Electrical Transient Analyzer Program

Unbalanced 3-Phase Short-Circuit Analysis

IEC Standards

	Swing	V-Control	Load	Total
Number of Buses:	4	0	18	22

	XFMR2	XFMR3	Reactor	Line/Cable/ Busway	Impedance	Tie PD	Total
Number of Branches:	3	0	0	17	0	1	21

	Synchronous Generator	Power Grid	Synchronous Motor	Induction Machines	Lumped Load	Total
Number of Machines:	1	0	0	0	1	1

System Frequency:	50
Unit System:	Metric
Project Filename:	Ofosu Replication
Output Filename:	C:\ETAP 2401\Ofosu Replication\SC_GEN_ONLY_3PHG.SC7S

Adjustments

Tolerance	Apply Adjustments	Individual /Global	Percent
Transformer Impedance:	No		
Reactor Impedance:	No		
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable / Busway Length:	No		

Temperature Correction	Apply Adjustments	Individual /Global	Degree C
Transmission Line Resistance:	Yes	Global	20
Cable / Busway Resistance:	Yes	Global	20

Bus Input Data

Bus						Initial Voltage		Generation		Load		Mvar Limits	
ID	Phase	Type	kV	Sub-sys	Ph	%	Ang.	MW	Mvar	MW	Mvar	Max.	Min.
Bus1	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus3	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus4	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus5	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus6	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus7	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus9	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus11	3Phase	Load	0.700	1	A	100.0	-30.0	0	0	0	0	0.000	0.000
					B	100.0	-150.0	0	0	0	0		
					C	100.0	90.0	0	0	0	0		
Bus12	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus13	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus14	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus15	3Phase	Load	11.000	1	A	100.0	30.0	0	0	0	0	0.000	0.000
					B	100.0	-90.0	0	0	0	0		
					C	100.0	150.0	0	0	0	0		
Bus16	3Phase	Load	11.000	1	A	100.0	30.0	0	0	0	0	0.000	0.000
					B	100.0	-90.0	0	0	0	0		
					C	100.0	150.0	0	0	0	0		
Bus17	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus18	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		

Bus						Initial Voltage		Generation		Load		Mvar Limits	
ID	Phase	Type	kV	Sub-sys	Ph	%	Ang.	MW	Mvar	MW	Mvar	Max.	Min.
Bus19	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus20	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus21	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus22	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus23	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Bus24	3Phase	Swing	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Main Bus	3Phase	Load	0.400	1	A	100.0	0.0	0	0	0	0	0.000	0.000
					B	100.0	-120.0	0	0	0	0		
					C	100.0	120.0	0	0	0	0		
Total Number of Buses: 22								0.000	0.000	0.000	0.000		

Cable/Busway Input Data

Cable/Busway										
				Length				ohms/1000 m per Conductor		
ID	Phase	Library	Size	Adj. (m)	% Tol.	#/Phase	T (°C)	R	X	Y
Cable2	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable3	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable4	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable5	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable6	3Phase	1.0kV 4/C CU	120	30.0	0.0	1	20	0.155670	0.077668	
Cable7	3Phase	1.0kV 4/C CU	120	30.0	0.0	1	20	0.155670	0.077668	
Cable12	3Phase	1.0kV 4/C CU	240	30.0	0.0	3	20	0.078156	0.077686	
Cable13	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable14	3Phase	1.0kV 4/C CU	240	30.0	0.0	3	20	0.078156	0.077686	
Cable15	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable16	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable17	3Phase	1.0kV 4/C CU	120	30.0	0.0	1	20	0.155670	0.077668	
Cable18	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable19	3Phase	1.0kV 4/C CU	25	30.0	0.0	1	20	0.727542	0.083922	
Cable20	3Phase	1.0kV 4/C CU	120	30.0	0.0	1	20	0.155670	0.077668	
Cable21	3Phase	1.0kV 4/C CU	240	30.0	0.0	3	20	0.078156	0.077686	

Cable / Busway resistances are listed at the specified temperatures.
Cables longer than 70.00 km are modeled with long line models in the study.

Impedance/Line Input Data

ID	Type	Phase	Length Adj. (m)	Length % Tol.	Operating Temp °C
Line1	Line	3Phase	300.0	0.0	20

Line resistances are listed at the specified temperatures.

Lines longer than 210.00 km are modeled with long line models in the study.

Series Impedance/Shunt Admittance Matrices (Phase Domain)

Line ID	Line ID	Length km	Ph	R (ohm)			X (ohm)			Y (micro-siemens)		
				A	B	C	A	B	C	A	B	C
Line1	Line1	0.300	A	0.11957	0.03220	0.03107	0.15408	0.06644	0.05683	0	0	0
			B	0.03220	0.12191	0.03220	0.06644	0.14701	0.06644	0	0	0
			C	0.03107	0.03220	0.11957	0.05683	0.06644	0.15408	0	0	0

For impedances below center-tap transformers, Phases A, B, and C correspond to (1), (2), and (N) respectively.

2-Winding Transformer Input Data

Transformer		Rating								Z Variation		% Tap Setting		Adjusted		Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	% Z0	X1/R1	X0/R0	% Tol.	+ 5%	- 5%	Prim.	Sec.	% Z 1	% Z 0	Type	Angle
ISOLATION TX	3Phase	0.500	0.700	0.400	4.00	4.00	1.50	1.50	0	0	0	0	0	4.0000	4.0000	Dyn	-30.000
STEP DOWN TX	3Phase	0.300	11.000	0.400	4.00	4.00	1.50	1.50	0	0	0	0	0	4.0000	4.0000	Dyn	30.000
STEP UP TX @ GEN	3Phase	0.500	0.400	11.000	4.00	4.00	1.50	1.50	0	0	0	0	0	4.0000	4.0000	YNd	30.000

Branch Connections

CKT/Branch			Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Phase	Type	From Bus	To Bus	R	X	Z	Y
Cable2	3Phase	Cable	Bus1	Bus3	1364.14	157.35	1373.19	
Cable3	3Phase	Cable	Bus1	Bus4	1364.14	157.35	1373.19	
Cable4	3Phase	Cable	Bus6	Bus5	1364.14	157.35	1373.19	
Cable5	3Phase	Cable	Bus6	Bus7	1364.14	157.35	1373.19	
Cable6	3Phase	Cable	Main Bus	Bus1	291.88	145.63	326.19	
Cable7	3Phase	Cable	Main Bus	Bus6	291.88	145.63	326.19	
Cable12	3Phase	Cable	Bus12	Main Bus	48.85	48.55	68.87	
Cable13	3Phase	Cable	Bus13	Main Bus	1364.14	157.35	1373.19	
Cable14	3Phase	Cable	Bus14	Main Bus	48.85	48.55	68.87	
Cable15	3Phase	Cable	Bus19	Bus18	1364.14	157.35	1373.19	
Cable16	3Phase	Cable	Bus19	Bus20	1364.14	157.35	1373.19	
Cable17	3Phase	Cable	Main Bus	Bus19	291.88	145.63	326.19	
Cable18	3Phase	Cable	Bus22	Bus21	1364.14	157.35	1373.19	
Cable19	3Phase	Cable	Bus22	Bus23	1364.14	157.35	1373.19	
Cable20	3Phase	Cable	Main Bus	Bus22	291.88	145.63	326.19	
Cable21	3Phase	Cable	Bus9	Bus24	48.85	48.55	68.87	
ISOLATION TX	3Phase	2W XFMR	Bus11	Bus12	443.76	665.64	800.00	
STEP DOWN TX	3Phase	2W XFMR	Bus16	Bus17	739.60	1109.40	1333.33	
STEP UP TX @ GEN SITE	3Phase	2W XFMR	Bus14	Bus15	443.76	665.64	800.00	
CB8	3Phase	Tie Circuit	Main Bus	Bus9	0.00	0.00	0.00	

Synchronous Generator Input Data

Synchronous Generator		Connected Bus	Rating				% Impedance in Machine Base					
								Xd"				Excitation
ID	Type	ID	MVA	kV	RPM	% PF	R	Adj.	Tol.	R/X	Xd, sat	Type
Gen1	Steam Turbo	Bus24	0.556	0.400	1500	90.00	1.000	19.00	0.0	0.05	155.00	Turbine 130%

Total Connected Synchronous Generators (= 1) : 0.556 MVA

Synchronous Generator			Grounding				Impedances (%)			
							Negative Seq		Zero Seq.	
ID	Type	Connected Bus ID	Conn.	Type	Amp	Exciter Type	R2	X2	R0	X0
Gen1	Steam Turbo	Bus24	Wye	Solid		Turbine 130%	2.00	18.00	1.00	7.00

Lumped Load Input Data

	Lumped Load						Motor Loads								
	Rating				% Load		Loading		% Impedance (Machine Base)			Grounding			
Lumped Load ID	kVA	kV	Amp	% PF	MTR	STAT	kW	kvar	R	X"	R/X"	Conn.	Type	Amp	MW/PP
COMMUNITY LOAD	140.0	0.400	202.073	85.00	80	20	119.00	73.75	6.46	15.37	0.42	Delta			0.10

Total Connected Lumped Loads (= 1): 140.0 kVA

SHORT- CIRCUIT REPORT

Fault at bus : Bus1
Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus1	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000
Bus3	Bus1	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus4	Bus1	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Main Bus	Bus1	3phG	11.30	-51.2	11.30	-171.2	11.30	68.8	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.00
Peak Current (kA), Method C	11.13
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.45

\# Indicates fault current contribution is from three-winding transformers.
* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus3

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus3	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus1	Bus3	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus4

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va Mag.	Va Ang.	Vb Mag.	Vb Ang.	Vc Mag.	Vc Ang.	Ia Mag.	Ia Ang.	Ib Mag.	Ib Ang.	Ic Mag.	Ic Ang.	I1	I2	I0
Bus4	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus1	Bus4	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus5

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus5	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus6	Bus5	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus6

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus6	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000
Bus5	Bus6	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus7	Bus6	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Main Bus	Bus6	3phG	11.30	-51.2	11.30	-171.2	11.30	68.8	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.00
Peak Current (kA), Method C	11.13
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.45

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus7

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus7	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus6	Bus7	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus9

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va		Vb		Vc		Ia		Ib		Ic				
			Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus9	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	5.338	-82.9	5.338	157.1	5.338	37.1	5.338	0.000	0.000
Bus24	Bus9	3phG	2.14	-41.4	2.14	-161.4	2.14	78.6	4.494	-86.2	4.494	153.8	4.494	33.8	4.494	0.000	0.000
Main Bus	Bus9	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.891	-65.8	0.891	174.2	0.891	54.2	0.891	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.34
Peak Current (kA), Method C	11.92
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.46

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus11

Nominal kV = 0.700 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus11	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	2.396	-106.6	2.396	133.4	2.396	13.4	2.396	0.000	0.000
Bus12	Bus11	3phG	22.73	-20.3	22.73	-140.3	22.73	99.7	2.396	-106.6	2.396	133.4	2.396	13.4	2.396	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	2.40
Peak Current (kA), Method C	5.21
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	0.81

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus12

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va Mag.	Va Ang.	Vb Mag.	Vb Ang.	Vc Mag.	Vc Ang.	Ia Mag.	Ia Ang.	Ib Mag.	Ib Ang.	Ic Mag.	Ic Ang.	I1	I2	I0
Bus12	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	5.238	-82.0	5.238	158.0	5.238	38.0	5.238	0.000	0.000
Main Bus	Bus12	3phG	2.50	-37.2	2.50	-157.2	2.50	82.8	5.238	-82.0	5.238	158.0	5.238	38.0	5.238	0.000	0.000
Bus11	Bus12	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.24
Peak Current (kA), Method C	12.69
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.46

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus13

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus13	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.413	-60.0	4.413	180.0	4.413	60.0	4.413	0.000	0.000
Main Bus	Bus13	3phG	41.98	-53.4	41.98	-173.4	41.98	66.6	4.413	-60.0	4.413	180.0	4.413	60.0	4.413	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.41
Peak Current (kA), Method C	7.60
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.44

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus14

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va		Vb		Vc		Ia		Ib		Ic				
			Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus14	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	5.277	-82.2	5.277	157.8	5.277	37.8	5.277	0.000	0.000
Main Bus	Bus14	3phG	2.11	-40.6	2.11	-160.6	2.11	79.4	4.426	-85.4	4.426	154.6	4.426	34.6	4.426	0.000	0.000
Bus15	Bus14	3phG	4.85	20.4	4.85	-99.6	4.85	140.4	0.894	-65.9	0.894	174.1	0.894	54.1	0.894	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.28
Peak Current (kA), Method C	11.63
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.46

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus15
Nominal kV = 11.000 Voltage c Factor = 1.10 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va		Vb		Vc		Ia		Ib		Ic				
			Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus15	**Total**	3phG	0.00	36.9	0.00	-90.0	0.00	156.9	0.175	-47.3	0.175	-167.3	0.175	72.7	0.175	0.000	0.000
Bus16	Bus15	3phG	0.07	7.2	0.07	-114.4	0.07	133.2	0.036	-36.3	0.036	-156.3	0.036	83.7	0.036	0.000	0.000
Bus14	Bus15	3phG	20.86	-23.8	20.86	-143.8	20.86	96.2	0.140	-50.1	0.140	-170.1	0.140	69.9	0.140	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	0.17
Peak Current (kA), Method C	0.36
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	0.05

# Indicates fault current contribution is from three-winding transformers.
* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus16

Nominal kV = 11.000 Voltage c Factor = 1.10 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus16	**Total**	3phG	0.00	37.0	0.00	-90.0	0.00	157.0	0.175	-47.3	0.175	-167.3	0.175	72.7	0.175	0.000	0.000
Bus15	Bus16	3phG	0.29	-6.5	0.27	-128.1	0.27	119.5	0.140	-50.0	0.140	-170.1	0.140	69.9	0.140	0.000	0.000
Bus17	Bus16	3phG	8.87	-10.0	8.87	-130.0	8.87	110.0	0.036	-36.3	0.036	-156.3	0.036	83.7	0.036	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	0.17
Peak Current (kA), Method C	0.36
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	0.05

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus17

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va Mag.	Va Ang.	Vb Mag.	Vb Ang.	Vc Mag.	Vc Ang.	Ia Mag.	Ia Ang.	Ib Mag.	Ib Ang.	Ic Mag.	Ic Ang.	I1	I2	I0
Bus17	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	3.843	-72.5	3.844	167.5	3.844	47.5	3.844	0.000	0.000
Bus16	Bus17	3phG	25.58	11.9	25.58	-108.1	25.58	131.9	2.831	-74.4	2.831	165.6	2.831	45.6	2.831	0.000	0.000
COMMUNITY LOAD	Bus17	3phG	105.00	0.0	105.00	-120.0	105.00	120.0	1.018	-67.2	1.018	172.8	1.018	52.8	1.018	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	3.84
Peak Current (kA), Method C	7.36
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.36

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus18

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus18	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus19	Bus18	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus19

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus19	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000
Bus18	Bus19	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus20	Bus19	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Main Bus	Bus19	3phG	11.30	-51.2	11.30	-171.2	11.30	68.8	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.00
Peak Current (kA), Method C	11.13
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.45

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus20

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va Mag.	Va Ang.	Vb Mag.	Vb Ang.	Vc Mag.	Vc Ang.	Ia Mag.	Ia Ang.	Ib Mag.	Ib Ang.	Ic Mag.	Ic Ang.	I1	I2	I0
Bus20	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus19	Bus20	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus21

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus21	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus22	Bus21	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus22

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus22	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000
Bus21	Bus22	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus23	Bus22	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Main Bus	Bus22	3phG	11.30	-51.2	11.30	-171.2	11.30	68.8	4.998	-77.7	4.998	162.3	4.999	42.3	4.999	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.00
Peak Current (kA), Method C	11.13
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.45

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus23

Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
			Va		Vb		Vc		Ia		Ib		Ic				
From Bus ID	To Bus ID	Fault Type	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Bus23	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000
Bus22	Bus23	3phG	38.86	-50.6	38.86	-170.6	38.86	69.4	4.084	-57.2	4.084	-177.2	4.084	62.8	4.084	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	4.08
Peak Current (kA), Method C	6.83
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.42

\# Indicates fault current contribution is from three-winding transformers.

* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Bus24
Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va Mag.	Va Ang.	Vb Mag.	Vb Ang.	Vc Mag.	Vc Ang.	Ia Mag.	Ia Ang.	Ib Mag.	Ib Ang.	Ic Mag.	Ic Ang.	I1	I2	I0
Bus24	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	5.400	-83.6	5.400	156.4	5.400	36.4	5.400	0.000	0.000
Bus9	Bus24	3phG	0.42	-20.9	0.42	-140.9	0.42	99.1	0.888	-65.7	0.888	174.3	0.888	54.3	0.888	0.000	0.000
Gen1	Bus24	3phG	105.00	0.0	105.00	-120.0	105.00	120.0	4.564	-87.0	4.564	153.0	4.564	33.0	4.564	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.40
Peak Current (kA), Method C	12.21
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.47

\# Indicates fault current contribution is from three-winding transformers.
* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Fault at bus : Main Bus
Nominal kV = 0.400 Voltage c Factor = 1.05 (Maximum If)

Contribution			% Voltage at From Bus						Current at From Bus (kA)						Sequence Current (kA)		
From Bus ID	To Bus ID	Fault Type	Va		Vb		Vc		Ia		Ib		Ic				
			Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	I1	I2	I0
Main Bus	**Total**	3phG	0.00	0.0	0.00	0.0	0.00	0.0	5.338	-82.9	5.338	157.1	5.338	37.1	5.338	0.000	0.000
Bus1	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus6	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus12	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus13	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus14	Main Bus	3phG	0.43	-21.0	0.43	-140.9	0.43	99.0	0.891	-65.8	0.891	174.2	0.891	54.2	0.891	0.000	0.000
Bus19	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus22	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	0.000	0.0	0.000	0.0	0.000	0.0	0.000	0.000	0.000
Bus9	Main Bus	3phG	0.00	0.0	0.00	0.0	0.00	0.0	4.494	-86.2	4.494	153.8	4.494	33.8	4.494	0.000	0.000

	3Phase-G
Initial Symmetrical Current (kA, rms)	5.34
Peak Current (kA), Method C	11.92
Breaking Current (kA, rms, symm)	0.00
Steady State Current (kA, rms)	1.46

\# Indicates fault current contribution is from three-winding transformers.
* Indicates a zero sequence fault current contribution (3I0) from a grounded Delta- Y transformer.

Short-Circuit Summary Report

3phG Fault Currents

Bus			Fault Current (kA)											
			Phase A				Phase B				Phase C			
ID	kV	Fault Type	I"k	ip	Ib	Ik	I"k	ip	Ib	Ik	I"k	ip	Ib	Ik
Bus1	0.400	3Phase-G	4.998	11.128	0.000	1.454	4.998	11.128	0.000	1.454	4.999	11.128	0.000	1.454
Bus3	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus4	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus5	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus6	0.400	3Phase-G	4.998	11.128	0.000	1.454	4.998	11.128	0.000	1.454	4.999	11.128	0.000	1.454
Bus7	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus9	0.400	3Phase-G	5.338	11.915	0.000	1.463	5.338	11.915	0.000	1.463	5.338	11.915	0.000	1.463
Bus11	0.700	3Phase-G	2.396	5.207	0.000	0.814	2.396	5.207	0.000	0.814	2.396	5.207	0.000	0.814
Bus12	0.400	3Phase-G	5.238	12.690	0.000	1.461	5.238	12.690	0.000	1.461	5.238	12.691	0.000	1.461
Bus13	0.400	3Phase-G	4.413	7.601	0.000	1.437	4.413	7.601	0.000	1.437	4.413	7.601	0.000	1.437
Bus14	0.400	3Phase-G	5.277	11.633	0.000	1.461	5.277	11.633	0.000	1.461	5.277	11.633	0.000	1.461
Bus15	11.000	3Phase-G	0.175	0.357	0.000	0.052	0.175	0.357	0.000	0.052	0.175	0.357	0.000	0.052
Bus16	11.000	3Phase-G	0.175	0.356	0.000	0.052	0.175	0.356	0.000	0.052	0.175	0.357	0.000	0.052
Bus17	0.400	3Phase-G	3.843	7.362	0.000	1.364	3.844	7.362	0.000	1.364	3.844	7.364	0.000	1.364
Bus18	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus19	0.400	3Phase-G	4.998	11.128	0.000	1.454	4.998	11.128	0.000	1.454	4.999	11.128	0.000	1.454
Bus20	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus21	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus22	0.400	3Phase-G	4.998	11.128	0.000	1.454	4.998	11.128	0.000	1.454	4.999	11.128	0.000	1.454
Bus23	0.400	3Phase-G	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424	4.084	6.830	0.000	1.424
Bus24	0.400	3Phase-G	5.400	12.214	0.000	1.466	5.400	12.214	0.000	1.466	5.400	12.214	0.000	1.466
Main Bus	0.400	3Phase-G	5.338	11.915	0.000	1.463	5.338	11.915	0.000	1.463	5.338	11.915	0.000	1.463

Current ip is calculated using Method C.