

ANEXO 14

**ESTUDIO DE CORTOCIRCUITO DE LA PLANTA.
ARCHIVO DE SALIDA DEL ETAP POWER STATION.**

Project:
Location:
Contract:
Engineer:
Filename: CC

ETAP PowerStation

4.0.0C

Study Case: SC

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SN: KLGCONSULT
Revision: Base
Config.: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Short Circuit Analysis

ANSI Standard

3-Phase, LG, LL, & LLG Fault Currents

30-Cycle Network

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses:	1	2	0	3

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	2	0	0	0	0	0	2

	<u>Synchronous Generator</u>	<u>Power Grid</u>	<u>Synchronous Motor</u>	<u>Induction Machines</u>	<u>Lumped Load</u>	<u>Total</u>
Number of Machines:	2	1	0	0	0	3

System Frequency: 60 Hz

Unit System: Metric

Project Filename: CC

Output Filename: C:\ETAP 400\PowerStation\CC\Untitled.SA2

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BUS Input Data

ID	Bus			Initial Voltage		Generation		Motor Load	
	Type	Nom. kV	Base kV	%Mag.	Ang.	MW	Mvar	MW	Mvar
Nodo 1	Gen.	15.000	15.000	100.0	0.0				
Nodo 2	Gen.	15.000	15.000	100.0	0.0				
Nodo 3	SWNG	230.000	230.000	100.0	0.0				
3 Buses Total						0.000			

All voltages reported by PowerStation are in % of bus Nominal kV. Base kV values of buses are calculated and used internally by PowerStation.

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2-WINDING TRANSFORMER Input Data

Transformer ID	Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
	MVA	Prim. kV	Sec. kV	% Z	X/R	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
T1	150.000	15.000	230.000	10.000	42.0	0	0	0	0	0	10.0000	Std Pos. Seq.	30.0
T2	150.000	15.000	230.000	10.000	42.0	0	0	0	0	0	10.0000	Std Pos. Seq.	30.0

2-WINDING TRANSFORMER Grounding Input Data

Transformer ID	Rating			Grounding				
	MVA	Prim. kV	Sec. kV	Conn. Type	Primary Type Amp		Secondary Type Amp	
T1	150.000	15.000	230.000	D/Y			Solid	
T2	150.000	15.000	230.000	D/Y			Solid	

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BRANCH CONNECTIONS

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVAb			
ID	Type	From Bus	To Bus	R	X	Z	Y
T1	2W XFMR	Nodo 1	Nodo 3	0.16	6.66	6.67	
T2	2W XFMR	Nodo 2	Nodo 3	0.16	6.66	6.67	

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POWER GRID Input Data

Power Grid	Connected Bus	Rating		Positive Seq. Imp			Grounding	Zero Seq. Imp.				
		ID	ID	MVASC	kV	X/R		% R	% X	Type	X/R	% R0
Sistema Externo CADAFE	Nodo 3			10716.000	230.000	1000	0.00093	0.93318	Wye - Solid	1000	0.004610	4.61451

Total Power Grids (= 1) 10716.000 MVA

SYNCHRONOUS GENERATOR Input Data

Synchronous Generator		Rating			Positive Seq. Imp.				Grounding			Zero Seq. Imp.		
ID	Type	MVA	kV	RPM	X"/R	% R	% X"	% X'	Conn.	Type	Amp	X/R	% R0	% X0
Turbogenerador 1	Turbo	150.000	15.000	1800	48.00	0.250	12.00	23.00	Wye	Reactor	400.00	48.00	0.250	12.00
Turbogenerador 2	Turbo	150.000	15.000	1800	48.00	0.250	12.00	23.00	Wye	Reactor	400.00	48.00	0.250	12.00

Total Connected Synchronous Generators (= 2): 300.000 MVA

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SHORT- CIRCUIT REPORT

Fault at bus: **Nodo 1**

Nominal kV = 15.000 Prefault Voltage = 100.00 % of nominal bus kV
 Base kV = 15.000 = 100.00 % of base kV

Contribution		3-Phase Fault		Line-To-Ground Fault			Positive & Zero Sequence Impedances Looking into "From Bus"					
From Bus ID	To Bus ID	% V From Bus	kA Symm. rms	% Voltage at From Bus			kA Symm. rms Ia 3I0	% Impedance on 100 MVA base				
				Va	Vb	Vc		R1	X1	RO	X0	
Nodo 1	Total	0.00	76.001	0.00	172.79	172.78	0.398	0.398	9.00E-002	5.06E+000	1.67E-001	2.89E+003
Nodo 3	Nodo 1	88.16	50.901	99.97	99.99	99.97	0.157	0.000	1.60E-001	7.56E+000		
Turbogenerador 1	Nodo 1	100.00	25.101	100.00	100.00	100.00	0.241	0.398	1.67E-001	1.53E+001	1.67E-001	2.89E+003

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

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Fault at bus: **Nodo 2**

Nominal kV = 15.000 Prefault Voltage = 100.00 % of nominal bus kV
 Base kV = 15.000 = 100.00 % of base kV

Contribution		3-Phase Fault		Line-To-Ground Fault					Positive & Zero Sequence Impedances Looking into "From Bus"			
From Bus ID	To Bus ID	% V From Bus	kA Symm. rms	% Voltage at From Bus			kA Symm. rms		% Impedance on 100 MVA base			
				Va	Vb	Vc	Ia	3I0	R1	X1	R0	X0
Nodo 2	Total	0.00	76.001	0.00	172.79	172.78	0.398	0.398	9.00E-002	5.06E+000	1.67E-001	2.89E+003
Nodo 3	Nodo 2	88.16	50.901	99.97	99.99	99.97	0.157	0.000	1.60E-001	7.56E+000		
Turbogenerador 2	Nodo 2	100.00	25.101	100.00	100.00	100.00	0.241	0.398	1.67E-001	1.53E+001	1.67E-001	2.89E+003

Indicates fault current contribution is from three-winding transformers

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

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Fault at bus: **Nodo 3**

Nominal kV = 230.000 Prefault Voltage = 100.00 % of nominal bus kV
 Base kV = 230.000 = 100.00 % of base kV

Contribution		3-Phase Fault		Line-To-Ground Fault					Positive & Zero Sequence Impedances Looking into "From Bus"			
From Bus ID	To Bus ID	% V From Bus	kA Symm. rms	% Voltage at From Bus			kA Symm. rms		% Impedance on 100 MVA base			
				Va	Vb	Vc	Ia	3I0	R1	X1	R0	X0
Nodo 3	Total	0.00	29.181	0.00	117.12	117.71	20.783	20.783	1.79E-003	8.60E-001	2.76E-002	1.94E+000
Nodo 1	Nodo 3	30.30	1.141	78.08	77.87	95.92	2.673	6.034 *	3.25E-001	2.20E+001	1.59E-001	6.66E+000
Nodo 2	Nodo 3	30.30	1.141	78.08	77.87	95.92	2.673	6.034 *	3.25E-001	2.20E+001	1.59E-001	6.66E+000
Sistema Externo CADAPE	Nodo 3	100.00	26.900	100.00	100.00	100.00	15.437	8.717	9.33E-004	9.33E-001	4.62E-003	4.61E+000

Indicates fault current contribution is from three-winding transformers

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