBj j	NWN%Tf	v1 f TB	
LV UGS _v%%	DIWD	11TfNf	1TD	N5f 6	vDBj j	[	[	3 V UGS _v%%	N5f 6	vDBj j	NWNBTB	v1 f TB	
LV UGS _v%j	DIWD	11TW%D	1TN	N5f 6	vDBj j	[	[	3 V UGS _v%j	N5f 6	vDBj j	NWN6T1	v1 f TB	
LV UGS _v%B	DIWD	11TBf j	5T5	N5f 6	vDBj j	[	[	3 V UGS _v%B	N5f 6	vDBj j	NWN5Tj	v1 f TB	
LV UGS _v%6	DIWD	11TBBf	5T5	N5f 6	vDBj j	[	[	3 V UGS _v%6	N5f 6	vDBj j	NWN5T5	v1 f TB	
LV UGS _v%W	DIWD	11T5WN	1T%	N5f 6	vDBj j	[	[	3 V UGS _v%W	N5f 6	vDBj j	NWN%TD	v1 f TB	
LV UGS _v%f	DIWD	11Tf 15	1T%	N5f 6	vDBj j	[	[	3 V UGS _v%f	N5f 6	vDBj j	NWj TN	v1 f TB	
LV UGS _v%5	DIWD	11TWf W	1T%	N5f 6	vDBj j	[	[	3 V UGS _v%5	N5f 6	vDBj j	NWN6TD	v1 f TB	
LV UGS _v%1	DIWD	11T5WW	1TD	N5f 6	vDBj j	[	[	3 V UGS _v%1	N5f 6	vDBj j	NWN%TD	v1 f TB	
LV UGS _vj N	DIWD	NDDINNf	1TB	N5f 6	vDBj j	[	[	3 V UGS _vj N	N5f 6	vDBj j	NWDfT1	v1 f TB	
LV UGS _vj %	DIWD	11T1j N	1Tj	N5f 6	vDBj j	[	[	3 V UGS _vj %	N5f 6	vDBj j	NWNDT1	v1 f TB	
LV UGS _vj j	DIWD	11T5j f	1Tj	N5f 6	vDBj j	[	[	3 V UGS _vj j	N5f 6	vDBj j	NWN%TB	v1 f TB	
LV UGS _vj B	DIWD	11T1Bj	1TB	N5f 6	vDBj j	[	[	3 V UGS _vj B	N5f 6	vDBj j	NWNDTf	v1 f TB	
LV UGS _vj W	DIWD	NDDINf 1	1TB	N5f 6	vDBj j	[	[	3 V UGS _vj W	N5f 6	vDBj j	NWDWT1	v1 f TB	
LV UGS _vj f	DIWD	NDD%%6	1TB	N5f 6	vDBj j	[	[	3 V UGS _vj f	N5f 6	vDBj j	NWDWT%	v1 f TB	
LV UGS _vj 1	DIWD	NDDINBW	1TB	N5f 6	vDBj j	[	[	3 V UGS _vj 1	N5f 6	vDBj j	NWDfT6	v1 f TB	
LV UGS _vBD	DIWD	11T1f f	1TW	N5f 6	vDBj j	[	[	3 V UGS _vBD	N5f 6	vDBj j	NWNDT%	v1 f TB	
LV UGS _vBN	DIWD	NDDj f 1	NDID	N5f 6	vDBj j	[	[	3 V UGS _vBN	N5f 6	vDBj j	NWDj Tf	v1 f TB	
LV UGS _vB%	DIWD	NDDj j %	NDID	N5f 6	vDBj j	[	[	3 V UGS _vB%	N5f 6	vDBj j	NWDBT6	v1 f TB	
LV UGS _vBj	DIWD	NDDj f 5	NDID	N5f 6	vDBj j	[	[	3 V UGS _vBj	N5f 6	vDBj j	NWDj Tf	v1 f TB	
LV UGS _vBB	DIWD	NDD%D%	1T1	N5f 6	vDBj j	[	[	3 V UGS _vBB	N5f 6	vDBj j	NWDWTW	v1 f TB	
LV UGS _vB6	DIWD	NDDIN%j	1T5	N5f 6	vDBj j	[	[	3 V UGS _vB6	N5f 6	vDBj j	NWDfT5	v1 f TB	
LV UGS _vBW	DIWD	NDDIDj 1	1Tf	N5f 6	vDBj j	[	[	3 V UGS _vBW	N5f 6	vDBj j	NWD1T%	v1 f TB	
LV UGS _vB5	DIWD	NDDIW 1	NDIN	N5f 6	vDBj j	[	[	3 V UGS _vB5	N5f 6	vDBj j	N615TW	v1 f TB	
LV UGS _vB1	DIWD	NDDIWj 5	NDIN	N5f 6	vDBj j	[	[	3 V UGS _vB1	N5f 6	vDBj j	N611TW	v1 f TB	
LV UGS _v6D	DIWD	NDDIW f	NDIN	N5f 6	vDBj j	[	[	3 V UGS _v6D	N5f 6	vDBj j	N615Tf	v1 f TB	
3 V UGS _vDN	j B16DD	NDD51j	f TN	[	D	DIDDB	DIDDB	3 V UGS _vD%	N5W%	vD6Nj	j %D	v1 WB	
								LV UGS _vDN	vN5WW	D6D1	j %N	v1 W6	
3 V UGS _vD%	j B16DD	NDD5NW	f TN	[	D	DIDDB	DIDDB	3 V UGS _vDN	vN5WD	DBWW	j N5	v1 f TD	
								3 V UGS _vDj	j Tf%%	vD1f 1	WyT1	v1 Wf	
								LV UGS _vD%	vN5WW	D6ND	j %N	v1 W6	
3 V UGS _vDj	j B16DD	NDDIW5j	f TN	[	D	DIDDB	DIDDB	3 V UGS _vD%	vj TfNf	D11BD	WyTf	v1 W1	
								3 V UGS _vDB	6T6f 1	vNB6B	16T5	v1 W5	

Proǀect:	F m OH m RF 0	ETAP	Page:	j
Location:	Paulding, OH	NWDIDC	0 ate:	NDvD6v%DNf
Contract:			SF :	m ES_m OO0 j
Engineer:	Josh Venden	Study Case: NPG 16LE. 0	k eAision:	f 6M p EF
I ilena- e:	F m 2OH		ConЅigT:	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
								LV UGS _vDj	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vDB	j B6DD	NDD611	f TD	Γ	D	DIDDB	DIDDB	3 V UGS _vDj	v6T6f j	NBDI	16TW	v1WI	
								3 V UGS _vD6	f TBj 6	vNII %%	N%fTf	v1W5	
								LV UGS _vDB	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vD6	j B6DD	NDDBf B	f TD	Γ	D	DIDDB	DIDDB	3 V UGS _vDB	vf TB%B	N5f B	N%fT6	v1f TD	
								3 V UGS _vD5	1 P%5W	v%fj 55	N61Tf	v1W5	
								LV UGS _vD6	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vDW	j B6DD	NDD6D%	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vDf	N5W%	vD6NB	j %P%	v1WB	
								LV UGS _vDW	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vDf	j B6DD	NDDB6j	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vDW	vN5WN	DB5B	j %D	v1W5	
								3 V UGS _vNW	vN5WD	DBB1	j NII	v1f T%	
								3 V UGS _vN6	6T65%	vNBBf	1WN	v1W5	
								LV UGS _vDf	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vD5	j B6DD	NDDf 1j	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vD6	v1 P%W	%P15	N61Tj	v1f TN	
								3 V UGS _vDI	NNNj 5	v%5N%	NINI6	v1f TD	
								LV UGS _vD5	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vDI	j B6DD	NDDP%j	W5	Γ	D	DIDDB	DIDDB	3 V UGS _vD5	vNNNP%D	%fDf	NIND	v1f T%	
								3 V UGS _vND	N%I 5%	vj P%N	%%j T%	v1f TN	
								LV UGS _vDI	vN5WW	D6ND	j %fj	v1W6	
3 V UGS _vND	j B6DD	NDDP%N6	W5	Γ	D	DIDDB	DIDDB	3 V UGS _vDI	vN%I f D	j TNBN	%8%I	v1f T%	
								3 V UGS _v%6	NB5j %	vj TN66	%66TN	v1f TN	
								LV UGS _vND	vN5WW	D6ND	j %fj	v1W6	
3 V UGS _vNj	j B6DD	NDDWB%	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vNB	N5W%	vD6Nj	j %N	v1WB	
								LV UGS _vNj	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vNB	j B6DD	NDD655	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vNj	vN5WN	DB5N	j %D	v1W5	
								3 V UGS _vN6	j Tf%j	vDII 16	WBN	v1WW	
								LV UGS _vNB	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vN6	j B6DD	NDDf %N	W5	Γ	D	DIDDB	DIDDB	3 V UGS _vDf	v6T6f B	Nj f f	16T5	v1f TN	
								3 V UGS _vNB	vj TN%	DIINf	Wj T5	v1f TN	
								3 V UGS _vNf	NNNBf	v%5D5	NINI5	v1f TD	
								LV UGS _vN6	vN5WW	D6ND	j %fj	v1W6	
3 V UGS _vNW	j B6DD	NDD6W%	WI	Γ	D	DIDDB	DIDDB	3 V UGS _vDf	N5W%	vD6NB	j %N	v1WB	
								LV UGS _vNW	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _vNf	j B6DD	NDDN6j	Wf	Γ	D	DIDDB	DIDDB	JUv%N	N%I 5B	vj TNW	%8j Tj	v1f TN	
								3 V UGS _vN6	vNNN%%	%WW%	NINN	v1f Tj	
								LV UGS _vNf	vN5WW	D6NN	j %fj	v1W6	
3 V UGS _v%D	j B6DD	NDDB1j	Wf	Γ	D	DIDDB	DIDDB	3 V UGS _v%N	N5W%	vD6NB	j %P%	v1WB	
								LV UGS _v%D	vN5WW	D6ND	j %P%	v1W6	
3 V UGS _v%N	j B6DD	NDDf W5	Wf	Γ	D	DIDDB	DIDDB	3 V UGS _v%D	vN561	DBj 1	j NII	v1f Tj	

Pro7ect: F m OH m RF 0

Location: Paulding, OH

Contract:

Engineer: Josh Venden

I ilena- e: F m 2OH

ETAP

NWDIDC

Study Case: NPG 16LE. 0

Page: B

0 ate: NDAD6v%DNf

SF : m ES_m OO0 j

k eAision: f 6M p EF

Con8gT F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
								3 V UGS _v%%	j Tf%N	vDII6j	WBD	vl WII	
								LV UGS _v%N	vN5WW	D6ND	j %fj	vl W6	
3 V UGS _v%%	j B6DD	NDDP%Wf	Wf	[	D	DIDDB	DIDDB	JUv%N	f TBj 5	vN5WB	N%5TD	vl f TD	
								3 V UGS _v%N	vj TfNf	DII%B	Wj TI	vl f TD	
								3 V UGS _v%l	vN561	DIB%W	j N5	vl f T6	
								LV UGS _v%%	vN5WW	D6ND	j %fj	vl W6	
3 V UGS _v%j	j B6DD	NDDNfN	W5	[	D	DIDDB	DIDDB	51I j .	%Dj 1B	vB5Bf	j 6DP%	vl f Tj	
								3 V UGS _v%5	vN5T6j %	BJj j	j N5TD	vl f TB	
								LV UGS _v%j	vN5WW	D6NN	j %fj	vl W6	
3 V UGS _v%B	j B6DD	NDDID%6	W6	[	D	DIDDB	DIDDB	3 V UGS _v%6	N5W%	vD6NB	j %fj	vl WB	
								LV UGS _v%B	vN5WW	D6NN	j %B	vl W6	
3 V UGS _v%6	j B6DD	11TI11	WB	[	D	DIDDB	DIDDB	51I N	N5T6D6	vBP%j %	j NfTf	vl f T6	
								3 V UGS _vND	vNBTf5%	j TP%B6	%6j Tj	vl f Tf	
								3 V UGS _v%B	vN5WN	DIBf %	j %N	vl WII	
								LV UGS _v%6	vN5WW	D6NN	j %B	vl W6	
3 V UGS _v%W	j B6DD	NDDIBND	WII	[	D	DIDDB	DIDDB	3 V UGS _v%f	N5W%	vD6NB	j %P%	vl WB	
								LV UGS _v%W	vN5WW	D6ND	j %P%	vl W6	
3 V UGS _v%f	j B6DD	NDDj Bf	WII	[	D	DIDDB	DIDDB	3 V UGS _v%W	vN5WN	DIBf W	j %D	vl WII	
								3 V UGS _v%5	j Tf%%	vDII1D	WBP%	vl WIW	
								LV UGS _v%f	vN5WW	D6ND	j %fj	vl W6	
3 V UGS _v%5	j B6DD	NDDP%%W	WII	[	D	DIDDB	DIDDB	3 V UGS _v%j	N5T66N	vBIB6B	j N5T6	vl f TP%	
								3 V UGS _v%f	vj TfNf	DII66	WBTN	vl WII	
								3 V UGS _vj j	vN%IIf %	%II56	%%%P%	vl f T6	
								LV UGS _v%5	vN5WW	D6ND	j %fj	vl W6	
3 V UGS _v%l	j B6DD	NDDIBN6	Wf	[	D	DIDDB	DIDDB	3 V UGS _v%%	N5W%	vD6NB	j %P%	vl WB	
								LV UGS _v%l	vN5WW	D6ND	j %P%	vl W6	
3 V UGS _vj N	j B6DD	NDDIWWB	f TN	[	D	DIDDB	DIDDB	3 V UGS _vj %	N5W%	vD6Nj	j %N	vl WB	
								LV UGS _vj N	vN5WW	D6ND	j %P%	vl W6	
3 V UGS _vj %	j B6DD	NDDIBf 1	f TN	[	D	DIDDB	DIDDB	3 V UGS _vj N	vN565	DIBDj	j NIf	vl f Tf	
								3 V UGS _vj j	j Tf%D	vDIINf	Wj T5	vl f TN	
								LV UGS _vj %	vN5WW	D6ND	j %P%	vl W6	
3 V UGS _vj j	j B6DD	NDDj 5W	f TD	[	D	DIDDB	DIDDB	3 V UGS _v%5	Nj TDDN	vj TP%DN	%%j TP%	vl f TN	
								3 V UGS _vj %	vj TfNW	D51D	Wj Tf	vl f TP%	
								3 V UGS _vj B	vf TB%j	NIf 1f	N%f Tj	vl f TP%	
								LV UGS _vj j	vN5WW	D6ND	j %P%	vl W6	
3 V UGS _vj B	j B6DD	NDDIB1%	f TN	[	D	DIDDB	DIDDB	3 V UGS _vj j	f TBj j	vN5j f	N%f T6	vl f TN	
								3 V UGS _vj W	vj TfNj	DIIj N	Wj Tf	vl f TD	
								3 V UGS _vj 1	vN565	Dj 1j	j NIW	vl f T5	
								LV UGS _vj B	vN5WW	D6ND	j %P%	vl W6	

Bus		Voltage		Generation		Load		Load Flow					XFMR
R0	9V	M 3 agT	. ngT	3 m	3 Aar	3 m	3 Aar	R0	3 m	3 Aar	. - 4	MPI	M_a4
3 V UGS _vj W	j B5DD	NDDIF%W	f TP%	D	D	DIDB	DIDB	3 V UGS _vj B	j TF%j	vDII 1 1	WBID	vI WWW	
								3 V UGS _vj f	vNI5WN	DIB5W	j %ID	vI W5	
								LV UGS _vj W	vNI5WW	DI5ND	j %IN	vI W5	
3 V UGS _vj f	j B5DD	NDDIf fN	f TP%	D	D	DIDB	DIDB	3 V UGS _vj W	NI5W%	vDI5Nj	j %IN	vI WB	
								LV UGS _vj f	vNI5WW	DI5ND	j %IN	vI W5	
3 V UGS _vj 1	j B5DD	NDDNWj	f TN	D	D	DIDB	DIDB	3 V UGS _vj B	NI5W%	vDI5Nj	j %IN	vI WB	
								LV UGS _vj 1	vNI5WW	DI5ND	j %IN	vI W5	
3 V UGS _vBD	j B5DD	NDDI5%6	f Tj	D	D	DIDB	DIDB	51 I B.	N5T5%6	vBTj 6N	j NW5	vI f TB	
								3 V UGS _vBW	vNWWWj	j T5j 5	%5BIF	vI f TB	
								LV UGS _vBD	vNI5WW	DI5ND	j %P%	vI W5	
3 V UGS _vBN	j B5DD	NDDII%B	f TF	D	D	DIDB	DIDB	JUvB/N	NI5W%	vDI5Nj	j %ID	vI WB	
								LV UGS _vBN	vNI5WW	DI5DI	j %IN	vI W5	
3 V UGS _vB%	j B5DD	NDDI5f f	f TF	D	D	DIDB	DIDB	JUvB/N	f TB%6	vNI5NB	N%W5	vI f TN	
								3 V UGS _vBI	v6T5Wj	NTj DN	1B5	vI f TB	
								LV UGS _vB%	vNI5WW	DI5DI	j %IN	vI W5	
3 V UGS _vBj	j B5DD	NDDII%j	f TF	D	D	DIDB	DIDB	JUvB/N	NI5W%	vDI5Nj	j %ID	vI WB	
								LV UGS _vBj	vNI5WW	DI5DI	j %IN	vI W5	
3 V UGS _vBB	j B5DD	NDDIf B5	f TW	D	D	DIDB	DIDB	JUvB/N	vNNIN%5	%TWW5	NIDIN	vI f TP%	
								3 V UGS _vB6	N%II 1D	vj TN5%	%88P%	vI f TN	
								LV UGS _vBB	vNI5WW	DI5ND	j %IN	vI W5	
3 V UGS _vB6	j B5DD	NDDNWD	f T5	D	D	DIDB	DIDB	3 V UGS _vBB	vN%II f W	j TDf B	%8NIF	vI f Tj	
								3 V UGS _vBW	NB5j 5	vj T555	%6j T5	vI f TP%	
								LV UGS _vB6	vNI5WW	DI5ND	j %P%	vI W5	
3 V UGS _vBW	j B5DD	NDDI55f	f TB	D	D	DIDB	DIDB	3 V UGS _vBD	NWW5D	vj TIj 5	%56TN	vI f Tj	
								3 V UGS _vB6	vNB5N5	j TB%B	%6j TD	vI f TB	
								LV UGS _vBW	vNI5WW	DI5ND	j %P%	vI W5	
3 V UGS _vB5	j B5DD	NDNP%B%	f TI	D	D	DIDB	DIDB	3 V UGS _vBI	NI5W%	vDI5Nj	j NII	vI WB	
								LV UGS _vB5	vNI5WW	DI5DI	j %ID	vI W5	
3 V UGS _vBI	j B5DD	NDNN5%	f T5	D	D	DIDB	DIDB	3 V UGS _vB%	6T55j	vNIBWW	16T5	vI WF	
								3 V UGS _vB5	vNI5WN	DIBf W	j NI5	vI WII	
								3 V UGS _v6D	vNI5WN	DIBf f	j NI5	vI WII	
								LV UGS _vBI	vNI5WW	DI5DI	j %ID	vI W5	
3 V UGS _v6D	j B5DD	NDNP%BD	f TI	D	D	DIDB	DIDB	3 V UGS _vBI	NI5W%	vDI5Nj	j NII	vI WB	
								LV UGS _v6D	vNI5WW	DI5DI	j %ID	vI W5	
* POR	Nj 5TDDD	NDDIDDD	DID	vf f TN'B	%6TP%BN	D	D	51_N	vf f TN'B	%6TP%BN	j j 1TF	vI 6TD	
3 P_~j	Nj T5DD	11TWNj	WII	D	D	D	D	HV UGS 3 P_	DIDDD	DIDDD	DID	DID	
								& 51_NU					

* Rndicates a Aoltage regulated bus (Aoltage controlled or swing ty4e - achine connected to it)

\# Rndicates a bus with a load - is- atch o8- ore than DIN3 V.

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
5. I N0	j BDDGG	. . Df f 1	TD	C	G	C	C	3 V U6 S _v%1	vN5IDf T	BDBf	j NID%	v. f D	
								5. _NU	N5IDf T	vBDBf	j NID%	v. f D	
5. I %0	j BDDGG	. . Df f 1	TD	C	G	C	C	JUv%N	v%GDj G	BD1.	j B. D	v. f DT	
								5. _NU	%GDj G	vBD1.	j B. D	v. f DT	
5. I j 0	j BDDGG	. . Df f 1	TD	C	G	C	C	3 V U6 S _v%j	v%GDC%	BDf B	j B5D	v. f D	
								5. _NU	%GDC%	vBDf B	j B5D	v. f D	
5. I B0	j BDDGG	. . Df f 1	TD	C	G	C	C	3 V U6 S _vBG	vN5DBj	j DNI	j N%DN	v. 5DT	
								5. _NU	N5DBj	vj DNI	j N%DN	v. 5DT	
5. _N0	Nj 5DDGG	NGBD. f	GDG	C	G	C	C	POR	f f DNTf	v%1DC%	j %j DT	v. 1DG	
								HV U6 S 3 P_	vf f DNTf	%1DC%	j %j DT	v. 1DG	
5. _NU	j BDDGG	. . Df f 1	TD	C	G	C	C	5. I B0	vN5DBj	j DNI	j N%DN	v. 5DT	
								5. I j 0	v%GDC%	BDf B	j B5D	v. f D	
								5. I %0	v%GDj G	BD1.	j B. D	v. f DT	
								5. I N0	vN5IDf T	BDBf	j NID%	v. f D	
								3 P_~j	f f DB1G	vNIDG T	Nj %IDT	v. f D	
							&	HV U6 S 3 P_					
HV U6 S 3 P_	Nj 5DDGG	NGBD. f	GDG	C	G	GDG1.	GDNT%	5. _N0	f f DNTf	v%1DC%	j %j DT	v. 1DG	
								5. _NU	vf f D8T	%1DNBG	j %j DT	v. 1DN	%DDCG
							&	3 P_~j					
JUv%N	j BDDGG	. . DBT	TDT	C	G	C	C	3 V U6 S _vNf	vN%DfG	j DDf.	%j D%	v. f D	
								3 V U6 S _v%%	vf D%N	ND. B	N%D	v. f D%	
								5. I %0	%GD. N	vBDf j	j 1NDG	v. f D	
JUvB/N	j BDDGG	NGGDB%	f D	C	G	C	C	3 V U6 S _vBN	vN5TN	GDB5B	j ND	v. TD	
								3 V U6 S _vB%	vf D%1	N5NI	N%DG	v. f DN	
								3 V U6 S _vBj	vN5TN	GDB51	j ND	v. TD	
								3 V U6 S _vBB	NNDBf	v%D5j	N GD	v. f DG	
LV U6 S _vGN	GDT. G	NGG%NB	. DB	N5f 1	vGDBj j	C	C	3 V U6 S _vGN	N5f 1	vGDBj j	NIGIDB	v. f DB	
LV U6 S _vC%	GDT. G	NGGDj T	. DB	N5f 1	vGDBj j	C	C	3 V U6 S _vC%	N5f 1	vGDBj j	NIGDT	v. f DB	
LV U6 S _vGj	GDT. G	NGGDC%	. DB	N5f 1	vGDBj j	C	C	3 V U6 S _vGj	N5f 1	vGDBj j	NIG D	v. f DB	
LV U6 S _vGB	GDT. G	. . DN5	. D	N5f 1	vGDBj j	C	C	3 V U6 S _vGB	N5f 1	vGDBj j	NINNDN	v. f DB	
LV U6 S _vGI	GDT. G	. . D. %	. D	N5f 1	vGDBj j	C	C	3 V U6 S _vGI	N5f 1	vGDBj j	NINj D%	v. f DB	
LV U6 S _vGT	GDT. G	. . D%G	. D%	N5f 1	vGDBj j	C	C	3 V U6 S _vGT	N5f 1	vGDBj j	NIN%D	v. f DB	
LV U6 S _vGf	GDT. G	. . Df G	. D%	N5f 1	vGDBj j	C	C	3 V U6 S _vGf	N5f 1	vGDBj j	NINj D	v. f DB	
LV U6 S _vG5	GDT. G	. . DNG	. D%	N5f 1	vGDBj j	C	C	3 V U6 S _vG5	N5f 1	vGDBj j	NINBD	v. f DB	
LV U6 S _vG	GDT. G	. . D55	. DN	N5f 1	vGDBj j	C	C	3 V U6 S _vG	N5f 1	vGDBj j	NINID	v. f DB	
LV U6 S _vNG	GDT. G	. . Dj G	. DN	N5f 1	vGDBj j	C	C	3 V U6 S _vNG	N5f 1	vGDBj j	NINf DB	v. f DB	

Pro7ect:	F m OH m RF W	**ETAP**	Page: %
Location:	Paulding, OH	NI10010C	Wate: NGvG1 v%GNf
Contract:			SF : m ES_m OOWj
Engineer:	Josh Venden	Study Case: NG1P6 . 1LE0 W	k eAision: f 1M p EF
I ilena- e:	F m 2OH		Con8igD F or- al

Bus		Voltage		Generation		Load		Load Flow				XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
LV U6 S _vNj	GD. G	. . DTG	. D%	N5f 1	vGDj j	C	C	3 V U6 S _vNj	N5f 1	vGDj j	NINGDB	v. f DB	
LV U6 S _vNB	GD. G	. . DGT	. D%	N5f 1	vGDj j	C	C	3 V U6 S _vNB	N5f 1	vGDj j	NINNDp	v. f DB	
LV U6 S _vN1	GD. G	. . Dj f	. DN	N5f 1	vGDj j	C	C	3 V U6 S _vN1	N5f 1	vGDj j	NIN1 D5	v. f DB	
LV U6 S _vNT	GD. G	. . D5G	. D%	N5f 1	vGDj j	C	C	3 V U6 S _vNT	N5f 1	vGDj j	NINND5	v. f DB	
LV U6 S _vNf	GD. G	. . DBT5	. DG	N5f 1	vGDj j	C	C	3 V U6 S _vNf	N5f 1	vGDj j	NIN5 DB	v. f DB	
LV U6 S _v%G	GD. G	. . D5NN	. DG	N5f 1	vGDj j	C	C	3 V U6 S _v%G	N5f 1	vGDj j	NIN%D	v. f DB	
LV U6 S _v%N	GD. G	. . D5B	. DG	N5f 1	vGDj j	C	C	3 V U6 S _v%N	N5f 1	vGDj j	NINBD	v. f DB	
LV U6 S _v%%	GD. G	. . D5%	. DG	N5f 1	vGDj j	C	C	3 V U6 S _v%%	N5f 1	vGDj j	NINIDT	v. f DB	
LV U6 S _v%j	GD. G	. . DB51	. DN	N5f 1	vGDj j	C	C	3 V U6 S _v%j	N5f 1	vGDj j	NIN5 DN	v. f DB	
LV U6 S _v%B	GD. G	. . Dj 5	5D	N5f 1	vGDj j	C	C	3 V U6 S _v%B	N5f 1	vGDj j	NI%GD	v. f DB	
LV U6 S _v%1	GD. G	. . DN%	5D	N5f 1	vGDj j	C	C	3 V U6 S _v%1	N5f 1	vGDj j	NI%NDG	v. f DB	
LV U6 S _v%T	GD. G	. . D%T	. D%	N5f 1	vGDj j	C	C	3 V U6 S _v%T	N5f 1	vGDj j	NINBD%	v. f DB	
LV U6 S _v%f	GD. G	. . DTj	. D%	N5f 1	vGDj j	C	C	3 V U6 S _v%f	N5f 1	vGDj j	NIN1 D%	v. f DB	
LV U6 S _v%5	GD. G	. . DBN	. D%	N5f 1	vGDj j	C	C	3 V U6 S _v%5	N5f 1	vGDj j	NINf D%	v. f DB	
LV U6 S _v%.	GD. G	. . Dj %	. DG	N5f 1	vGDj j	C	C	3 V U6 S _v%.	N5f 1	vGDj j	NINBDN	v. f DB	
LV U6 S _vj N	GD. G	. . D5%	. DB	N5f 1	vGDj j	C	C	3 V U6 S _vj N	N5f 1	vGDj j	NINGDN	v. f DB	
LV U6 S _vj %	GD. G	. . D. T	. DB	N5f 1	vGDj j	C	C	3 V U6 S _vj %	N5f 1	vGDj j	NINj DN	v. f DB	
LV U6 S _vj j	GD. G	. . DC%	. Dp	N5f 1	vGDj j	C	C	3 V U6 S _vj j	N5f 1	vGDj j	NINBDT	v. f DB	
LV U6 S _vj B	GD. G	. . D5G	. DB	N5f 1	vGDj j	C	C	3 V U6 S _vj B	N5f 1	vGDj j	NIN%D	v. f DB	
LV U6 S _vj T	GD. G	NGGDB1	. DB	N5f 1	vGDj j	C	C	3 V U6 S _vj T	N5f 1	vGDj j	NIG DN	v. f DB	
LV U6 S _vj f	GD. G	NGGDG N	. Dp	N5f 1	vGDj j	C	C	3 V U6 S _vj f	N5f 1	vGDj j	NIG5 Dp	v. f DB	
LV U6 S _vj .	GD. G	NGGDN%	. DB	N5f 1	vGDj j	C	C	3 V U6 S _vj .	N5f 1	vGDj j	NIG DT	v. f DB	
LV U6 S _vBG	GD. G	. . D5B%	. DT	N5f 1	vGDj j	C	C	3 V U6 S _vBG	N5f 1	vGDj j	NIN%Dp	v. f DB	
LV U6 S _vBN	GD. G	NGGD%B1	NGDG	N5f 1	vGDj j	C	C	3 V U6 S _vBN	N5f 1	vGDj j	NIG1 D	v. f DB	
LV U6 S _vB%	GD. G	NGGDN f	NGDG	N5f 1	vGDj j	C	C	3 V U6 S _vB%	N5f 1	vGDj j	NIGIDT	v. f DB	
LV U6 S _vBj	GD. G	NGGD%Bj	NGDG	N5f 1	vGDj j	C	C	3 V U6 S _vBj	N5f 1	vGDj j	NIG1 D	v. f DB	
LV U6 S _vBB	GD. G	NGGDGIf	. D	N5f 1	vGDj j	C	C	3 V U6 S _vBB	N5f 1	vGDj j	NIG5 D5	v. f DB	
LV U6 S _vB1	GD. G	. . D5.	. D5	N5f 1	vGDj j	C	C	3 V U6 S _vB1	N5f 1	vGDj j	NINGDG	v. f DB	
LV U6 S _vBT	GD. G	. . DGB	. D5	N5f 1	vGDj j	C	C	3 V U6 S _vBT	N5f 1	vGDj j	NINNDp	v. f DB	
LV U6 S _vB5	GD. G	NGGDT1	NGDN	N5f 1	vGDj j	C	C	3 V U6 S _vB5	N5f 1	vGDj j	NIGGD5	v. f DB	
LV U6 S _vB.	GD. G	NGGDGB	NGDN	N5f 1	vGDj j	C	C	3 V U6 S _vB.	N5f 1	vGDj j	NIGND5	v. f DB	
LV U6 S _v1G	GD. G	NGGDTj	NGDN	N5f 1	vGDj j	C	C	3 V U6 S _v1G	N5f 1	vGDj j	NIGGD5	v. f DB	
3 V U6 S _vGN	j BDGG	NGGD5TG	f DN	C	G	GDGB	GDGB	3 V U6 S _vG%	N5T%	vGDNj	j %DN	v. TDB	
								LV U6 S _vGN	vN5TT	GDNG	j %DN	v. TDp	
3 V U6 S _vG%	j BDGG	NGGD5%	f DN	C	G	GDGB	GDGB	3 V U6 S _vGN	vN5TG	GDBTT	j ND	v. f DG	
								3 V U6 S _vGj	j D%%	vGD5G	TBDG	v. TD5	
								LV U6 S _vG%	vN5TT	GDNG	j %D%	v. TDp	
3 V U6 S _vGj	j BDGG	NGGD1G	f DN	C	G	GDGB	GDGB	3 V U6 S _vG%	vj DNf	GDBN	Tj D5	v. TD	
								3 V U6 S _vGB	1Df 5	vNDB11	. 1D	v. TD5	

Pro7ect:	F m OH m RF W	**ETAP**	Page: j
Location:	Paulding, OH	NI1D1D1C	Wate: NGAGI v%GNI'
Contract:			SF : m ES_m OOWj
Engineer:	Josh Venden	Study Case: NGI P6 . 1LE0 W	k eAision: f 1M p EF
I ilena- e:	F m 2OH		Con8gD F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M3 agD	0ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0- 4	MPI	M_a4
								LV U6 S _vGj	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vGB	j BDGG	NGGDBIT	f DN	C	G	GDGB	GDGB	3 V U6 S _vGj	vl Df j	NDBNG	. 1D5	v. TD	
								3 V U6 S _vGl	f Dj 1	vND%B	N%TD	v. TD5	
								LV U6 S _vGB	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vGl	j BDGG	NGGDBN	f DG	C	G	GDGB	GDGB	3 V U6 S _vGB	vf D%B	N5f T	N%TD	v. f DG	
								3 V U6 S _vG5	. D5T	v%D. G	NI. D	v. TD5	
								LV U6 S _vGl	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _vGT	j BDGG	NGGDT.	TD	C	G	GDGB	GDGB	3 V U6 S _vGI'	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _vGT	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _vGI'	j BDGG	NGGD%G	TD	C	G	GDGB	GDGB	3 V U6 S _vGT	vN5TN	GD51	j %DN	v. TD5	
								3 V U6 S _vNI'	vN5TG	GDB.	j ND	v. f D%	
								3 V U6 S _vNl	1D5%	vNDB5	. TD%	v. TD5	
								LV U6 S _vGI'	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _vG5	j BDGG	NGGD%TG	TD	C	G	GDGB	GDGB	3 V U6 S _vGl	v. D%T	%DGG	NI. D	v. f DN	
								3 V U6 S _vG	NNDj f	v%D5NB	N ND	v. f DG	
								LV U6 S _vG5	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _vG	j BDGG	NGGDj .	TD5	C	G	GDGB	GDGB	3 V U6 S _vG5	vNNDN	%D5G	N ND	v. f D%	
								3 V U6 S _vNG	N%D5N	vj D%j	%j D	v. f DN	
								LV U6 S _vG	vN5TT	GDNN	j %D	v. TD	
3 V U6 S _vNG	j BDGG	NGGD5N	TD5	C	G	GDGB	GDGB	3 V U6 S _vG	vN%Df G	j DNBB	%j D%	v. f D%	
								3 V U6 S _v%l	NBDj %	vj DT15	%l 1DB	v. f DN	
								LV U6 S _vNG	vN5TT	GDNN	j %D	v. TD	
3 V U6 S _vNj	j BDGG	NGGDG5	TD	C	G	GDGB	GDGB	3 V U6 S _vNB	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _vNj	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vNB	j BDGG	NGGDB11	TD	C	G	GDGB	GDGB	3 V U6 S _vNj	vN5TN	GD5%	j %DG	v. TD5	
								3 V U6 S _vNl	j D%j	vGD. 1	TBD%	v. TDI'	
								LV U6 S _vNB	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vNl	j BDGG	NGGD55	TD5	C	G	GDGB	GDGB	3 V U6 S _vGI'	vl Df B	NDf 5	. 1D	v. f DN	
								3 V U6 S _vNB	vj DNN	GDN5	Tj D	v. f DN	
								3 V U6 S _vNI'	NNDBf	v%D5NG	N %DG	v. f DG	
								LV U6 S _vNl	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _vNT	j BDGG	NGGD%5	TD	C	G	GDGB	GDGB	3 V U6 S _vGI'	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _vNT	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vNI'	j BDGG	NGGD%G	TD	C	G	GDGB	GDGB	JUv%N	N%D5B	vj DNI'.	%j D	v. f DN	
								3 V U6 S _vNl	vNND%%	%DTB	N NDB	v. f D%	
								LV U6 S _vNI'	vN5TT	GDNN	j %DB	v. TD	
3 V U6 S _v%G	j BDGG	NGGDTG	TD5	C	G	GDGB	GDGB	3 V U6 S _v%N	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _v%G	vN5TT	GDNG	j %D	v. TD	
3 V U6 S _v%N	j BDGG	NGGD%j B	TD	C	G	GDGB	GDGB	3 V U6 S _v%G	vN51.	GDj .	j ND	v. f D	

Pro7ect:	F m OH m RF W	Page:	B
Location:	Paulding, OH	Wate:	NGvG1 v%GNf
Contract:		SF :	m ES_m OOWj
Engineer:	Josh Venden	k eAision:	f 1M p EF
I ilena- e:	F m 2OH	Con8igD	F or- al

ETAP

NTDGDC

Study Case: NG1P6 . 1LE0 W

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
								3 V U6 S _v%%	jD%N	vGD1j	TBDN	v. TD	
								LV U6 S _v%N	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _v%%	j BDGG	NGGDNj j	TDf	C	G	GDGB	GDGB	JUv%N	f Dj f	vN5T1	N%5DN	v. fDG	
								3 V U6 S _v%N	vjDNf	GD%B	TBDG	v. fDG	
								3 V U6 S _v%	vN51.	GD%T	j ND	v. fD	
								LV U6 S _v%%	vN5TT	GDNN	j %Dp	v. TD	
3 V U6 S _v%j	j BDGG	NGGDj f	TD5	C	G	GDGB	GDGB	5. I j 0	%GD. B	vBD1%	j 1GDf	v. fDp	
								3 V U6 S _v%5	vN5Dj %	BDj f	j N5DB	v. fDB	
								LV U6 S _v%j	vN5TT	GDNN	j %DB	v. TD	
3 V U6 S _v%B	j BDGG	. . D5. N	TD	C	G	GDGB	GDGB	3 V U6 S _v%d	N5T%	vGDNl	j %DB	v. TDB	
								LV U6 S _v%B	vN5TT	GDNN	j %DB	v. TDB	
3 V U6 S _v%d	j BDGG	. . D5T1	TD	C	G	GDGB	GDGB	5. I N0	N5DGB	vBD%j f	j N5DN	v. fD	
								3 V U6 S _vNG	vNBD5N	j D%d G	%d j DT	v. fDf	
								3 V U6 S _v%B	vN5TN	GDf %	j %D%	v. TD	
								LV U6 S _v%d	vN5TT	GDNN	j %DB	v. TDB	
3 V U6 S _v%T	j BDGG	NGGD%f T	TD	C	G	GDGB	GDGB	3 V U6 S _v%f	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _v%T	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _v%f	j BDGG	NGGD%Nj	TD	C	G	GDGB	GDGB	3 V U6 S _v%T	vN5TN	GDf f	j %DN	v. TD	
								3 V U6 S _v%5	j D%%	vGD. N	TBDp	v. TDT	
								LV U6 S _v%f	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _v%5	j BDGG	NGGDG %	TD	C	G	GDGB	GDGB	3 V U6 S _v%j	N5D1G	vBDB15	j N DG	v. fD%	
								3 V U6 S _v%f	vjDNf	GD1T	TBD%	v. TD5	
								3 V U6 S _vj j	vN%Df N	%D55	%8%DT	v. fDB	
								LV U6 S _v%5	vN5TT	GDNN	j %Dp	v. TD	
3 V U6 S _v%	j BDGG	NGGD%5N	TDf	C	G	GDGB	GDGB	3 V U6 S _v%%	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _v%	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _vj N	j BDGG	NGGDj G	fDN	C	G	GDGB	GDGB	3 V U6 S _vj %	N5T%	vGDNB	j %D%	v. TDB	
								LV U6 S _vj N	vN5TT	GDNG	j %D%	v. TD	
3 V U6 S _vj %	j BDGG	NGGDpBT	fDN	C	G	GDGB	GDGB	3 V U6 S _vj N	vN515	GDGB	j NDf	v. fDf	
								3 V U6 S _vj j	j D%G	vGDN5	Tj D	v. fDN	
								LV U6 S _vj %	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _vj j	j BDGG	NGGD%d %	fDN	C	G	GDGB	GDGB	3 V U6 S _v%5	NjDGN	vjD%Gj	%8j D	v. fDN	
								3 V U6 S _vj %	vjDNT	GD5. N	TjD5	v. fD%	
								3 V U6 S _vj B	vfDB%j	NDf. .	N%f D	v. fD%	
								LV U6 S _vj j	vN5TT	GDNG	j %Dp	v. TD	
3 V U6 S _vj B	j BDGG	NGGDp15	fDN	C	G	GDGB	GDGB	3 V U6 S _vj j	fDB j j	vN5j .	N%f Df	v. fDN	
								3 V U6 S _vj T	vjDNj	GDj N	TjD5	v. fDG	
								3 V U6 S _vj .	vN515	GDp. B	j NDf	v. fD5	
								LV U6 S _vj B	vN5TT	GDNG	j %Dp	v. TD	

Pro7ect:	F m OH m RF W	ETAP	Page:	1
Location:	Paulding, OH	NI1OO1C	Wate:	NGvG1 v%GN'
Contract:			SF :	m ES_m OOWj
Engineer:	Josh Venden	Study Case: NG1P6 . 1LE0 W	k eAision:	f 1M p EF
I ilena- e:	F m 2OH		Con8gD	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
RW	9V	M 3 agD	0 ngD	3 m	3 Aar	3 m	3 Aar	RW	3 m	3 Aar	0 - 4	MPI	M_a4
3 V U6 S _vj T	j BDGG	NGGD. %	f D%	C	G	GDGB	GDGB	3 V U6 S _vj B	j D%j	vNDGG	TBDN	v. TDT	
								3 V U6 S _vj f	vN5TN	GD5T	j %DG	v. TD5	
								LV U6 S _vj T	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vj f	j BDGG	NGGDj 5	f D%	C	G	GDGB	GDGB	3 V U6 S _vj T	N5T%	vGDNj	j %DN	v. TDB	
								LV U6 S _vj f	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vj .	j BDGG	NGGDTG	f D%	C	G	GDGB	GDGB	3 V U6 S _vj B	N5T%	vGDNB	j %DN	v. TDB	
								LV U6 S _vj .	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vBG	j BDGG	NGGD. N	f D	C	G	GDGB	GDGB	5. I B0	N5D%1	vBD1T	j Nf D%	v. f D	
								3 V U6 S _vBT	vNIDTj	j D5B%	%51DN	v. f DB	
								LV U6 S _vBG	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vBN	j BDGG	NGGD. N	f D5	C	G	GDGB	GDGB	JUvB/N	N5T%	vGDNj	j %DN	v. TDB	
								LV U6 S _vBN	vN5TT	GDNG	j %DN	v. TDD	
3 V U6 S _vB%	j BDGG	NGGDBB	f D5	C	G	GDGB	GDGB	JUvB/N	f DB%1	vN5N1	N%f DG	v. f DN	
								3 V U6 S _vB.	v1DTj	NDG%	. BD	v. f DB	
								LV U6 S _vB%	vN5TT	GDNG	j %DN	v. TDD	
3 V U6 S _vBj	j BDGG	NGGD. G	f D5	C	G	GDGB	GDGB	JUvB/N	N5T%	vGDNj	j %DN	v. TDB	
								LV U6 S _vBj	vN5TT	GDNG	j %DN	v. TDD	
3 V U6 S _vBB	j BDGG	NGGDN1	f DT	C	G	GDGB	GDGB	JUvB/N	vNND%5	%Df N	N GD	v. f D%	
								3 V U6 S _vB1	N%D. G	vj D5B	%%8D	v. f DN	
								LV U6 S _vBB	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vB1	j BDGG	NGGDj f	f DT	C	G	GDGB	GDGB	3 V U6 S _vBB	vN%Df 1	j Df f	%%8DG	v. f D	
								3 V U6 S _vBT	NBD5j f	vj D. N	%1BDN	v. f D%	
								LV U6 S _vB1	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vBT	j BDGG	NGGDB1j	f DB	C	G	GDGB	GDGB	3 V U6 S _vBG	NIDf .	vj DB%	%51DD	v. f D	
								3 V U6 S _vB1	vNBD5N'	j DB%5	%1j DB	v. f DB	
								LV U6 S _vBT	vN5TT	GDNG	j %D%	v. TDD	
3 V U6 S _vB5	j BDGG	NGNDNG	f D	C	G	GDGB	GDGB	3 V U6 S _vB.	N5T%	vGDNj	j %DG	v. TDB	
								LV U6 S _vB5	vN5TT	GDG	j %DG	v. TDD	
3 V U6 S _vB.	j BDGG	NGNDB5	f D	C	G	GDGB	GDGB	3 V U6 S _vB%	1D5j	vNDTT	. 1DT	v. TD5	
								3 V U6 S _vB5	vN5TN	GDf T	j N5	v. TDD	
								3 V U6 S _v1G	vN5TN	GDf f	j N5	v. TDD	
								LV U6 S _vB.	vN5TT	GDG	j %DG	v. TDD	
3 V U6 S _v1G	j BDGG	NGNDGT	f D	C	G	GDGB	GDGB	3 V U6 S _vB.	N5T%	vGDNj	j %DG	v. TDB	
								LV U6 S _v1G	vN5TT	GDG	j %DG	v. TDD	
* POR	Nj 5DGG	NG1DGG	GDG	vf f DNTT	%1DG5	C	C	5. _N0	vf f DNTT	%1DG5	j %j DT	v. 1DG	
3 P_~j	Nj D5GG	. . DBf 5	TD	C	G	C	C	HV U6 S 3 P_	GDGG	GDGG	GDG	GDG	
								& 5. _NU					

* Indicates a Aoltage regulated bus (Aoltage controlled or swing ty4e - achine connected to it)

\# Indicates a bus with a load - is- atch o8- ore than GDN3 V0

Project:	UW OH WNUD	ETAP		Page:	F
Location:	Paulding, OH	F6.0.0C		Date:	F0-06-20F7
Contract:				SU:	WESI WOODP
Engineer:	Josh Venden	Study Case:	1 UN T PY	Revision:	F00% GEU
Yilename:	UW_OH			Config.:	Uormal

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ND	MW	Mvar	Amp	%PY	%I ap
89YFA	34.500	99.8F2	8.5	0	0	0	0	MV B1 S I -25	-24.580	0.3F8	4F2.F	F00.0	
								89I FB	24.580	-0.3F8	4F2.F	F00.0	
89Y2A	34.500	99.8F2	8.5	0	0	0	0	JB-2/F	-27.048	0.442	453.6	-F00.0	
								89I FB	27.048	-0.442	453.6	-F00.0	
89Y3A	34.500	99.8F2	8.5	0	0	0	0	MV B1 S I -23	-27.00F	0.30F	452.7	F00.0	
								89I FB	27.00F	-0.30F	452.7	F00.0	
89Y4A	34.500	99.8F2	8.5	0	0	0	0	MV B1 S I -40	-24.358	-0.485	408.5	F00.0	
								89I FB	24.358	0.485	408.5	F00.0	
89I FA	F38.000	F00.000	0.0	0	0	0	0	PON	F02.555	-F6.04F	434.3	-98.8	
								HV B1 S MPI	-F02.555	F6.04F	434.3	-98.8	
89I FB	34.500	99.8F2	8.5	0	0	0	0	89Y4A	-24.358	-0.485	408.5	F00.0	
								89Y3A	-27.00F	0.30F	452.7	F00.0	
								89Y2A	-27.048	0.442	453.6	-F00.0	
								89YFA	-24.580	0.3F8	4F2.F	F00.0	
								MPI ~3	F02.988	-0.576	F726.8	F00.0	
							&	HV B1 S MPI					
HV B1 S MPI	F38.000	F00.000	0.0	0	0	0.053	0.F47	89I FA	F02.555	-F6.04F	434.3	-98.8	
								89I FB	-F02.609	F5.894	434.4	-98.8	-0.625
							&	MPI ~3					
JB-2/F	34.500	F00.F76	8.9	0	0	0	0	MV B1 S I -F7	-F7.268	0.420	288.5	-F00.0	
								MV B1 S I -22	-9.883	0.266	F65.2	-F00.0	
								89Y2A	27.F5F	-0.685	453.7	-F00.0	
JB-4/F	34.500	F0F.690	F0.2	0	0	0	0	MV B1 S I -4F	-2.480	0.098	40.8	-99.9	
								MV B1 S I -42	-9.89F	0.273	F62.8	-F00.0	
								MV B1 S I -43	-2.480	0.099	40.9	-99.9	
								MV B1 S I -44	F4.852	-0.47F	244.5	-99.9	
LV B1 S I -0F	0.690	F0F.886	F2.3	2.500	0.000	0	0	MV B1 S I -0F	2.500	0.000	2053.F	F00.0	
LV B1 S I -02	0.690	F0F.778	F2.3	2.500	0.000	0	0	MV B1 S I -02	2.500	0.000	2055.3	F00.0	
LV B1 S I -03	0.690	F0F.594	F2.3	2.500	0.000	0	0	MV B1 S I -03	2.500	0.000	2059.0	F00.0	
LV B1 S I -04	0.690	F0F.472	F2.2	2.500	0.000	0	0	MV B1 S I -04	2.500	0.000	206F.5	F00.0	
LV B1 S I -05	0.690	F0F.289	F2.2	2.500	0.000	0	0	MV B1 S I -05	2.500	0.000	2065.2	F00.0	
LV B1 S I -06	0.690	F0F.279	F2.F	2.500	0.000	0	0	MV B1 S I -06	2.500	0.000	2065.4	F00.0	
LV B1 S I -07	0.690	F0F.2FF	F2.F	2.500	0.000	0	0	MV B1 S I -07	2.500	0.000	2066.8	F00.0	
LV B1 S I -08	0.690	F0F.F57	F2.F	2.500	0.000	0	0	MV B1 S I -08	2.500	0.000	2067.9	F00.0	
LV B1 S I -09	0.690	F00.96F	F2.F	2.500	0.000	0	0	MV B1 S I -09	2.500	0.000	207F.9	F00.0	
LV B1 S I -F0	0.690	F00.858	F2.0	2.500	0.000	0	0	MV B1 S I -F0	2.500	0.000	2074.F	F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ND	MW	Mvar	Amp	%PY	%I ap
LV B1 S I -F3	0.690	F0F.464	F2.F	2.500	0.000	0	0	MV B1 S I -F3	2.500	0.000	206F.7	F00.0	
LV B1 S I -F4	0.690	F0F.390	F2.F	2.500	0.000	0	0	MV B1 S I -F4	2.500	0.000	2063.2	F00.0	
LV B1 S I -F5	0.690	F0F.0F9	F2.0	2.500	0.000	0	0	MV B1 S I -F5	2.500	0.000	2070.8	F00.0	
LV B1 S I -F6	0.690	F0F.362	F2.F	2.500	0.000	0	0	MV B1 S I -F6	2.500	0.000	2063.7	F00.0	
LV B1 S I -F7	0.690	F00.746	FF.9	2.500	0.000	0	0	MV B1 S I -F7	2.500	0.000	2076.4	F00.0	
LV B1 S I -20	0.690	F0F.204	FF.9	2.500	0.000	0	0	MV B1 S I -20	2.500	0.000	2067.0	F00.0	
LV B1 S I -2F	0.690	F0F.029	FF.9	2.500	0.000	0	0	MV B1 S I -2F	2.500	0.000	2070.5	F00.0	
LV B1 S I -22	0.690	F00.889	FF.9	2.500	0.000	0	0	MV B1 S I -22	2.500	0.000	2073.4	F00.0	
LV B1 S I -23	0.690	F00.804	F2.0	2.500	0.000	0	0	MV B1 S I -23	2.500	0.000	2075.2	F00.0	
LV B1 S I -24	0.690	F00.479	FF.7	2.500	0.000	0	0	MV B1 S I -24	2.500	0.000	208F.9	F00.0	
LV B1 S I -25	0.690	F00.44F	FF.7	2.500	0.000	0	0	MV B1 S I -25	2.500	0.000	2082.7	F00.0	
LV B1 S I -26	0.690	F0F.F79	F2.2	2.500	0.000	0	0	MV B1 S I -26	2.500	0.000	2067.5	F00.0	
LV B1 S I -27	0.690	F0F.092	F2.F	2.500	0.000	0	0	MV B1 S I -27	2.500	0.000	2069.3	F00.0	
LV B1 S I -28	0.690	F00.924	F2.F	2.500	0.000	0	0	MV B1 S I -28	2.500	0.000	2072.7	F00.0	
LV B1 S I -29	0.690	F0F.095	FF.9	2.500	0.000	0	0	MV B1 S I -29	2.500	0.000	2069.2	F00.0	
LV B1 S I -3F	0.690	F0F.59F	F2.3	2.500	0.000	0	0	MV B1 S I -3F	2.500	0.000	2059.F	F00.0	
LV B1 S I -32	0.690	F0F.335	F2.3	2.500	0.000	0	0	MV B1 S I -32	2.500	0.000	2064.3	F00.0	
LV B1 S I -33	0.690	F0F.205	F2.3	2.500	0.000	0	0	MV B1 S I -33	2.500	0.000	2066.9	F00.0	
LV B1 S I -34	0.690	F0F.359	F2.3	2.500	0.000	0	0	MV B1 S I -34	2.500	0.000	2063.8	F00.0	
LV B1 S I -36	0.690	F0F.684	F2.4	2.500	0.000	0	0	MV B1 S I -36	2.500	0.000	2057.2	F00.0	
LV B1 S I -37	0.690	F0F.748	F2.4	2.500	0.000	0	0	MV B1 S I -37	2.500	0.000	2055.9	F00.0	
LV B1 S I -39	0.690	F0F.639	F2.4	2.500	0.000	0	0	MV B1 S I -39	2.500	0.000	2058.F	F00.0	
LV B1 S I -40	0.690	F0F.502	F2.6	2.500	0.000	0	0	MV B1 S I -40	2.500	0.000	2060.9	F00.0	
LV B1 S I -4F	0.690	F02.F94	F3.0	2.500	0.000	0	0	MV B1 S I -4F	2.500	0.000	2046.9	F00.0	
LV B1 S I -42	0.690	F02.F29	F3.0	2.500	0.000	0	0	MV B1 S I -42	2.500	0.000	2048.2	F00.0	
LV B1 S I -43	0.690	F02.F92	F3.0	2.500	0.000	0	0	MV B1 S I -43	2.500	0.000	2047.0	F00.0	
LV B1 S I -44	0.690	F0F.920	F2.9	2.500	0.000	0	0	MV B1 S I -44	2.500	0.000	2052.4	F00.0	
LV B1 S I -45	0.690	F0F.783	F2.9	2.500	0.000	0	0	MV B1 S I -45	2.500	0.000	2055.2	F00.0	
LV B1 S I -46	0.690	F0F.62F	F2.7	2.500	0.000	0	0	MV B1 S I -46	2.500	0.000	2058.5	F00.0	
LV B1 S I -48	0.690	F02.654	F3.F	2.500	0.000	0	0	MV B1 S I -48	2.500	0.000	2037.8	F00.0	
LV B1 S I -49	0.690	F02.570	F3.F	2.500	0.000	0	0	MV B1 S I -49	2.500	0.000	2039.4	F00.0	
LV B1 S I -50	0.690	F02.65F	F3.F	2.500	0.000	0	0	MV B1 S I -50	2.500	0.000	2037.8	F00.0	
MV B1 S I -0F	34.500	F0F.450	9.4	0	0	0.004	0.004	MV B1 S I -02	2.482	-0.F29	4F.0	-99.9	
								LV B1 S I -0F	-2.486	0.F25	4F.F	-99.9	
MV B1 S I -02	34.500	F0F.34F	9.4	0	0	0.004	0.004	MV B1 S I -0F	-2.479	0.082	4F.0	-99.9	
								MV B1 S I -03	4.96F	-0.2FF	82.0	-99.9	
								LV B1 S I -02	-2.486	0.F25	4F.F	-99.9	
MV B1 S I -03	34.500	F0F.F57	9.4	0	0	0.004	0.004	MV B1 S I -02	-4.952	0.F72	82.0	-99.9	
								MV B1 S I -04	7.434	-0.302	F23.F	-99.9	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PY	%I ap
								LV B1 S I -03	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -04	34.500	F0F.034	9.3	0	0	0.004	0.004	MV B1 S I -03	-7.425	0.258	F23.F	-99.9	
								MV B1 S I -05	9.907	-0.388	F64.2	-99.9	
								LV B1 S I -04	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -05	34.500	F00.852	9.3	0	0	0.004	0.004	MV B1 S I -04	-9.888	0.342	F64.2	-99.9	
								MV B1 S I -08	F2.370	-0.473	205.4	-99.9	
								LV B1 S I -05	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -06	34.500	F00.842	9.2	0	0	0.004	0.004	MV B1 S I -07	2.482	-0.F30	4F.2	-99.9	
								LV B1 S I -06	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -07	34.500	F00.773	9.2	0	0	0.004	0.004	MV B1 S I -06	-2.480	0.F0F	4F.2	-99.9	
								MV B1 S I -F6	-2.478	0.065	4F.2	-F00.0	
								MV B1 S I -F5	7.440	-0.297	F23.6	-99.9	
								LV B1 S I -07	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -08	34.500	F00.720	9.2	0	0	0.004	0.004	MV B1 S I -05	-F2.353	0.388	205.4	-F00.0	
								MV B1 S I -09	F4.835	-0.5F8	246.6	-99.9	
								LV B1 S I -08	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -09	34.500	F00.523	9.F	0	0	0.004	0.004	MV B1 S I -08	-F4.806	0.422	246.6	-F00.0	
								MV B1 S I -F0	F7.287	-0.553	287.9	-99.9	
								LV B1 S I -09	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -F0	34.500	F00.420	9.F	0	0	0.004	0.004	MV B1 S I -09	-F7.269	0.48F	287.9	-F00.0	
								MV B1 S I -25	F9.75F	-0.6F3	329.3	-F00.0	
								LV B1 S I -F0	-2.486	0.F28	4F.5	-99.9	
MV B1 S I -F3	34.500	F0F.027	9.2	0	0	0.004	0.004	MV B1 S I -F4	2.482	-0.F30	4F.2	-99.9	
								LV B1 S I -F3	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -F4	34.500	F00.953	9.2	0	0	0.004	0.004	MV B1 S I -F3	-2.480	0.098	4F.F	-99.9	
								MV B1 S I -F5	4.962	-0.228	82.3	-99.9	
								LV B1 S I -F4	-2.486	0.F26	4F.3	-99.9	
MV B1 S I -F5	34.500	F00.58F	9.F	0	0	0.004	0.004	MV B1 S I -07	-7.426	0.229	F23.6	-F00.0	
								MV B1 S I -F4	-4.943	0.F5F	82.3	-F00.0	
								MV B1 S I -F7	F4.85F	-0.5FF	247.2	-99.9	
								LV B1 S I -F5	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -F6	34.500	F00.925	9.2	0	0	0.004	0.004	MV B1 S I -07	2.482	-0.F30	4F.2	-99.9	
								LV B1 S I -F6	-2.486	0.F26	4F.3	-99.9	
MV B1 S I -F7	34.500	F00.307	9.0	0	0	0.004	0.004	JB-2/F	F7.29F	-0.509	288.6	-F00.0	
								MV B1 S I -F5	-F4.809	0.378	247.F	-F00.0	
								LV B1 S I -F7	-2.486	0.F28	4F.5	-99.9	
MV B1 S I -20	34.500	F00.766	9.0	0	0	0.004	0.004	MV B1 S I -2F	2.482	-0.F3F	4F.3	-99.9	
								LV B1 S I -20	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -2F	34.500	F00.59F	9.0	0	0	0.004	0.004	MV B1 S I -20	-2.477	0.056	4F.2	-F00.0	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ND	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ND	MW	Mvar	Amp	%PY	%I ap
								MV B1 S I -22	4.959	-0.F87	82.6	-99.9	
								LV B1 S I -2F	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -22	34.500	F00.450	8.9	0	0	0.004	0.004	JB-2/F	9.9FF	-0.332	F65.2	-99.9	
								MV B1 S I -2F	-4.952	0.F58	82.5	-99.9	
								MV B1 S I -29	-2.477	0.043	4F.3	-F00.0	
								LV B1 S I -22	-2.486	0.F28	4F.5	-99.9	
MV B1 S I -23	34.500	F00.366	9.F	0	0	0.004	0.004	89Y3A	27.F56	-0.673	452.9	-F00.0	
								MV B1 S I -28	-24.674	0.54F	4FF.5	-F00.0	
								LV B1 S I -23	-2.486	0.F28	4F.5	-99.9	
MV B1 S I -24	34.500	F00.040	8.7	0	0	0.004	0.004	MV B1 S I -25	2.482	-0.F32	4F.6	-99.9	
								LV B1 S I -24	-2.486	0.F29	4F.6	-99.9	
MV B1 S I -25	34.500	F00.002	8.7	0	0	0.004	0.004	89YFA	24.628	-0.474	4F2.2	-F00.0	
								MV B1 S I -F0	-F9.666	0.25F	329.F	F00.0	
								MV B1 S I -24	-2.48F	0.090	4F.5	-99.9	
								LV B1 S I -25	-2.486	0.F29	4F.7	-99.9	
MV B1 S I -26	34.500	F00.742	9.2	0	0	0.004	0.004	MV B1 S I -27	2.482	-0.F3F	4F.3	-99.9	
								LV B1 S I -26	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -27	34.500	F00.654	9.2	0	0	0.004	0.004	MV B1 S I -26	-2.480	0.093	4F.3	-99.9	
								MV B1 S I -28	4.96F	-0.224	82.6	-99.9	
								LV B1 S I -27	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -28	34.500	F00.485	9.2	0	0	0.004	0.004	MV B1 S I -23	24.705	-0.642	4FF.6	-F00.0	
								MV B1 S I -27	-4.953	0.F89	82.5	-99.9	
								MV B1 S I -33	-F7.270	0.322	287.7	-F00.0	
								LV B1 S I -28	-2.486	0.F28	4F.5	-99.9	
MV B1 S I -29	34.500	F00.657	9.0	0	0	0.004	0.004	MV B1 S I -22	2.482	-0.F3F	4F.3	-99.9	
								LV B1 S I -29	-2.486	0.F27	4F.4	-99.9	
MV B1 S I -3F	34.500	F0F.F54	9.4	0	0	0.004	0.004	MV B1 S I -32	2.482	-0.F30	4F.F	-99.9	
								LV B1 S I -3F	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -32	34.500	F00.897	9.4	0	0	0.004	0.004	MV B1 S I -3F	-2.476	0.0F9	4F.F	F00.0	
								MV B1 S I -33	4.957	-0.F49	82.3	-F00.0	
								LV B1 S I -32	-2.486	0.F26	4F.3	-99.9	
MV B1 S I -33	34.500	F00.767	9.4	0	0	0.004	0.004	MV B1 S I -28	F7.320	-0.5F7	287.8	-F00.0	
								MV B1 S I -32	-4.95F	0.F23	82.2	-F00.0	
								MV B1 S I -34	-9.888	0.264	F64.3	-F00.0	
								LV B1 S I -33	-2.486	0.F27	4F.3	-99.9	
MV B1 S I -34	34.500	F00.922	9.4	0	0	0.004	0.004	MV B1 S I -33	9.903	-0.302	F64.3	-F00.0	
								MV B1 S I -36	-4.946	0.F63	82.F	-99.9	
								MV B1 S I -39	-2.475	0.009	4F.0	F00.0	
								LV B1 S I -34	-2.486	0.F26	4F.3	-99.9	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PY	%I ap
MV B1 S I -36	34.500	F0F.247	9.5	0	0	0.004	0.004	MV B1 S I -34	4.962	-0.23F	82.F	-99.9	
								MV B1 S I -37	-2.480	0.F0F	4F.0	-99.9	
								LV B1 S I -36	-2.486	0.F26	4F.F	-99.9	
MV B1 S I -37	34.500	F0F.3FF	9.5	0	0	0.004	0.004	MV B1 S I -36	2.482	-0.F29	4F.F	-99.9	
								LV B1 S I -37	-2.486	0.F25	4F.F	-99.9	
MV B1 S I -39	34.500	F0F.202	9.5	0	0	0.004	0.004	MV B1 S I -34	2.482	-0.F29	4F.F	-99.9	
								LV B1 S I -39	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -40	34.500	F0F.065	9.7	0	0	0.004	0.004	89Y4A	24.665	-0.552	408.5	-F00.0	
								MV B1 S I -46	-22.F83	0.422	367.4	-F00.0	
								LV B1 S I -40	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -4F	34.500	F0F.758	F0.2	0	0	0.004	0.004	JB-4/F	2.482	-0.F28	40.9	-99.9	
								LV B1 S I -4F	-2.486	0.F24	40.9	-99.9	
MV B1 S I -42	34.500	F0F.693	F0.2	0	0	0.004	0.004	JB-4/F	9.89F	-0.274	F62.8	-F00.0	
								MV B1 S I -49	-7.409	0.F46	F22.0	-F00.0	
								LV B1 S I -42	-2.486	0.F25	4F.0	-99.9	
MV B1 S I -43	34.500	F0F.756	F0.2	0	0	0.004	0.004	JB-4/F	2.482	-0.F28	40.9	-99.9	
								LV B1 S I -43	-2.486	0.F24	40.9	-99.9	
MV B1 S I -44	34.500	F0F.484	F0.F	0	0	0.004	0.004	JB-4/F	-F4.82F	0.366	244.5	-F00.0	
								MV B1 S I -45	F7.303	-0.495	285.4	-F00.0	
								LV B1 S I -44	-2.486	0.F25	4F.0	-99.9	
MV B1 S I -45	34.500	F0F.346	F0.0	0	0	0.004	0.004	MV B1 S I -44	-F7.279	0.396	285.4	-F00.0	
								MV B1 S I -46	F9.76F	-0.525	326.4	-F00.0	
								LV B1 S I -45	-2.486	0.F25	4F.F	-99.9	
MV B1 S I -46	34.500	F0F.F84	9.8	0	0	0.004	0.004	MV B1 S I -40	22.2F0	-0.508	367.4	-F00.0	
								MV B1 S I -45	-F9.728	0.378	326.3	-F00.0	
								LV B1 S I -46	-2.486	0.F26	4F.2	-99.9	
MV B1 S I -48	34.500	F02.2F9	F0.3	0	0	0.004	0.004	MV B1 S I -49	2.482	-0.F27	40.7	-99.9	
								LV B1 S I -48	-2.486	0.F23	40.8	-99.9	
MV B1 S I -49	34.500	F02.F35	F0.3	0	0	0.004	0.004	MV B1 S I -42	7.442	-0.308	F22.0	-99.9	
								MV B1 S I -48	-2.480	0.090	40.7	-99.9	
								MV B1 S I -50	-2.480	0.09F	40.7	-99.9	
								LV B1 S I -49	-2.486	0.F23	40.8	-99.9	
MV B1 S I -50	34.500	F02.2F6	F0.3	0	0	0.004	0.004	MV B1 S I -49	2.482	-0.F27	40.7	-99.9	
								LV B1 S I -50	-2.486	0.F23	40.8	-99.9	
* PON	F38.000	F00.000	0.0	-F02.552	F6.056	0	0	89I FA	-F02.552	F6.056	434.3	-98.8	
MPI ~3	F3.800	99.706	9.3	0	0	0	0	HV B1 S MPI	0.000	0.000	0.0	0.0	
								& 89I FB					

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

\# Indicates a bus with a load mismatch of more than 0.F MVA

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
51- N	I B6DD	11T511	1TD	[	D	[	[	3 V UGS _%6	%6B6NN	%NNff	B6I Tk	1D6	
								51_NU	f B6NN	NN6ff	B6I Tk	1D6	
51- f .	I B6DD	11T511	1TD	[	D	[	[	JU%6/N	%6WIkB	%NfT61W	B15Tk	1DTW	
								51_NU	f WIkB	NfT61W	B15Tk	1DTW	
51- I .	I B6DD	11T511	1TD	[	D	[	[	3 V UGS _%6I	%6WIN5	%NfTkf6	B15T5	1DB	
								51_NU	f WIN5	NfTkf6	B15T5	1DB	
51- B.	I B6DD	11T511	1TD	[	D	[	[	3 V UGS _%BD	%6BTfB6	%NfTIDB	B66TB	51Tf	
								51_NU	f BTfB6	NfTIDB	B66TB	51Tf	
51_N	N 5TDDD	NDDIDD1	DTD	[	D	[	[	POv	NDfTNN5	I I TkI N	BB1TI	16TD	
								HV UGS 3 P_	%NDfTNN5	%I TkI N	BB1TI	16TD	
51_NU	I B6DD	11T511	1TD	[	D	DTDDD	%TI1f	51- B.	%6BTfB6	%NfTIDB	B66TB	51Tf	
								51- I .	%6WIN5	%NfTkf6	B15T5	1DB	
								51- f .	%6WIkB	%NfT61W	B15Tk	1DTW	
								51- N	%6B6NN	%NN6ff	B6I Tk	1D6	
								3 P_~I	NDfTWB5	6I TN 1	NI I WI	55T5	
								& HV UGS 3 P_					
HV UGS 3 P_	N 5TDDD	NDDIDD1	DTD	[	D	DTD6B	DTNBk	51_N	NDfTNN5	I I TkI N	BB1TI	16TD	
								51_NU	%NDfTNkf	%I T5k5	B6DTI	1BTI	kT6DD
								& 3 P_~I					
JU%6/N	I B6DD	NDDT6kW	1TI	[	D	[	[	3 V UGS _%Nk	%NkTfI f	%6T51k	I N6TB	1DTI	
								3 V UGS _%6f	%1T5W6	%BTB51	N5DTI	1NTD	
								51- f .	fkTD1k	NfTI5W	B16Tk	1DTI	
JU%B/N	I B6DD	NDI TNWN	NDTf	[	D	[	[	3 V UGS _%BN	%6TBk5	%NDI B	BI TI	1N6	
								3 V UGS _%Bf	%1T5kk	%BT6DD	NkWN	1NTD	
								3 V UGS _%BI	%6TBk5	%NDI I	BI TI	1N6	
								3 V UGS _%BB	NBT5I I	WW5k	f WTI	1NTf	
LV UGS _%DN	DTWD	ND6TNDf	NfTN	fT6DD	NfND	[	[	3 V UGS _%DN	fT6DD	NfND	f f NNf	1DTD	
LV UGS _%Df	DTWD	NDBTI5W	NfTN	fT6DD	NfND	[	[	3 V UGS _%Df	fT6DD	NfND	f f NTW	1DTD	
LV UGS _%DI	DTWD	NDBTkkD	NfTf	fT6DD	NfDD	[	[	3 V UGS _%DI	fT6DD	NfDD	f f NBTk	1DTf	
LV UGS _%DB	DTWD	NDBTWBk	NfTf	fT6DD	NfND	[	[	3 V UGS _%DB	fT6DD	NfND	f f f D5	1DTD	
LV UGS _%D6	DTWD	NDBTBI 6	NfTf	fT6DD	NfND	[	[	3 V UGS _%D6	fT6DD	NfND	f f f 6TI	1DTD	
LV UGS _%DW	DTWD	NDBTI fD	NfTN	fT6DD	NfND	[	[	3 V UGS _%DW	fT6DD	NfND	f f f kT5	1DTD	
LV UGS _%Dk	DTWD	NDBTfBk	NfTN	fT6DD	NfND	[	[	3 V UGS _%Dk	fT6DD	NfND	f f f 1TI	1DTD	
LV UGS _%D5	DTWD	NDBTf6B	NfTf	fT6DD	NfND	[	[	3 V UGS _%D5	fT6DD	NfND	f f f 1Tf	1DTD	
LV UGS _%D1	DTWD	NDI TI5W	NfTN	fT6DD	NfND	[	[	3 V UGS _%D1	fT6DD	NfND	f f I BTI	1DTD	
LV UGS _%ND	DTWD	NDI T5I D	NfTN	fT6DD	NfND	[	[	3 V UGS _%ND	fT6DD	NfND	f f I 5TI	1DTD	

ProRct:	F m OH m vF j	ETAP	Page: f
Location:	Paulding, OH	NWDIDC	j ate: ND%6%fDNk
Contract:			SF : m ES_m OOj I
Engineer:	Josh Venden	Study Case: NPG 16L. 0	AeMsion: NDDp 0 EF
- ilena2 e:	F m 7OH		Con8igT F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
LV UGS _%I	DIWD	NDB6DD	N'TD	f T6DD	NIfND	[	[	3 V UGS _%I	f T6DD	NIfND	f f f I TI	1DID	
LV UGS _%B	DIWD	NDBIBfD	N'TD	f T6DD	NIfND	[	[	3 V UGS _%B	f T6DD	NIfND	f f f 6TW	1DID	
LV UGS _%6	DIWD	NDBIDf f	N'TN	f T6DD	NIfND	[	[	3 V UGS _%6	f T6DD	NIfND	f f I BTN	1DID	
LV UGS _%W	DIWD	NDBIBD5	N'TN	f T6DD	NIfND	[	[	3 V UGS _%W	f T6DD	NIfND	f f f 6TI	1DID	
LV UGS _%k	DIWD	NDI TWB5	N'TN	f T6DD	NIfND	[	[	3 V UGS _%k	f T6DD	NIfND	f f Bf TF	1DID	
LV UGS _%6D	DIWD	NDBIND5	NNII	f T6DD	NIfND	[	[	3 V UGS _%6D	f T6DD	NIfND	f f I f TI	1DID	
LV UGS _%6N	DIWD	NDI TI f D	N'TD	f T6DD	NIfND	[	[	3 V UGS _%6N	f T6DD	NIfND	f f I WI	1DID	
LV UGS _%6f	DIWD	NDI TkkD	N'TD	f T6DD	NIfND	[	[	3 V UGS _%6f	f T6DD	NIfND	f f I 1TW	1DID	
LV UGS _%6I	DIWD	NDI Tk1D	N'TN	f T6DD	NIfND	[	[	3 V UGS _%6I	f T6DD	NIfND	f f I 1TN	1DID	
LV UGS _%6B	DIWD	NDI TNk5	NNII	f T6DD	NIfND	[	[	3 V UGS _%6B	f T6DD	NIfND	f f 6f TB	1DID	
LV UGS _%66	DIWD	NDI TNI	NNII	f T6DD	NIfND	[	[	3 V UGS _%66	f T6DD	NIfND	f f 6I TB	1DID	
LV UGS _%6W	DIWD	NDBIf 5D	N'TI	f T6DD	NIfND	[	[	3 V UGS _%6W	f T6DD	NIfND	f f f 5TW	1DID	
LV UGS _%6k	DIWD	NDBIN5W	N'TI	f T6DD	NIfND	[	[	3 V UGS _%6k	f T6DD	NIfND	f f I DTW	1DID	
LV UGS _%65	DIWD	NDBIDDk	N'TI	f T6DD	NIfND	[	[	3 V UGS _%65	f T6DD	NIfND	f f I BT6	1DID	
LV UGS _%61	DIWD	NDI TI 1N	N'TD	f T6DD	NIfND	[	[	3 V UGS _%61	f T6DD	NIfND	f f I BT5	1DID	
LV UGS _%N	DIWD	NDB5BB	N'TI	f T6DD	NIfND	[	[	3 V UGS _%N	f T6DD	NIfND	f f NWTW	1DID	
LV UGS _%f	DIWD	NDB6kD	N'TI	f T6DD	NIfND	[	[	3 V UGS _%f	f T6DD	NIfND	f f f f TB	1DID	
LV UGS _%I	DIWD	NDBIBI N	N'TI	f T6DD	NIfND	[	[	3 V UGS _%I	f T6DD	NIfND	f f f 6TB	1DID	
LV UGS _%B	DIWD	NDBIWND	N'TI	f T6DD	NIfND	[	[	3 V UGS _%B	f T6DD	NIfND	f f f NTW	1DID	
LV UGS _%W	DIWD	NDBI I 65	N'TI	f T6DD	NIfND	[	[	3 V UGS _%W	f T6DD	NIfND	f f NBTF	1DID	
LV UGS _%k	DIWD	ND6TDf W	N'TI	f T6DD	NIfND	[	[	3 V UGS _%k	f T6DD	NIfND	f f N'T5	1DID	
LV UGS _%1	DIWD	NDBI I DI	N'TI	f T6DD	NIfND	[	[	3 V UGS _%1	f T6DD	NIfND	f f N6TF	1DID	
LV UGS _%BD	DIWD	ND6TDf D	N'T6	f T6DD	NIfND	[	[	3 V UGS _%BD	f T6DD	NIfND	f f N'TI	1DID	
LV UGS _%BN	DIWD	NDWIDBB	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%BN	f T6DD	NIfND	f NI NT6	1DID	
LV UGS _%Bf	DIWD	ND6TI k6	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%Bf	f T6DD	NIfND	f NI f TI	1DID	
LV UGS _%BI	DIWD	NDWIDBf	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%BI	f T6DD	NIfND	f NI NTW	1DID	
LV UGS _%BB	DIWD	ND6TWI f	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%BB	f T6DD	NIfND	f NI 5T5	1DID	
LV UGS _%B6	DIWD	ND6TB5W	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%B6	f T6DD	NIfND	f f DI TN	1DID	
LV UGS _%BW	DIWD	ND6TfNk	N'TW	f T6DD	NIfND	[	[	3 V UGS _%BW	f T6DD	NIfND	f f D6T5	1DID	
LV UGS _%B5	DIWD	NDW6k6	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%B5	f T6DD	NIfND	f N5DTW	1DID	
LV UGS _%B1	DIWD	NDWIB5W	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%B1	f T6DD	NIfND	f N5f TB	1DID	
LV UGS _%6D	DIWD	NDW6kf	N'Tk	f T6DD	NIfND	[	[	3 V UGS _%6D	f T6DD	NIfND	f N5DTk	1DID	
3 V UGS _%DN	I B6DD	NDf Tf WI	1T6	[	D	DIDDB	DIDDB	3 V UGS _%Df	f TB5D	NDWN	BBTN	1NII	
								LV UGS _%DN	%6TB5B	%NDW6	BBTf	1NII	
3 V UGS _%Df	I B6DD	NDf TN6D	1T6	[	D	DIDDB	DIDDB	3 V UGS _%DN	%6TBkk	%NND1	BBT6	1NIf	
								3 V UGS _%DI	BTI 6W	f TNkD	55TW	1NIW	
								LV UGS _%Df	%6TB5B	%NDW6	BBTI	1NII	
3 V UGS _%DI	I B6DD	NDNI I B5	1T6	[	D	DIDDB	DIDDB	3 V UGS _%Df	%BTI B6	%6Tf D1	55TI	1NIf	
								3 V UGS _%DB	kTBf 6	I Tf 61	NI I TN	1NIW	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								LV UGS _%DI	%6TB5B	%NID6B	BBTI	1f TD	
3 V UGS _%DB	I B%6DD	NDN%5DI	1T6	[	D	DIDDB	DIDDB	3 V UGS _%DI	%kTBNB	%TI DI	NI I TB	1NTI	
								3 V UGS _%D6	1T51B	BTI W	NkkT5	1N%6	
								LV UGS _%DB	%6TB5B	%NIDWB	BBTB	1NII	
3 V UGS _%D6	I B%6DD	NDN%656	1T6	[	D	DIDDB	DIDDB	3 V UGS _%DB	%T5kI	%BTBD5	Nk5TN	1NTI	
								3 V UGS _%D5	NfTI 6f	6TBWk	f f f T6	1NTB	
								LV UGS _%D6	%6TB5B	%NIDW	BBT6	1NII	
3 V UGS _%DW	I B%6DD	NDNBWk	1TB	[	D	DIDDB	DIDDB	3 V UGS _%Dk	f TBk1	NID61	BBT6	1f TD	
								LV UGS _%DW	%6TB5B	%NIDW	BBTW	1NII	
3 V UGS _%Dk	I B%6DD	NDNII 1f	1TB	[	D	DIDDB	DIDDB	3 V UGS _%DW	%6TBkk	%NID51	BBTk	1NTW	
								3 V UGS _%NW	%6TBk6	%NTNf 6	BBTI	1NTD	
								3 V UGS _%N6	kTBI f	I Tfkf	NI BTD	1N%6	
								LV UGS _%Dk	%6TB5B	%NIDW	BBTW	1NII	
3 V UGS _%D5	I B%6DD	NDNBDD	1T6	[	D	DIDDB	DIDDB	3 V UGS _%D6	%NfTI I f	%6T66N	f f I Tf	1NTf	
								3 V UGS _%DI	NBT5Nf	WWND	f WkTk	1NTI	
								LV UGS _%D5	%6TB5B	%NIDW	BBTW	1NII	
3 V UGS _%DI	I B%6DD	NDNTNf 6	1T6	[	D	DIDDB	DIDDB	3 V UGS _%D5	%NBTkkk	%WkDI	f W5T6	1NTN	
								3 V UGS _%ND	NkTf 6W	kTkWN	I NI TN	1NTf	
								LV UGS _%DI	%6TB5B	%NIDW	BBTk	1f TD	
3 V UGS _%ND	I B%6DD	NDDII W6	1TB	[	D	DIDDB	DIDDB	3 V UGS _%DI	%NkTf I B	%kT5I D	I NI T5	1NTD	
								3 V UGS _%66	NI TkNB	5T555	I 65TB	1NTf	
								LV UGS _%ND	%6TB5B	%NIDWN	BBT5	1f TD	
3 V UGS _%NI	I B%6DD	NDNTW6f	1TB	[	D	DIDDB	DIDDB	3 V UGS _%NB	f TB5D	NID61	BBTB	1f TD	
								LV UGS _%NI	%6TB5B	%NIDW	BBT6	1NII	
3 V UGS _%NB	I B%6DD	NDN%6kD	1TB	[	D	DIDDB	DIDDB	3 V UGS _%NI	%6TBkk	%NIDI f	BBTW	1N%6	
								3 V UGS _%N6	BTI 6k	f TN6N	51TD	1NTk	
								LV UGS _%NB	%6TB5B	%NIDW	BBT6	1NII	
3 V UGS _%N6	I B%6DD	NDNTNW	1TB	[	D	DIDDB	DIDDB	3 V UGS _%Dk	%kTBN6	%TI BD	NI BT6	1NTf	
								3 V UGS _%NB	%BTI I 6	%6Tf f 5	51TW	1NTN	
								3 V UGS _%Nk	NBT5f 1	WWW W	f W5Tk	1NTI	
								LV UGS _%N6	%6TB5B	%NIDW	BBTk	1NII	
3 V UGS _%NW	I B%6DD	NDN%665	1TB	[	D	DIDDB	DIDDB	3 V UGS _%Dk	f TBk1	NID61	BBTB	1f TD	
								LV UGS _%NW	%6TB5B	%NIDW	BBT6	1NII	
3 V UGS _%Nk	I B%6DD	NDDTkk1	1TB	[	D	DIDDB	DIDDB	JU%6/N	NkTf WD	kT5Nf	I NBTW	1NTN	
								3 V UGS _%N6	%NBTk5D	%Wk66	f WT5	1NTD	
								LV UGS _%Nk	%6TB5I	%NIDWN	BBT5	1f TD	
3 V UGS _%6D	I B%6DD	NDNTf 6D	1TI	[	D	DIDDB	DIDDB	3 V UGS _%6N	f TBk1	NID65	BBTW	1f TD	
								LV UGS _%6D	%6TB5B	%NIDW	BBTW	1NII	
3 V UGS _%6N	I B%6DD	NDNID6k	1TI	[	D	DIDDB	DIDDB	3 V UGS _%6D	%6TBkB	%NTNI B	B6TN	1DII	

ProRct:	F m OH m vF j	**ETAP**		Page:	B
Location:	Paulding, OH	NWDIDC		j ate:	ND%D6%DNk
Contract:				SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case:	NPG 16L. 0	AeMsion:	NDp 0 EF
- ilena2 e:	F m 7OH			Con8gT	F or2 al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
vj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	. 2 4	p P-	p _a4
								3 V UGS _%f	BII6B	f TNIf	51Tk	1NB	
								LV UGS _%N	%6TB5B	%NDW	BBk	1f TD	
3 V UGS _%f	I B6DD	NDDIIDI	1TI	[	D	DIDB	DIDB	JU%/N	1T515	BIBfB	Nk1T6	1NII	
								3 V UGS _%N	%BII B6	%TIf D	51TI	1NIf	
								3 V UGS _%1	%6TBkI	%NNBW	B6TI	1DIk	
								LV UGS _%f	%6TB5B	%NDWN	BB5	1f TD	
3 V UGS _%I	I B6DD	NDDIIf 6	1TB	[	D	DIDB	DIDB	51- I .	f kTNDB	N TBDB	BIBII	1DII	
								3 V UGS _%5	%6BTW6	%NIBW	BBITW	1D5	
								LV UGS _%I	%6TB5B	%NDWN	BB5	1f TD	
3 V UGS _%B	I B6DD	NDDf 1W	1TI	[	D	DIDB	DIDB	3 V UGS _%6	f TBk1	ND6W	B6TD	1f TD	
								LV UGS _%B	%6TB5I	%ND61	B6TD	1f TD	
3 V UGS _%6	I B6DD	NDDf 6N	1TI	[	D	DIDB	DIDB	51- N	f B6WI	NNI5I	B6f TD	1DIk	
								3 V UGS _%ND	%NITWNf	%TIf f 1	I WN5	1D6	
								3 V UGS _%B	%6TBk5	%NDI5	B6TI	1NB	
								LV UGS _%6	%6TB5I	%ND61	B6TN	1f TD	
3 V UGS _%W	I B6DD	NDNBf k	1T6	[	D	DIDB	DIDB	3 V UGS _%k	f TBk1	ND61	BB6	1f TD	
								LV UGS _%W	%6TB5B	%NDW	BBTW	1NII	
3 V UGS _%k	I B6DD	NDNII N	1T6	[	D	DIDB	DIDB	3 V UGS _%W	%6TBkk	%NDIk	BBk	1NB	
								3 V UGS _%5	BII6W	f TN66	51TI	1Nk	
								LV UGS _%k	%6TB5B	%NDW	BBTW	1NII	
3 V UGS _%5	I B6DD	NDNNBW	1T6	[	D	DIDB	DIDB	3 V UGS _%I	f BTWf	NNf 6I	BB5T6	1ND	
								3 V UGS _%k	%BII Bk	%6TN1D	51T6	1NB	
								3 V UGS _%I	%kTI W	%5TD6	I NBB	1DIk	
								LV UGS _%5	%6TB5B	%NDW	BBk	1NII	
3 V UGS _%1	I B6DD	NDNNND	1TI	[	D	DIDB	DIDB	3 V UGS _%f	f TBk1	ND65	BBTW	1f TD	
								LV UGS _%1	%6TB5B	%NDW	BBk	1NII	
3 V UGS _%N	I B6DD	NDf TD6	1TW	[	D	DIDB	DIDB	3 V UGS _%f	f TB5D	NDWD	BBII	1NII	
								LV UGS _%N	%6TB5B	%NDWB	BBII	1NII	
3 V UGS _%f	I B6DD	NDNkf B	1TW	[	D	DIDB	DIDB	3 V UGS _%N	%6TBkf	%NNkI	B6TD	1DB	
								3 V UGS _%I	BII6f	f TIf	51TB	1NIf	
								LV UGS _%f	%6TB5B	%NDW	BBB	1NII	
3 V UGS _%I	I B6DD	NDN65f	1TW	[	D	DIDB	DIDB	3 V UGS _%5	NkT16	kT5Nk	I NTk	1NN	
								3 V UGS _%f	%BII BB	%6T61	51T6	1ND	
								3 V UGS _%B	%T5kN	%BIB11	Nk5Tk	1ND	
								LV UGS _%I	%6TB5B	%NDW	BB6	1NII	
3 V UGS _%B	I B6DD	NDNkW6	1TW	[	D	DIDB	DIDB	3 V UGS _%I	1T551	BIBWN	Nk5TB	1NIf	
								3 V UGS _%W	%BII 1	%6TN5	51TD	1NIf	
								3 V UGS _%1	%6TBkN	%NN5I	B6TN	1DIf	
								LV UGS _%B	%6TB5B	%NDWB	BBB	1NII	

ProRct:	F m OH m vF j	**ETAP**	Page: 6
Location:	Paulding, OH	NWDIDC	j ate: ND%b6%bDNk
Contract:			SF : m ES_m OOj I
Engineer:	Josh Venden	Study Case: NPG 16L. 0	AeMsion: NDDp 0 EF
- ilena2 e:	F m 7OH		Con8gT: F or2 al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
ꞌj	9V	p 3 agT	. ngT	3 m	3 Mar	3 m	3 Mar	ꞌj	3 m	3 Mar	. 2 4	p P-	p _a4
3 V UGS _%bW	I B6DD	NDˆTNˆN	1TW	Ɫ	D	DIDB	DIDB	3 V UGS _%bB	BII6k	f TN6D	55T6	1NK	
								3 V UGS _%bk	%6TBk5	%ND51	BBTB	1N6	
								LV UGS _%bW	%6TB5B	%NDWB	BBTI	1NII	
3 V UGS _%bk	I B6DD	NDˆTNIN	1TW	Ɫ	D	DIDB	DIDB	3 V UGS _%bW	f TB5D	NDWN	BBTI	1NII	
								LV UGS _%bk	%6TB5B	%NDW6	BBTI	1NII	
3 V UGS _%b1	I B6DD	NDˆTDkf	1TW	Ɫ	D	DIDB	DIDB	3 V UGS _%bB	f TB5D	NDWN	BBTI	1NII	
								LV UGS _%b1	%6TB5B	%NDWB	BBTI	1NII	
3 V UGS _%BD	I B6DD	NDˆTN56	1TI	Ɫ	D	DIDB	DIDB	51- B.	f BTWNk	NNI WN	BBBID	1D6	
								3 V UGS _%BW	%6f TNI k	%NDI DD	I 11TI	1DK	
								LV UGS _%BD	%6TB5B	%NDW6	BBTI	1NII	
3 V UGS _%BN	I B6DD	NDI TI B	NDI	Ɫ	D	DIDB	DIDB	JU%B/N	f TB5D	NDWB	BI Tk	1NII	
								LV UGS _%BN	%6TB5B	%NDWk	BI T6	1NII	
3 V UGS _%Bf	I B6DD	NDI TNWB	NDI	Ɫ	D	DIDB	DIDB	JU%B/N	1T6kk	BTB11	NkWN	1NID	
								3 V UGS _%BI	%bTI 1k	%6TBI W	NI f TI	1DK	
								LV UGS _%Bf	%6TB5B	%NDWk	BI TI	1NII	
3 V UGS _%BI	I B6DD	NDI TI1 f	NDI	Ɫ	D	DIDB	DIDB	JU%B/N	f TB5D	NDWB	BI Tk	1NII	
								LV UGS _%BI	%6TB5B	%NDWk	BI T6	1NII	
3 V UGS _%BB	I B6DD	NDˆT6kB	NDN	Ɫ	D	DIDB	DIDB	JU%B/N	%NBTK1W	%WK1N	f WBT6	1DII	
								3 V UGS _%B6	NkTkW	kT66B	I D5Tk	1NID	
								LV UGS _%BB	%6TB5B	%NDWW	BBTD	1NII	
3 V UGS _%B6	I B6DD	NDˆTWW	NDN	Ɫ	D	DIDB	DIDB	3 V UGS _%BB	%Nk TB5	%bTI 6N	I DI TW	1D6	
								3 V UGS _%BW	NI Tkf 5	1TDN	I 6I T6	1NID	
								LV UGS _%B6	%6TB5B	%NDWW	BBTN	1NII	
3 V UGS _%BW	I B6DD	NDˆTI 5W	NDID	Ɫ	D	DIDB	DIDB	3 V UGS _%BD	f f TNWI	NDI N5	I 11TD	1D6	
								3 V UGS _%B6	%NI TW1	%6TN6W	I 6BTI	1DK	
								LV UGS _%BW	%6TB5B	%NDW6	BBTI	1NII	
3 V UGS _%B5	I B6DD	NDI Tkk5	NDN	Ɫ	D	DIDB	DIDB	3 V UGS _%BI	f TB5D	NDW6	BI T6	1NII	
								LV UGS _%B5	%6TB5B	%NDWI	BI TW	1NII	
3 V UGS _%BI	I B6DD	NDI TWk	NDI	Ɫ	D	DIDB	DIDB	3 V UGS _%Bf	kTBI 6	I TkD	N NN	1N6	
								3 V UGS _%B5	%6TBk5	%NNDI	BI T6	1NB	
								3 V UGS _%6D	%6TBk5	%NNDI	BI T6	1NB	
								LV UGS _%BI	%6TB5B	%NDWI	BI TW	1NII	
3 V UGS _%6D	I B6DD	NDI Tkk6	NDN	Ɫ	D	DIDB	DIDB	3 V UGS _%BI	f TB5D	NDW6	BI T6	1NII	
								LV UGS _%6D	%6TB5B	%NDWI	BI TW	1NII	
* POv	N 5TDDD	NDDIDDD	DID	%NDˆTNN6	%bI TkNB	Ɫ	Ɫ	51_N	%NDˆTNN6	%bI TkNB	BBI TI	16TD	
3 P_~I	N T5DD	NDD6f 1	1TI	Ɫ	D	Ɫ	Ɫ	HV UGS 3 P_	DIDD	DIDD	DID	DID	
							&	51_NU					

* vndicates a Mbltage regulated bus (Mbltage controlled or swing ty4e 2 achine connected to it)

\# vndicates a bus with a load 2 is2 atch o82 ore than DTN3 V.

Project:	F m OH m vF j	**ETAP**		Page:	0
Location:	Paulding, OH	0WDDDC		j ate:	0D%DC%DD0k
Contract:				SF :	m ES_m OOj I
Engineer:	Josh Venden	Study Case:	NGP1 NGL6 .	AeMsion:	0DDp . EF
- ilena2 e:	F m 7OH			Con8gT	F or2 al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
5N-06	I BTGDD	0DDDDkB	NDD	[	D	[	[	3 V U1 S _%6G	%6BTG0I	%00TBBW	BGfTB	NDTW	
								5N_0U	f BTG0I	00TBBW	BGfTB	NDTW	
5N-f6	I BTGDD	0DDDDkB	NDD	[	D	[	[	JU%6/0	%6WNkk	%0f TGDf	BNkTf	NDk	
								5N_0U	f WNkk	0f TGDf	BNkTf	NDk	
5N-I6	I BTGDD	0DDDDkB	NDD	[	D	[	[	3 V U1 S _%6I	%6WNf0	%0f TWf	BNkTI	NDTG	
								5N_0U	f WNf0	0f TWf	BNkTI	NDTG	
5N-B6	I BTGDD	0DDDDkB	NDD	[	D	[	[	3 V U1 S _%BD	%6BTf BN	%0f Tf G	BGBTD	5NTI	
								5N_0U	f BTf BN	0f Tf G	BGBTD	5NTI	
5N_06	0I 5TDDD	NGTD0D	DTD	[	D	[	[	POv	0DfTDI 5	I I TGI 0	BkI TB	NGTD	
								HV U1 S 3 P_	%0DfTDI 5	%I TGI 0	BkI TB	NGTD	
5N_0U	I BTGDD	0DDDDkB	NDD	[	D	DTDDD	%BTDDW	5N-B6	%6BTf BN	%0f Tf G	BGBTD	5NTI	
								5N-I6	%6WNf0	%0f TWf	BNkTI	NDTG	
								5N-f6	%6WNkk	%0f TGDf	BNkTf	NDk	
								5N-06	%6BTG0I	%00TBBW	BGfTB	NDTW	
								3 P_~I	0DfTWWD	GfT500	0NI DTW	55TN	
								& HV U1 S 3 P_					
HV U1 S 3 P_	0I 5TDDD	NGTD0D	DTD	[	D	DTDB5	DTDI I	5N_06	0DfTDI 5	I I TGI 0	BkI TB	NGTD	
								5N_0U	%0DfTD5W	%I TWWB	BkI T5	NGTD	0T5kG
								& 3 P_~I					
JU%6/0	I BTGDD	0DDkBk	NTI	[	D	[	[	3 V U1 S _%0k	%0kTI I	%6T5I G	I 0BTG	N0TD	
								3 V U1 S _%6f	%N5WW	%BTBGB	0kN5	N0TD	
								5N-f6	f kTDNN	0f Tf5N	BNBTI	N0TD	
JU%B/0	I BTGDD	0DI Tf D	0DTD	[	D	[	[	3 V U1 S _%B0	%6TBk5	%0TD5G	BI T5	N0TW	
								3 V U1 S _%Bf	%N5kk	%BTBWB	0kGTW	N0TD	
								3 V U1 S _%BI	%6TBk5	%0TD5B	BI T5	N0TW	
								3 V U1 S _%BB	0B5I I	WWI	f WTf	N0TI	
LV U1 S _%B0	DTWND	0DGTf BG	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%B0	f TGDD	0TfDD	f f DBk	NDTf	
LV U1 S _%Bf	DTWND	0DGDf N	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%Bf	f TGDD	0TfDD	f f Dkf	NDTf	
LV U1 S _%BI	DTWND	0DBTN f	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%BI	f TGDD	0TfDD	f f 00TI	NDTf	
LV U1 S _%BB	DTWND	0DBTkN0	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%BB	f TGDD	0TfDD	f f 0BTI	NDTf	
LV U1 S _%BG	DTWND	0DBTGkN	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%BG	f TGDD	0TfDD	f f 05T5	NDTf	
LV U1 S _%BW	DTWND	0DBTBWB	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%BW	f TGDD	0TfDD	f f f 0Tf	NDTf	
LV U1 S _%Bk	DTWND	0DBTI N0	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%Bk	f TGDD	0TfDD	f f f f T5	NDTf	
LV U1 S _%B5	DTWND	0DBTI NN	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%B5	f TGDD	0TfDD	f f f f TW	NDTf	
LV U1 S _%BN	DTWND	0DBTDI 0	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%BN	f TGDD	0TfDD	f f f 5TI	NDTf	
LV U1 S _%0D	DTWND	0DI TNkW	0fTD	f TGDD	0TfDD	[	[	3 V U1 S _%0D	f TGDD	0TfDD	f f I 0TW	NDTf	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
LV U1 S _%0I	DIWND	0DBIWBB	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%0I	f TGDD	0TfDD	f f 0kTB	NDIf	
LV U1 S _%0B	DIWND	0DBIGWB	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%0B	f TGDD	0TfDD	f f 0ND	NDIf	
LV U1 S _%0G	DIWND	0DBIDWk	0f T0	f TGDD	0TfDD	[	[	3 V U1 S _%0G	f TGDD	0TfDD	f f f kTG	NDIf	
LV U1 S _%0W	DIWND	0DBIGGI	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%0W	f TGDD	0TfDD	f f 0NI	NDIf	
LV U1 S _%0k	DIWND	0DI TkNG	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%0k	f TGDD	0TfDD	f f I GIG	NDIf	
LV U1 S _%fD	DIWND	0DBIfGB	00TN	f TGDD	0TfDD	[	[	3 V U1 S _%fD	f TGDD	0TfDD	f f f Gk	NDIf	
LV U1 S _%f0	DIWND	0DBIDWW	00TN	f TGDD	0TfDD	[	[	3 V U1 S _%f0	f TGDD	0TfDD	f f f Nk	NDIf	
LV U1 S _%ff	DIWND	0DI TN0W	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%ff	f TGDD	0TfDD	f f I f TN	NDIf	
LV U1 S _%fI	DIWND	0DI TNI W	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%fI	f TGDD	0TfDD	f f I f TG	NDIf	
LV U1 S _%fB	DIWND	0DI TI f W	00TN	f TGDD	0TfDD	[	[	3 V U1 S _%fB	f TGDD	0TfDD	f f BGk	NDIf	
LV U1 S _%fG	DIWND	0DI T5f	00TN	f TGDD	0TfDD	[	[	3 V U1 S _%fG	f TGDD	0TfDD	f f BWW	NDIf	
LV U1 S _%fW	DIWND	0DBIBfB	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%fW	f TGDD	0TfDD	f f f f TD	NDIf	
LV U1 S _%fk	DIWND	0DBII I 0	0f TD	f TGDD	0TfDD	[	[	3 V U1 S _%fk	f TGDD	0TfDD	f f f BD	NDIf	
LV U1 S _%f5	DIWND	0DBIDC0	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%f5	f TGDD	0TfDD	f f f kTN	NDIf	
LV U1 S _%fN	DIWND	0DBIDI k	00TN	f TGDD	0TfDD	[	[	3 V U1 S _%fN	f TGDD	0TfDD	f f f 5Tf	NDIf	
LV U1 S _%I0	DIWND	0DBIN5W	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%I0	f TGDD	0TfDD	f f 0DTf	NDIf	
LV U1 S _%If	DIWND	0DBIk0I	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%If	f TGDD	0TfDD	f f 0GTN	NDIf	
LV U1 S _%II	DIWND	0DBICkB	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%II	f TGDD	0TfDD	f f 05TN	NDIf	
LV U1 S _%IB	DIWND	0DBIkGI	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%IB	f TGDD	0TfDD	f f 0GD	NDIf	
LV U1 S _%IW	DIWND	0DGDDD	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%IW	f TGDD	0TfDD	f f Dk T5	NDIf	
LV U1 S _%Ik	DIWND	0DGDW5	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%Ik	f TGDD	0TfDD	f f DWI	NDIf	
LV U1 S _%IN	DIWND	0DGDC0	0f Tf	f TGDD	0TfDD	[	[	3 V U1 S _%IN	f TGDD	0TfDD	f f D5T5	NDIf	
LV U1 S _%BD	DIWND	0DGDW0	0f TG	f TGDD	0TfDD	[	[	3 V U1 S _%BD	f TGDD	0TfDD	f f DWG	NDIf	
LV U1 S _%B0	DIWND	0DWD5D	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%B0	f TGDD	0TfDD	f 05GI	NDIf	
LV U1 S _%Bf	DIWND	0DWD0f	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%Bf	f TGDD	0TfDD	f 05Wk	NDIf	
LV U1 S _%BI	DIWND	0DWDk5	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%BI	f TGDD	0TfDD	f 05GI	NDIf	
LV U1 S _%BB	DIWND	0DG5fN	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%BB	f TGDD	0TfDD	f 0NTG	NDIf	
LV U1 S _%BG	DIWND	0DGIWB	0f TW	f TGDD	0TfDD	[	[	3 V U1 S _%BG	f TGDD	0TfDD	f 0NW5	NDIf	
LV U1 S _%BW	DIWND	0DGI GW	0f TW	f TGDD	0TfDD	[	[	3 V U1 S _%BW	f TGDD	0TfDD	f f DTB	NDIf	
LV U1 S _%B5	DIWND	0DWk0D	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%B5	f TGDD	0TfDD	f 0kBG	NDIf	
LV U1 S _%BN	DIWND	0DWW0	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%BN	f TGDD	0TfDD	f 0kWI	NDIf	
LV U1 S _%GD	DIWND	0DWkDk	0f Tk	f TGDD	0TfDD	[	[	3 V U1 S _%GD	f TGDD	0TfDD	f 0kBG	NDIf	
3 V U1 S _%D0	I BIGDD	0DfTBI G	NIG	[	D	DIDDB	DIDDB	3 V U1 S _%Df	f TB5D	0TDGf	BBID	NTD	
								LV U1 S _%D0	%fTB5B	%0TDGW	BBID	NTD	
3 V U1 S _%Df	I BIGDD	0DfTI 0W	NIG	[	D	DIDDB	DIDDB	3 V U1 S _%D0	%fTBkk	%0TDDD	BBII	N0TB	
								3 V U1 S _%DI	BING W	f TDGf	55TB	N0Tk	
								LV U1 S _%Df	%fTB5B	%0TDGG	BBID	NTD	
3 V U1 S _%DI	I BIGDD	0DfTD0G	NIG	[	D	DIDDB	DIDDB	3 V U1 S _%Df	%BINBW	%fTDN0	55TW	N0TB	
								3 V U1 S _%DB	kTBfG	I TBf	0I f T5	N0TW	

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								LV U1 S _%DI	%6TB5B	%0TDGG	BBT	NTD	
3 V U1 S _%DB	IBTGDD	0DDTNkD	NTG	[	D	DIDDB	DIDDB	3 V U1 S _%DI	%kTB0G	%TI5W	0I I TD	N0TB	
								3 V U1 S _%DG	NT5NB	BTI I W	0kkTI	N0TW	
								LV U1 S _%DB	%6TB5B	%0TDGB	BBTI	NTD	
3 V U1 S _%DG	IBTGDD	0DDTkGI	NTG	[	D	DIDDB	DIDDB	3 V U1 S _%DB	%NT5kI	%BTI 5f	0kkTW	N0TB	
								3 V U1 S _%D5	0f TI GI	GBTI f	f f 0TN	N0TG	
								LV U1 S _%DG	%6TB5B	%0TDGB	BBTB	NTD	
3 V U1 S _%DW	IBTGDD	0DDTWG	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%Dk	f TB5D	0TDGD	BBTI	NTD	
								LV U1 S _%DW	%6TB5B	%0TDGB	BBTB	NTD	
3 V U1 S _%Dk	IBTGDD	0DDTGWD	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%DW	%6TBk5	%0TD5D	BBTG	N0Tk	
								3 V U1 S _%0W	%6TBkG	%0TD0W	BBTk	N0TI	
								3 V U1 S _%0G	kTBI f	I TBG	0I I TW	N0TW	
								LV U1 S _%Dk	%6TB5B	%0TDGI	BBTG	NTD	
3 V U1 S _%D5	IBTGDD	0DDTGW5	NTG	[	D	DIDDB	DIDDB	3 V U1 S _%DG	%0f TI I I	%GTDW	f f f TW	N0TI	
								3 V U1 S _%DN	0BT50I	WTGWW	f WTD	N0TB	
								LV U1 S _%D5	%6TB5B	%0TDGI	BBTG	NTD	
3 V U1 S _%DN	IBTGDD	0DDTf NB	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%D5	%0BTkk5	%WWWD	f WT5	N0TI	
								3 V U1 S _%0D	0kTGk	kTD5	I 0f TI	N0TI	
								LV U1 S _%DN	%6TB5B	%0TDGI	BBTW	NTD	
3 V U1 S _%0D	IBTGDD	0DDTDI B	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%DN	%0kTI G	%kTkk5	I 0f TN	N0TD	
								3 V U1 S _%6G	0NTk0G	5T5f W	I GkTB	N0TI	
								LV U1 S _%0D	%6TB5B	%0TDGf	BBTW	NTD	
3 V U1 S _%0I	IBTGDD	0DDT50N	NTI	[	D	DIDDB	DIDDB	3 V U1 S _%0B	f TB5D	0TDGD	BBTI	NTD	
								LV U1 S _%0I	%6TB5B	%0TDGB	BBTI	NTD	
3 V U1 S _%0B	IBTGDD	0DDTkI 5	NTI	[	D	DIDDB	DIDDB	3 V U1 S _%0I	%6TBkk	%0TD5I	BBTG	N0TW	
								3 V U1 S _%0G	BTNTk	f TDI I	55T5	N0TN	
								LV U1 S _%0B	%6TB5B	%0TDGB	BBTB	NTD	
3 V U1 S _%0G	IBTGDD	0DDTI I 0	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%Dk	%kTB0G	%TI 0I	0I BTD	N0TI	
								3 V U1 S _%0B	%BTNI G	%6TI 0D	5NTI	N0TI	
								3 V U1 S _%0k	0BT5I D	WTGkf	f WTN	N0TB	
								LV U1 S _%0G	%6TB5B	%0TDGI	BBTW	NTD	
3 V U1 S _%0W	IBTGDD	0DDTkf W	NTB	[	D	DIDDB	DIDDB	3 V U1 S _%Dk	f TB5D	0TDGD	BBTI	NTD	
								LV U1 S _%0W	%6TB5B	%0TDGB	BBTB	NTD	
3 V U1 S _%0k	IBTGDD	0DDTNBN	NTI	[	D	DIDDB	DIDDB	JU%6/0	0kTW0	kTBN	I 0I Tk	N0TI	
								3 V U1 S _%0G	%0BTk50	%WTDf	f WTD	N0TD	
								LV U1 S _%0k	%6TB5B	%0TDGf	BBTk	NTD	
3 V U1 S _%6D	IBTGDD	0DDTB0N	NTf	[	D	DIDDB	DIDDB	3 V U1 S _%60	f TB5D	0TDBN	BBTB	NTD	
								LV U1 S _%6D	%6TB5B	%0TDGI	BBTG	NTD	
3 V U1 S _%60	IBTGDD	0DDTf fk	NTf	[	D	DIDDB	DIDDB	3 V U1 S _%6D	%6TBkB	%0TDf G	BBTN	N0TD	

ProRct:	F m OH m vF j	**ETAP**	Page: B
Location:	Paulding, OH	0WDIDC	j ate: 0D%C%D0k
Contract:			SF: m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion: 0DDp . EF
- ilena2 e:	F m 7OH		Con8gT F or2 al

Bus		**Voltage**		**Generation**		**Load**		**Load Flow**					**XFMR**
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
								3 V U1 S _%f	BNGB	f TkB	5NB	NTW	
								LV U1 S _%0	%TB5B	%0TDGf	BBTW	NTD	
3 V U1 S _%f	I BGDD	0DTDkI	NI	⊏	D	DDDB	DDDB	JU%/0	N5N5	BI 55	0kNI	NTB	
								3 V U1 S _%0	%BNBW	%TTDf	5NW	NTB	
								3 V U1 S _%N	%TBkI	%0TDI 5	BGD	NDN	
								LV U1 S _%f	%TB5B	%0TDGf	BBk	NTD	
3 V U1 S _%I	I BGDD	0DTDNB	NB	⊏	D	DDDB	DDDB	5N-I 6	f kDDW	0f TI Dk	BNT5	NTD	
								3 V U1 S _%5	%BTWk	%00TGN	BB5T	NDN	
								LV U1 S _%I	%TB5B	%0TDGf	BBTW	NTD	
3 V U1 S _%B	I BGDD	0DDBWN	ND	⊏	D	DDDB	DDDB	3 V U1 S _%G	f TBkN	0TDBk	BB5	NTD	
								LV U1 S _%B	%TB5I	%0TDGD	BBN	NTD	
3 V U1 S _%G	I BGDD	0DDBf B	ND	⊏	D	DDDB	DDDB	5N-06	f BCk0	00TI DW	BGDk	ND5	
								3 V U1 S _%0D	%0NW0B	%NDkD	I WD5	NDW	
								3 V U1 S _%B	%TBk5	%0TD5N	BGD	NTG	
								LV U1 S _%G	%TB5I	%0TDGD	BBN	NTD	
3 V U1 S _%W	I BGDD	0DTDNG	NG	⊏	D	DDDB	DDDB	3 V U1 S _%k	f TB5D	0TDGD	BBB	NTD	
								LV U1 S _%W	%TB5B	%0TDGI	BBB	NTD	
3 V U1 S _%k	I BGDD	0DTBN5	NG	⊏	D	DDDB	DDDB	3 V U1 S _%W	%TBkk	%0TD55	BBTW	NTW	
								3 V U1 S _%5	BNGk	f TDI k	5ND	NT5	
								LV U1 S _%k	%TB5B	%0TDGI	BBTG	NTD	
3 V U1 S _%5	I BGDD	0DTI 0B	NG	⊏	D	DDDB	DDDB	3 V U1 S _%I	f BNWW	00TDWG	BBkT	NTD	
								3 V U1 S _%k	%BNBk	%TDkf	5NI	NTW	
								3 V U1 S _%I	%0kTI k	%kTNBB	I 0I TG	ND5	
								LV U1 S _%5	%TB5B	%0TDGI	BBTW	NTD	
3 V U1 S _%N	I BGDD	0DTI DD	NI	⊏	D	DDDB	DDDB	3 V U1 S _%f	f TBkN	0TDBN	BBTG	NTD	
								LV U1 S _%N	%TB5B	%0TDGI	BBTW	NTD	
3 V U1 S _%0	I BGDD	0Df TDkD	NW	⊏	D	DDDB	DDDB	3 V U1 S _%f	f TB5D	0TDC0	BBD	NTD	
								LV U1 S _%0	%TB5B	%0TDGG	BBT	NTD	
3 V U1 S _%f	I BGDD	0DT5ND	NW	⊏	D	DDDB	DDDB	3 V U1 S _%0	%TBkf	%0TDWB	BBN	NDG	
								3 V U1 S _%I	BNGf	f TI 0B	5ND	NTI	
								LV U1 S _%f	%TB5B	%0TDGB	BBI	NTD	
3 V U1 S _%I	I BGDD	0DTkB5	NW	⊏	D	DDDB	DDDB	3 V U1 S _%5	0kTNW	kTkGB	I 00T5	NTI	
								3 V U1 S _%f	%BNBB	%TTB0	5NI	NTD	
								3 V U1 S _%B	%N5kf	%BBW	0k5T	NTD	
								LV U1 S _%I	%TB5B	%0TDGB	BBB	NTD	
3 V U1 S _%B	I BGDD	0DTNI 0	NW	⊏	D	DDDB	DDDB	3 V U1 S _%I	N5ND	BBf G	0kkTN	NTI	
								3 V U1 S _%W	%BNI N	%TTDD	55T5	NTI	
								3 V U1 S _%N	%TBkf	%0TDkB	BBN	NDI	
								LV U1 S _%B	%TB5B	%0TDGB	BBI	NTD	

ProRect:	F m OH m vF j	ETAP	Page: G
Location:	Paulding, OH	0WDIDC	j ate: 0D%C%D0k
Contract:			SF : m ES_m OOj I
Engineer:	Josh Venden	Study Case: NGP1 NGL6 .	AeMsion: 0DDp . EF
- ilena2 e:	F m 7OH		Con8gT F or2 al

Bus		Voltage		Generation		Load		Load Flow					XFMR
vj	9V	p 3 agT	6 ngT	3 m	3 Mar	3 m	3 Mar	vj	3 m	3 Mar	6 2 4	p P-	p _a4
3 V U1 S _%W	I BTGDD	0DfTf5k	NTW	[	D	DIDB	DIDB	3 V U1 S _%B	BTNG5	fTDI 0	55TI	N0TN	
								3 V U1 S _%k	%6TBk5	%0TD5D	BBTf	N0Tk	
								LV U1 S _%W	%6TB5B	%0TDGG	BBTf	NfTD	
3 V U1 S _%k	I BTGDD	0DfTIGW	NTW	[	D	DIDB	DIDB	3 V U1 S _%W	fTB5D	0TDGf	BBTD	NfTD	
								LV U1 S _%k	%6TB5B	%0TDGW	BBTD	NfTD	
3 V U1 S _%N	I BTGDD	0DfTfI k	NTW	[	D	DIDB	DIDB	3 V U1 S _%B	fTB5D	0TDG0	BBTD	NfTD	
								LV U1 S _%N	%6TB5B	%0TDGG	BBTf	NfTD	
3 V U1 S _%BD	I BTGDD	0DfTIBN	NTN	[	D	DIDB	DIDB	5N-B6	fBTW05	00TfkI	BBfTk	NDTN	
								3 V U1 S _%BW	%6fTDI N	%0DTff0	I N5Tk	NDT5	
								LV U1 S _%BD	%6TB5B	%0TDGG	BBTD	NfTD	
3 V U1 S _%B0	I BTGDD	0DITINB	0DTD	[	D	DIDB	DIDB	JU%B/0	fTB5D	0TDGB	BI TW	NfTD	
								LV U1 S _%B0	%6TB5B	%0TDG5	BI Tk	NfTD	
3 V U1 S _%Bf	I BTGDD	0DITfI	0DTD	[	D	DIDB	DIDB	JU%B/0	N5k5	BTBW	0kGTW	N0TD	
								3 V U1 S _%BN	%kTI N5	%6TBDN	0I 0TN	NDT5	
								LV U1 S _%Bf	%6TB5B	%0TDG5	BI Tk	NfTD	
3 V U1 S _%BI	I BTGDD	0DITINf	0DTD	[	D	DIDB	DIDB	JU%B/0	fTB5D	0TDGB	BI TW	NfTD	
								LV U1 S _%BI	%6TB5B	%0TDG5	BI Tk	NfTD	
3 V U1 S _%BB	I BTGDD	0DITDI B	0DTD	[	D	DIDB	DIDB	JU%B/0	%0BTkNk	%WkI 5	fWBTD	N0TD	
								3 V U1 S _%BG	0kTfkk	kTkN0	I Dk T5	N0Tf	
								LV U1 S _%BB	%6TB5B	%0TDGk	BI TN	NfTD	
3 V U1 S _%BG	I BTGDD	0DfT5fB	0DTD	[	D	DIDB	DIDB	3 V U1 S _%BB	%0kTfBN	%kT55N	I D5Tk	NDTN	
								3 V U1 S _%BW	0NTkfN	5TNBf	I GfTG	N0TD	
								LV U1 S _%BG	%6TB5B	%0TDGk	BI TN	NfTD	
3 V U1 S _%BW	I BTGDD	0DfTGBN	NTN	[	D	DIDB	DIDB	3 V U1 S _%BD	ffTDkD	0DTDI 5	I NkT5	NDTN	
								3 V U1 S _%BG	%0NTWND	%NTD5W	I GI TN	NDT5	
								LV U1 S _%BW	%6TB5B	%0TDGW	BBTD	NfTD	
3 V U1 S _%B5	I BTGDD	0DITNI W	0DTD	[	D	DIDB	DIDB	3 V U1 S _%BN	fTB5D	0TDGW	BI TB	NfTD	
								LV U1 S _%B5	%6TB5B	%0TDWD	BI TG	NfTD	
3 V U1 S _%BN	I BTGDD	0DIT5BG	0DTD	[	D	DIDB	DIDB	3 V U1 S _%Bf	kTBI G	I TfBI	0I DTk	N0Tk	
								3 V U1 S _%B5	%6TBk5	%0TDNB	BI TW	N0TG	
								3 V U1 S _%GD	%6TBk5	%0TDNI	BI TW	N0TG	
								LV U1 S _%BN	%6TB5B	%0TDGN	BI TG	NfTD	
3 V U1 S _%GD	I BTGDD	0DITNI I	0DTD	[	D	DIDB	DIDB	3 V U1 S _%BN	fTB5D	0TDGW	BI TB	NfTD	
								LV U1 S _%GD	%6TB5B	%0TDWD	BI TG	NfTD	
* POv	0I 5TDDD	NGTDDD	DTD	%0DfTDI G	%I TG00	[	[	5N_06	%0DfTDI G	%I TG00	BkI TB	NGTD	
3 P_~I	0I T5DD	0DDTWN5	NT5	[	D	[	[	HV U1 S 3 P_	DIDDD	DIDDD	DTD	DTD	
							&	5N_0U					

* vndicates a Mbltage regulated bus (Mbltage controlled or swing ty4e 2 achine connected to it)

\# vndicates a bus with a load 2 is2 atch o82 ore than DTD 3 V6

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	8V	M 9 agD	0 ngD	9 m	9 Aar	9 m	9 Aar	Rj	9 m	9 Aar	0 - 3	MPI	M_a3
4. I N0	5BD GG	. . D. 5	. DN	C	G	C	C	9 V U6 S _v%1	v%BDG	vNND%G	B1BDT	. GD	
								4. _NU	%BDG	NND%G	B1BDT	. GD	
4. I %0	5BD GG	. . D. 5	. DN	C	G	C	C	JUv%N	v%TDf %	vN%D4B	B. . DT	. GDT	
								4. _NU	%TDf %	N%D4B	B. . DT	. GDT	
4. I 50	5BD GG	. . D. 5	. DN	C	G	C	C	9 V U6 S _v%5	v%TDNf	vN%D5NN	B. . D5	. GDB	
								4. _NU	%TDNf	N%D5NN	B. . D5	. GDB	
4. I B0	5BD GG	. . D. 5	. DN	C	G	C	C	9 V U6 S _vBG	v%BD%B5	vN%D%4T	B1TD%	4. D%	
								4. _NU	%BD%B5	N%D%4T	B1TD%	4. D%	
4. _N0	N54DGG	NG1DGG	GDG	C	G	C	C	POR	NG%DNG5	55D4B	B%4D%	. 1DG	
								HV U6 S 9 P_	vNG%DNG5	v55D4B	B%4D%	. 1DG	
4. _NU	5BD GG	. . D. 5	. DN	C	G	GDGG	v5Df 1	4. I B0	v%BD%B5	vN%D%4T	B1TD%	4. D%	
								4. I 50	v%TDNf	vN%D5NN	B. . D5	. GDB	
								4. I %0	v%TDf %	vN%D4B	B. . DT	. GDT	
								4. I N0	v%BDG	vNND%G	B1BDT	. GD	
								9 P_~5	NG%DTBN	15DGf T	N 5. D5	44D4	
								& HV U6 S 9 P_					
HV U6 S 9 P_	N54DGG	NG1DGG	GDG	C	G	GDG1.	GDNT5	4. _N0	NG%DNG5	55D4B	B%4D%	. 1DG	
								4. _NU	vNG%DNT%	v55D5Bf	B%4D5	. 1DG	N5D%1
								& 9 P_~5					
JUv%N	5BD GG	NGG5fG	. D5	C	G	C	C	9 V U6 S _vNf	vNfD%5N	vf D4. N	5N1DG	. GD	
								9 V U6 S _v%%	v. D4T1	vBDD4T	N4GD	. NDG	
								4. I %0	%fDG T	N%D5f T	B. TD5	. NDG	
JUvB N	5BD GG	NG%D1.	NGD%	C	G	C	C	9 V U6 S _vBN	v%4DBf 4	vNDG B	BBDG	. ND	
								9 V U6 S _vB%	v. D4f T	vBDB f	NfTDB	. NDG	
								9 V U6 S _vB5	v%4DBf 4	vNDG 5	BBDG	. ND	
								9 V U6 S _vBB	NB%5%	TD45	%TBDB	. ND%	
LV U6 S _vGN	GDT. G	NGBDG1	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vGN	%4DGG	N%NG	%%N15	. GDG	
LV U6 S _vG%	GDT. G	NGBD4.	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vG%	%4DGG	N%NG	%%NT4	. GDG	
LV U6 S _vG5	GDT. G	NGBD. %	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vG5	%4DGG	N%NG	%%%4DG	. GDG	
LV U6 S _vGB	GDT. G	NGBDB1G	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vGB	%4DGG	N%NG	%%%1DG	. GDG	
LV U6 S _vG1	GDT. G	NGBD%f	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vG1	%4DGG	N%NG	%%%. D	. GDG	
LV U6 S _vGT	GDT. G	NGBD%N	N%DN	%4DGG	N%NG	C	C	9 V U6 S _vGT	%4DGG	N%NG	%%5%4DG	. GDG	
LV U6 S _vGf	GDT. G	NGBDB4	N%DN	%4DGG	N%NG	C	C	9 V U6 S _vGf	%4DGG	N%NG	%%55DT	. GDG	
LV U6 S _vG4	GDT. G	NGBDG1T	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vG4	%4DGG	N%NG	%%55DB	. GDG	
LV U6 S _vG	GDT. G	NG5D4f	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vG	%4DGG	N%NG	%%5. D%	. GDG	
LV U6 S _vNG	GDT. G	NG5D5N	N%D%	%4DGG	N%NG	C	C	9 V U6 S _vNG	%4DGG	N%NG	%%B%DT	. GDG	

Pro7ect:	F m OH m RF j	ETAP		Page:	%
Location:	Paulding, OH	NIDOC		j ate:	NGGTv%GNI
Contract:				SF :	m ES_m OOj P
Engineer:	Josh Venden	Study Case:	NG1P6 . 1L0 W	k eAision:	NGGM WEF
I ilena- e:	F m 2OH			ConpigD	F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
B	8V	M 9 agD	0 ngD	9 m	9 Aar	9 m	9 Aar	B	9 m	9 Aar	0 - 3	MPI	M_a3
LV U6 S _vN5	GDI. G	NGBB5C%	N4DN	%DGG	N9NG	C	C	9 V U6 S _vN5	%DGG	N9NG	%84DN	. GG	
LV U6 S _vNB	GDI. G	NGBD8%	N4DN	%DGG	N9NG	C	C	9 V U6 S _vNB	%DGG	N9NG	%8% D	. GG	
LV U6 S _vNI	GDI. G	NG5E4%5	N4DN	%DGG	N9NG	C	C	9 V U6 S _vNI	%DGG	N9NG	%854DB	. GG	
LV U6 S _vNT	GDI. G	NGBD9NG	N4DN	%DGG	N9NG	C	C	9 V U6 S _vNT	%DGG	N9NG	%85GDN	. GG	
LV U6 S _vNf	GDI. G	NG5DB4	N4DN	%DGG	N9NG	C	C	9 V U6 S _vNf	%DGG	N9NG	%84BTD	. GG	
LV U6 S _v%G	GDI. G	NG5DG	N4DG	%DGG	N9NG	C	C	9 V U6 S _v%G	%DGG	N9NG	%85TD	. GG	
LV U6 S _v%N	GDI. G	NG5D%N	N4DG	%DGG	N9NG	C	C	9 V U6 S _v%N	%DGG	N9NG	%84BGD	. GG	
LV U6 S _v%%	GDI. G	NG5DfG	N4DG	%DGG	N9NG	C	C	9 V U6 S _v%%	%DGG	N9NG	%845D	. GG	
LV U6 S _v%5	GDI. G	NG5D. N	N4D%	%DGG	N9NG	C	C	9 V U6 S _v%5	%DGG	N9NG	%845DB	. GG	
LV U6 S _v%B	GDI. G	NGP4Dff	NND	%DGG	N9NG	C	C	9 V U6 S _v%B	%DGG	N9NG	%84TD	. GG	
LV U6 S _v%I	GDI. G	NGP4D55	N4DG	%DGG	N9NG	C	C	9 V U6 S _v%I	%DGG	N9NG	%84fD	. GG	
LV U6 S _v%T	GDI. G	NGBC4%	N4D%	%DGG	N9NG	C	C	9 V U6 S _v%T	%DGG	N9NG	%85%D	. GG	
LV U6 S _v%f	GDI. G	NG5D44	N4D%	%DGG	N9NG	C	C	9 V U6 S _v%f	%DGG	N9NG	%85BD	. GG	
LV U6 S _v%4	GDI. G	NG5E4GI	N45	%DGG	N9NG	C	C	9 V U6 S _v%4	%DGG	N9NG	%854D	. GG	
LV U6 S _v%	GDI. G	NG5D. %	N4DG	%DGG	N9NG	C	C	9 V U6 S _v%	%DGG	N9NG	%85. DN	. GG	
LV U6 S _v5N	GDI. G	NGBDBT	N45	%DGG	N9NG	C	C	9 V U6 S _v5N	%DGG	N9NG	%88GD	. GG	
LV U6 S _v5%	GDI. G	NGB5f%	N45	%DGG	N9NG	C	C	9 V U6 S _v5%	%DGG	N9NG	%88D	. GG	
LV U6 S _v55	GDI. G	NGBD55	N4DB	%DGG	N9NG	C	C	9 V U6 S _v55	%DGG	N9NG	%8% D	. GG	
LV U6 S _v5B	GDI. G	NGBDN%	N45	%DGG	N9NG	C	C	9 V U6 S _v5B	%DGG	N9NG	%88D	. GG	
LV U6 S _v5T	GDI. G	NGBDTG	N45	%DGG	N9NG	C	C	9 V U6 S _v5T	%DGG	N9NG	%8N4DB	. GG	
LV U6 S _v5f	GDI. G	NGB4%	N45	%DGG	N9NG	C	C	9 V U6 S _v5f	%DGG	N9NG	%8NTD	. GG	
LV U6 S _v5.	GDI. G	NGBDN%	N45	%DGG	N9NG	C	C	9 V U6 S _v5.	%DGG	N9NG	%8N DB	. GG	
LV U6 S _vBG	GDI. G	NGB4%	N4DI	%DGG	N9NG	C	C	9 V U6 S _vBG	%DGG	N9NG	%8NTDN	. GG	
LV U6 S _vBN	GDI. G	NG1E4B4	N44	%DGG	N9NG	C	C	9 V U6 S _vBN	%DGG	N9NG	%N 1DI	. GG	
LV U6 S _vB%	GDI. G	NG1Df.	N44	%DGG	N9NG	C	C	9 V U6 S _vB%	%DGG	N9NG	%N fDG	. GG	
LV U6 S _vB5	GDI. G	NG1E4BT	N44	%DGG	N9NG	C	C	9 V U6 S _vB5	%DGG	N9NG	%N 1DI	. GG	
LV U6 S _vBB	GDI. G	NG1DB. 1	N44	%DGG	N9NG	C	C	9 V U6 S _vBB	%DGG	N9NG	%8CP4D	. GG	
LV U6 S _vBI	GDI. G	NG1D4.	N4D	%DGG	N9NG	C	C	9 V U6 S _vBI	%DGG	N9NG	%8GfD	. GG	
LV U6 S _vBT	GDI. G	NG1DN	N4DI	%DGG	N9NG	C	C	9 V U6 S _vBT	%DGG	N9NG	%8NP4D	. GG	
LV U6 S _vB4	GDI. G	NGTD5f.	N4D	%DGG	N9NG	C	C	9 V U6 S _vB4	%DGG	N9NG	%N4BDI	. GG	
LV U6 S _vB.	GDI. G	NGTD% G	N44	%DGG	N9NG	C	C	9 V U6 S _vB.	%DGG	N9NG	%N4TDB	. GG	
LV U6 S _vIG	GDI. G	NGTD5fT	N4D	%DGG	N9NG	C	C	9 V U6 S _vIG	%DGG	N9NG	%N4BD	. GG	
9 V U6 S _vGN	5BDGG	NGP4DGT4	. D	C	G	GDGB	GDGB	9 V U6 S _vG%	%D4G	NDGTN	BBD%	. ND	
								LV U6 S _vGN	v%D4B	vNDGTB	BBD	. ND	
9 V U6 S _vG%	5BDGG	NGNDB.	. D	C	G	GDGB	GDGB	9 V U6 S _vGN	v%DfT	vNDG4	BBD	. N5	
								9 V U6 S _vG5	BD1T	%DNT.	44D	. NDI	
								LV U6 S _vG%	v%D4B	vNDGTB	BBDB	. ND	
9 V U6 S _vG5	5BDGG	NGNDBT	. DI	C	G	GDGB	GDGB	9 V U6 S _vG%	vBDBI	v%D%GI	4. DN	. N5	
								9 V U6 S _vGB	fD%I	5D%f	N55DB	. ND	

Bus		Voltage		Generation		Load		Load Flow					XFMR
ŖJ	8V	M 9 agD	0 ngD	9 m	9 Aar	9 m	9 Aar	ŖJ	9 m	9 Aar	0 - 3	MPI	M_a3
								LV U6 S _vG5	v%IDI4B	vNI0iT5	BBDB	. ND	
9 V U6 S _vGB	5BDCG	NGNDfGN	. DF	C	G	GI0GB	GI0GB	9 V U6 S _vG5	vf IDINB	v5 I5NN	N55ID	. N5	
								9 V U6 S _vGI	. I4. B	BI5f G	NF4DN	. ND	
								LV U6 S _vGB	v%IDI4B	vNI0iT5	BBD	. ND	
9 V U6 S _vGI	5BDCG	NGN545	. DF	C	G	GI0GB	GI0GB	9 V U6 S _vGB	v. I4f %	vBIDINI	NF4D	. N5	
								9 V U6 S _vG4	N%451%	1IDf 5	%65IG	. NB	
								LV U6 S _vGI	v%IDI4B	vNI0iT%	BBDF	. ND	
9 V U6 S _vGF	5BDCG	NGN%TB	. DB	C	G	GI0GB	GI0GB	9 V U6 S _vGF	%IDf .	NI0i14	BBDF	. %IG	
								LV U6 S _vGF	v%IDI4B	vNI0iT%	BBDF	. ND	
9 V U6 S _vGF	5BDCG	NGND4.	. D	C	G	GI0GB	GI0GB	9 V U6 S _vGF	v%IDf f	vNI0i44	BBD	. NF	
								9 V U6 S _vNF	v%IDf 1	vNDI%B	B1IG	. NN	
								9 V U6 S _vNI	f ID5%	5I%f G	N5BI5	. ND	
								LV U6 S _vGF	v%IDI4B	vNI0iT%	BBD	. ND	
9 V U6 S _vG4	5BDCG	NGNDN f	. D	C	G	GI0GB	GI0GB	9 V U6 S _vGI	vN%455%	v1D1f	%65ID	. N%	
								9 V U6 S _vG	NBI4NN	TDNI	%T4D%	. N5	
								LV U6 S _vG4	v%IDI4B	vNI0iT%	BBD	. ND	
9 V U6 S _vG	5BDCG	NGGD%N	. D	C	G	GI0GB	GI0GB	9 V U6 S _vG4	vNBDf T	vTIDG4	%T. DN	. NN	
								9 V U6 S _vNG	NFD11	f IDT1	5N5I4	. N%	
								LV U6 S _vG	v%IDI4B	vNI0iTN	BBI4	. %IG	
9 V U6 S _vNG	5BDCG	NGGDTN	. D	C	G	GI0GB	GI0GB	9 V U6 S _vG	vNFD55	vf I455	5NBDB	. NG	
								9 V U6 S _v%I	N DN5	4I4. G	51. D%	. N%	
								LV U6 S _vNG	v%IDI45	vNI0iTN	BBD	. %IG	
9 V U6 S _vN5	5BDCG	NGNDBB	. DB	C	G	GI0GB	GI0GB	9 V U6 S _vNB	%IDf .	NI0i1.	BBD	. %IG	
								LV U6 S _vN5	v%IDI4B	vNI0iT5	BBDF	. ND	
9 V U6 S _vNB	5BDCG	NGN5Tf	. DB	C	G	GI0GB	GI0GB	9 V U6 S _vN5	v%IDf f	vNI0i N	BBD	. ND	
								9 V U6 S _vNI	BD1f	%IDNIG	4. D%	. ND	
								LV U6 S _vNB	v%IDI4B	vNI0iT%	BBDF	. ND	
9 V U6 S _vNI	5BDCG	NGGD14	. D	C	G	GI0GB	GI0GB	9 V U6 S _vGF	vf IDINI	v5 I554	N5BI4	. N%	
								9 V U6 S _vNB	vBD51	v%ID%T	4. D	. N%	
								9 V U6 S _vNF	NBI4%	TD%%	%T. D%	. N5	
								LV U6 S _vNI	v%IDI4B	vNI0iTN	BBI4	. %IG	
9 V U6 S _vNT	5BDCG	NGN511	. DB	C	G	GI0GB	GI0GB	9 V U6 S _vGF	%IDf .	NI0i1.	BBD	. %IG	
								LV U6 S _vNT	v%IDI4B	vNI0iT%	BBDF	. ND	
9 V U6 S _vNF	5BDCG	NGGDf B	. DB	C	G	GI0GB	GI0GB	JUv%N	NFD1.	f I4GT	5NID%	. NN	
								9 V U6 S _vNI	vNBD4G	vTIDB	%TGDB	. NG	
								LV U6 S _vNF	v%IDI45	vNI0iTG	BBD	. %IG	
9 V U6 S _v%G	5BDCG	NGNI0BT	. D5	C	G	GI0GB	GI0GB	9 V U6 S _v%N	%IDf .	NI0i14	BBDF	. %IG	
								LV U6 S _v%G	v%IDI4B	vNI0iT%	BBD	. %IG	
9 V U6 S _v%N	5BDCG	NGGI415	. D5	C	G	GI0GB	GI0GB	9 V U6 S _v%G	v%IDf B	vNDI55	B1D%	. GD	

Pro7ect:	F m OH m RF j	**ETAP**	Page: B
Location:	Paulding, OH	NI0I0IC	j ate: NG\GTv%GNF
Contract:			SF : m ES_m OOj P
Engineer:	Josh Venden	Study Case: NG1P6 . 1L0 W	k eAision: NGGM WEF
I ilena- e:	F m 2OH		ConpigD F or- al

Bus		Voltage		Generation		Load		Load Flow					XFMR
R	8V	M 9 agD	0 ngD	9 m	9 Aar	9 m	9 Aar	R	9 m	9 Aar	0 - 3	MPI	M_a3
								9 V U6 S _v%%	BD1B	%DN G	4. D	. ND	
								LV U6 S _v%N	v%DB45	vN0GTN	BBD4	. %DG	
9 V U6 S _v%%	5BDGG	NGGDT. .	. D5	C	G	G0GB	G0GB	JUv%N	. D4. 4	BDB%N	N4GD%	. N5	
								9 V U6 S _v%N	vBDB1	v%DB%N	. GDN	. ND%	
								9 V U6 S _v%	v%DBf 5	vNDNB1	B1D5	. GD	
								LV U6 S _v%%	v%DB45	vN0GTN	BBD	. %DG	
9 V U6 S _v%5	5BDGG	NGGD%G	. D	C	G	G0GB	G0GB	4. I 50	%f DNG5	N%D5. B	B. 1D%	. GD	
								9 V U6 S _v%4	v%BDT%B	vNN55f	B1GDB	. GD4	
								LV U6 S _v%5	v%DB45	vN0GTN	BBD	. %DG	
9 V U6 S _v%B	5BDGG	NGGDGi G	. D%	C	G	G0GB	G0GB	9 V U6 S _v%1	%DBf.	N0G1 1	B1DG	. %DG	
								LV U6 S _v%B	v%DB45	vN0G1.	B1DN	. %DG	
9 V U6 S _v%1	5BDGG	NGGD0B1	. D%	C	G	G0GB	G0GB	4. I N0	%BDT4	NN54%	B1%D	. GD	
								9 V U6 S _vNG	vN DNN	v. D%%	5T%D	. GD	
								9 V U6 S _v%B	v%DBf 4	vN0Gi f	B1D5	. NDB	
								LV U6 S _v%1	v%DB45	vN0G1.	B1D%	. %DG	
9 V U6 S _v%T	5BDGG	NGND%5	. D	C	G	G0GB	G0GB	9 V U6 S _v%f	%DBf.	N0G1 4	BBDT	. %DG	
								LV U6 S _v%T	v%DB4B	vN0GT%	BBD	. ND	
9 V U6 S _v%f	5BDGG	NGND%f	. DT	C	G	G0GB	G0GB	9 V U6 S _v%T	v%DBf f	vN0Gi T	BBD4	. NDB	
								9 V U6 S _v%4	BD1T	%DN1 B	4. DB	. ND	
								LV U6 S _v%f	v%DB4B	vN0GT%	BBD	. ND	
9 V U6 S _v%4	5BDGG	NGGDB%	. DT	C	G	G0GB	G0GB	9 V U6 S _v%5	%BDTN	NN%BB	BB. D5	. N0G	
								9 V U6 S _v%f	vBDBT	v%DN4.	4. D	. NDB	
								9 V U6 S _v55	vNTD%51	vf D. 4	5N1DG	. GD	
								LV U6 S _v%4	v%DB4B	vN0GTN	BBD4	. %DG	
9 V U6 S _v%	5BDGG	NGGD%T	. D5	C	G	G0GB	G0GB	9 V U6 S _v%%	%DBf.	N0G1 f	BBD	. %DG	
								LV U6 S _v%	v%DB4B	vN0GTN	BBD4	. %DG	
9 V U6 S _v5N	5BDGG	NGN4G%	. DT	C	G	G0GB	G0GB	9 V U6 S _v5%	%DB4G	N0GTG	BBD5	. %DG	
								LV U6 S _v5N	v%DB4B	vN0GTB	BBDB	. ND	
9 V U6 S _v5%	5BDGG	NGND%N	. D	C	G	G0GB	G0GB	9 V U6 S _v5N	v%DBf %	vNDNT%	B1DN	. GDB	
								9 V U6 S _v55	BD1%	%D%5N	4. D	. ND%	
								LV U6 S _v5%	v%DB4B	vN0GT5	BBD	. ND	
9 V U6 S _v55	5BDGG	NGN5f 4	. D	C	G	G0GB	G0GB	9 V U6 S _v%4	NTD%B	f DN%	5N5D5	. NDN	
								9 V U6 S _v5%	vBDBB	v%D%1 f	4. D	. N0G	
								9 V U6 S _v5B	v. D4f N	vBDB. 1	NT. DG	. N0G	
								LV U6 S _v55	v%DB4B	vN0GT%	BBDT	. ND	
9 V U6 S _v5B	5BDGG	NGNDT%	. D	C	G	G0GB	G0GB	9 V U6 S _v55	. D4.	BDB14	NT4D	. ND%	
								9 V U6 S _v5T	vBD54	v%D%NT	4. D%	. ND%	
								9 V U6 S _v5.	v%DBf N	vNDN4%	B1DN	. GD%	
								LV U6 S _v5B	v%DB4B	vN0GT5	BBD	. ND	

Bus		Voltage		Generation		Load		Load Flow					XFMR
Rj	8V	M 9 agD	0 ngD	9 m	9 Aar	9 m	9 Aar	Rj	9 m	9 Aar	0 - 3	MPI	M_a3
9 V U6 S _v5T	5BDGG	NGNDN	. DF	C	G	G00GB	G00GB	9 V U6 S _v5B	BD1f	%0NB	44DF	. N4	
								9 V U6 S _v5f	v%0Bf4	vN0G44	BBDB	. NF	
								LV U6 S _v5T	v%0B4B	vN0GTB	BBDB	. ND	
9 V U6 S _v5f	5BDGG	NGND4.	. DF	C	G	G00GB	G00GB	9 V U6 S _v5T	%0B4G	N0GTG	BB0%	. ND	
								LV U6 S _v5f	v%0B4B	vN0GTB	BBD5	. ND	
9 V U6 S _v5.	5BDGG	NGN4T.	. DF	C	G	G00GB	G00GB	9 V U6 S _v5B	%0B4G	N0GTG	BBD5	. %0G	
								LV U6 S _v5.	v%0B4B	vN0GTB	BBDB	. ND	
9 V U6 S _vBG	5BDGG	NGND4%	NG0G	C	G	G00GB	G00GB	4. I B0	%BDN1	NN51N	BBB4	. G4	
								9 V U6 S _vBT	v%0D5T	vNGD% N	BGGDF	. GD	
								LV U6 S _vBG	v%0B4B	vN0GTB	BBD5	. ND	
9 V U6 S _vBN	5BDGG	NG5I0G55	NGD%	C	G	G00GB	G00GB	JUvB'N	%0B4G	N0GT5	B5I4	. ND	
								LV U6 S _vBN	v%0B4B	vN0GTf	B5D	. ND	
9 V U6 S _vB%	5BDGG	NGP4DT5	NGD%	C	G	G00GB	G00GB	JUvB'N	. D4f f	BDB. T	NFTDB	. N0G	
								9 V U6 S _vB.	vf D5. f	v5D855	N5%4D	. GD	
								LV U6 S _vB%	v%0B4B	vN0GTf	B5D	. ND	
9 V U6 S _vB5	5BDGG	NG5I0G5N	NGD%	C	G	G00GB	G00GB	JUvB'N	%0B4G	N0GT5	B5I4	. ND	
								LV U6 S _vB5	v%0B4B	vN0GTf	B5D	. ND	
9 V U6 S _vBB	5BDGG	NGP4Df %	NGD%	C	G	G00GB	G00GB	JUvB'N	vNBD. T	vTD4T	%T1D5	. GD	
								9 V U6 S _vB1	NFD%f T	f D4B	5G D5	. N0G	
								LV U6 S _vBB	v%0B4B	vN0GTT	BBDN	. ND	
9 V U6 S _vB1	5BDGG	NGP4DBTG	NGDN	C	G	G00GB	G00GB	9 V U6 S _vBB	vNFD%Bf	vf DB1	5NGDN	. G4	
								9 V U6 S _vBT	N D%f	. D0GT	51BD%	. N0G	
								LV U6 S _vB1	v%0B4B	vN0GT1	BBDN	. ND	
9 V U6 S _vBT	5BDGG	NGP4D4B	NG0G	C	G	G00GB	G00GB	9 V U6 S _vBG	%4DNT4	NGD%NG	5. . D	. G4	
								9 V U6 S _vB1	vN DF44	v. DNB	511D	. GD	
								LV U6 S _vBT	v%0B4B	vN0GT1	BBD5	. ND	
9 V U6 S _vB4	5BDGG	NG5Df 4	NGD%	C	G	G00GB	G00GB	9 V U6 S _vB.	%0B4G	N0GTB	B5DF	. ND	
								LV U6 S _vB4	v%0B4B	vN0GT4	B5D	. ND	
9 V U6 S _vB.	5BDGG	NG5DB4f	NGD%	C	G	G00GB	G00GB	9 V U6 S _vB%	f D51	5D%T4	N5N5	. ND	
								9 V U6 S _vB4	v%0Bf4	vNDGC5	B5D	. NB	
								9 V U6 S _v1G	v%0Bf4	vNDGN	B5I4	. NB	
								LV U6 S _vB.	v%0B4B	vN0GT4	B5D	. ND	
9 V U6 S _v1G	5BDGG	NG5Df 1	NGD%	C	G	G00GB	G00GB	9 V U6 S _vB.	%0B4G	N0GTB	B5DF	. ND	
								LV U6 S _v1G	v%0B4B	vN0GT4	B5D	. ND	
* POR	N54I0GG	NG1I0GG	G0G	vNGP4DNGN	v55Df N	C	C	4. _N0	vNGP4DNGN	v55Df N	B%4D%	. 1I0G	
9 P_~5	N5I4GG	NGG5%B	. D	C	G	C	C	HV U6 S 9 P_	G00GG	G00GG	G0G	G0G	
								& 4. _NU					

* Rndicates a Aoltage regulated bus (Aoltage controlled or swing ty3e - achine connected to it)

\# Rndicates a bus with a load - is- atch op- ore than GDN9 V0

Pro2ect:	F m OH m 7F 0	**ETAP**		Page:	N
Location:	Paulding, OH	NWDIDC		0 ate:	NDRDWRvDN%
Contract:				SF :	m ES_m OO0 P
Engineer:	Josh Venden	Study Case:	NPG 16LE. 0	f ekision:	NDDA MEF
j ilenaI e:	F m - OH			ConpigT	F orI al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	8V	A 9 agT	. ngT	9 m	9 kar	9 m	9 kar	70	9 m	9 kar	. I 3	A Pj	A _a3
41j N	5B16DD	11T1W4	4T5	[	D	[	[	9 V UGS _Rv6	RvB16WW	B154N	BN%d%	R14TB	
								41_NU	vB16WW	RB154N	BN%d%	R14TB	
41j v.	5B16DD	11T1W4	4T5	[	D	[	[	JURv/N	Rv%dD55	BT1D1	B61T1	R14TB	
								41_NU	v%dD55	RBT1D1	B61T1	R14TB	
41j 5.	5B16DD	11T1W4	4T5	[	D	[	[	9 V UGS _Rv5	RvWT146	BT%8W	B64T%	R14T6	
								41_NU	vWT146	RBT%8W	B64T%	R14T6	
41j B.	5B16DD	11T1W4	4T5	[	D	[	[	9 V UGS _RBD	RvB155%	5TWDv	BNN14	R14T1	
								41_NU	vB155%	R5TWDv	BNN14	R14T1	
41_N	N54TDDD	11T11W	DID	[	D	[	[	PO7	NDvTB%4	R55T6N6	B6NIN	R16TD	
								HV UGS 9 P_	RNDvTB%4	55T6N6	B6NIN	R16TD	
41_NU	5B16DD	11T1W4	4T5	[	D	[	[	41j B.	RvB155%	5TWDv	BNN14	R14T1	
								41j 5.	RvWT146	BT%8W	B64T%	R14T6	
								41j v.	Rv%dD55	BT1D1	B61T1	R14TB	
								41j N	RvB16WW	B154N	BN%d%	R14TB	
								9 P_~5	NDvT1vD	RN%dWW4	N%B4TN	R14TW	
							&	HV UGS 9 P_					
HV UGS 9 P_	N54TDDD	11T11W	DID	[	D	DID65	DTNB%	41_N	NDvTB%4	R55T6N6	B6NIN	R16TD	
								41_NU	RNDvT65v	55T5W%	B6NIN	R16TN	R5TNv6
							&	9 P_~5					
JURv/N	5B16DD	NDDTvv6	4T%	[	D	[	[	9 V UGS _RN%	RN%dWD	5TvWN	v15T5	R14T5	
								9 V UGS _Rvv	R1T4%1	N144%	NW%1	R14Tv	
								41j v.	v%dN51	R6TNB4	BWNTv	R14Tv	
JURB/N	5B16DD	NDN5Wv	NDTv	[	D	[	[	9 V UGS _RBN	RvTB4D	DT6D6	BN14	R14TD	
								9 V UGS _RBv	R1T44%	N11DD	NWWTv	R14Tv	
								9 V UGS _RB5	RvTB4D	DT6D6	BN14	R14TD	
								9 V UGS _RBB	NB14BW	RvT1ND	vB1T4	R14TN	
LV UGS _RDN	DTWD	NDDT1WN	NvT5	vT6DD	RDTBDD	[	[	9 V UGS _RDN	vT6DD	RDTBDD	vD14T5	R14T%	
LV UGS _RDv	DTWD	NDD146W	NvT5	vT6DD	RDTBDD	[	[	9 V UGS _RDv	vT6DD	RDTBDD	vNDDT6	R14T%	
LV UGS _RD5	DTWD	NDDTW%W	NvT5	vT6DD	RDTBDD	[	[	9 V UGS _RD5	vT6DD	RDTBDD	vNDBTv	R14T%	
LV UGS _RDB	DTWD	NDDT6Wv	NvTv	vT6DD	RDTBDD	[	[	9 V UGS _RDB	vT6DD	RDTBDD	vNDWTW	R14T%	
LV UGS _RD6	DTWD	NDDT51N	NvTv	vT6DD	RDTBDD	[	[	9 V UGS _RD6	vT6DD	RDTBDD	vNNDTv	R14T%	
LV UGS _RDW	DTWD	NDDTBN1	NvTN	vT6DD	RDTBDD	[	[	9 V UGS _RDW	vT6DD	RDTBDD	vND1TW	R14T%	
LV UGS _RD%	DTWD	NDDT56v	NvTD	vT6DD	RDTBDD	[	[	9 V UGS _RD%	vT6DD	RDTBDD	vNNND	R14T%	
LV UGS _RD4	DTWD	NDDTv%W	NvTN	vT6DD	RDTBDD	[	[	9 V UGS _RD4	vT6DD	RDTBDD	vNNvTW	R14T%	
LV UGS _RD1	DTWD	NDDTND%	NvTD	vT6DD	RDTBDD	[	[	9 V UGS _RD1	vT6DD	RDTBDD	vNNWTv	R14T%	
LV UGS _RND	DTWD	NDDTDvv	NNT1	vT6DD	RDTBDD	[	[	9 V UGS _RND	vT6DD	RDTBDD	vNN4TD	R14T%	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	8V	A9agT	.ngT	9m	9kar	9m	9kar	70	9m	9kar	.I3	APj	A_a3
LV UGS _RN5	DIWID	NDDIWD6	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _RN5	vT6DD	RDIBDD	vND6T%	R14T%	
LV UGS _RNB	DIWID	NDDI655	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _RNB	vT6DD	RDIBDD	vND%Tv	R14T%	
LV UGS _RN6	DIWID	NDDIN%v	NvTD	vT6DD	RDIBDD	[	[	9 V UGS _RN6	vT6DD	RDIBDD	vNNBT4	R14T%	
LV UGS _RNW	DIWID	NDDIB11	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _RNW	vT6DD	RDIBDD	vND%TI	R14T%	
LV UGS _RN%	DIWID	11TI56	NN4	vT6DD	RDIBDD	[	[	9 V UGS _RN%	vT6DD	RDIBDD	vNN1T4	R14T%	
LV UGS _RvD	DIWID	NDDI51v	NNI	vT6DD	RDIBDD	[	[	9 V UGS _RvD	vT6DD	RDIBDD	vNNDTv	R14T%	
LV UGS _RvN	DIWID	NDDIvvv	NN4	vT6DD	RDIBDD	[	[	9 V UGS _RvN	vT6DD	RDIBDD	vNN5T4	R14T%	
LV UGS _Rvv	DIWID	NDDID46	NN4	vT6DD	RDIBDD	[	[	9 V UGS _Rvv	vT6DD	RDIBDD	vNNWTW	R14T%	
LV UGS _Rv5	DIWID	11TIW5	NNI	vT6DD	RDIBDD	[	[	9 V UGS _Rv5	vT6DD	RDIBDD	vNN1Tv	R14T%	
LV UGS _RvB	DIWID	11T%BN	NNTW	vT6DD	RDIBDD	[	[	9 V UGS _RvB	vT6DD	RDIBDD	vNvBTD	R14T%	
LV UGS _Rv6	DIWID	11T%D6	NN6	vT6DD	RDIBDD	[	[	9 V UGS _Rv6	vT6DD	RDIBDD	vNvBT%	R14T%	
LV UGS _RvW	DIWID	NDDIv1%	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _RvW	vT6DD	RDIBDD	vNNvTv	R14T%	
LV UGS _Rv%	DIWID	NDDIvNv	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _Rv%	vT6DD	RDIBDD	vNNBTD	R14T%	
LV UGS _Rv4	DIWID	NDDIDB4	NvTN	vT6DD	RDIBDD	[	[	9 V UGS _Rv4	vT6DD	RDIBDD	vNN%TB	R14T%	
LV UGS _Rv1	DIWID	NDDIv4W	NNI	vT6DD	RDIBDD	[	[	9 V UGS _Rv1	vT6DD	RDIBDD	vNNvTB	R14T%	
LV UGS _R5N	DIWID	NDDIW6B	NvT5	vT6DD	RDIBDD	[	[	9 V UGS _R5N	vT6DD	RDIBDD	vNDBT%	R14T%	
LV UGS _R5v	DIWID	NDDIBDB	NvT5	vT6DD	RDIBDD	[	[	9 V UGS _R5v	vT6DD	RDIBDD	vNDITI	R14T%	
LV UGS _R55	DIWID	NDDIv%4	NvT5	vT6DD	RDIBDD	[	[	9 V UGS _R55	vT6DD	RDIBDD	vNNvTW	R14T%	
LV UGS _R5B	DIWID	NDDIBvv	NvT5	vT6DD	RDIBDD	[	[	9 V UGS _R5B	vT6DD	RDIBDD	vNDIT5	R14T%	
LV UGS _R5W	DIWID	NDDI%51	NvTB	vT6DD	RDIBDD	[	[	9 V UGS _R5W	vT6DD	RDIBDD	vNDvTI	R14T%	
LV UGS _R5%	DIWID	NDDI4DN	NvTB	vT6DD	RDIBDD	[	[	9 V UGS _R5%	vT6DD	RDIBDD	vNDNTW	R14T%	
LV UGS _R51	DIWID	NDDIW16	NvTB	vT6DD	RDIBDD	[	[	9 V UGS _R51	vT6DD	RDIBDD	vND5T4	R14T%	
LV UGS _RBD	DIWID	NDDIBW4	NvTW	vT6DD	RDIBDD	[	[	9 V UGS _RBD	vT6DD	RDIBDD	vND4TW	R14T%	
LV UGS _RBN	DIWID	NDNID51	N5TN	vT6DD	RDIBDD	[	[	9 V UGS _RBN	vT6DD	RDIBDD	vDIWT%	R14T%	
LV UGS _RBv	DIWID	NDDII%W	N5TN	vT6DD	RDIBDD	[	[	9 V UGS _RBv	vT6DD	RDIBDD	vDI4TD	R14T%	
LV UGS _RB5	DIWID	NDNID5%	N5TN	vT6DD	RDIBDD	[	[	9 V UGS _RB5	vT6DD	RDIBDD	vDIWT%	R14T%	
LV UGS _RBB	DIWID	NDDI%1B	N5TD	vT6DD	RDIBDD	[	[	9 V UGS _RBB	vT6DD	RDIBDD	vNDN4	R14T%	
LV UGS _RB6	DIWID	NDDIW4v	NvTI	vT6DD	RDIBDD	[	[	9 V UGS _RB6	vT6DD	RDIBDD	vNDBTN	R14T%	
LV UGS _RBW	DIWID	NDDI664	NvT4	vT6DD	RDIBDD	[	[	9 V UGS _RBW	vT6DD	RDIBDD	vNDWT%	R14T%	
LV UGS _RB4	DIWID	NDNIB%5	N5T5	vT6DD	RDIBDD	[	[	9 V UGS _RB4	vT6DD	RDIBDD	vD4%T%	R14T%	
LV UGS _RB1	DIWID	NDN51N	N5Tv	vT6DD	RDIBDD	[	[	9 V UGS _RB1	vT6DD	RDIBDD	vD41TB	R14T%	
LV UGS _R6D	DIWID	NDNIB%D	N5T5	vT6DD	RDIBDD	[	[	9 V UGS _R6D	vT6DD	RDIBDD	vD4%T4	R14T%	
9 V UGS _RDN	5BT6DD	NDN56D	1TB	[	D	DIDDB	DIDDB	9 V UGS _RDv	vTB4N	RDI65B	BNII	R1%T4	
								LV UGS _RDN	RvTB4W	DI65N	BvTD	R1%T4	
9 V UGS _RDv	5BT6DD	NDNIvB6	1T5	[	D	DIDDB	DIDDB	9 V UGS _RDN	RvTB%1	DIB4%	BN4	R14TN	
								9 V UGS _RD5	BTIWD	RNIDvv	45T%	R1%TI	
								LV UGS _RDv	RvTB46	DI65N	BvTD	R1%T4	
9 V UGS _RD5	5BT6DD	NDNIDW%	1T5	[	D	DIDDB	DIDDB	9 V UGS _RDv	RBTI6D	DII45	45TW	R14TN	
								9 V UGS _RDB	%TB5v	RNI6NI	Nv6TW	R14TD	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	8V	A 9 agT	. ngT	9 m	9 kar	9 m	9 kar	70	9 m	9 kar	. I 3	A Pj	A_a3
								LV UGS _RD5	RvTB46	DI65N	BvTN	RI%I4	
9 V UGS _RDB	5BI6DD	NDDII 65	1T5	[	D	DIDDB	DIDDB	9 V UGS _RD5	R%IBvv	NIB%6	Nv6TB	RI4TN	
								9 V UGS _RD6	1TI D5	RvTDNN	NW%6	RI4TD	
								LV UGS _RDB	RvTB46	DI65v	BvTN	RI%I4	
9 V UGS _RD6	5BI6DD	NDDP/45	1Tv	[	D	DIDDB	DIDDB	9 V UGS _RDB	RIT44B	NII W6	NW%5	RI4TN	
								9 V UGS _RD4	NvT5WW	RvT6DN	vDI T6	RI4TD	
								LV UGS _RD6	RvTB46	DI65v	BvTv	RI%I4	
9 V UGS _RDW	5BI6DD	NDDI4NN	1TN	[	D	DIDDB	DIDDB	9 V UGS _RD%	vTB4N	RDI65W	BvTN	RI%I%	
								LV UGS _RDW	RvTB46	DI65v	BvTv	RI%I4	
9 V UGS _RD%	5BI6DD	NDDP/B6	1TD	[	D	DIDDB	DIDDB	9 V UGS _RDW	RvTB%I	DI6D%	BvTD	RI4TD	
								9 V UGS _RNW	RvTB%%	DIB%N	BNII	RI4Tv	
								9 V UGS _RN6	%IB54	RNI6N5	NvWN	RI4TD	
								LV UGS _RD%	RvTB46	DI65v	BvTv	RI%I4	
9 V UGS _RD4	5BI6DD	NDDIWWD	1TN	[	D	DIDDB	DIDDB	9 V UGS _RD6	RNvT5B4	vTBN%	vDI Tv	RI4TN	
								9 V UGS _RDI	NBI4v1	RvTI 65	v6NIB	RI4TN	
								LV UGS _RD4	RvTB46	DI65v	BvT5	RI%I4	
9 V UGS _RDI	5BI6DD	NDDI6DN	1TD	[	D	DIDDB	DIDDB	9 V UGS _RD4	RNBP/I 1	vTI64	v6NID	RI4Tv	
								9 V UGS _RND	N%I4D	RST516	v15Tv	RI4TN	
								LV UGS _RDI	RvTB46	DI655	BvT5	RI%I4	
9 V UGS _RND	5BI6DD	NDDIBN4	4TI	[	D	DIDDB	DIDDB	9 V UGS _RDI	RN%IWN	5T5vB	v1vTI	RI4Tv	
								9 V UGS _Rv6	NI P/Bv	RST4WD	556Tv	RI4TN	
								LV UGS _RND	RvTB46	DI655	BvTB	RI%I4	
9 V UGS _RN5	5BI6DD	NDDII 1W	1TN	[	D	DIDDB	DIDDB	9 V UGS _RNB	vTB4N	RDI656	BvTN	RI%I4	
								LV UGS _RN5	RvTB46	DI65v	BvTN	RI%I4	
9 V UGS _RNB	5BI6DD	NDDII vB	1TN	[	D	DIDDB	DIDDB	9 V UGS _RN5	RvTB%I	DI6D5	BNII	RI4TD	
								9 V UGS _RN6	BII WN	RNID51	4BID	RI%II	
								LV UGS _RNB	RvTB46	DI65v	BvTN	RI%I4	
9 V UGS _RN6	5BI6DD	NDDI6WW	1TD	[	D	DIDDB	DIDDB	9 V UGS _RD%	R%IBv5	NIBB6	Nv6T4	RI4Tv	
								9 V UGS _RNB	RBII BN	DII W	45T4	RI4Tv	
								9 V UGS _RN%	NBI4B6	RvTI BB	v6NI4	RI4TN	
								LV UGS _RN6	RvTB46	DI655	BvT5	RI%I4	
9 V UGS _RNW	5BI6DD	NDDI41N	1TN	[	D	DIDDB	DIDDB	9 V UGS _RD%	vTB4N	RDI65W	BvTN	RI%I%	
								LV UGS _RNW	RvTB46	DI65v	BvTv	RI%I4	
9 V UGS _RN%	5BI6DD	NDDI65N	4T4	[	D	DIDDB	DIDDB	JURv/N	N%I4B	RST5BI	v15TW	RI4Tv	
								9 V UGS _RN6	RNBI4D5	vTI4Nv	v6NI5	RI4Tv	
								LV UGS _RN%	RvTB46	DI655	BvTB	RI%I4	
9 V UGS _RvD	5BI6DD	NDDP/46	4TI	[	D	DIDDB	DIDDB	9 V UGS _RvN	vTB4N	RDI65W	BvTN	RI%I%	
								LV UGS _RvD	RvTB46	DI65v	BvTv	RI%I4	
9 V UGS _RvN	5BI6DD	NDDIWW6	4T4	[	D	DIDDB	DIDDB	9 V UGS _RvD	RvTB%%	DIBWN	BNII	RI4T5	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	8V	A 9 agT	. ngT	9 m	9 kar	9 m	9 kar	70	9 m	9 kar	. I 3	A Pj	A_a3
								9 V UGS _Rvv	BII64	RDII1%	4BIN	RI4TD	
								LV UGS _RvN	RvTB46	DI655	BvT5	RI%TI4	
9 V UGS _Rvv	5BI6DD	NDDIB4D	4T4	I	D	DIDDB	DIDDB	JURv/N	1TID4	RNII6B	NW4Tv	RI4TN	
								9 V UGS _RvN	RBII6N	DII WI	4BID	RI4TN	
								9 V UGS _Rv1	RvTB%W	DIBB4	BNII	RI4TB	
								LV UGS _Rvv	RvTB46	DI655	BvT5	RI%TI4	
9 V UGS _Rv5	5BI6DD	NDDI561	4TI	I	D	DIDDB	DIDDB	41j 5.	v%TNBB	R6TNBD	BWDI%	RI4T5	
								9 V UGS _Rv4	RvBIWW5	BIWD5	BN4TB	RI4T5	
								LV UGS _Rv5	RvTB46	DI655	BvTB	RI%TI4	
9 V UGS _RvB	5BI6DD	NDDIN54	4T6	I	D	DIDDB	DIDDB	9 V UGS _Rv6	vTB4N	RDI654	BvTB	RI%TI%	
								LV UGS _RvB	RvTB46	DI65B	BvT6	RI%TI4	
9 V UGS _Rv6	5BI6DD	NDDIND5	4T6	I	D	DIDDB	DIDDB	41j N	vBIWN6	RBI656	BN4TB	RI4T5	
								9 V UGS _RND	RNITW6B	5T6D5	555TI%	RI4TB	
								9 V UGS _RvB	RvTB4D	DIB16	BvT5	RI4TN	
								LV UGS _Rv6	RvTB46	DI65B	BvT6	RI%TI4	
9 V UGS _RvW	5BI6DD	NDDIWID	1TN	I	D	DIDDB	DIDDB	9 V UGS _Rv%	vTB4N	RDI65W	BvTv	RI%TI%	
								LV UGS _RvW	RvTB46	DI65v	BvTv	RI%TI4	
9 V UGS _Rv%	5BI6DD	NDDIWD6	1TN	I	D	DIDDB	DIDDB	9 V UGS _RvW	RvTB%I	DIB11	BvTN	RI4TD	
								9 V UGS _Rv4	BII WD	RND56	4BT5	RI%TI	
								LV UGS _Rv%	RvTB46	DI655	BvT5	RI%TI4	
9 V UGS _Rv4	5BI6DD	NDDIBB5	1TN	I	D	DIDDB	DIDDB	9 V UGS _Rv5	vBIWI6	RBTI%Dv	BN4T4	RI4Tv	
								9 V UGS _Rv%	RBII6N	NIDDN	4BTv	RI4TD	
								9 V UGS _R55	RN%TvWv	5TNW6	v1vTB	RI4TB	
								LV UGS _Rv4	RvTB46	DI655	BvT5	RI%TI4	
9 V UGS _Rv1	5BI6DD	NDDIW%I	4TI	I	D	DIDDB	DIDDB	9 V UGS _Rvv	vTB4N	RDI65W	BvTv	RI%TI%	
								LV UGS _Rv1	RvTB46	DI65v	BvTv	RI%TI4	
9 V UGS _R5N	5BI6DD	NDNIDB6	1TB	I	D	DIDDB	DIDDB	9 V UGS _R5v	vTB4N	RDI656	BvTD	RI%TI4	
								LV UGS _R5N	RvTB46	DI65N	BvTN	RI%TI4	
9 V UGS _R5v	5BI6DD	NDDI%I1%	1T5	I	D	DIDDB	DIDDB	9 V UGS _R5N	RvTB%6	DIBv6	BNI%	RI4TW	
								9 V UGS _R55	BII6W	RDII WN	45T4	RI4Tv	
								LV UGS _R5v	RvTB46	DI65v	BvTv	RI%TI4	
9 V UGS _R55	5BI6DD	NDDIW%N	1T5	I	D	DIDDB	DIDDB	9 V UGS _Rv4	N%T5NB	R5T564	v15Tv	RI4Tv	
								9 V UGS _R5v	RBIIB1	DII5B	45TI%	RI4T5	
								9 V UGS _R5B	RIT44B	NI44%	NW%T5	RI4Tv	
								LV UGS _R55	RvTB46	DI65v	BvT5	RI%TI4	
9 V UGS _R5B	5BI6DD	NDDI4N6	1T5	I	D	DIDDB	DIDDB	9 V UGS _R55	1T411	RNIIv6	NW%TB	RI4Tv	
								9 V UGS _R5W	RBIIBB	DII%6	45TW	RI4TN	
								9 V UGS _R51	RvTB%B	DIBN6	BNIW	RI4TW	
								LV UGS _R5B	RvTB46	DI65v	BvTv	RI%TI4	

Bus		Voltage		Generation		Load		Load Flow					XFMR
70	8V	A 9 agT	. ngT	9 m	9 kar	9 m	9 kar	70	9 m	9 kar	. I 3	A Pj	A _a3
9 V UGS _R5W	5BI6DD	NDNINv1	1TB	[	D	DIDDB	DIDDB	9 V UGS _R5B	BTI WN	RNDBv	45TI	RI%TI	
								9 V UGS _R5%	RvTB4D	DI6D%	BNII	RI4TD	
								LV UGS _R5W	RvTB46	DI65N	BvTN	RI%T4	
9 V UGS _R5%	5BI6DD	NDNINI N	1TB	[	D	DIDDB	DIDDB	9 V UGS _R5W	vTB4N	RDI656	BvTD	RI%T4	
								LV UGS _R5%	RvTB46	DI65N	BvTD	RI%T4	
9 V UGS _R51	5BI6DD	NDNID46	1TB	[	D	DIDDB	DIDDB	9 V UGS _R5B	vTB4N	RDI656	BvTD	RI%T4	
								LV UGS _R51	RvTB46	DI65N	BvTN	RI%T4	
9 V UGS _RBD	5BI6DD	NDDI4WD	1T%	[	D	DIDDB	DIDDB	41j B.	vBTW6v	RBTWv5	BNWv	RI4T5	
								9 V UGS _RBW	RvvTN%N	BID44	5%BTN	RI4T5	
								LV UGS _RBD	RvTB46	DI65v	BvTv	RI%T4	
9 V UGS _RBN	5BI6DD	NDNIBv%	NDTv	[	D	DIDDB	DIDDB	JURB/N	vTB4N	RDI65B	BNII	RI%T4	
								LV UGS _RBN	RvTB4W	DI65D	BNII	RI%T4	
9 V UGS _RBv	5BI6DD	NDNI5WB	NDTv	[	D	DIDDB	DIDDB	JURB/N	1TI4%	RNIIDN	NWWv	RI4Tv	
								9 V UGS _RB1	R%BDW	NI5WW	NvBT5	RI4T5	
								LV UGS _RBv	RvTB4W	DI65N	BvTD	RI%T4	
9 V UGS _RB5	5BI6DD	NDNIBvW	NDTv	[	D	DIDDB	DIDDB	JURB/N	vTB4N	RDI65B	BNII	RI%T4	
								LV UGS _RB5	RvTB4W	DI65D	BNII	RI%T4	
9 V UGS _RBB	5BI6DD	NDNIN4B	NDTD	[	D	DIDDB	DIDDB	JURB/N	RNBT4NB	vT4D%	vB1TB	RI4T5	
								9 V UGS _RB6	N%Tv16	R5T5Bv	v1NI5	RI4Tv	
								LV UGS _RBB	RvTB46	DI65N	BvTD	RI%T4	
9 V UGS _RB6	5BI6DD	NDNID%5	1TI	[	D	DIDDB	DIDDB	9 V UGS _RBB	RN%Tv%D	5TvB6	v1NID	RI4T5	
								9 V UGS _RBW	NI TN6N	R5T4D	555TD	RI4Tv	
								LV UGS _RB6	RvTB46	DI65N	BvTN	RI%T4	
9 V UGS _RBW	5BI6DD	NDDII6D	1T4	[	D	DIDDB	DIDDB	9 V UGS _RBD	vvTN1 1	RBTN%v	5%BTB	RI4T5	
								9 V UGS _RB6	RNI TN%	5TW5W	55vTB	RI4T5	
								LV UGS _RBW	RvTB46	DI65v	BvTN	RI%T4	
9 V UGS _RB4	5BI6DD	NDNI464	NDT5	[	D	DIDDB	DIDDB	9 V UGS _RB1	vTB4N	RDI655	BNT%	RI%T4	
								LV UGS _RB4	RvTB4W	DI6v1	BNT4	RI%T4	
9 V UGS _RB1	5BI6DD	NDNI%%	NDT5	[	D	DIDDB	DIDDB	9 V UGS _RBv	%TBBD	RNI5v%	NvBTI	RI4TD	
								9 V UGS _RB4	RvTB%I	DIB1W	BNIW	RI4TN	
								9 V UGS _R6D	RvTB%I	DIB1%	BNIW	RI4TD	
								LV UGS _RB1	RvTB4W	DI65D	BNT4	RI%T4	
9 V UGS _R6D	5BI6DD	NDNI46W	NDT5	[	D	DIDDB	DIDDB	9 V UGS _RB1	vTB4N	RDI655	BNT%	RI%T4	
								LV UGS _R6D	RvTB4W	DI6v1	BNT4	RI%T4	
* PO7	N54TDDD	NDDIDDD	DTD	RNDvTB%6	55T65N	[	[	41_N	RNDvTB%6	55T65N	B6NIN	RI6TD	
9 P_~5	N5T4DD	11TW4	1TN	[	D	[	[	HV UGS 9 P_	DIDDD	DIDDD	DTD	DTD	
								& 41_NU					

* 7ndicates a koltage regulated bus (koltage controlled or swing ty3e I achine connected to it)

\# 7ndicates a bus with a load I isI atch opI ore than DTN9 V.

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
7.	8V	A 9 agT	6 ngT	9 m	9 kar	9 m	9 kar	7.	9 m	9 kar	6 I 3	A Pj	A _a3
4Nj 06	5BTGDD	NNBvW	4TB	[	D	[	[	9 V U1 S _RvG	RvBTGWv	BT5W0	B0NIN	RN4TG	
								4N_0U	vBTGWv	RBT5W0	B0NIN	RN4TG	
4Nj v6	5BTGDD	NNBvW	4TB	[	D	[	[	JURv/0	Rv%DvN	BT44B	BWvT5	RN4TB	
								4N_0U	v%DvN	RBT44B	BWvT5	RN4TB	
4Nj 56	5BTGDD	NNBvW	4TB	[	D	[	[	9 V U1 S _Rv5	RvWN4D	BTP/GW	BW0TD	RN4TG	
								4N_0U	vWN4D	RBTP/GW	BW0TD	RN4TG	
4Nj B6	5BTGDD	NNBvW	4TB	[	D	[	[	9 V U1 S _RBD	RvBT550	5TGN4	B0BTD	RN4TN	
								4N_0U	vBT550	R5TGN4	B0BTD	RN4TN	
4N_06	054TDDD	NBTNNW	DTD	[	D	[	[	PO7	0DvTBWv	R55TGNB	B%BTN	RNGTD	
								HV U1 S 9 P_	R0DvTBWv	55TGNB	B%BTN	RNGTD	
4N_0U	5BTGDD	NNBvW	4TB	[	D	[	[	4Nj B6	RvBT550	5TGN4	B0BTD	RN4TN	
								4Nj 56	RvWN4D	BTP/GW	BW0TD	RN4TG	
								4Nj v6	Rv%DvN	BT44B	BWvT5	RN4TB	
								4Nj 06	RvBTGWv	BT5W0	B0NIN	RN4TG	
								9 P_~5	0DvTND5	R0%GNN	0%GP%D	RN4TW	
								& HV U1 S 9 P_					
HV U1 S 9 P_	054TDDD	NBTNNW	DTD	[	D	DTDB4	DTD55	4N_06	0DvTBWv	R55TGNB	B%BTN	RNGTD	
								4N_0U	R0DvTG0D	55TBW0	B%BTN	RNGTD	R%GDD
								& 9 P_~5					
JURv/0	5BTGDD	NNTW4B	4T4	[	D	[	[	9 V U1 S _R0%	R0%vG4	5TvB0	vNBT4	RN4T5	
								9 V U1 S _Rvv	RNT4%4	0T4%W	0W4T4	RN4Tv	
								4Nj v6	v%D5W	RGTD0%	BW5TW	RN4T5	
JURB/0	5BTGDD	0DDT4vN	0DT5	[	D	[	[	9 V U1 S _RB0	RvTB%N	DTGD0	BvTD	RN4TD	
								9 V U1 S _RBv	RNT44W	0T444	0W%D	RN4Tv	
								9 V U1 S _RB5	RvTB4D	DTGDv	BvTD	RN4TD	
								9 V U1 S _RBB	0BT4BG	RvT4N0	vG0TD	RN4Tv	
LV U1 S _RD0	DTWND	0DDTB5G	0vTG	vTGDD	RDT5NG	[	[	9 V U1 S _RD0	vTGDD	RDT5NG	v0D4TW	RN4T4	
LV U1 S _RDv	DTWND	0DDT5vN	0vTB	vTGDD	RDT5NG	[	[	9 V U1 S _RDv	vTGDD	RDT5NG	v00DTN	RN4T4	
LV U1 S _RD5	DTWND	0DDTDB4	0vTB	vTGDD	RDT5NG	[	[	9 V U1 S _RD5	vTGDD	RDT5NG	v00BTP%	RN4T4	
LV U1 S _RDB	DTWND	0DDTD55	0vTB	vTGDD	RDT5NG	[	[	9 V U1 S _RDB	vTGDD	RDT5NG	v00%TD	RN4T4	
LV U1 S _RDG	DTWND	NNT4W0	0vT5	vTGDD	RDT5NG	[	[	9 V U1 S _RDG	vTGDD	RDT5NG	v0vDTP%	RN4T4	
LV U1 S _RDW	DTWND	NNT44N	0vTv	vTGDD	RDT5NG	[	[	9 V U1 S _RDW	vTGDD	RDT5NG	v0vDTv	RN4T4	
LV U1 S _RD%	DTWND	NNT4vv	0vTv	vTGDD	RDT5NG	[	[	9 V U1 S _RD%	vTGDD	RDT5NG	v0v0TW	RN4T4	
LV U1 S _RD4	DTWND	NNTP4BW	0vTv	vTGDD	RDT5NG	[	[	9 V U1 S _RD4	vTGDD	RDT5NG	v0v5Tv	RN4T4	
LV U1 S _RDN	DTWND	NNTGP/G	0vTD	vTGDD	RDT5NG	[	[	9 V U1 S _RDN	vTGDD	RDT5NG	v0vWT4	RN4T4	
LV U1 S _R0D	DTWND	NNTBND	0vTD	vTGDD	RDT5NG	[	[	9 V U1 S _R0D	vTGDD	RDT5NG	v0v4TP%	RN4T4	

Pro2ect:	F m OH m 7F .	**ETAP**	Page: v
Location:	Paulding, OH	0WDDC	. ate: 0DRDWRvD0%
Contract:			SF : m ES_m OO. P
Engineer:	Josh Venden	Study Case: NGP1 NGLE6 .	f ekision: 0DDA MEF
j ilenaI e:	F m - OH		ConpigT: F orI al

Bus		Voltage		Generation		Load		Load Flow					XFMR
7.	8V	A 9 agT	6 ngT	9 m	9 kar	9 m	9 kar	7.	9 m	9 kar	6 I 3	A Pj	A _a3
LV U1 S _R05	DIWND	0DDD%W	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _R05	vTGDD	RD5NG	v00WTv	RN4T4	
LV U1 S _R0B	DIWND	0DDDDB	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _R0B	vTGDD	RD5NG	v00%T%	RN4T4	
LV U1 S _R0G	DIWND	NNIWBD	0vT0	vTGDD	RD5NG	[	[	9 V U1 S _R0G	vTGDD	RD5NG	v0vGIB	RN4T4	
LV U1 S _R0W	DIWND	NNIN%D	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _R0W	vTGDD	RD5NG	v004TB	RN4T4	
LV U1 S _R0%	DIWND	NNIBDv	0vTD	vTGDD	RD5NG	[	[	9 V U1 S _R0%	vTGDD	RD5NG	v05DIG	RN4T4	
LV U1 S _RvD	DIWND	NNI4Wv	0vTD	vTGDD	RD5NG	[	[	9 V U1 S _RvD	vTGDD	RD5NG	v0vDT%	RN4T4	
LV U1 S _Rv0	DIWND	NNIWND	0vTD	vTGDD	RD5NG	[	[	9 V U1 S _Rv0	vTGDD	RD5NG	v0vBIB	RN4T4	
LV U1 S _Rvv	DIWND	NNIGG5	00TN	vTGDD	RD5NG	[	[	9 V U1 S _Rvv	vTGDD	RD5NG	v0v%T5	RN4T4	
LV U1 S _Rv5	DIWND	NNIB50	0vT0	vTGDD	RD5NG	[	[	9 V U1 S _Rv5	vTGDD	RD5NG	v0vNIN	RN4T4	
LV U1 S _RvB	DIWND	NNIvDW	00T%	vTGDD	RD5NG	[	[	9 V U1 S _RvB	vTGDD	RD5NG	v05BT%	RN4T4	
LV U1 S _RvG	DIWND	NND%0	00T%	vTGDD	RD5NG	[	[	9 V U1 S _RvG	vTGDD	RD5NG	v05GIG	RN4T4	
LV U1 S _RvW	DIWND	NNP%WW	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _RvW	vTGDD	RD5NG	v0vvT4	RN4T4	
LV U1 S _Rv%	DIWND	NNIW40	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _Rv%	vTGDD	RD5NG	v0vBIW	RN4T4	
LV U1 S _Rv4	DIWND	NNIC0W	0vTv	vTGDD	RD5NG	[	[	9 V U1 S _Rv4	vTGDD	RD5NG	v0v4TD	RN4T4	
LV U1 S _RvN	DIWND	NNP%GG	0vTD	vTGDD	RD5NG	[	[	9 V U1 S _RvN	vTGDD	RD5NG	v0v5TD	RN4T4	
LV U1 S _R50	DIWND	0DDDvG	0vTG	vTGDD	RD5NG	[	[	9 V U1 S _R50	vTGDD	RD5NG	v00GID	RN4T4	
LV U1 S _R5v	DIWND	NNI4%B	0vTB	vTGDD	RD5NG	[	[	9 V U1 S _R5v	vTGDD	RD5NG	v0vDIG	RN4T4	
LV U1 S _R55	DIWND	NNP%B4	0vTB	vTGDD	RD5NG	[	[	9 V U1 S _R55	vTGDD	RD5NG	v0v5Tv	RN4T4	
LV U1 S _R5B	DIWND	NNI4N5	0vTG	vTGDD	RD5NG	[	[	9 V U1 S _R5B	vTGDD	RD5NG	v0vDID	RN4T4	
LV U1 S _R5W	DIWND	0DDIv00	0vTG	vTGDD	RD5NG	[	[	9 V U1 S _R5W	vTGDD	RD5NG	v005T5	RN4T4	
LV U1 S _R5%	DIWND	0DDIv%B	0vTG	vTGDD	RD5NG	[	[	9 V U1 S _R5%	vTGDD	RD5NG	v00vTD	RN4T4	
LV U1 S _R5N	DIWND	0DDDW%	0vTG	vTGDD	RD5NG	[	[	9 V U1 S _R5N	vTGDD	RD5NG	v00BI5	RN4T4	
LV U1 S _RBD	DIWND	NNIN5N	0vT4	vTGDD	RD5NG	[	[	9 V U1 S _RBD	vTGDD	RD5NG	v00NID	RN4T4	
LV U1 S _RB0	DIWND	0DDIC05	05T5	vTGDD	RD5NG	[	[	9 V U1 S _RB0	vTGDD	RD5NG	v0D%D	RN4T4	
LV U1 S _RBv	DIWND	0DDIBGD	05T5	vTGDD	RD5NG	[	[	9 V U1 S _RBv	vTGDD	RD5NG	v0D4T5	RN4T4	
LV U1 S _RB5	DIWND	0DDIC0v	05T5	vTGDD	RD5NG	[	[	9 V U1 S _RB5	vTGDD	RD5NG	v0D%D	RN4T4	
LV U1 S _RBB	DIWND	0DDIvW%	05TD	vTGDD	RD5NG	[	[	9 V U1 S _RBB	vTGDD	RD5NG	v00vTv	RN4T4	
LV U1 S _RBG	DIWND	0DDIDGB	05TD	vTGDD	RD5NG	[	[	9 V U1 S _RBG	vTGDD	RD5NG	v00BIG	RN4T4	
LV U1 S _RBW	DIWND	0DDIDvN	0vTN	vTGDD	RD5NG	[	[	9 V U1 S _RBW	vTGDD	RD5NG	v00%Tv	RN4T4	
LV U1 S _RB4	DIWND	0DDINBN	05TB	vTGDD	RD5NG	[	[	9 V U1 S _RB4	vTGDD	RD5NG	vDN%N	RN4T4	
LV U1 S _RBN	DIWND	0DDI4W4	05TB	vTGDD	RD5NG	[	[	9 V U1 S _RBN	vTGDD	RD5NG	vDNNIW	RN4T4	
LV U1 S _RGD	DIWND	0DDINB%	05TB	vTGDD	RD5NG	[	[	9 V U1 S _RGD	vTGDD	RD5NG	vDN%N	RN4T4	
9 V U1 S _RD0	5BIGDD	0DDI40%	NIG	[	D	DIDDB	DIDDB	9 V U1 S _RDv	vTB40	RDIG50	BvTD	RN%T4	
								LV U1 S _RD0	RvTB4G	DIGv%	BvTv	RN%T4	
9 V U1 S _RDv	5BIGDD	0DDP%00	NIB	[	D	DIDDB	DIDDB	9 V U1 S _RD0	RvTB%4	DIB4B	BvTD	RN4TD	
								9 V U1 S _RD5	BINWD	RvTD0G	4BID	RN4TD	
								LV U1 S _RDv	RvTB4G	DIGv%	BvTv	RN%T4	
9 V U1 S _RD5	5BIGDD	0DDIC5v	NIB	[	D	DIDDB	DIDDB	9 V U1 S _RDv	RBINGD	DIN%%	4BID	RN4TD	
								9 V U1 S _RDB	%4B50	RvTGD4	0vWTv	RN4TD	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7.	8V	A 9 agT	6 ngT	9 m	9 kar	9 m	9 kar	7.	9 m	9 kar	6 I 3	A Pj	A_a3
								LV U1 S _RD5	RvTB4G	DTGv4	BvT5	RN%4	
9 V U1 S _RDB	5BTGDD	0DDTB04	NTB	Γ	D	DTDDB	DTDDB	9 V U1 S _RD5	R%BvV	0TBWG	0vWD	RN4TD	
								9 V U1 S _RDG	NTND5	R0TNN%	0W4TB	RN4TD	
								LV U1 S _RDB	RvTB4G	DTGv4	BvT5	RN%4	
9 V U1 S _RDG	5BTGDD	0DDTvB%	NT5	Γ	D	DTDDB	DTDDB	9 V U1 S _RDB	RNT44B	0TNG5	0W4Tv	RN4TD	
								9 V U1 S _RD4	0vT5WG	RvTB4G	v0DTG	RN4TD	
								LV U1 S _RDG	RvTB4G	DTGvN	BvTB	RN%4	
9 V U1 S _RDW	5BTGDD	0DDTv%G	NTv	Γ	D	DTDDB	DTDDB	9 V U1 S _RD%	vTB40	RDTG5v	BvT5	RN%4	
								LV U1 S _RDW	RvTB4G	DTGv4	BvTB	RN%4	
9 V U1 S _RD%	5BTGDD	0DDTvD4	NTD	Γ	D	DTDDB	DTDDB	9 V U1 S _RDW	RvTB%N	DTGD5	BvTv	RN4TD	
								9 V U1 S _R0W	RvTB%%	DTBW4	BvTD	RN4T5	
								9 V U1 S _R0G	%B54	R0TGD5	0vWP%	RN4TD	
								LV U1 S _RD%	RvTB4G	DTGvN	BvTB	RN%4	
9 V U1 S _RD4	5BTGDD	0DDTD5v	NTv	Γ	D	DTDDB	DTDDB	9 V U1 S _RDG	R0vT5B%	vTBDv	v0DTv	RN4Tv	
								9 V U1 S _RDN	0BT4v4	RvTN5B	vGvTW	RN4TD	
								LV U1 S _RD4	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _RDN	5BTGDD	NNTNW5	NTD	Γ	D	DTDDB	DTDDB	9 V U1 S _RD4	R0BTP%N%	vT4BD	vGvTv	RN4Tv	
								9 V U1 S _R0D	0%Tv%4	R5T5%5	vNBTP%	RN4TD	
								LV U1 S _RDN	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _R0D	5BTGDD	NNT4%4	NTD	Γ	D	DTDDB	DTDDB	9 V U1 S _RDN	R0%TvGN	5T5DB	vNBTB	RN4Tv	
								9 V U1 S _RvG	0NTP%BD	R5T45%	55WTN	RN4Tv	
								LV U1 S _R0D	RvTB4G	DTGvN	BvTW	RN%4	
9 V U1 S _R05	5BTGDD	0DDTBW0	NTv	Γ	D	DTDDB	DTDDB	9 V U1 S _R0B	vTB40	RDTG5v	BvT5	RN%4	
								LV U1 S _R05	RvTB4G	DTGv4	BvT5	RN%4	
9 V U1 S _R0B	5BTGDD	0DDT544	NTv	Γ	D	DTDDB	DTDDB	9 V U1 S _R05	RvTB%N	DTGDD	BvTv	RN4TD	
								9 V U1 S _R0G	BTNWD	R0TD5v	4BTG	RN%N	
								LV U1 S _R0B	RvTB4G	DTGv4	BvTB	RN%4	
9 V U1 S _R0G	5BTGDD	0DDTDv4	NTD	Γ	D	DTDDB	DTDDB	9 V U1 S _RD%	R%BvV	0TB5W	0vWTG	RN4Tv	
								9 V U1 S _R0B	RBTNB0	DTNGW	4BTv	RN4Tv	
								9 V U1 S _R0%	0BT4BB	RvTNvG	vG5TD	RN4TD	
								LV U1 S _R0G	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _R0W	5BTGDD	0DDT5GG	NTv	Γ	D	DTDDB	DTDDB	9 V U1 S _RD%	vTB40	RDTG5v	BvT5	RN%4	
								LV U1 S _R0W	RvTB4G	DTGv4	BvTB	RN%4	
9 V U1 S _R0%	5BTGDD	NNTP%N0	4TN	Γ	D	DTDDB	DTDDB	JURv/0	0%Tv4v	R5T5vN	vNGTD	RN4Tv	
								9 V U1 S _R0G	R0BT4D0	vTP%NG	vGvTW	RN4T5	
								LV U1 S _R0%	RvTB4G	DTG5D	BvTW	RN%4	
9 V U1 S _RvD	5BTGDD	0DDTvB%	NTD	Γ	D	DTDDB	DTDDB	9 V U1 S _Rv0	vTB40	RDTG5v	BvTB	RN%4	
								LV U1 S _RvD	RvTB4G	DTGv4	BvTB	RN%4	
9 V U1 S _Rv0	5BTGDD	0DDTD%%	4TN	Γ	D	DTDDB	DTDDB	9 V U1 S _RvD	RvTB%%	DTBG4	BvTD	RN4T5	

Pro2ect:	F m OH m 7F .	ETAP		Page:	B
Location:	Paulding, OH	0WDDC		. ate:	0DRDWRvD0%
Contract:				SF :	m ES_m OO. P
Engineer:	Josh Venden	Study Case:	NGP1 NGLE6 .	f ekision:	0DDA MEF
j ilenaI e:	F m - OH			ConpigT	F orI al

Bus		Voltage		Generation		Load		Load Flow					XFMR
7.	8V	A 9 agT	6 ngT	9 m	9 kar	9 m	9 kar	7.	9 m	9 kar	6 I 3	A Pj	A_a3
								9 V U1 S _Rvv	BNG4	RDNN0	4BTG	RN4TD	
								LV U1 S _Rv0	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _Rvv	5BTGDD	NNNB0	4TN	Г	D	DTDDB	DTDDB	JURv/0	NND%	R0TNB0	0WND	RN4TD	
								9 V U1 S _Rv0	RBTNGD	DTNWv	4BTB	RN4Tv	
								9 V U1 S _RvN	RvTB%W	DTBBW	BvTD	RN4TB	
								LV U1 S _Rvv	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _Rv5	5BTGDD	NN40N	NTD	Г	D	DTDDB	DTDDB	4Nj 56	v%0B0	RGD0D	BW5TD	RN4T5	
								9 V U1 S _Rv4	RvBTWWD	BTG%%	BvDTG	RN4T5	
								LV U1 S _Rv5	RvTB4G	DTG5D	BvTW	RN%4	
9 V U1 S _RvB	5BTGDD	NNTGNW	4TW	Г	D	DTDDB	DTDDB	9 V U1 S _RvG	vTB40	RDTG5B	BvTW	RN%4	
								LV U1 S _RvB	RvTB4G	DTG5D	BvT%	RN%4	
9 V U1 S _RvG	5BTGDD	NNTGW0	4TW	Г	D	DTDDB	DTDDB	4Nj 06	vBTW0v	RBTG00	BvDTW	RN4TB	
								9 V U1 S _R0D	R0NTWG0	5TB4G	55GTG	RN4TG	
								9 V U1 S _RvB	RvTB4D	DTBNv	BvTG	RN4TD	
								LV U1 S _RvG	RvTB4G	DTG5D	BvT%	RN%4	
9 V U1 S _RvW	5BTGDD	0DDTDG5	NTv	Г	D	DTDDB	DTDDB	9 V U1 S _Rv%	vTB40	RDTG5v	BvTB	RN%4	
								LV U1 S _RvW	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _Rv%	5BTGDD	0DDTDW4	NTv	Г	D	DTDDB	DTDDB	9 V U1 S _RvW	RvTB%N	DTBNG	BvT5	RN4TD	
								9 V U1 S _Rv4	BTNWD	R0TDv4	4BT%	RN%N	
								LV U1 S _Rv%	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _Rv4	5BTGDD	NNTNDB	NTv	Г	D	DTDDB	DTDDB	9 V U1 S _Rv5	vBTWN5	RBTW%B	Bv0TD	RN4T5	
								9 V U1 S _Rv%	RBTNG0	DTNNB	4BTW	RN4TD	
								9 V U1 S _R55	R0%TvWD	5TDB%	vN5TN	RN4TB	
								LV U1 S _Rv4	RvTB4G	DTGvN	BvTW	RN%4	
9 V U1 S _RvN	5BTGDD	0DDTDB0	4TN	Г	D	DTDDB	DTDDB	9 V U1 S _Rvv	vTB40	RDTG5v	BvTB	RN%4	
								LV U1 S _RvN	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _R50	5BTGDD	0DDTGDN	NTG	Г	D	DTDDB	DTDDB	9 V U1 S _R5v	vTB40	RDTG5v	BvTv	RN%4	
								LV U1 S _R50	RvTB4G	DTGv4	BvT5	RN%4	
9 V U1 S _R5v	5BTGDD	0DDTvWD	NTB	Г	D	DTDDB	DTDDB	9 V U1 S _R50	RvTB%B	DTBvv	B0TN	RN4TW	
								9 V U1 S _R55	BTNGW	RDTNGG	4BTv	RN4Tv	
								LV U1 S _R5v	RvTB4G	DTGv4	BvTB	RN%4	
9 V U1 S _R55	5BTGDD	0DDTD5B	NTB	Г	D	DTDDB	DTDDB	9 V U1 S _Rv4	0%T505	R5T55W	vNBT%	RN4Tv	
								9 V U1 S _R5v	RBTNBN	DTNv4	4BTD	RN4T5	
								9 V U1 S _R5B	RNT445	0T4%G	0W4TD	RN4Tv	
								LV U1 S _R55	RvTB4G	DTGvN	BvTG	RN%4	
9 V U1 S _R5B	5BTGDD	0DDTv%N	NTB	Г	D	DTDDB	DTDDB	9 V U1 S _R55	NT4NN	R0TN05	0W4Tv	RN4Tv	
								9 V U1 S _R5W	RBTNBB	DTNW4	4BTD	RN4TD	
								9 V U1 S _R5N	RvTB%B	DTB0v	B0TN	RN4TW	
								LV U1 S _R5B	RvTB4G	DTGv4	BvTB	RN%4	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7.	8V	A 9 agT	6 ngT	9 m	9 kar	9 m	9 kar	7.	9 m	9 kar	6 I 3	A Pj	A _a3
9 V U1 S _R5W	5BDDD	0DDDNG	NG	D	D	DDDB	DDDB	9 V U1 S _R5B	BNW0	R0TD5G	4B5	R%4N	
								9 V U1 S _R5%	RvB4D	DDDB	BvTD	R4TD	
								LV U1 S _R5W	RvB4G	DGv4	BvT5	R%4	
9 V U1 S _R5%	5BDDD	0DDW0%	NG	D	D	DDDB	DDDB	9 V U1 S _R5W	vB40	R0D50	BvTv	R%4	
								LV U1 S _R5%	RvB4G	DGv%	BvTv	R%4	
9 V U1 S _R5N	5BDDD	0DDDG0	NG	D	D	DDDB	DDDB	9 V U1 S _R5B	vB40	R0D50	BvTv	R%4	
								LV U1 S _R5N	RvB4G	DGv4	BvT5	R%4	
9 V U1 S _R8D	5BDDD	0DD5vB	N4	D	D	DDDB	DDDB	4Nj B6	vBNWBN	R8DN%	B04T5	R4T5	
								9 V U1 S _R8W	RvTDW4	BDWG	5%GN	R4TB	
								LV U1 S _R8D	RvB4G	DGv4	BvTB	R%4	
9 V U1 S _R80	5BDDD	0DD4NG	0D5	D	D	DDDB	DDDB	JUR8/0	vB40	R0D50	BvTD	R%4	
								LV U1 S _R80	RvB4G	DGv%	BvTD	R%4	
9 V U1 S _R8v	5BDDD	0DD450	0D5	D	D	DDDB	DDDB	JUR8/0	N4%	R0T44	0WD	R4Tv	
								9 V U1 S _R8N	R%BDG	0T5G4	0vGD	R4TB	
								LV U1 S _R8v	RvB4G	DGv%	BvTv	R%4	
9 V U1 S _R85	5BDDD	0DD4N5	0D5	D	D	DDDB	DDDB	JUR8/0	vB40	R0D50	BvTD	R%4	
								LV U1 S _R85	RvB4G	DGv%	BvTD	R%4	
9 V U1 S _R8B	5BDDD	0DDWGD	0DD	D	D	DDDB	DDDB	JUR8/0	R0B405	vT4N	vGDW	R4T5	
								9 V U1 S _R8G	0%vNB	R5T5v0	vNvT4	R4Tv	
								LV U1 S _R8B	RvB4G	DGv%	BvTv	R%4	
9 V U1 S _R8G	5BDDD	0DDG54	0DD	D	D	DDDB	DDDB	9 V U1 S _R8B	R0%vWN	5TvW	vNvTB	R4T5	
								9 V U1 S _R8W	0NP4GD	R5T4G%	55BW	R4Tv	
								LV U1 S _R8G	RvB4G	DGv4	BvT5	R%4	
9 V U1 S _R8W	5BDDD	0DDB0B	NN	D	D	DDDB	DDDB	9 V U1 S _R8D	vvTDNW	R8DB%	5%W5	R4T5	
								9 V U1 S _R8G	R0NP0G	5TW0W	55BD	R4TB	
								LV U1 S _R8W	RvB4G	DGv4	BvT5	R%4	
9 V U1 S _R84	5BDDD	0D0T5v4	0DB	D	D	DDDB	DDDB	9 V U1 S _R8N	vB40	R0DGvN	B0TN	R%4	
								LV U1 S _R84	RvB4W	DGvW	BvTD	R%4	
9 V U1 S _R8N	5BDDD	0D0TvB%	0DB	D	D	DDDB	DDDB	9 V U1 S _R8v	%BBD	R0TD0W	0vGG	R4TD	
								9 V U1 S _R84	RvB%N	DBN5	B0T4	R4TD	
								9 V U1 S _RGD	RvB%N	DBNB	B0T4	R4TD	
								LV U1 S _R8N	RvB4W	DGvW	BvTD	R%4	
9 V U1 S _RGD	5BDDD	0D0T5vG	0DB	D	D	DDDB	DDDB	9 V U1 S _R8N	vB40	R0DGvN	B0TN	R%4	
								LV U1 S _RGD	RvB4W	DGvW	BvTD	R%4	
* PO7	054TDDD	NGDDD	DD	R0DvBGN	55TW05	D	D	4N_06	R0DvBGN	55TW05	B%BN	RNGD	
9 P_~5	05T4DDD	NND4G	NV	D	D	D	D	HV U1 S 9 P_	DDDD	DDDD	DD	DD	
								& 4N_0U					

* 7ndicates a koltage regulated bus (koltage controlled or swing ty3e I achine connected to it)

\# 7ndicates a bus with a load I isI atch opI ore than DD 9 V6

Project:	F m OH m 7F W	ETAP	Page:	N
Location:	Paulding, OH	NΠ0Ι0C	Wate:	NGRGTRvGN%
Contract:			SF :	m ES_m OOWP
Engineer:	Josh Venden	Study Case: NGΙP6 . 1LE0 W	f ekision:	NGGA MEF
j ilenaI e:	F m - OH		ConpigD	F orI al

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A _a3
4. j N0	5BDGG	. . D% B	4D5	C	G	C	C	9 V U6 S _Rv1	RvBDTB	BD5. N	BN4D	R 4DB	
								4. _NU	vBDTB	RBD5. N	BN4D	R 4DB	
4. j v0	5BDGG	. . D% B	4D5	C	G	C	C	JURv/N	Rv%4D5v	BDN	BTGD%	R 4DB	
								4. _NU	v%4D5v	RBDN	BTGD%	R 4DB	
4. j 50	5BDGG	. . D% B	4D5	C	G	C	C	9 V U6 S _Rv5	RvTD45	BD%44	B1. DT	R 4DD	
								4. _NU	vTD45	RBD%44	B1. DT	R 4DD	
4. j B0	5BDGG	. . D% B	4D5	C	G	C	C	9 V U6 S _RBG	RvBD551	5DTN%	BNvDT	R 4D	
								4. _NU	vBD551	R5DTN%	BNvDT	R 4D	
4. _N0	N54DGG	NGBD. T	GDG	C	G	C	C	PO7	NGvDBT1	R55DT5v	Bv. D%	R 1DG	
								HV U6 S 9 P_	RNGvDBT1	55DT5v	Bv. D%	R 1DG	
4. _NU	5BDGG	. . D% B	4D5	C	G	C	C	4. j B0	RvBD551	5DTN%	BNvDT	R 4D	
								4. j 50	RvTD45	BD%44	B1. DT	R 4DD	
								4. j v0	Rv%4D5v	BDN	BTGD%	R 4DB	
								4. j N0	RvBDTB	BD5. N	BN4D	R 4DB	
								9 P_~5	NGvDNB	RN%4D%N1	N%1 ND	R 4DT	
								& HV U6 S 9 P_					
HV U6 S 9 P_	N54DGG	NGBD. T	GDG	C	G	GDG1.	GDNTv	4. _N0	NGvDBT1	R55DT5v	Bv. D%	R 1DG	
								4. _NU	RNGvDvB	55DB%G	Bv. D%	R 1DN	N4%1
								& 9 P_~5					
JURv/N	5BDGG	NGGDG1N	4D%	C	G	C	C	9 V U6 S _RN%	RN%4D1.	5DTT	v. 5D4	R 4D5	
								9 V U6 S _Rvv	R D4%	ND4. G	NT4D	R 4D	
								4. j v0	v%4D54	R DN1 T	BTvDG	R 4D	
JURB/N	5BDGG	NGND4.	NGD	C	G	C	C	9 V U6 S _RBN	RvD4G	GDGI	BN4	R 4DG	
								9 V U6 S _RBv	R D44%	NDG5	NTTD	R 4D	
								9 V U6 S _RB5	RvD4G	GDGT	BND	R 4DG	
								9 V U6 S _RBB	NB4BT	RvDNB	v1 GD	R 4DN	
LV U6 S _RGN	GDT. G	NGGD%44	NvDB	vDGG	RGDGG	C	C	9 V U6 S _RGN	vDGG	RGDGG	vNGND	R 4D%	
LV U6 S _RGv	GDT. G	NGGDT4v	NvDB	vDGG	RGDGG	C	C	9 V U6 S _RGv	vDGG	RGDGG	vNGBDN	R 4D%	
LV U6 S _RG5	GDT. G	NGGDG5	NvD5	vDGG	RGDGG	C	C	9 V U6 S _RG5	vDGG	RGDGG	vNG%4D	R 4D%	
LV U6 S _RGB	GDT. G	NGGD544	NvD5	vDGG	RGDGG	C	C	9 V U6 S _RGB	vDGG	RGDGG	vNNGD5	R 4D%	
LV U6 S _RGI	GDT. G	NGGDN%	NvD	vDGG	RGDGG	C	C	9 V U6 S _RGI	vDGG	RGDGG	vNN5D	R 4D%	
LV U6 S _RGT	GDT. G	NGGDBI	NvDN	vDGG	RGDGG	C	C	9 V U6 S _RGT	vDGG	RGDGG	vNN5D5	R 4D%	
LV U6 S _RG%	GDT. G	NGGDN%4	NvDN	vDGG	RGDGG	C	C	9 V U6 S _RG%	vDGG	RGDGG	vNNBD%	R 4D%	
LV U6 S _RG4	GDT. G	NGGDNGv	NvD	vDGG	RGDGG	C	C	9 V U6 S _RG4	vDGG	RGDGG	vNNTD5	R 4D%	
LV U6 S _RG	GDT. G	. . D5v	NvDG	vDGG	RGDGG	C	C	9 V U6 S _RG	vDGG	RGDGG	vNN D	R 4D%	
LV U6 S _RNG	GDT. G	. . D4B4	NvDG	vDGG	RGDGG	C	C	9 V U6 S _RNG	vDGG	RGDGG	vNvND%	R 4D%	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A _a3
LV U6 S _RN5	GD. G	NGGD5v	NvDN	vDGG	RGDGG	C	C	9 V U6 S _RN5	vDGG	RGDGG	vNG DB	R 4D%	
LV U6 S _RNB	GD. G	NGG51.	NvDN	vDGG	RGDGG	C	C	9 V U6 S _RNB	vDGG	RGDGG	vNNGD	R 4D%	
LV U6 S _RN1	GD. G	. . D. %	NvDG	vDGG	RGDGG	C	C	9 V U6 S _RN1	vDGG	RGDGG	vNN4D	R 4D%	
LV U6 S _RNT	GD. G	NGG5v1	NvDN	vDGG	RGDGG	C	C	9 V U6 S _RNT	vDGG	RGDGG	vNNNDT	R 4D%	
LV U6 S _RN%	GD. G	. . D%TG	NND	vDGG	RGDGG	C	C	9 V U6 S _RN%	vDGG	RGDGG	vNv5D	R 4D%	
LV U6 S _RvG	GD. G	NGGDvN4	NND	vDGG	RGDGG	C	C	9 V U6 S _RvG	vDGG	RGDGG	vNN5D4	R 4D%	
LV U6 S _RvN	GD. G	NGGDB%	NND	vDGG	RGDGG	C	C	9 V U6 S _RvN	vDGG	RGDGG	vNN%D	R 4D%	
LV U6 S _Rvv	GD. G	. . DNN	NND	vDGG	RGDGG	C	C	9 V U6 S _Rvv	vDGG	RGDGG	vNvGD5	R 4D%	
LV U6 S _Rv5	GD. G	. . D%4.	NvDG	vDGG	RGDGG	C	C	9 V U6 S _Rv5	vDGG	RGDGG	vNvvD	R 4D%	
LV U6 S _RvB	GD. G	. . DTT	NNDT	vDGG	RGDGG	C	C	9 V U6 S _RvB	vDGG	RGDGG	vNv%D%	R 4D%	
LV U6 S _Rv1	GD. G	. . D5G	NNDT	vDGG	RGDGG	C	C	9 V U6 S _Rv1	vDGG	RGDGG	vNv4D	R 4D%	
LV U6 S _RvT	GD. G	NGGDNv5	NvD	vDGG	RGDGG	C	C	9 V U6 S _RvT	vDGG	RGDGG	vNN1D	R 4D%	
LV U6 S _Rv%	GD. G	NGGD5%	NvDN	vDGG	RGDGG	C	C	9 V U6 S _Rv%	vDGG	RGDGG	vNN%D%	R 4D%	
LV U6 S _Rv4	GD. G	. . D4%5	NvDN	vDGG	RGDGG	C	C	9 V U6 S _Rv4	vDGG	RGDGG	vNvNDN	R 4D%	
LV U6 S _Rv.	GD. G	NGGDNv	NND	vDGG	RGDGG	C	C	9 V U6 S _Rv.	vDGG	RGDGG	vNNTDN	R 4D%	
LV U6 S _R5N	GD. G	NGGD4G	NvDB	vDGG	RGDGG	C	C	9 V U6 S _R5N	vDGG	RGDGG	vNG4D5	R 4D%	
LV U6 S _R5v	GD. G	NGGD5G	NvD5	vDGG	RGDGG	C	C	9 V U6 S _R5v	vDGG	RGDGG	vNN5DT	R 4D%	
LV U6 S _R55	GD. G	NGGDNG5	NvD5	vDGG	RGDGG	C	C	9 V U6 S _R55	vDGG	RGDGG	vNNTD5	R 4D%	
LV U6 S _R5B	GD. G	NGGDB4	NvDB	vDGG	RGDGG	C	C	9 V U6 S _R5B	vDGG	RGDGG	vNN5D	R 4D%	
LV U6 S _R5T	GD. G	NGGDT1	NvDB	vDGG	RGDGG	C	C	9 V U6 S _R5T	vDGG	RGDGG	vNGTD	R 4D%	
LV U6 S _R5%	GD. G	NGGDv%	NvDB	vDGG	RGDGG	C	C	9 V U6 S _R5%	vDGG	RGDGG	vNG1D	R 4D%	
LV U6 S _R5.	GD. G	NGGDvN	NvDB	vDGG	RGDGG	C	C	9 V U6 S _R5.	vDGG	RGDGG	vNC%D	R 4D%	
LV U6 S _RBG	GD. G	NGGD. 5	NvD%	vDGG	RGDGG	C	C	9 V U6 S _RBG	vDGG	RGDGG	vNvvD5	R 4D%	
LV U6 S _RBN	GD. G	NGG4T1	N5D	vDGG	RGDGG	C	C	9 V U6 S _RBN	vDGG	RGDGG	vNGGD5	R 4D%	
LV U6 S _RBv	GD. G	NGG4Gv	N5D	vDGG	RGDGG	C	C	9 V U6 S _RBv	vDGG	RGDGG	vNGNDT	R 4D%	
LV U6 S _RB5	GD. G	NGG4T5	N5D	vDGG	RGDGG	C	C	9 V U6 S _RB5	vDGG	RGDGG	vNGGD5	R 4D%	
LV U6 S _RBB	GD. G	NGGDvG	N5DG	vDGG	RGDGG	C	C	9 V U6 S _RBB	vDGG	RGDGG	vNG1DB	R 4D%	
LV U6 S _RB1	GD. G	NGGDG4	NvD	vDGG	RGDGG	C	C	9 V U6 S _RB1	vDGG	RGDGG	vNC%D4	R 4D%	
LV U6 S _RBT	GD. G	NGG54B	NvD4	vDGG	RGDGG	C	C	9 V U6 S _RBT	vDGG	RGDGG	vNNGDB	R 4D%	
LV U6 S _RB4	GD. G	NGND. .	N5D5	vDGG	RGDGG	C	C	9 V U6 S _RB4	vDGG	RGDGG	vG ND5	R 4D%	
LV U6 S _RB.	GD. G	NGNDN4	N5D5	vDGG	RGDGG	C	C	9 V U6 S _RB.	vDGG	RGDGG	vG 5DG	R 4D%	
LV U6 S _R1G	GD. G	NGND. %	N5D5	vDGG	RGDGG	C	C	9 V U6 S _R1G	vDGG	RGDGG	vG ND5	R 4D%	
9 V U6 S _RGN	5BDGG	NGNDN%4	. DB	C	G	GDGB	GDGB	9 V U6 S _RGv	vDB4N	RGD51	BvDG	R %D4	
								LV U6 S _RGN	RvDB41	GD5N	BvDG	R %D4	
9 V U6 S _RGv	5BDGG	NGNDP%5	. DB	C	G	GDGB	GDGB	9 V U6 S _RGN	RvDB%4	GDB44	BND4	R 4DN	
								9 V U6 S _RG5	BDTG	RNDv5	45D4	R %D	
								LV U6 S _RGv	RvDB41	GD5N	BvDN	R %D4	
9 V U6 S _RG5	5BDGG	NGGD4. 1	. D5	C	G	GDGB	GDGB	9 V U6 S _RGv	RBD1G	GD41	45D%	R 4DN	
								9 V U6 S _RGB	%DB5N	RNDvG	Nv1D4	R 4DG	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
								LV U6 S _RG5	RvDB41	GD5v	BvD	R %44	
9 V U6 S _RGB	5BDGG	NGGD%4N	. D5	C	G	GDGB	GDGB	9 V U6 S _RG5	R%4Bvv	NDB%%	Nv1D%	R 4DN	
								9 V U6 S _RGI	. DG5	RvDGN5	NT%44	R 4DG	
								LV U6 S _RGB	RvDB41	GD5v	BvD	R %44	
9 V U6 S _RGI	5BDGG	NGGDNG	. D	C	G	GDGB	GDGB	9 V U6 S _RGB	R D4B	NDT4	NT%4T	R 4DN	
								9 V U6 S _RG4	NvD5T1	RvDGB	vG D	R 4DG	
								LV U6 S _RGI	RvDB41	GD55	BvD5	R %44	
9 V U6 S _RGT	5BDGG	NGGD54	. DN	C	G	GDGB	GDGB	9 V U6 S _RG%	vDB4N	RGD5T	BvD	R %4D%	
								LV U6 S _RGT	RvDB41	GD55	BvD5	R %44	
9 V U6 S _RG%	5BDGG	NGGD%v	. DN	C	G	GDGB	GDGB	9 V U6 S _RGT	RvDB%	GDG%	BvDN	R 4DG	
								9 V U6 S _RNT	RvDB%%	GDB%N	BvDG	R 4D	
								9 V U6 S _RNI	%4D54	RvDNI	NvTD5	R 4DG	
								LV U6 S _RG%	RvDB41	GD55	BvD5	R %44	
9 V U6 S _RG4	5BDGG	NGGDB. %	. DN	C	G	GDGB	GDGB	9 V U6 S _RGI	RNv5B4	vDBvG	vG D	R 4DN	
								9 V U6 S _RG	NB4v.	RvD1%	v1N4	R 4DN	
								LV U6 S _RG4	RvDB41	GD55	BvD5	R %44	
9 V U6 S _RG	5BDGG	NGG5v4	. DG	C	G	GDGB	GDGB	9 V U6 S _RG4	RNB%4	vDTv	v1NDB	R 4D	
								9 V U6 S _RNG	N%D%	R5D5. .	v. 5D%	R 4DN	
								LV U6 S _RG	RvDB41	GD55	BvDB	R %44	
9 V U6 S _RNG	5BDGG	NGGDBB	4D	C	G	GDGB	GDGB	9 V U6 S _RG	RN%DTG	5D5v.	v. 5DB	R 4D	
								9 V U6 S _Rv1	N D4BN	R5D4TT	551D4	R 4DN	
								LV U6 S _RNG	RvDB41	GD5B	BvDB	R %44	
9 V U6 S _RN5	5BDGG	NGG4vB	. DN	C	G	GDGB	GDGB	9 V U6 S _RNB	vDB4N	RGD5T	BvDN	R %4D%	
								LV U6 S _RN5	RvDB41	GD5v	BvD	R %44	
9 V U6 S _RNB	5BDGG	NGGD%d v	. DN	C	G	GDGB	GDGB	9 V U6 S _RN5	RvDB%	GDGB	BvDG	R 4DG	
								9 V U6 S _RNI	BDTG	RNDBG	4BD	R %D	
								LV U6 S _RNB	RvDB41	GD5v	BvD	R %44	
9 V U6 S _RNI	5BDGG	NGG5. 5	. DG	C	G	GDGB	GDGB	9 V U6 S _RG%	R%4Bv5	NDBB%	NvTDN	R 4D	
								9 V U6 S _RNB	RBD BN	GDTB	45D	R 4D	
								9 V U6 S _RN%	NB4BI	RvDB4	v1vD5	R 4DN	
								LV U6 S _RNI	RvDB41	GD55	BvDB	R %44	
9 V U6 S _RNT	5BDGG	NGG%N	. DN	C	G	GDGB	GDGB	9 V U6 S _RG%	vDB4N	RGD5T	BvD	R %4D%	
								LV U6 S _RNT	RvDB41	GD5v	BvD	R %44	
9 V U6 S _RN%	5BDGG	NGGDN1%	4D4	C	G	GDGB	GDGB	JURvN	N%D45	R5D51B	v. BD	R 4D	
								9 V U6 S _RNI	RNB4Gv	vD4N%	v1N4	R 4D	
								LV U6 S _RN%	RvDB41	GD5B	BvD	R %44	
9 V U6 S _RvG	5BDGG	NGGDNv	4D	C	G	GDGB	GDGB	9 V U6 S _RvN	vDB4N	RGD5T	BvD	R %4D%	
								LV U6 S _RvG	RvDB41	GD55	BvD5	R %44	
9 V U6 S _RvN	5BDGG	NGGDBBv	4D	C	G	GDGB	GDGB	9 V U6 S _RvG	RvDB%%	GDBTv	BvDG	R 4D5	

Pro2ect:	F m OH m 7F W	**ETAP**	Page: B
Location:	Paulding, OH	NI10I0IC	Wate: NGRGTRvGN%
Contract:			SF : m ES_m OOWP
Engineer:	Josh Venden	Study Case: NGI P6 . 1LE0 W	f ekision: NGGA MEF
j ilenaI e:	F m - OH		ConpigD F orI al

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
								9 V U6 S _Rvv	BD14	RGD. .	4BD	R 4DG	
								LV U6 S _RvN	RvDB41	GD55	BvD	R %D4	
9 V U6 S _Rvv	5BDGG	NGGD5C%	4D4	C	G	GD0GB	GD0GB	JURv/N	. DC%	RND1T	NT4D	R 4DN	
								9 V U6 S _RvN	RBD1G	GD%G	4BD	R 4DN	
								9 V U6 S _Rv.	RvDB%T	GDBB	BvDG	R 4DB	
								LV U6 S _Rvv	RvDB41	GD55	BvDB	R %D4	
9 V U6 S _Rv5	5BDGG	NGGDN41	4D	C	G	GD0GB	GD0GB	4. j 50	v%DNB5	R DNB	BTND	R 4D	
								9 V U6 S _Rv4	RvBDTv	BDNN	BN DN	R 4D5	
								LV U6 S _Rv5	RvDB41	GD5B	BvD	R %D4	
9 V U6 S _RvB	5BDGG	. . DTB	4DT	C	G	GD0GB	GD0GB	9 V U6 S _Rv1	vDB4N	RGD54	BvD	R %D%	
								LV U6 S _RvB	RvDB41	GD5B	BvDT	R %D4	
9 V U6 S _Rv1	5BDGG	. . Dv.	4D	C	G	GD0GB	GD0GB	4. j N0	vBDNB	RBDBB	BN D	R 4D5	
								9 V U6 S _RNG	RN DT15	5DNG	55BD	R 4DB	
								9 V U6 S _RvB	RvDB4G	GDB. T	BvDB	R 4DN	
								LV U6 S _Rv1	RvDB41	GD5B	BvDT	R %D4	
9 V U6 S _RvT	5BDGG	NGGDN%	. DN	C	G	GD0GB	GD0GB	9 V U6 S _Rv%	vDB4N	RGD5%	BvD	R %D%	
								LV U6 S _RvT	RvDB41	GD55	BvD	R %D4	
9 V U6 S _Rv%	5BDGG	NGGDB5v	. DN	C	G	GD0GB	GD0GB	9 V U6 S _RvT	RvDB%	GDB. .	BvDN	R 4DG	
								9 V U6 S _Rv4	BDTG	RND5T	4BDB	R %D	
								LV U6 S _Rv%	RvDB41	GD55	BvDB	R %D4	
9 V U6 S _Rv4	5BDGG	NGGD9T.	. DN	C	G	GD0GB	GD0GB	9 V U6 S _Rv5	vBDT. B	RBD%NG	BN DT	R 4D	
								9 V U6 S _Rv%	RBD1N	N0GGv	4BD	R 4DG	
								9 V U6 S _RB5	RN%DTv	5DN%N	v. vD	R 4DB	
								LV U6 S _Rv4	RvDB41	GD5B	BvDB	R %D4	
9 V U6 S _Rv.	5BDGG	NGGDDGT	4D	C	G	GD0GB	GD0GB	9 V U6 S _Rvv	vDB4N	RGD5%	BvD	R %D%	
								LV U6 S _Rv.	RvDB41	GD55	BvD	R %D4	
9 V U6 S _RBN	5BDGG	NGGD4%v	. DB	C	G	GD0GB	GD0GB	9 V U6 S _RBv	vDB4N	RGD5T	BvDN	R %D%	
								LV U6 S _RBN	RvDB41	GD5v	BvD	R %D4	
9 V U6 S _RBv	5BDGG	NGGDTvB	. D	C	G	GD0GB	GD0GB	9 V U6 S _RBN	RvDB%1	GDBvT	BND4	R 4DT	
								9 V U6 S _RB5	BD1T	RGDTv	4BDG	R 4D	
								LV U6 S _RBv	RvDB41	GD55	BvD	R %D4	
9 V U6 S _RB5	5BDGG	NGGDB. 4	. D	C	G	GD0GB	GD0GB	9 V U6 S _Rv4	N%D5N5	RBDTv	v. 5D%	R 4D	
								9 V U6 S _RBv	RBDB	GD5T	45D	R 4D5	
								9 V U6 S _RBB	R D45	ND4. G	NT%DT	R 4D	
								LV U6 S _RB5	RvDB41	GD55	BvD	R %D4	
9 V U6 S _RBB	5BDGG	NGGDTBv	. DB	C	G	GD0GB	GD0GB	9 V U6 S _RB5	. D4. .	RNDv4	NT%D%	R 4D	
								9 V U6 S _RBT	RBDBB	GD%T	45D4	R 4DN	
								9 V U6 S _RB.	RvDB%B	GDBNT	BND%	R 4DT	
								LV U6 S _RBB	RvDB41	GD55	BvD	R %D4	

Bus		Voltage		Generation		Load		Load Flow					XFMR
7W	8V	A 9 agD	0 ngD	9 m	9 kar	9 m	9 kar	7W	9 m	9 kar	0 I 3	A Pj	A_a3
9 V U6 S _R5T	5BDGG	NGGD1%	. DB	C	G	GDGB	GDGB	9 V U6 S _R5B	BDTN	RN0B5	4BDG	R %D	
								9 V U6 S _R5%	RvDB4G	GDG4	BvDG	R 4DG	
								LV U6 S _R5T	RvDB41	GD5v	BvDN	R %4	
9 V U6 S _R5%	5BDGG	NGN0N4	. D	C	G	GDGB	GDGB	9 V U6 S _R5T	vDB4N	RGD51	BvDN	R %4	
								LV U6 S _R5%	RvDB41	GD5v	BvDN	R %4	
9 V U6 S _R5.	5BDGG	NGGDN5	. DB	C	G	GDGB	GDGB	9 V U6 S _R5B	vDB4N	RGD5T	BvDN	R %D%	
								LV U6 S _R5.	RvDB41	GD5v	BvDN	R %4	
9 V U6 S _RBG	5BDGG	NGGDT4%	. D%	C	G	GDGB	GDGB	4. j B0	vBDT1N	RBDT5N	BNTD	R 4D5	
								9 V U6 S _RBT	RvvDN%G	BDG 1	5%BD%	R 4D5	
								LV U6 S _RBG	RvDB41	GD5v	BvD	R %4	
9 V U6 S _RBN	5BDGG	NGND11	NGD	C	G	GDGB	GDGB	JURB/N	vDB4N	RGD51	BvDG	R %4	
								LV U6 S _RBN	RvDB4T	GD5N	BvDG	R %4	
9 V U6 S _RBv	5BDGG	NGNDN v	NGD	C	G	GDGB	GDGB	JURB/N	. D4%	RNDG5	NITD	R 4D	
								9 V U6 S _RB.	R%DGT	ND5T4	NvBD	R 4D5	
								LV U6 S _RBv	RvDB41	GD5N	BvDG	R %4	
9 V U6 S _RB5	5BDGG	NGND15	NGD	C	G	GDGB	GDGB	JURB/N	vDB4N	RGD51	BvDG	R %4	
								LV U6 S _RB5	RvDB41	GD5N	BvDG	R %4	
9 V U6 S _RBB	5BDGG	NGN0NN	NGDN	C	G	GDGB	GDGB	JURB/N	RNBD4NB	vD4NN	vB. D4	R 4D	
								9 V U6 S _RB1	N%D. 1	R5D5B%	v. ND4	R 4D	
								LV U6 S _RBB	RvDB41	GD5v	BvDN	R %4	
9 V U6 S _RB1	5BDGG	NGGD4. .	NGDG	C	G	GDGB	GDGB	9 V U6 S _RBB	RN%D%G	5D1N	v. ND	R 4D5	
								9 V U6 S _RBT	N D%1N	R5D%4T	555D	R 4D	
								LV U6 S _RB1	RvDB41	GD5v	BvD	R %4	
9 V U6 S _RBT	5BDGG	NGGD%%T	. D4	C	G	GDGB	GDGB	9 V U6 S _RBG	vvDN 4	RBDN%	5%1DN	R 4D5	
								9 V U6 S _RB1	RN D%N%	5DTB5	555DG	R 4D5	
								LV U6 S _RBT	RvDB41	GD5v	BvD	R %4	
9 V U6 S _RB4	5BDGG	NGNDT4T	NGDB	C	G	GDGB	GDGB	9 V U6 S _RB.	vDB4N	RGD5B	BND4	R %4	
								LV U6 S _RB4	RvDB4T	GD5G	BND4	R %4	
9 V U6 S _RB.	5BDGG	NGNDTG1	NGD5	C	G	GDGB	GDGB	9 V U6 S _RBv	%DBBG	RNDv4	Nv1DN	R 4DG	
								9 V U6 S _RB4	RvDB%	GDB. %	BNDT	R 4DN	
								9 V U6 S _R1G	RvDB%	GDB. 4	BND%	R 4DG	
								LV U6 S _RB.	RvDB4T	GD5G	BND	R %4	
9 V U6 S _R1G	5BDGG	NGNDT45	NGDB	C	G	GDGB	GDGB	9 V U6 S _RB.	vDB4N	RGD5B	BND4	R %4	
								LV U6 S _R1G	RvDB4T	GD5G	BND4	R %4	
* PO7	N54DGG	NG1DGG	GDG	RNGvDBT5	55DTBT	C	C	4. _N0	RNGvDBT5	55DTBT	Bv. D%	R 1DG	
9 P_~5	N5D4GG	. . DB15	. DN	C	G	C	C	HV U6 S 9 P_	GDGG	GDGG	GDG	GDG	
								& 4. _NU					

* 7ndicates a koltage regulated bus (koltage controlled or swing ty3e I achine connected to it)

\# 7ndicates a bus with a load I isI atch opI ore than GDN9 V0

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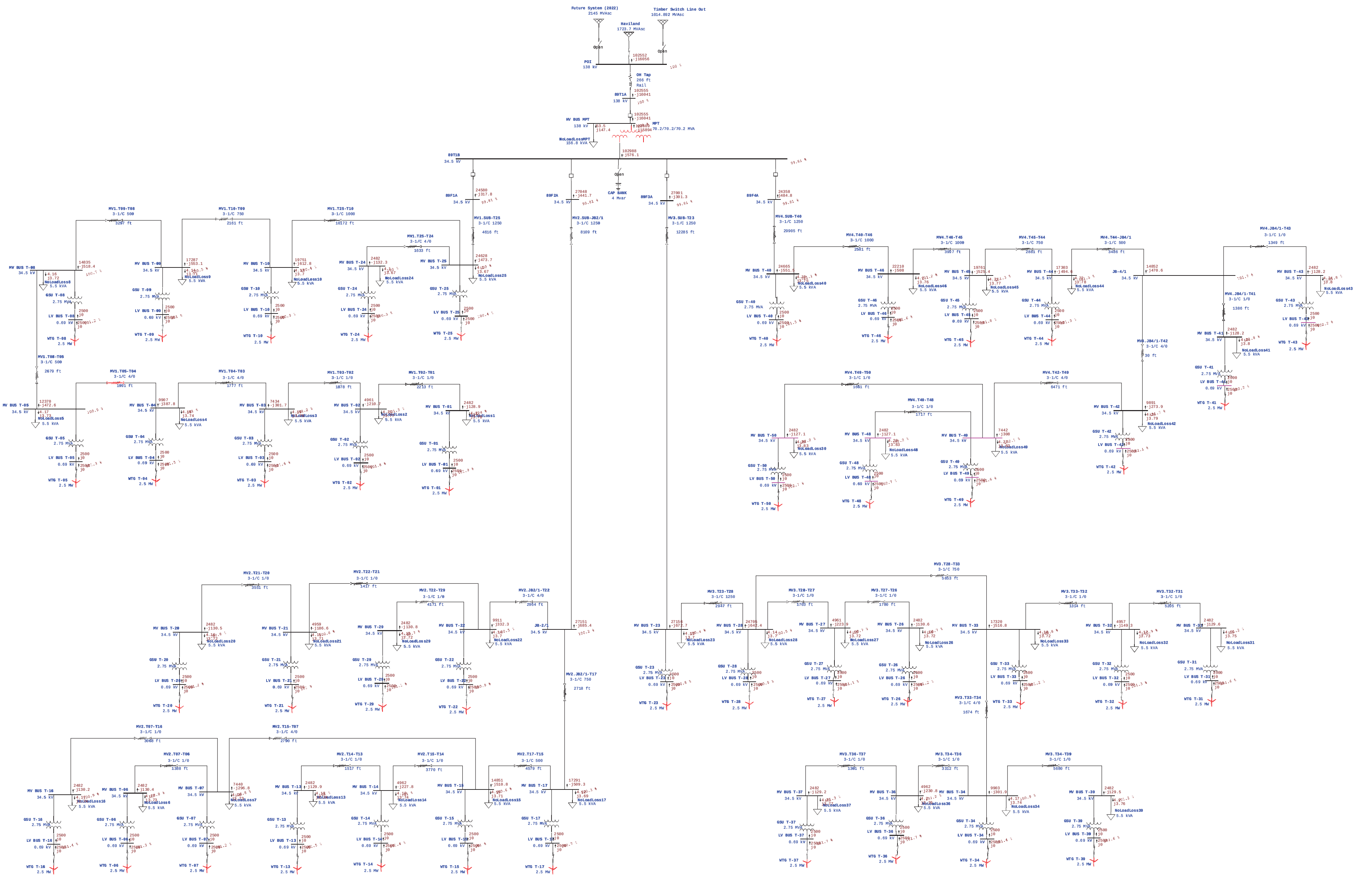
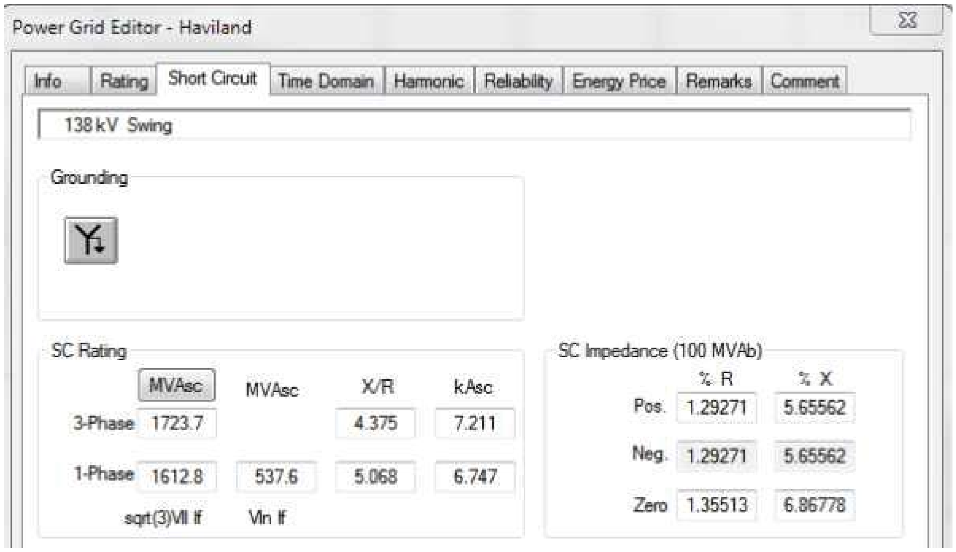
APPENDIX B: ETAP SINGLE LINE DIAGRAM

One-Line Diagram - NW_OH (Load Flow Analysis)



APPENDIX C: ETAP MODEL INPUTS



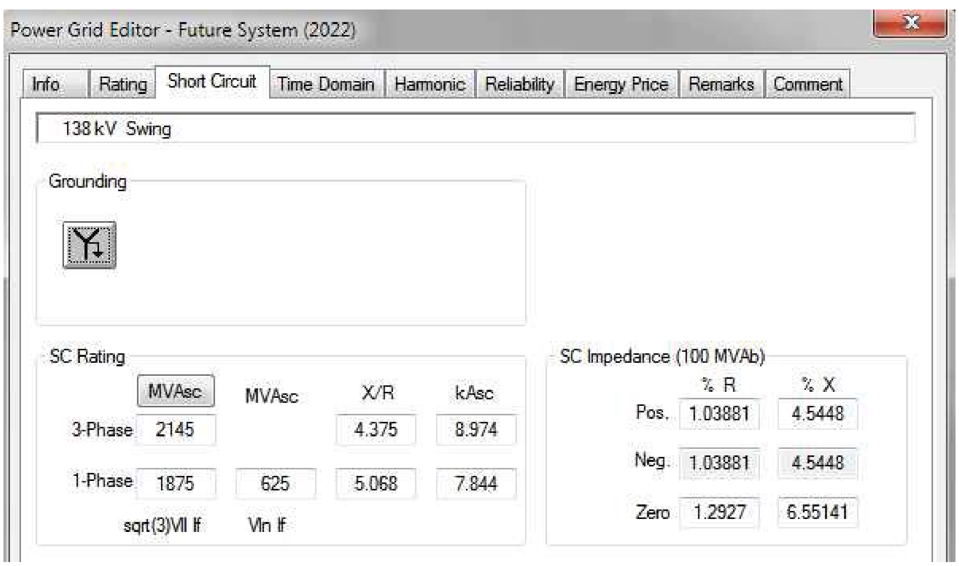


Figure 1: Utility Equivalent Data

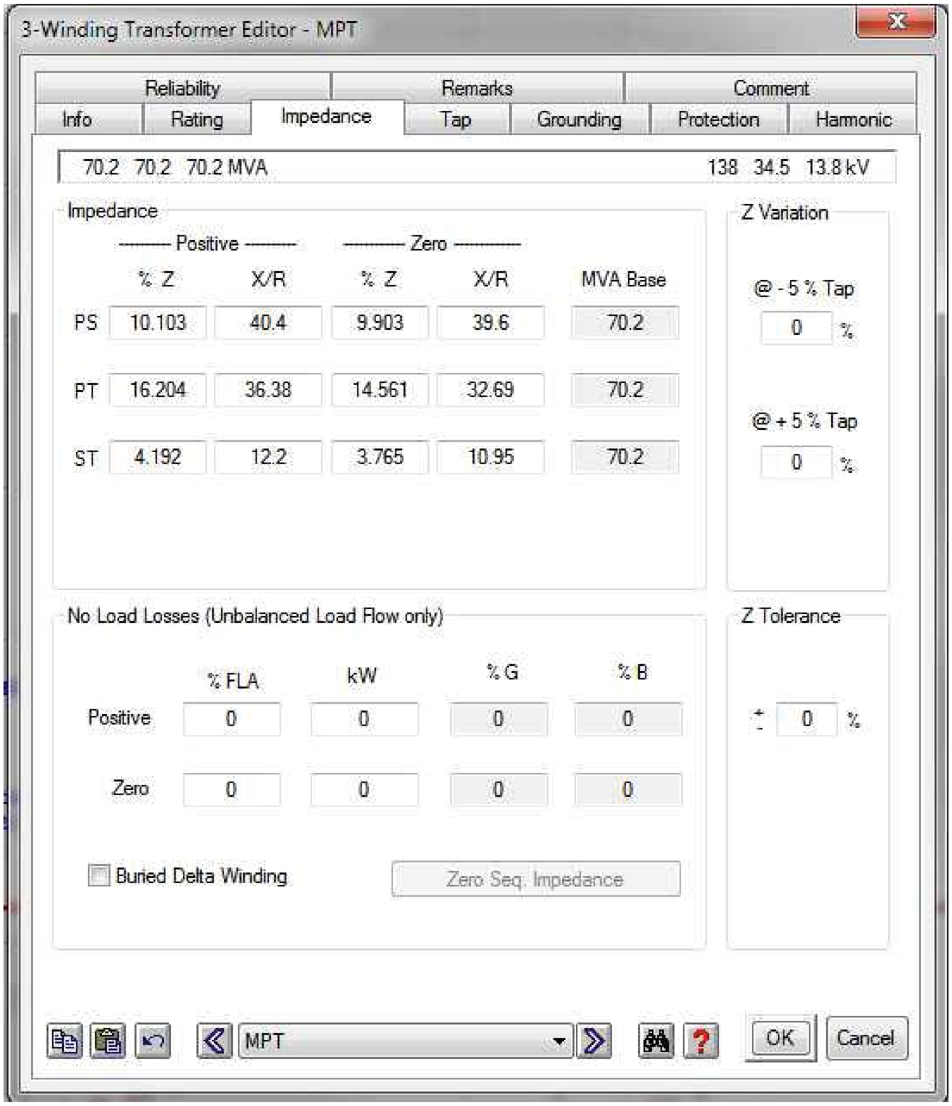


Figure 2: Main Power Transformer Impedance

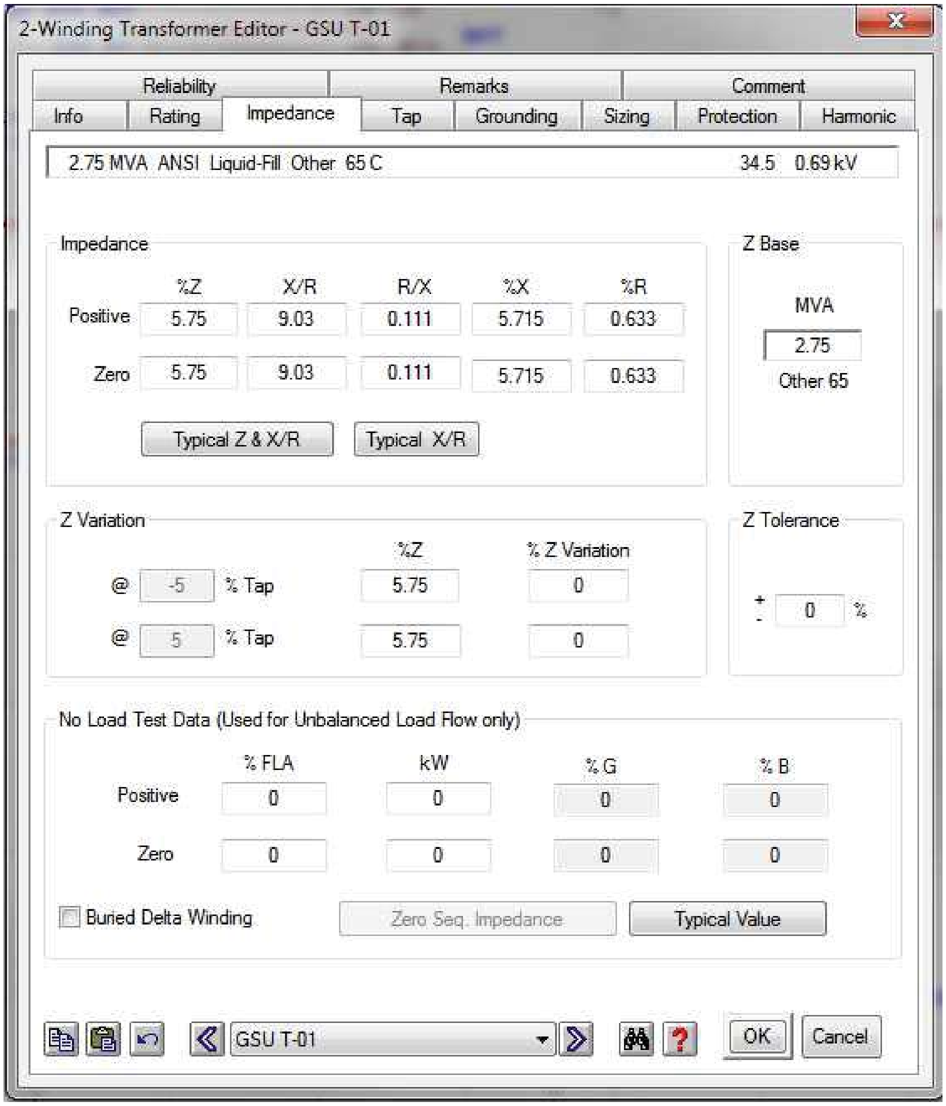


Figure 3: Step-Up Transformer Impedance Data

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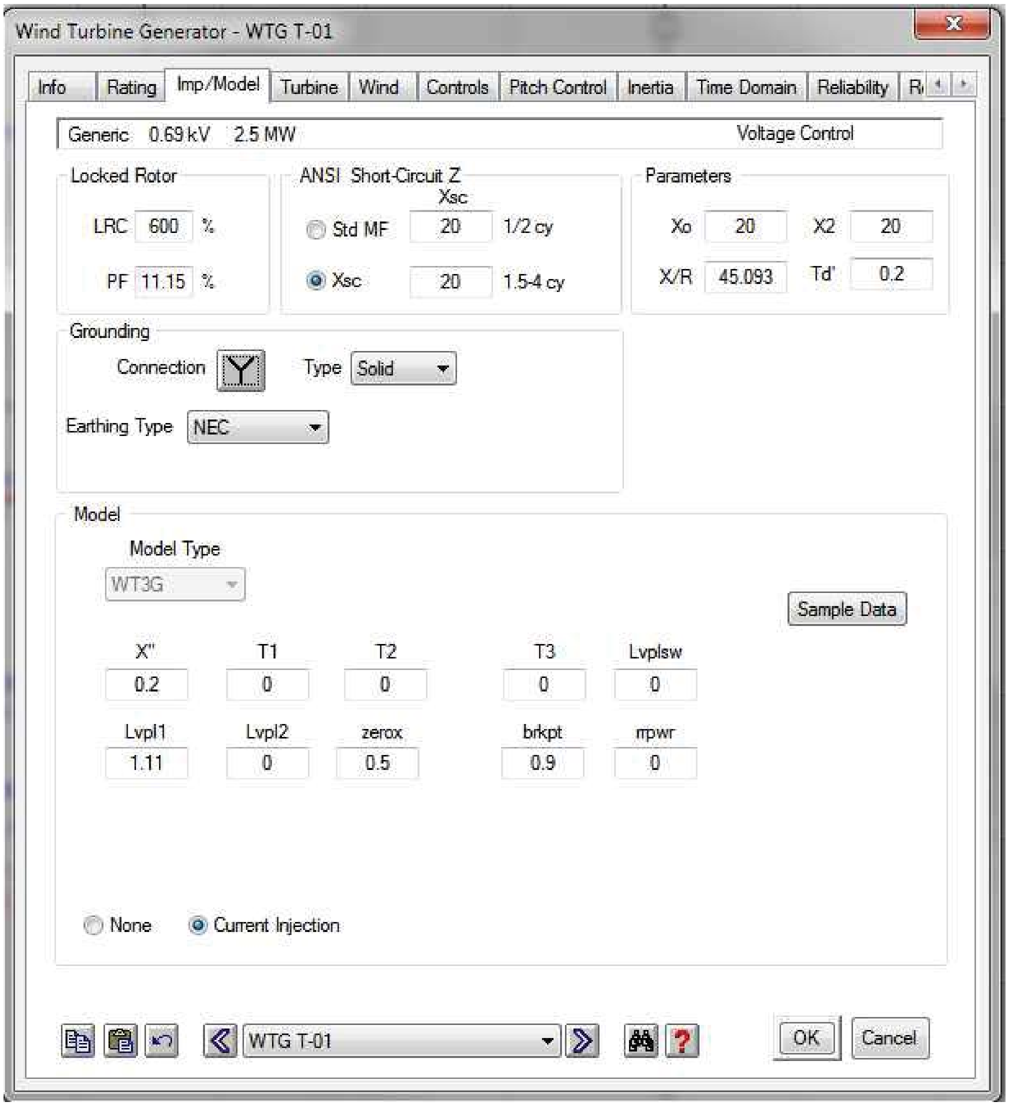

Figure 4: Turbine Impedance/Short Circuit Data

NW_OH 1/C AL XLPE 35 kV 100 % Non-Mag. 60 Hz Ohms/1000ft RHO 200°C.cm/W

Ampacity | Impedance | Physical | Cable Pulling

		Phase		Ground/Neutral		R	X	L	Y	Ro	Xo	Lo	Yo	Rdc
	Avail.	Code	Size	#	Size	90°C	60 Hz	60 Hz	60 Hz	90°C	60 Hz	60 Hz	60 Hz	25°C
1	Yes	1/0 - 2/3 CN	1/0	18	16	0.24087	0.05182	0.00014	1.77E-05	0.35886	0.05482	0.00015	1.77E-05	0.18596
2	Yes	4/0 - 1/2 CN	4/0	17	14	0.11303	0.04679	0.00012	2.2E-05	0.28416	0.07373	0.0002	2.2E-05	0.08673
3	Yes	500 - 1/3 CN	500	16	12	0.4939	0.04115	0.00011	3.05E-05	0.16756	0.04488	0.00012	3.05E-05	0.0361
4	Yes	750 - 1/6 CN	750	19	14	0.0343	0.03865	0.0001	3.56E-05	0.18978	0.05914	0.00016	3.56E-05	0.0248
5	Yes	1000 - 1/6 CN	1000	25	14	0.02568	0.03703	0.0001	3.98E-05	0.20941	0.07373	0.0002	3.98E-05	0.01814
6	Yes	1250 - 1/6 CN	1250	20	12	0.02048	0.03537	9E-05	4.36E-05	0.23977	0.09952	0.00026	4.36E-05	0.01422

Figure 5: Cable Impedance Data

30% Electrical Collection Plans

for

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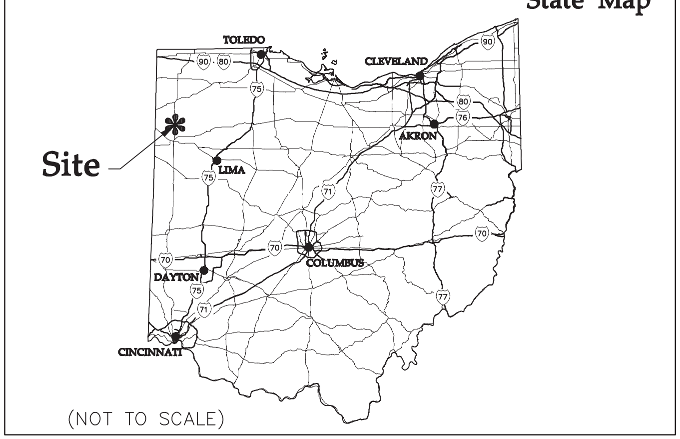

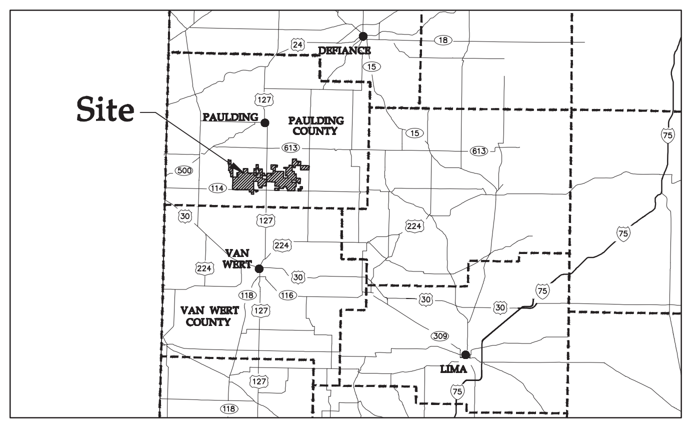

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Cover Sheet

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Sheet List Table

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E.201	MVAC Oneline Diagram Circuits 3 and 4
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E.421	Padmount TransformerTerminal
E.422	Sectionalizing Cabinet
E.800	MVAC Wiring Schedule

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Index Sheet

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GENERAL SYMBOLOGY	MATERIALS IN PLAN/SECTION
NORTH ARROW	RIPRAP (PLAN AND/OR SECTION)
(X) KEYNOTE	CONCRETE (PLAN AND/OR SECTION)
(B) OR (MV01) CONDUCTOR ID	GRANULAR FILL (SECTION)
	UNDISTURBED EARTH (SECTION)
	COMPACTED EARTH (SECTION)
	SAND (SECTION)

DETAIL TITLE

DETAIL NUMBER

1 **Detail Title**
1" = 40'-0"

SCALE

DETAIL CALLOUT

DETAIL NUMBER

X
E.XXX

DRAWING NUMBER

NOTES

1. THIS IS A STANDARD SYMBOLOGY AND ABBREVIATION SHEET. ALL SYMBOLS AND ABBREVIATIONS ARE NOT NECESSARILY USED ON THIS PROJECT.
2. THESE SYMBOLS AND ABBREVIATIONS APPLY TO THIS ENTIRE SET OF ELECTRICAL (E.XXX) DRAWINGS.
3. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.

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General Symbology & Abbreviations

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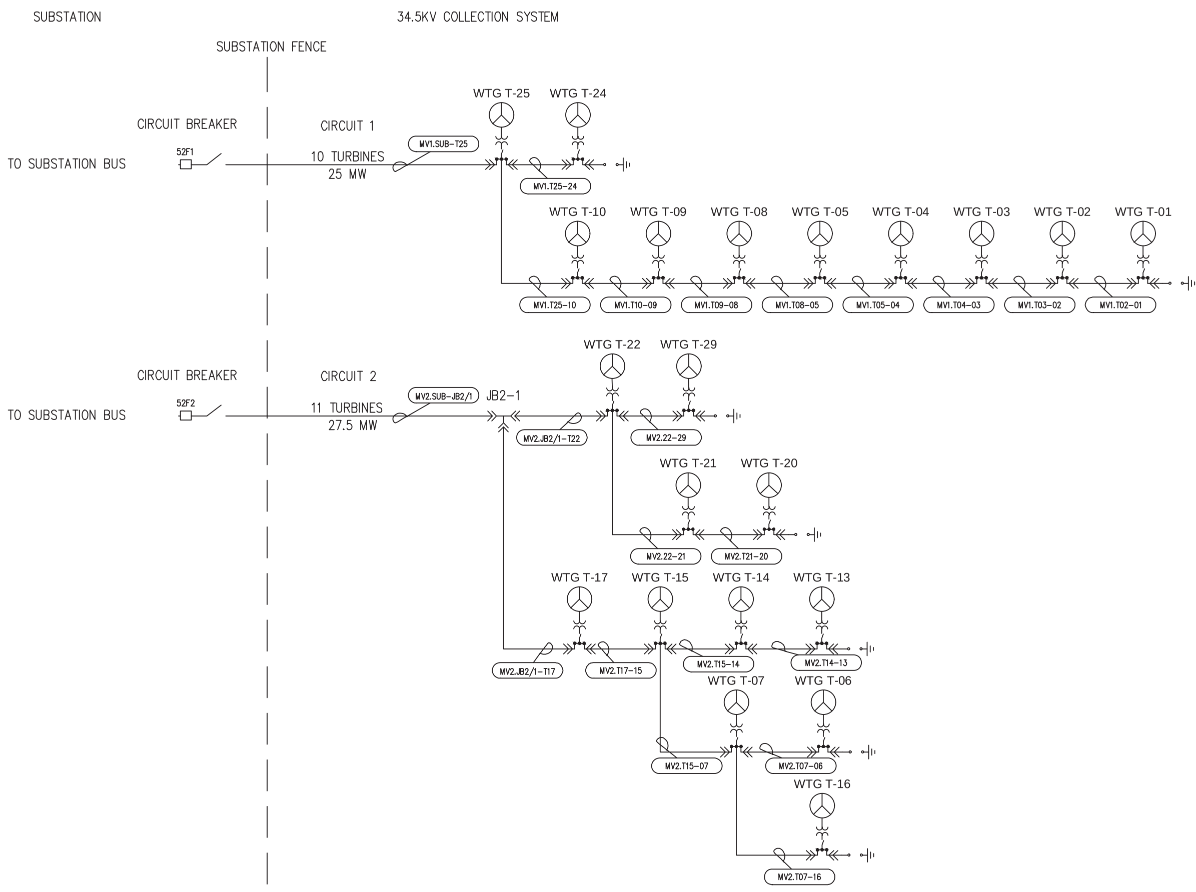
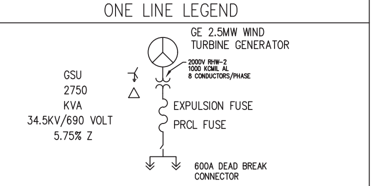


GENERAL NOTES

1. SEE SUBSTATION DRAWING NWO-OLI-001 FOR SUBSTATION SINGLE LINE DRAWING.
2. ALL SURGE ARRESTERS 24.4KV MCOV.
3. SEE E.800 FOR MVAC WIRE SCHEDULE.

ONE LINE LEGEND



35 kV CABLE AND CONCENTRIC NEUTRAL SIZES

PHASE CONDUCTOR		CONCENTRIC NEUTRAL			
SIZE	MAT'L	DESIGNATION	MAT'L	WIRE SIZE	WIRE QTY
1/0 AWG	Al	2/3	Cu	16 AWG	18
4/0 AWG	Al	1/2	Cu	14 AWG	17
500 kCMIL	Al	1/3	Cu	12 AWG	16
750 kCMIL	Al	1/6	Cu	14 AWG	19
1000 kCMIL	Al	1/6	Cu	14 AWG	25
1250 kCMIL	Al	1/6	Cu	12 AWG	20

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MVAC Oneline Diagram
Circuits 1 and 2

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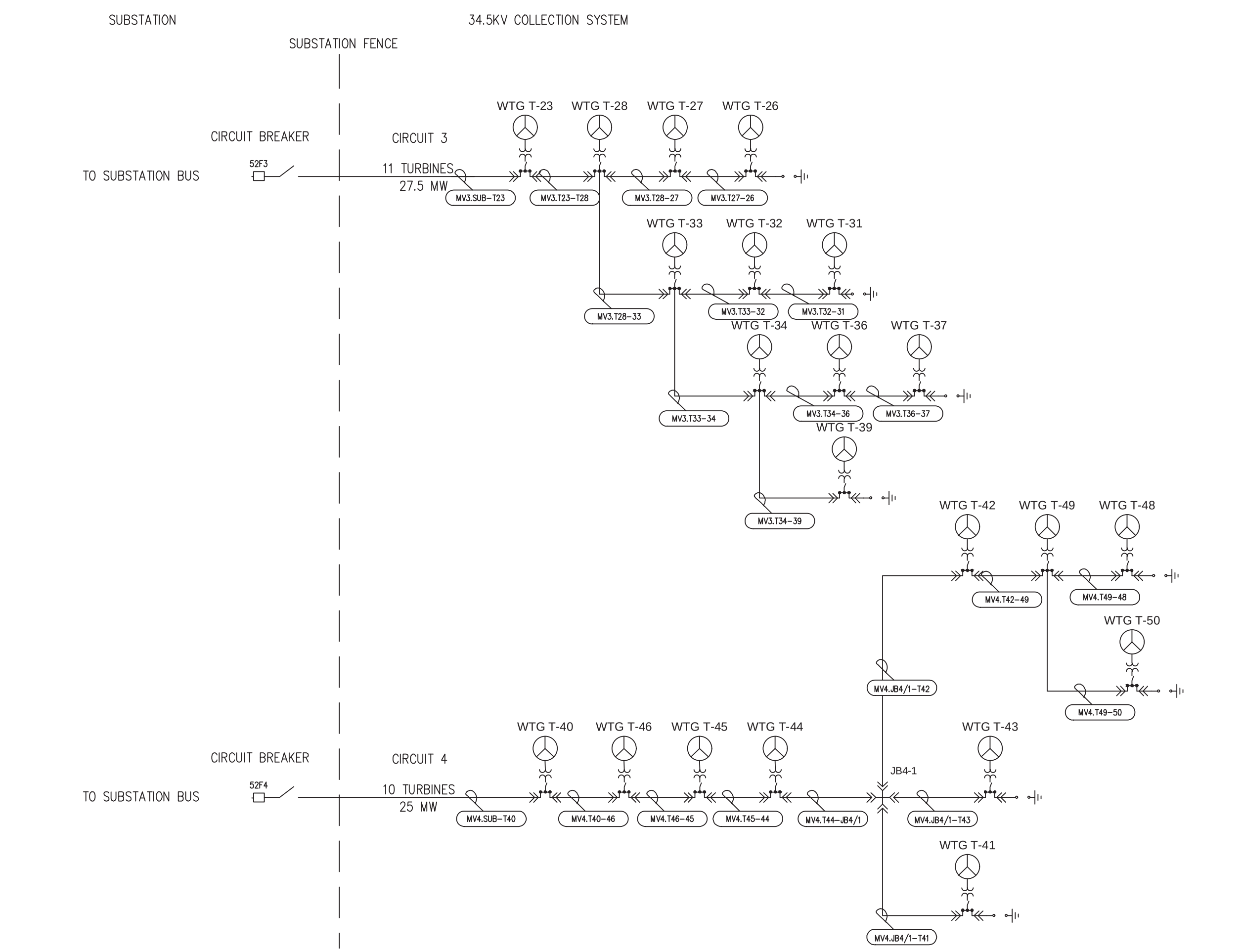

GENERAL NOTES

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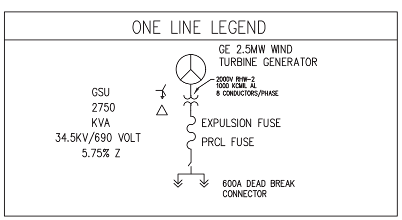

35 kV CABLE AND CONCENTRIC NEUTRAL SIZES

PHASE CONDUCTOR		CONCENTRIC NEUTRAL			
SIZE	MAT'L	DESIGNATION	MAT'L	WIRE SIZE	WIRE QTY
1/0 AWG	Al	2/3	Cu	16 AWG	18
4/0 AWG	Al	1/2	Cu	14 AWG	17
500 kCMIL	Al	1/3	Cu	12 AWG	16
750 kCMIL	Al	1/6	Cu	14 AWG	19
1000 kCMIL	Al	1/6	Cu	14 AWG	25
1250 kCMIL	Al	1/6	Cu	12 AWG	20

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MVAC Oneline Diagram
Circuits 3 and 4

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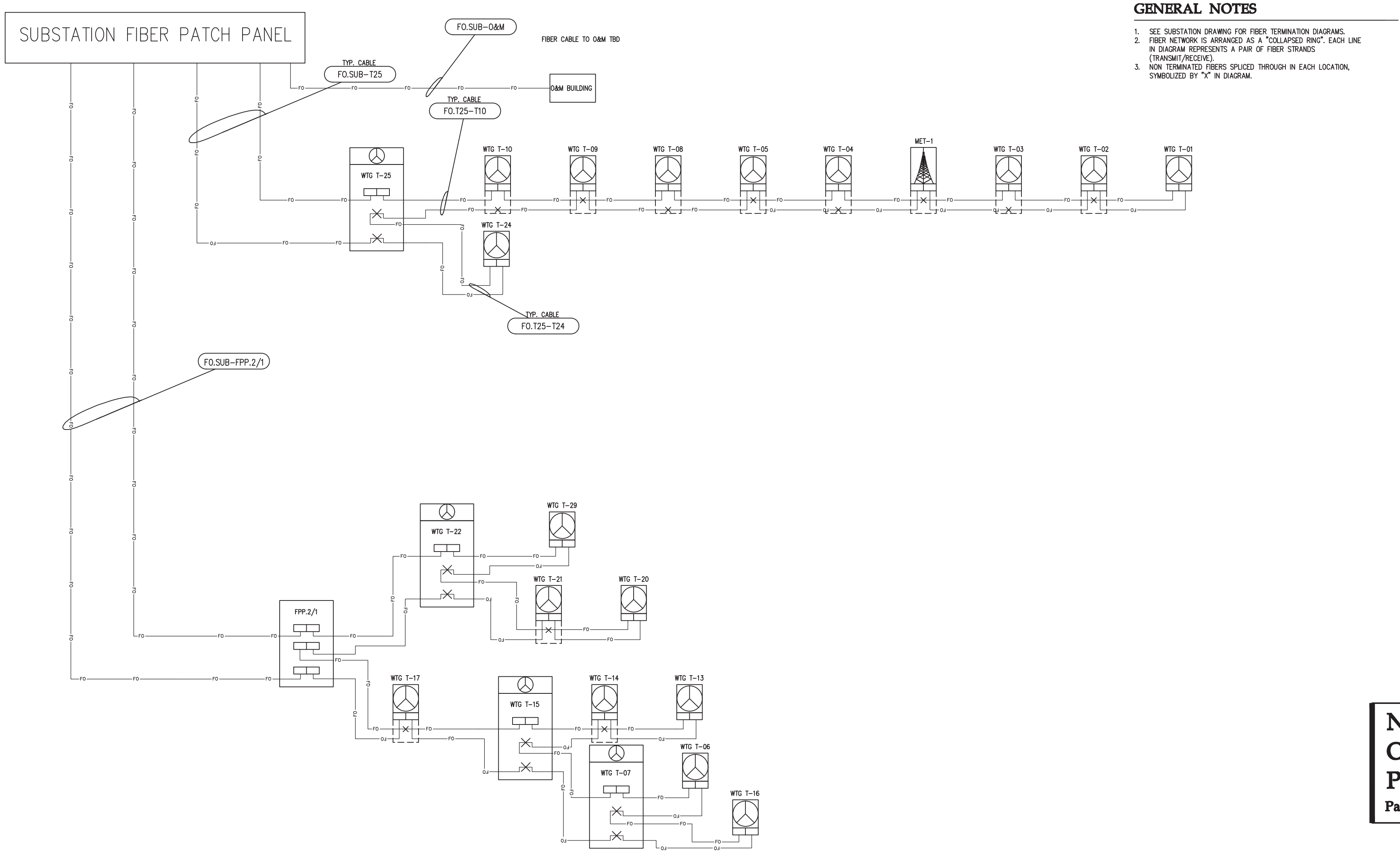

GENERAL NOTES

1. SEE SUBSTATION DRAWING FOR FIBER TERMINATION DIAGRAMS.
2. FIBER NETWORK IS ARRANGED AS A "COLLAPSED RING". EACH LINE IN DIAGRAM REPRESENTS A PAIR OF FIBER STRANDS (TRANSMIT/RECEIVE).
3. NON TERMINATED FIBERS SPLICED THROUGH IN EACH LOCATION, SYMBOLIZED BY "X" IN DIAGRAM.

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Fiber Optic Oneline Diagram

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Date: 09/27/17
Sheet: E.210

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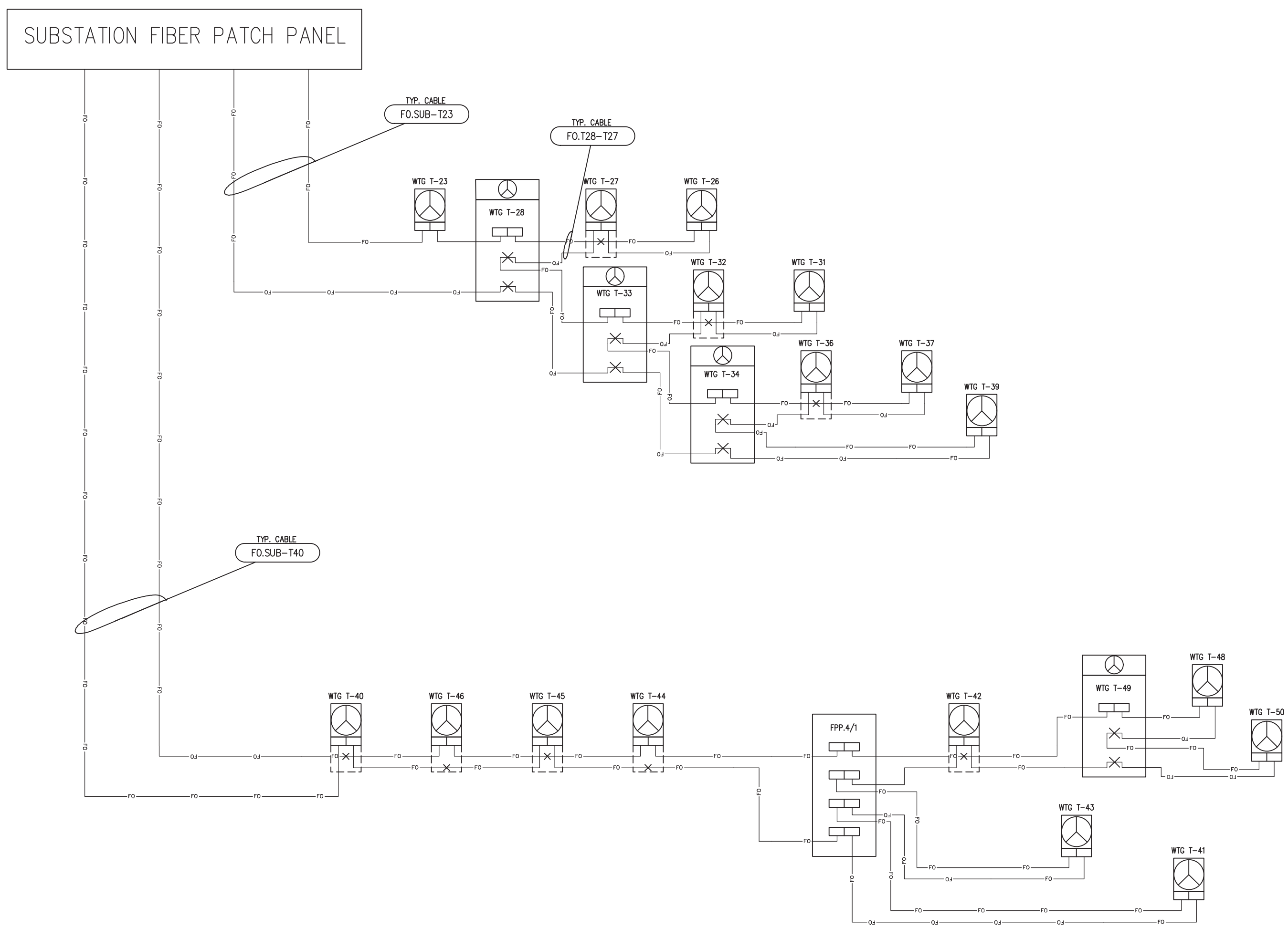

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Fiber Optic Oneline Diagram (2)

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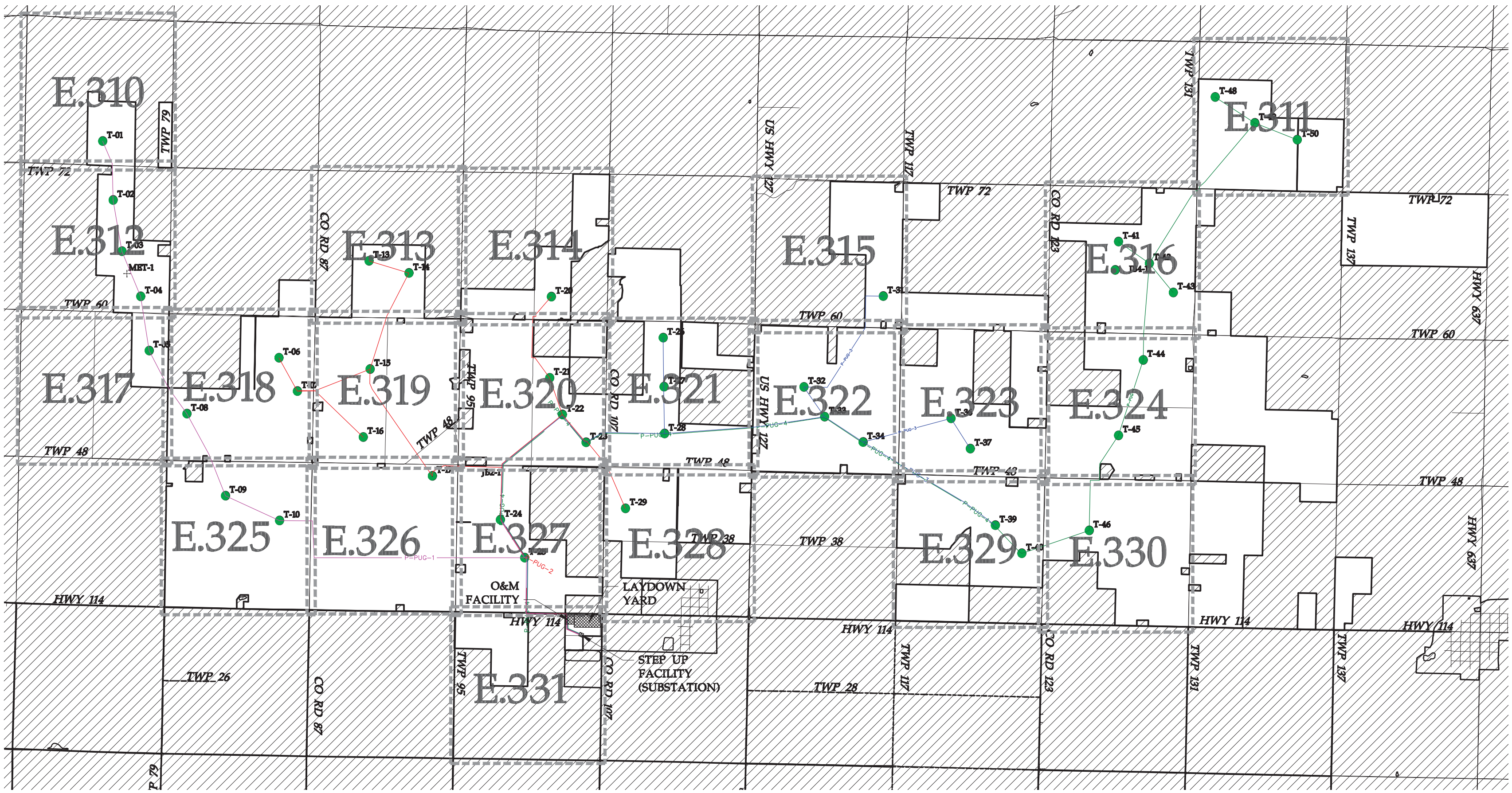
0007186_E200_ONELINES.dwg

LEGEND:

●	PROPOSED TURBINE LOCATION
T-XX	PROPOSED TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
(hatched)	OUTSIDE PROJECT BOUNDARY



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0' 2000' 4000' 6000'

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Overall Electrical Site Plan

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0007186_E300_Overall Electrical Site Plan.dwg

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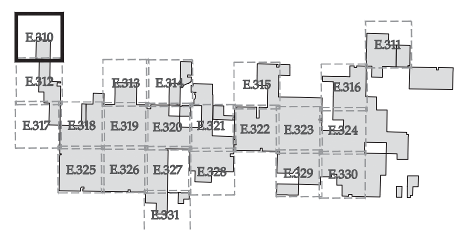
LEGEND

	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY



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0' 300' 600' 900'

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Electrical Site Plan

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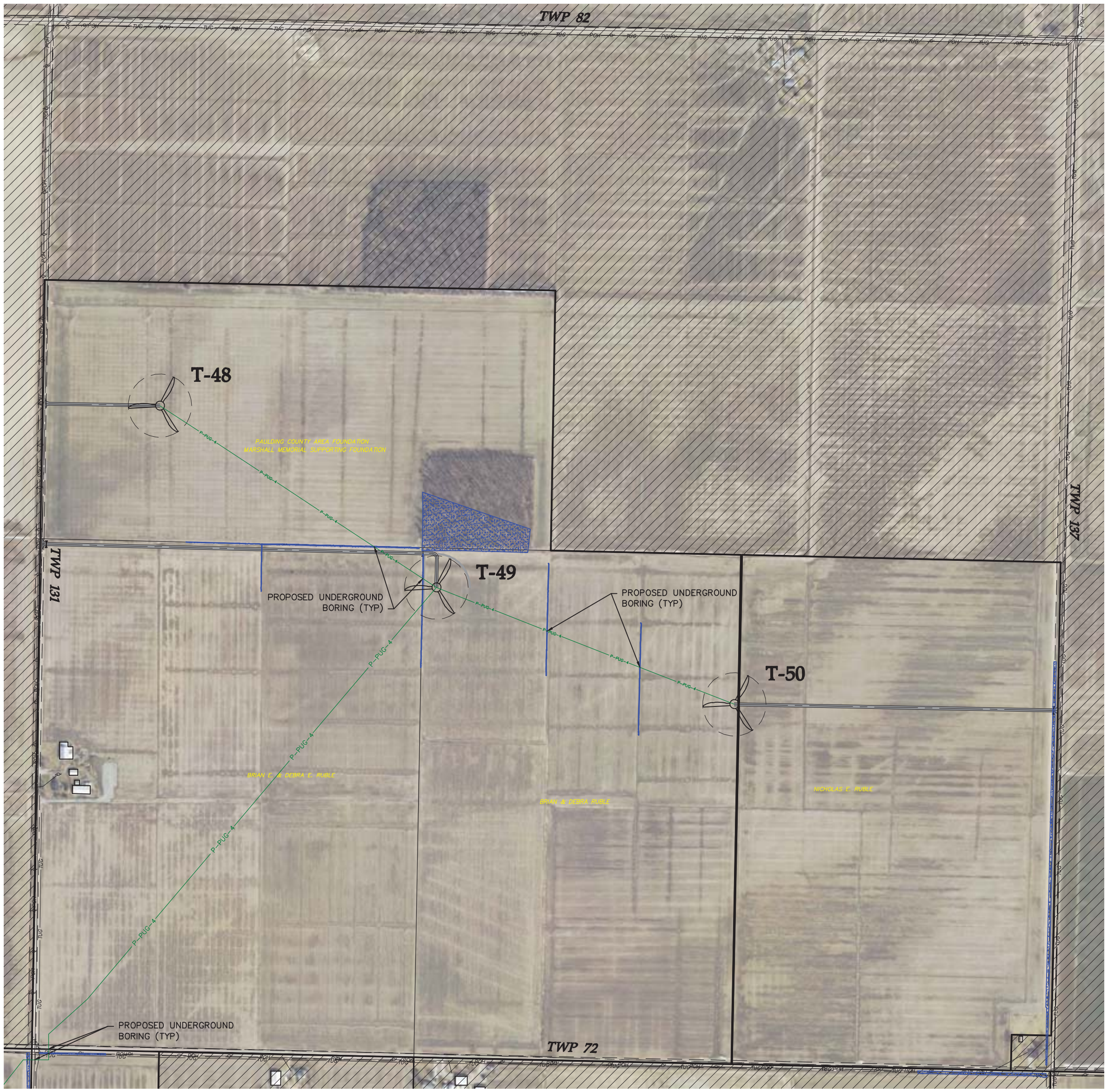

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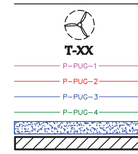
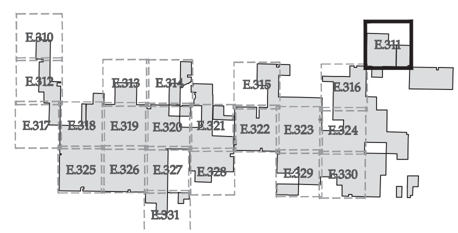


TURBINE LOCATION
TURBINE NUMBER
PROPOSED CIRCUIT 1
PROPOSED CIRCUIT 2
PROPOSED CIRCUIT 3
PROPOSED CIRCUIT 4
DELINEATED WETLAND
NON-PARTICIPATING PROPERTY



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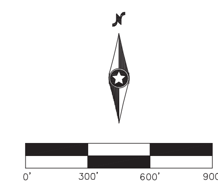

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Paulding County, Ohio

Electrical Site Plan

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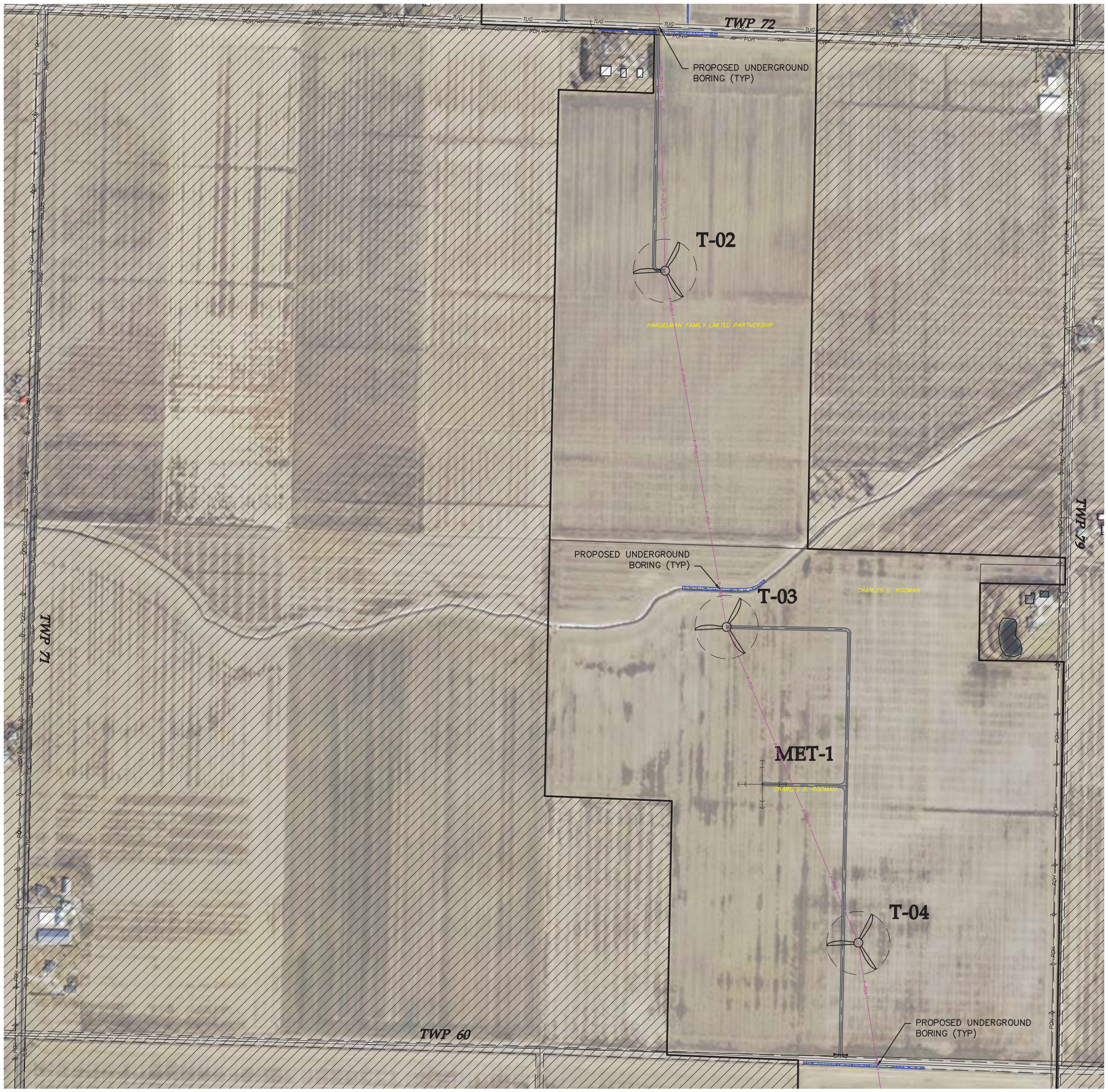

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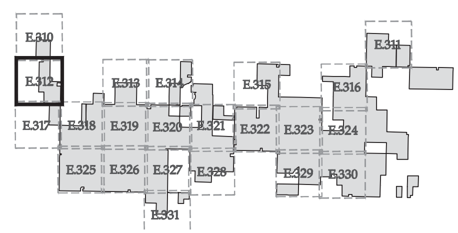
LEGEND

	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY

GENERAL NOTES

1. LV POWER FOR MET-1 FED FROM WTG T-04. LV POWER CABLE INSTALLED IN COMMON MV TRENCH FROM T-04.
2. FIBER OPTIC CABLE BETWEEN T-03 AND T-04 RUNS THROUGH MET-1 PATCH PANEL (SEE E.210).



KEY MAP

Westwood
Phone (952) 937-5150
Fax (952) 937-5822
Toll Free (888) 937-5150
7699 Anagram Drive
Eden Prairie, MN 55344
westwoodps.com
Westwood Professional Services, Inc.

Designed: JRV
Checked: ANS
Drawn: JMC
As-Built Drawing:

Revisions:

#	DATE	DESCRIPTION
A	09/27/17	30% plans

Prepared for:

WHITE an IEA company
3900 E. White Ave
Clinton, IN 47842

Trishe Wind Ohio, LLC
c/o Starwood Energy Group, LLC
5 Greenwich Office Park, 2nd Floor
Greenwich, CT 06831

0' 300' 600' 900'

Northwest Ohio Wind Project
Paulding County, Ohio

Electrical Site Plan

Not For Construction
Array Date: 09/14/2017
Date: 09/27/17
Sheet: E.312

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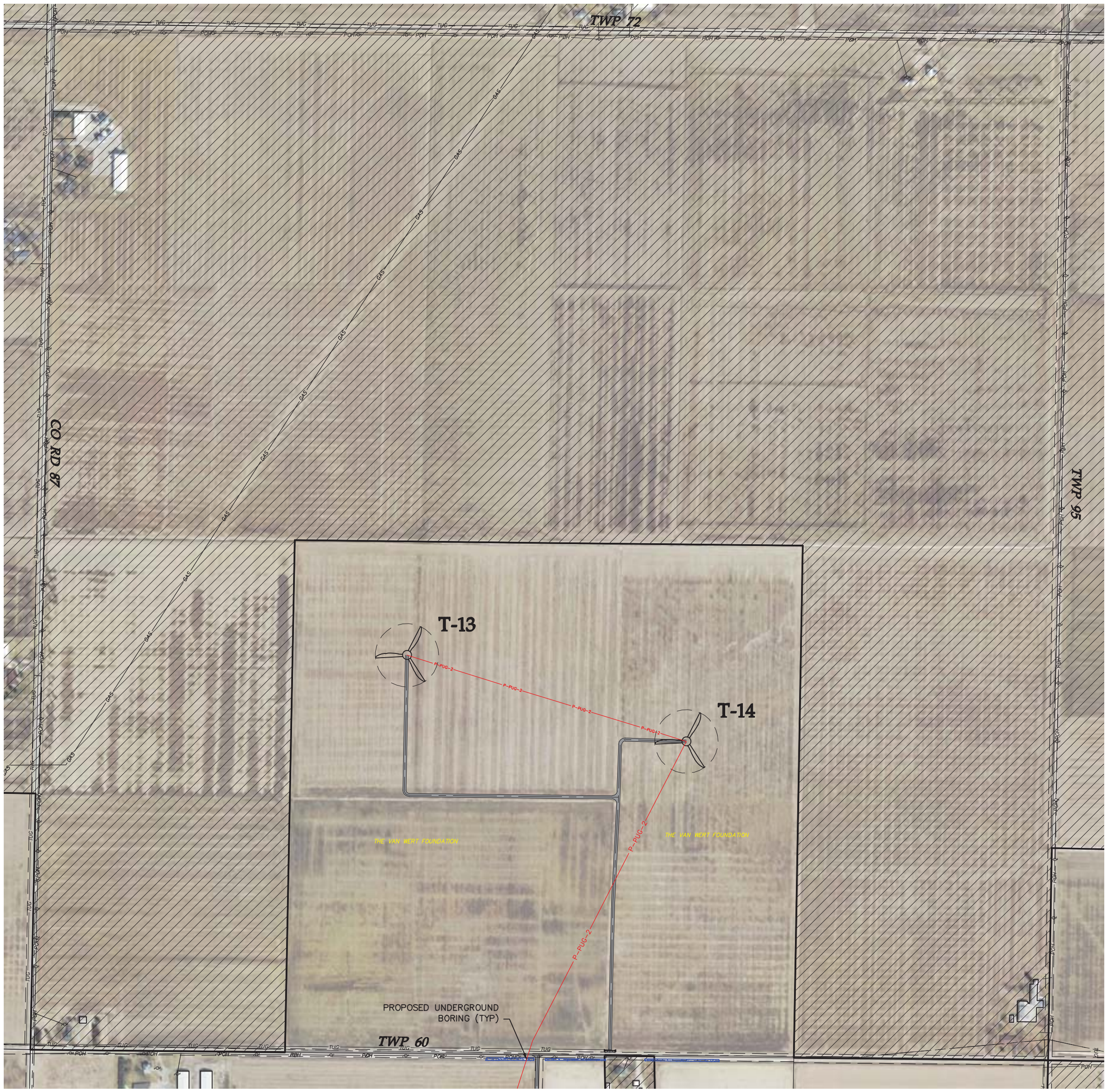

SEE SHEET E.314

SEE SHEET E.319

LEGEND

(turbine symbol)	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY

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Sheet: E.313

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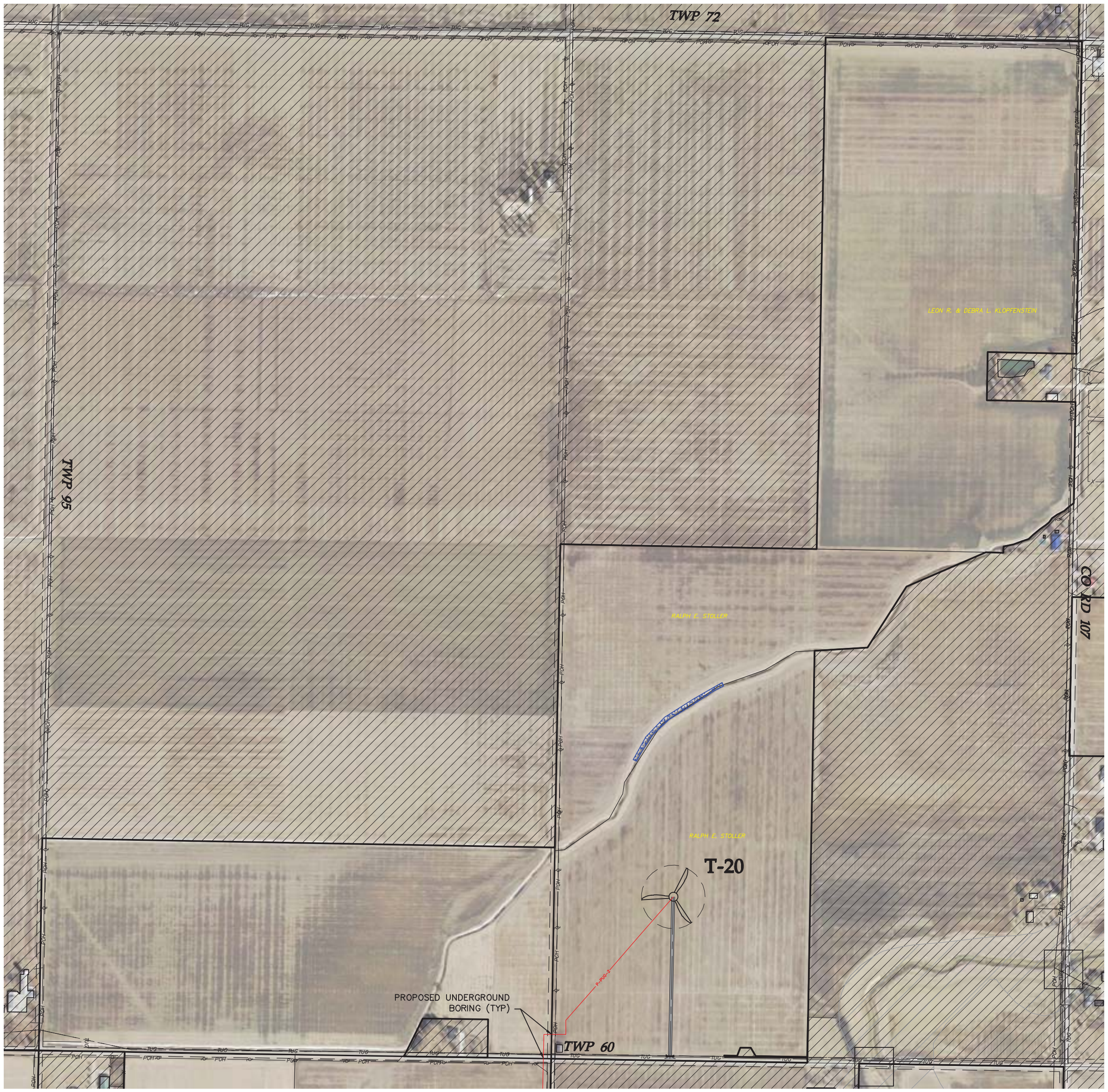
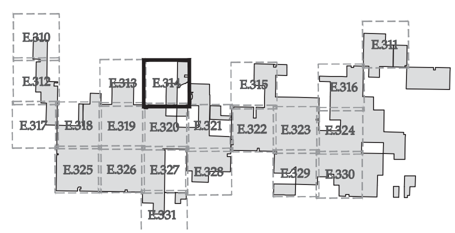


SEE SHEET E.313

SEE SHEET E.320

LEGEND

	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY



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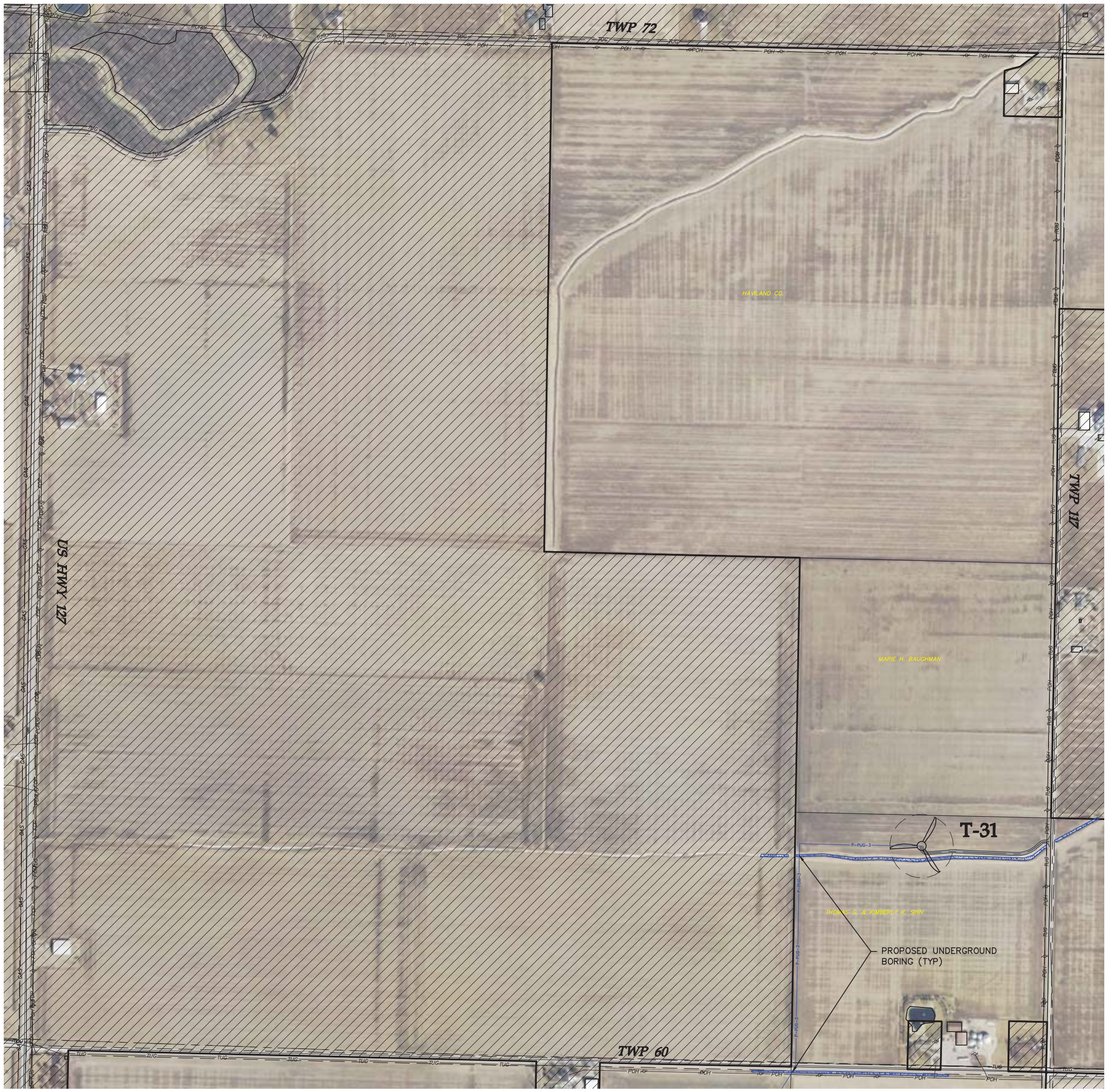
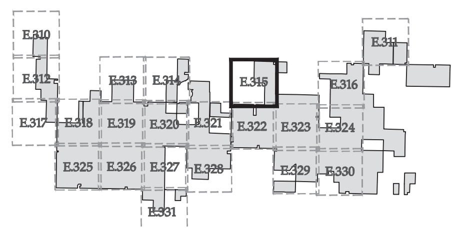


SEE SHEET E.322

LEGEND

	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY



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Date: 09/27/17
Sheet: E.315

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SEE SHEET E.311

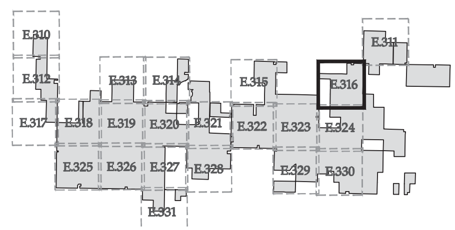
SEE SHEET E.324

LEGEND

(turbine symbol)	TURBINE LOCATION
T-XX	TURBINE NUMBER
P-PUG-1	PROPOSED CIRCUIT 1
P-PUG-2	PROPOSED CIRCUIT 2
P-PUG-3	PROPOSED CIRCUIT 3
P-PUG-4	PROPOSED CIRCUIT 4
	DELINEATED WETLAND
	NON-PARTICIPATING PROPERTY

GENERAL NOTES

1. EXACT POSITION OF JB4-1 IS TO BE DETERMINED.



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