

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 1
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design
Generation Category (1): Design
Load Diversity Factor: None

	<u>Swing</u>	<u>V-Control</u>	<u>Load</u>	<u>Total</u>
Number of Buses:	1	0	58	59

	<u>XEMR2</u>	<u>XEMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	8	0	0	62	0	16	86

Method of Solution:	Newton-Raphson Method
Maximum No. of Iteration:	99
Precision of Solution:	0.0001000
System Frequency:	50.00 Hz
Unit System:	Metric
Project Filename:	ali
Output Filename:	C:\Users\Ali\Desktop\project-etap\ali\Untitled.lfr

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 2
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Adjustments

<u>Tolerance</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Percent</u>
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Length:	No		
Cable Length:	No		

<u>Temperature Correction</u>	<u>Apply Adjustments</u>	<u>Individual /Global</u>	<u>Degree C</u>
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 3
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus Input Data

Bus			Initial Voltage		Load							
					Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
Bus 1	161.000	1	100.0	0.0								
Bus 2	161.000	1	100.0	0.0								
Bus 3	161.000	1	100.0	0.0								
Bus4	33.000	1	100.0	0.0								
Bus5	33.000	1	100.0	0.0								
Bus6	33.000	1	100.0	0.0								
Bus7	33.000	1	100.0	0.0								
Bus8	33.000	1	100.0	0.0								
Bus 9	33.000	1	100.0	0.0	3.250	1.477	13.000	5.909				
Bus 10	33.000	1	100.0	0.0	2.472	1.030	14.005	5.836				
Bus 11	33.000	1	100.0	0.0	3.295	1.373	13.182	5.492				
Bus 12	33.000	1	100.0	0.0	13.182	5.492	3.295	1.373				
Bus 13	33.000	1	100.0	0.0	3.295	1.373	13.182	5.492				
Bus 14	33.000	1	100.0	0.0	9.750	4.432	6.500	2.955				
Bus 15	33.000	1	100.0	0.0	3.250	1.477	13.000	5.909				
Bus 16	33.000	1	100.0	0.0	13.000	5.909	3.250	1.477				
Bus17	161.000	1	100.0	0.0								
Bus18	161.000	1	100.0	0.0								
Bus19	33.000	1	100.0	0.0								
Bus20	33.000	1	100.0	0.0								
Bus21	33.000	1	100.0	0.0								
Bus22	33.000	1	100.0	0.0								
Bus 23	33.000	1	100.0	0.0								
Bus 24	33.000	1	100.0	0.0	7.828	3.261	31.312	13.044				
Bus 25	33.000	1	100.0	0.0	31.312	13.044	7.828	3.261				
Bus 26	33.000	1	100.0	0.0	5.871	2.446	33.268	13.862				
Bus 27	33.000	1	100.0	0.0	31.311	13.046	7.828	3.262				
Bus 28	33.000	1	100.0	0.0	7.828	3.262	31.311	13.046				
Bus 29	33.000	1	100.0	0.0	31.311	13.046	7.828	3.262				
Bus 30	33.000	1	100.0	0.0	7.828	3.262	31.311	13.046				
Bus 31	33.000	1	100.0	0.0	31.311	13.046	7.828	3.262				
Bus 32	33.000	1	100.0	0.0	7.828	3.262	31.311	13.046				
Bus 33	161.000	1	100.0	0.0								

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 4
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

					Load							
Bus			Initial Voltage		Constant kVA		Constant Z		Constant I		Generic	
ID	kV	Sub-sys	% Mag.	Ang.	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
Bus 34	161.000	1	100.0	0.0								
Bus 35	33.000	1	100.0	0.0								
Bus 36	33.000	1	100.0	0.0								
Bus 37	33.000	1	100.0	0.0								
Bus 38	33.000	1	100.0	0.0								
Bus 39	33.000	1	100.0	0.0								
Bus 40	33.000	1	100.0	0.0	6.237	2.639	24.947	10.555				
Bus 41	33.000	1	100.0	0.0	24.947	10.555	6.237	2.639				
Bus 42	33.000	1	100.0	0.0	6.271	2.555	25.086	10.220				
Bus 43	33.000	1	100.0	0.0	25.086	10.220	6.271	2.555				
Bus 44	33.000	1	100.0	0.0	6.271	2.555	25.086	10.220				
Bus 45	33.000	1	100.0	0.0	25.086	10.220	6.271	2.555				
Bus 46	33.000	1	100.0	0.0	6.237	2.639	24.947	10.555				
Bus 47	33.000	1	100.0	0.0	24.947	10.555	6.237	2.639				
Bus 48	33.000	1	100.0	0.0	6.237	2.639	24.947	10.555				
Bus 49	33.000	1	100.0	0.0	18.710	7.916	12.474	5.277				
Bus 50	161.000	1	100.0	0.0								
Bus 51	161.000	1	100.0	0.0								
Bus 52	33.000	1	100.0	0.0								
Bus 53	33.000	1	100.0	0.0								
Bus 54	33.000	1	100.0	0.0								
Bus 55	33.000	1	100.0	0.0								
Bus56	33.000	1	100.0	0.0								
Bus 57	33.000	1	100.0	0.0	4.055	1.964	16.222	7.856				
Bus 58	33.000	1	100.0	0.0	12.166	5.892	8.111	3.928				
Bus 59	33.000	1	100.0	0.0	16.041	8.218	4.010	2.055				
Total Number of Buses: 59					396.213	168.805	460.083	195.141	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-sys	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus 1	161.000	Swing	1	100.0	0.0					
						0.000	0.000			

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 5
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Line/Cable Input Data

Line/Cable		Ohms or Siemens/1000 m per Conductor (Cable) or per Phase (Line)								
		Library	Size	Length		#/Phase	T (°C)	R	X	Y
				Adj. (m)	% Tol.					
ID										
Cable1	138NCUS1	1500	600.0	0.0	1	75	0.056325	0.180446		
Cable3	138NCUS1	1500	600.0	0.0	1	75	0.056325	0.180446		
Cable7	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Cable8	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Cable11	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Cable12	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Cable13	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Cable14	138NCUS1	500	600.0	0.0	1	75	0.109521	0.213255		
Line1		262	2000.0	0.0	1	75	0.102982	0.314194	0.0000028	
Line3		262	1000.0	0.0	1	75	0.102982	0.314194	0.0000028	
Line4		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line5		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line6		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line7		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line14		262	1609.3	0.0	1	75	0.106978	0.236662	0.0000032	
Line15		262	10500.0	0.0	1	75	0.107004	0.304271	0.0000028	
Line16		262	10500.0	0.0	1	75	0.107004	0.304271	0.0000028	
Line17		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line18		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line19		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line26		262	1609.3	0.0	1	75	0.106978	0.242657	0.0000032	
Line27		262	15000.0	0.0	1	75	0.106981	0.314194	0.0000028	
Line28		262	15000.0	0.0	1	75	0.106981	0.304206	0.0000028	
Line29		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line30		262	1609.3	0.0	1	75	0.106978	0.242657	0.0000032	
Line31		262	1609.3	0.0	1	75	0.106978	0.242657	0.0000032	
Line32		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line33		262	13000.0	0.0	1	75	0.106981	0.314194	0.0000028	
Line34		262	13000.0	0.0	1	75	0.106981	0.314194	0.0000028	
Line35		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line36		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line37		262	1609.3	0.0	1	75	0.106978	0.256651	0.0000032	
Line44		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030	
Line45		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030	

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 6
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Ohms or Siemens/1000 m per Conductor (Cable) or per Phase (Line)									
Line/Cable	Library	Size	Length		#/Phase	T (°C)	R	X	Y
ID			Adj. (m)	% Tol.					
Line46		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line47		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line48		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line49		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line56		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line57		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line58		120	1609.3	0.0	1	75	0.102979	0.348257	0.0000030
Line59		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line60		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line61		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line62		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line63		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line64		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line65		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line66		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line67		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line74		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line75		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line76		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line91		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line92		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line94		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line95		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line96		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line98		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line99		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line100		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030
Line101		120	1609.3	0.0	1	75	0.102979	0.288653	0.0000030

Line / Cable resistances are listed at the specified temperatures.

2-Winding Transformer Input Data

Transformer		Rating					Z Variation			% Tap Setting		Adjusted	Phase Shift	
ID	Phase	MVA	Prim. kV	Sec. kV	% Z1	X1/R1	+ 5%	- 5%	% Tol.	Prim.	Sec.	% Z	Type	Angle
T 1	3-Phase	75.000	161.000	33.000	3.00	20.00	0	0	0	0	0	3.0000	Dyn	0.000
T 2	3-Phase	75.000	161.000	33.000	3.00	20.00	0	0	0	0	0	3.0000	Dyn	0.000
T 3	3-Phase	200.000	161.000	33.000	1.50	20.00	0	0	0	0	0	1.5000	Dyn	0.000
T 4	3-Phase	200.000	161.000	33.000	1.50	20.00	0	0	0	0	0	1.5000	Dyn	0.000
T 5	3-Phase	200.000	161.000	33.000	1.50	20.00	0	0	0	0	0	1.5000	Dyn	0.000
T 6	3-Phase	150.000	161.000	33.000	2.00	20.00	0	0	0	0	0	2.0000	Dyn	0.000
T 7	3-Phase	50.000	161.000	33.000	3.50	20.00	0	0	0	0	0	3.5000	Dyn	0.000
T 8	3-Phase	25.000	161.000	33.000	4.00	20.00	0	0	0	0	0	4.0000	Dyn	0.000

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 8
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
T 1	2W XFMR	Bus 2	Bus5	0.20	4.00	4.00	
T 2	2W XFMR	Bus 3	Bus4	0.20	4.00	4.00	
T 3	2W XFMR	Bus17	Bus19	0.04	0.75	0.75	
T 4	2W XFMR	Bus18	Bus20	0.04	0.75	0.75	
T 5	2W XFMR	Bus 33	Bus 36	0.04	0.75	0.75	
T 6	2W XFMR	Bus 34	Bus 35	0.07	1.33	1.33	
T 7	2W XFMR	Bus 50	Bus 52	0.35	6.99	7.00	
T 8	2W XFMR	Bus 51	Bus 53	0.80	15.98	16.00	
Cable1	Cable	Bus 2	Bus 3	0.01	0.04	0.04	
Cable3	Cable	Bus 2	Bus 3	0.01	0.04	0.04	
Cable7	Cable	Bus17	Bus18	0.03	0.05	0.06	
Cable8	Cable	Bus17	Bus18	0.03	0.05	0.06	
Cable11	Cable	Bus 33	Bus 34	0.03	0.05	0.06	
Cable12	Cable	Bus 33	Bus 34	0.03	0.05	0.06	
Cable13	Cable	Bus 50	Bus 51	0.03	0.05	0.06	
Cable14	Cable	Bus 50	Bus 51	0.03	0.05	0.06	
Line1	Line	Bus 2	Bus 1	0.08	0.24	0.26	0.1426855
Line3	Line	Bus 2	Bus 1	0.04	0.12	0.13	0.0713428
Line4	Line	Bus4	Bus8	1.58	3.79	4.11	0.0056364
Line5	Line	Bus5	Bus8	1.58	3.79	4.11	0.0056364
Line6	Line	Bus7	Bus8	1.58	3.79	4.11	0.0056364
Line7	Line	Bus6	Bus8	1.58	3.79	4.11	0.0056364
Line14	Line	Bus22	Bus 23	1.58	3.50	3.84	0.0056364
Line15	Line	Bus17	Bus 3	0.43	1.23	1.31	0.7492593
Line16	Line	Bus17	Bus 3	0.43	1.23	1.31	0.7492593
Line17	Line	Bus19	Bus 23	1.58	3.79	4.11	0.0056364
Line18	Line	Bus20	Bus 23	1.58	3.79	4.11	0.0056364
Line19	Line	Bus21	Bus 23	1.58	3.79	4.11	0.0056364
Line26	Line	Bus 37	Bus 39	1.58	3.59	3.92	0.0056364
Line27	Line	Bus 33	Bus18	0.62	1.82	1.92	1.0704490
Line28	Line	Bus 33	Bus18	0.62	1.76	1.87	1.0704490
Line29	Line	Bus 36	Bus 39	1.58	3.79	4.11	0.0056364
Line30	Line	Bus 35	Bus 39	1.58	3.59	3.92	0.0056364
Line31	Line	Bus 38	Bus 39	1.58	3.59	3.92	0.0056364
Line32	Line	Bus 54	Bus56	1.58	3.79	4.11	0.0056364
Line33	Line	Bus 50	Bus 34	0.54	1.58	1.66	0.9277222
Line34	Line	Bus 50	Bus 34	0.54	1.58	1.66	0.9277222

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 9
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
Line35	Line	Bus 52	Bus56	1.58	3.79	4.11	0.0056364
Line36	Line	Bus 53	Bus56	1.58	3.79	4.11	0.0056364
Line37	Line	Bus 55	Bus56	1.58	3.79	4.11	0.0056364
Line44	Line	Bus8	Bus 10	1.52	4.27	4.53	0.0052615
Line45	Line	Bus8	Bus 11	1.52	4.27	4.53	0.0052615
Line46	Line	Bus8	Bus 12	1.52	4.27	4.53	0.0052615
Line47	Line	Bus8	Bus 13	1.52	4.27	4.53	0.0052615
Line48	Line	Bus8	Bus 14	1.52	4.27	4.53	0.0052615
Line49	Line	Bus8	Bus 15	1.52	4.27	4.53	0.0052615
Line56	Line	Bus 23	Bus 30	1.52	4.27	4.53	0.0052615
Line57	Line	Bus 23	Bus 29	1.52	4.27	4.53	0.0052615
Line58	Line	Bus 23	Bus 28	1.52	5.15	5.37	0.0052615
Line59	Line	Bus 23	Bus 27	1.52	4.27	4.53	0.0052615
Line60	Line	Bus 23	Bus 26	1.52	4.27	4.53	0.0052615
Line61	Line	Bus 23	Bus 25	1.52	4.27	4.53	0.0052615
Line62	Line	Bus 39	Bus 47	1.52	4.27	4.53	0.0052615
Line63	Line	Bus 39	Bus 46	1.52	4.27	4.53	0.0052615
Line64	Line	Bus 39	Bus 45	1.52	4.27	4.53	0.0052615
Line65	Line	Bus 39	Bus 44	1.52	4.27	4.53	0.0052615
Line66	Line	Bus 39	Bus 43	1.52	4.27	4.53	0.0052615
Line67	Line	Bus 39	Bus 42	1.52	4.27	4.53	0.0052615
Line74	Line	Bus56	Bus 57	1.52	4.27	4.53	0.0052615
Line75	Line	Bus56	Bus 58	1.52	4.27	4.53	0.0052615
Line76	Line	Bus56	Bus 59	1.52	4.27	4.53	0.0052615
Line91	Line	Bus8	Bus 9	1.52	4.27	4.53	0.0052615
Line92	Line	Bus8	Bus 16	1.52	4.27	4.53	0.0052615
Line94	Line	Bus 23	Bus 24	1.52	4.27	4.53	0.0052615
Line95	Line	Bus 23	Bus 31	1.52	4.27	4.53	0.0052615
Line96	Line	Bus 23	Bus 32	1.52	4.27	4.53	0.0052615
Line98	Line	Bus 39	Bus 41	1.52	4.27	4.53	0.0052615
Line99	Line	Bus 39	Bus 48	1.52	4.27	4.53	0.0052615
Line100	Line	Bus 39	Bus 49	1.52	4.27	4.53	0.0052615
Line101	Line	Bus 39	Bus 40	1.52	4.27	4.53	0.0052615
CB7	Tie Breakr	Bus4	Bus5				
CB8	Tie Breakr	Bus6	Bus4				
CB10	Tie Breakr	Bus5	Bus7				
CB11	Tie Breakr	Bus6	Bus7				
CB29	Tie Breakr	Bus21	Bus22				
CB30	Tie Breakr	Bus19	Bus22				

Project:

Location:

Contract:

Engineer:

Filename: ali

ETAP

12.6.0H

Study Case: LF

Page: 10

Date: 04-02-2017

SN:

Revision: Base

Config.: Normal

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA Base			
ID	Type	From Bus	To Bus	R	X	Z	Y
CB39	Tie Breakr	Bus20	Bus19				
CB40	Tie Breakr	Bus21	Bus20				
CB53	Tie Breakr	Bus 38	Bus 37				
CB54	Tie Breakr	Bus 36	Bus 37				
CB63	Tie Breakr	Bus 35	Bus 36				
CB64	Tie Breakr	Bus 38	Bus 35				
CB65	Tie Breakr	Bus 55	Bus 54				
CB66	Tie Breakr	Bus 52	Bus 54				
CB75	Tie Breakr	Bus 53	Bus 52				
CB76	Tie Breakr	Bus 55	Bus 53				

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 11
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

LOAD FLOW REPORT

Bus		Voltage		Generation		Load		Load Flow					XFMR	
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap	
* Bus 1	161.000	100.000	0.0	814.461	444.508	0	0	Bus 2	271.487	148.134	1109.1	87.8		
								Bus 2	542.974	296.375	2218.3	87.8		
Bus 2	161.000	99.426	-0.3	0	0	0	0	Bus 3	373.553	202.680	1532.8	87.9		
								Bus 3	373.553	202.680	1532.8	87.9		
								Bus 1	-270.727	-145.956	1109.3	88.0		
								Bus 1	-541.454	-291.807	2218.4	88.0		
								Bus5	65.075	32.404	262.2	89.5		
Bus 3	161.000	99.292	-0.4	0	0	0	0	Bus 2	-373.315	-201.916	1532.8	88.0		
								Bus 2	-373.315	-201.916	1532.8	88.0		
								Bus17	342.501	187.358	1410.0	87.7		
								Bus17	342.501	187.358	1410.0	87.7		
								Bus4	61.627	29.116	246.2	90.4		
Bus4	33.000	98.027	-1.8	0	0	0	0	Bus8	31.625	14.376	620.0	91.0		
								Bus 3	-61.533	-27.234	1201.0	91.4		
								Bus5	14.954	6.429	290.5	91.9		
								Bus6	14.954	6.429	290.5	91.9		
Bus5	33.000	98.027	-1.8	0	0	0	0	Bus8	31.625	14.376	620.0	91.0		
								Bus 2	-64.968	-30.269	1279.2	90.6		
								Bus4	-14.954	-6.429	290.5	91.9		
								Bus7	48.297	22.322	949.6	90.8		
Bus6	33.000	98.027	-1.8	0	0	0	0	Bus8	31.625	14.376	620.0	91.0		
								Bus4	-14.954	-6.429	290.5	91.9		
								Bus7	-16.671	-7.947	329.6	90.3		
Bus7	33.000	98.027	-1.8	0	0	0	0	Bus8	31.625	14.376	620.0	91.0		
								Bus5	-48.297	-22.322	949.6	90.8		
								Bus6	16.671	7.947	329.6	90.3		
Bus8	33.000	96.966	-2.4	0	0	0	0	Bus4	-31.427	-13.905	620.1	91.4		
								Bus5	-31.427	-13.905	620.1	91.4		
								Bus7	-31.427	-13.905	620.1	91.4		
								Bus6	-31.427	-13.905	620.1	91.4		
								Bus 10	15.542	6.581	304.5	92.1		
								Bus 11	15.599	6.606	305.7	92.1		
								Bus 12	16.295	6.906	319.3	92.1		
								Bus 13	15.599	6.606	305.7	92.1		
								Bus 14	15.839	7.310	314.8	90.8		
								Bus 15	15.381	7.095	305.6	90.8		

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 12
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus		Voltage		Generation		Load		Load Flow				XFMR	
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
								Bus 9	15.381	7.095	305.6	90.8	
								Bus 16	16.070	7.419	319.4	90.8	
Bus 9	33.000	96.414	-2.7	0	0	15.334	6.970	Bus8	-15.334	-6.970	305.7	91.0	
Bus 10	33.000	96.434	-2.7	0	0	15.496	6.457	Bus8	-15.496	-6.457	304.6	92.3	
Bus 11	33.000	96.432	-2.7	0	0	15.553	6.480	Bus8	-15.553	-6.480	305.7	92.3	
Bus 12	33.000	96.408	-2.7	0	0	16.244	6.769	Bus8	-16.244	-6.769	319.4	92.3	
Bus 13	33.000	96.432	-2.7	0	0	15.553	6.480	Bus8	-15.553	-6.480	305.7	92.3	
Bus 14	33.000	96.397	-2.7	0	0	15.790	7.177	Bus8	-15.790	-7.177	314.8	91.0	
Bus 15	33.000	96.414	-2.7	0	0	15.334	6.970	Bus8	-15.334	-6.970	305.7	91.0	
Bus 16	33.000	96.389	-2.7	0	0	16.020	7.282	Bus8	-16.020	-7.282	319.4	91.0	
Bus17	161.000	95.529	-2.4	0	0	0	0	Bus18	250.743	125.266	1052.2	89.5	
								Bus18	250.743	125.266	1052.2	89.5	
								Bus 3	-335.794	-168.998	1411.2	89.3	
								Bus 3	-335.794	-168.998	1411.2	89.3	
								Bus19	170.103	87.465	718.0	88.9	
Bus18	161.000	95.397	-2.5	0	0	0	0	Bus17	-250.525	-124.841	1052.2	89.5	
								Bus17	-250.525	-124.841	1052.2	89.5	
								Bus 33	169.159	88.844	718.2	88.5	
								Bus 33	175.020	89.716	739.3	89.0	
								Bus20	156.870	71.122	647.5	91.1	
Bus19	33.000	94.785	-3.2	0	0	0	0	Bus 23	79.970	38.248	1636.2	90.2	
								Bus17	-169.953	-84.462	3503.0	89.6	
								Bus22	44.991	23.107	933.6	89.0	
								Bus20	44.991	23.107	933.6	89.0	
								Bus 23	79.970	38.248	1636.2	90.2	
Bus20	33.000	94.785	-3.2	0	0	0	0	Bus18	-156.748	-68.680	3158.8	91.6	
								Bus19	-44.991	-23.107	933.6	89.0	
								Bus21	121.770	53.538	2455.3	91.5	
Bus21	33.000	94.785	-3.2	0	0	0	0	Bus 23	79.970	38.248	1636.2	90.2	
								Bus22	41.800	15.289	821.5	93.9	
								Bus20	-121.770	-53.538	2455.3	91.5	
Bus22	33.000	94.785	-3.2	0	0	0	0	Bus 23	86.791	38.396	1751.8	91.5	
								Bus21	-41.800	-15.289	821.5	93.9	
								Bus19	-44.991	-23.107	933.6	89.0	
Bus 23	33.000	91.956	-4.8	0	0	0	0	Bus22	-85.206	-34.895	1751.8	92.5	
								Bus19	-78.587	-34.936	1636.3	91.4	
								Bus20	-78.587	-34.936	1636.3	91.4	
								Bus21	-78.587	-34.936	1636.3	91.4	
								Bus 30	33.844	14.682	701.9	91.7	

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 13
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus		Voltage		Generation		Load		Load Flow					XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
Bus 24	33.000	90.725	-5.7	0	0	33.600	13.998	Bus 29	38.042	16.586	789.6	91.7	
								Bus 28	33.764	14.789	701.3	91.6	
								Bus 27	38.042	16.586	789.6	91.7	
								Bus 26	33.501	14.527	694.7	91.7	
								Bus 25	38.043	16.584	789.6	91.7	
								Bus 24	33.845	14.680	701.9	91.7	
								Bus 31	38.042	16.586	789.6	91.7	
								Bus 32	33.844	14.682	701.9	91.7	
Bus 24	33.000	90.725	-5.7	0	0	33.600	13.998	Bus 23	-33.600	-13.998	701.9	92.3	
Bus 25	33.000	90.570	-5.8	0	0	37.733	15.719	Bus 23	-37.733	-15.719	789.6	92.3	
Bus 26	33.000	90.737	-5.7	0	0	33.261	13.859	Bus 23	-33.261	-13.859	694.8	92.3	
Bus 27	33.000	90.569	-5.8	0	0	37.732	15.722	Bus 23	-37.732	-15.722	789.6	92.3	
Bus 28	33.000	90.585	-5.9	0	0	33.520	13.967	Bus 23	-33.520	-13.967	701.4	92.3	
Bus 29	33.000	90.569	-5.8	0	0	37.732	15.722	Bus 23	-37.732	-15.722	789.6	92.3	
Bus 30	33.000	90.725	-5.7	0	0	33.599	14.000	Bus 23	-33.599	-14.000	701.9	92.3	
Bus 31	33.000	90.569	-5.8	0	0	37.732	15.722	Bus 23	-37.732	-15.722	789.6	92.3	
Bus 32	33.000	90.725	-5.7	0	0	33.599	14.000	Bus 23	-33.599	-14.000	701.9	92.3	
Bus 33	161.000	92.635	-4.1	0	0	0	0	Bus 34	78.052	38.291	336.6	89.8	
Bus 34	161.000	92.593	-4.2	0	0	0	0	Bus 34	78.052	38.291	336.6	89.8	
								Bus18	-166.670	-82.480	719.9	89.6	
								Bus18	-172.383	-83.164	740.9	90.1	
								Bus 36	182.948	89.062	787.7	89.9	
								Bus 33	-78.030	-38.247	336.6	89.8	
								Bus 33	-78.030	-38.247	336.6	89.8	
								Bus 50	27.742	14.621	121.5	88.5	
								Bus 50	27.742	14.621	121.5	88.5	
Bus 35	33.000	91.852	-5.0	0	0	0	0	Bus 35	100.575	47.252	430.4	90.5	
								Bus 39	71.804	32.728	1503.1	91.0	
								Bus 34	-100.479	-45.334	2099.7	91.2	
								Bus 36	14.338	6.303	298.3	91.5	
								Bus 38	14.338	6.303	298.3	91.5	
								Bus 39	67.835	32.598	1433.5	90.1	
								Bus 33	-182.768	-85.448	3842.9	90.6	
								Bus 37	129.270	59.153	2707.8	90.9	
Bus 36	33.000	91.852	-5.0	0	0	0	0	Bus 35	-14.338	-6.303	298.3	91.5	
								Bus 39	71.804	32.728	1503.1	91.0	
								Bus 38	57.466	26.425	1204.8	90.9	
								Bus 36	-129.270	-59.153	2707.8	90.9	
								Bus 39	71.804	32.728	1503.1	91.0	
Bus 37	33.000	91.852	-5.0	0	0	0	0	Bus 39	71.804	32.728	1503.1	91.0	
Bus 38	33.000	91.852	-5.0	0	0	0	0	Bus 38	57.466	26.425	1204.8	90.9	
								Bus 36	-129.270	-59.153	2707.8	90.9	
Bus 38	33.000	91.852	-5.0	0	0	0	0	Bus 39	71.804	32.728	1503.1	91.0	

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 14
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus		Voltage		Generation		Load		Load Flow						XFMR
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap	
Bus 39	33.000	89.366	-6.5	0	0	0	0	Bus 37	-57.466	-26.425	1204.8	90.9		
								Bus 35	-14.338	-6.303	298.3	91.5		
								Bus 37	-70.637	-30.086	1503.1	92.0		
								Bus 36	-66.773	-30.056	1433.6	91.2		
								Bus 35	-70.637	-30.086	1503.1	92.0		
								Bus 38	-70.637	-30.086	1503.1	92.0		
								Bus 47	30.007	13.178	641.6	91.6		
								Bus 46	25.880	11.307	552.9	91.6		
								Bus 45	30.175	12.780	641.5	92.1		
								Bus 44	26.030	10.965	553.0	92.2		
								Bus 43	30.175	12.780	641.5	92.1		
								Bus 42	26.030	10.965	553.0	92.2		
								Bus 41	30.007	13.178	641.6	91.6		
								Bus 48	25.880	11.307	552.9	91.6		
Bus 49	28.619	12.547	611.8	91.6										
Bus 40	25.880	11.307	552.9	91.6										
Bus 40	33.000	88.392	-7.2	0	0	25.728	10.885	Bus 39	-25.728	-10.885	552.9	92.1		
Bus 41	33.000	88.235	-7.3	0	0	29.803	12.609	Bus 39	-29.803	-12.609	641.7	92.1		
Bus 42	33.000	88.406	-7.2	0	0	25.878	10.543	Bus 39	-25.878	-10.543	553.0	92.6		
Bus 43	33.000	88.251	-7.3	0	0	29.970	12.210	Bus 39	-29.970	-12.210	641.6	92.6		
Bus 44	33.000	88.406	-7.2	0	0	25.878	10.543	Bus 39	-25.878	-10.543	553.0	92.6		
Bus 45	33.000	88.251	-7.3	0	0	29.970	12.210	Bus 39	-29.970	-12.210	641.6	92.6		
Bus 46	33.000	88.392	-7.2	0	0	25.728	10.885	Bus 39	-25.728	-10.885	552.9	92.1		
Bus 47	33.000	88.235	-7.3	0	0	29.803	12.609	Bus 39	-29.803	-12.609	641.7	92.1		
Bus 48	33.000	88.392	-7.2	0	0	25.728	10.885	Bus 39	-25.728	-10.885	552.9	92.1		
Bus 49	33.000	88.288	-7.2	0	0	28.433	12.029	Bus 39	-28.433	-12.029	611.8	92.1		
Bus 50	161.000	92.178	-4.4	0	0	0	0	Bus 51	8.417	4.626	37.4	87.6		
Bus 51	161.000	92.173	-4.4	0	0	0	0	Bus 51	8.417	4.626	37.4	87.6		
								Bus 34	-27.680	-15.230	122.9	87.6		
								Bus 34	-27.680	-15.230	122.9	87.6		
								Bus 52	38.525	21.208	171.1	87.6		
								Bus 50	-8.417	-4.625	37.4	87.6		
								Bus 50	-8.417	-4.625	37.4	87.6		
Bus 52	33.000	90.468	-6.2	0	0	0	0	Bus56	13.811	7.043	299.8	89.1		
Bus 52	33.000	90.468	-6.2	0	0	0	0	Bus 50	-38.445	-19.617	834.7	89.1		
								Bus 54	12.317	6.287	267.4	89.1		
								Bus 53	12.317	6.287	267.4	89.1		
								Bus56	13.811	7.043	299.8	89.1		
Bus 53	33.000	90.468	-6.2	0	0	0	0	Bus56	13.811	7.043	299.8	89.1		

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 15
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus		Voltage		Generation		Load		Load Flow				XFMR	
ID	kV	% Mag.	Ang.	MW	Mvar	MW	Mvar	ID	MW	Mvar	Amp	%PF	%Tap
Bus 54	33.000	90.468	-6.2	0	0	0	0	Bus 51	-16.799	-8.557	364.6	89.1	
								Bus 52	-12.317	-6.287	267.4	89.1	
								Bus 55	15.305	7.800	332.2	89.1	
								Bus56	13.811	7.043	299.8	89.1	
								Bus 55	-1.494	-0.757	32.4	89.2	
Bus 55	33.000	90.468	-6.2	0	0	0	0	Bus 52	-12.317	-6.287	267.4	89.1	
								Bus56	13.811	7.043	299.8	89.1	
								Bus 54	1.494	0.757	32.4	89.2	
Bus56	33.000	89.932	-6.5	0	0	0	0	Bus 53	-15.305	-7.800	332.2	89.1	
								Bus 54	-13.765	-6.937	299.9	89.3	
								Bus 52	-13.765	-6.937	299.9	89.3	
								Bus 53	-13.765	-6.937	299.9	89.3	
								Bus 55	-13.765	-6.937	299.9	89.3	
								Bus 57	17.044	8.408	369.7	89.7	
								Bus 58	18.699	9.242	405.8	89.6	
Bus 57	33.000	89.247	-6.9	0	0	16.976	8.222	Bus 59	19.317	10.097	424.0	88.6	
								Bus56	-16.976	-8.222	369.8	90.0	
								Bus56	-18.617	-9.017	405.8	90.0	
Bus 58	33.000	89.180	-7.0	0	0	18.617	9.017	Bus56	-18.617	-9.017	405.8	90.0	
Bus 59	33.000	89.129	-7.0	0	0	19.227	9.850	Bus56	-19.227	-9.850	424.1	89.0	

* 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

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 16
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus Loading Summary Report

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic		MVA	% PF	Amp	Percent Loading
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar				
Bus 1	161.000		0	0	0	0	0	0	0	0	927.866	87.8	3327.4	
Bus 2	161.000		0	0	0	0	0	0	0	0	922.645	88.0	3327.7	
Bus 3	161.000		0	0	0	0	0	0	0	0	848.844	88.0	3065.7	
Bus4	33.000		0	0	0	0	0	0	0	0	67.291	91.4	1201.0	
Bus5	33.000		0	0	0	0	0	0	0	0	87.945	90.9	1569.6	
Bus6	33.000		0	0	0	0	0	0	0	0	34.739	91.0	620.0	
Bus7	33.000		0	0	0	0	0	0	0	0	53.206	90.8	949.6	
Bus8	33.000		0	0	0	0	0	0	0	0	137.461	91.4	2480.2	
Bus 9	33.000		3.250	1.477	12.084	5.493	0	0	0	0	16.844	91.0	305.7	
Bus 10	33.000		2.472	1.030	13.024	5.427	0	0	0	0	16.787	92.3	304.6	
Bus 11	33.000		3.295	1.373	12.258	5.107	0	0	0	0	16.849	92.3	305.7	
Bus 12	33.000		13.182	5.492	3.063	1.276	0	0	0	0	17.598	92.3	319.4	
Bus 13	33.000		3.295	1.373	12.258	5.107	0	0	0	0	16.849	92.3	305.7	
Bus 14	33.000		9.750	4.432	6.040	2.745	0	0	0	0	17.345	91.0	314.8	
Bus 15	33.000		3.250	1.477	12.084	5.493	0	0	0	0	16.844	91.0	305.7	
Bus 16	33.000		13.000	5.909	3.020	1.373	0	0	0	0	17.597	91.0	319.4	
Bus17	161.000		0	0	0	0	0	0	0	0	751.846	89.3	2822.3	
Bus18	161.000		0	0	0	0	0	0	0	0	559.814	89.5	2104.4	
Bus19	33.000		0	0	0	0	0	0	0	0	189.783	89.6	3503.0	
Bus20	33.000		0	0	0	0	0	0	0	0	221.638	91.0	4091.0	
Bus21	33.000		0	0	0	0	0	0	0	0	133.019	91.5	2455.3	
Bus22	33.000		0	0	0	0	0	0	0	0	94.905	91.5	1751.8	
Bus 23	33.000		0	0	0	0	0	0	0	0	350.052	91.7	6660.0	
Bus 24	33.000		7.828	3.261	25.772	10.737	0	0	0	0	36.399	92.3	701.9	
Bus 25	33.000		31.312	13.044	6.421	2.675	0	0	0	0	40.876	92.3	789.6	
Bus 26	33.000		5.871	2.446	27.390	11.413	0	0	0	0	36.033	92.3	694.8	
Bus 27	33.000		31.311	13.046	6.421	2.675	0	0	0	0	40.876	92.3	789.6	
Bus 28	33.000		7.828	3.262	25.692	10.705	0	0	0	0	36.313	92.3	701.4	
Bus 29	33.000		31.311	13.046	6.421	2.675	0	0	0	0	40.876	92.3	789.6	
Bus 30	33.000		7.828	3.262	25.772	10.738	0	0	0	0	36.399	92.3	701.9	
Bus 31	33.000		31.311	13.046	6.421	2.675	0	0	0	0	40.876	92.3	789.6	
Bus 32	33.000		7.828	3.262	25.772	10.738	0	0	0	0	36.399	92.3	701.9	
Bus 33	161.000		0	0	0	0	0	0	0	0	377.352	89.9	1460.8	
Bus 34	161.000		0	0	0	0	0	0	0	0	173.799	89.8	673.1	
Bus 35	33.000		0	0	0	0	0	0	0	0	110.233	91.2	2099.7	
Bus 36	33.000		0	0	0	0	0	0	0	0	217.414	90.7	4141.2	

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 17
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Bus			Directly Connected Load								Total Bus Load			
			Constant kVA		Constant Z		Constant I		Generic		MVA	% PF	Amp	Percent Loading
ID	kV	Rated Amp	MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar				
Bus 37	33.000		0	0	0	0	0	0	0	0	142.162	90.9	2707.8	
Bus 38	33.000		0	0	0	0	0	0	0	0	78.911	91.0	1503.1	
Bus 39	33.000		0	0	0	0	0	0	0	0	303.547	91.8	5942.6	
Bus 40	33.000		6.237	2.639	19.492	8.246	0	0	0	0	27.936	92.1	552.9	
Bus 41	33.000		24.947	10.555	4.856	2.054	0	0	0	0	32.360	92.1	641.7	
Bus 42	33.000		6.271	2.555	19.606	7.988	0	0	0	0	27.943	92.6	553.0	
Bus 43	33.000		25.086	10.220	4.884	1.990	0	0	0	0	32.362	92.6	641.6	
Bus 44	33.000		6.271	2.555	19.606	7.988	0	0	0	0	27.943	92.6	553.0	
Bus 45	33.000		25.086	10.220	4.884	1.990	0	0	0	0	32.362	92.6	641.6	
Bus 46	33.000		6.237	2.639	19.492	8.246	0	0	0	0	27.936	92.1	552.9	
Bus 47	33.000		24.947	10.555	4.856	2.054	0	0	0	0	32.360	92.1	641.7	
Bus 48	33.000		6.237	2.639	19.492	8.246	0	0	0	0	27.936	92.1	552.9	
Bus 49	33.000		18.710	7.916	9.723	4.113	0	0	0	0	30.873	92.1	611.8	
Bus 50	161.000		0	0	0	0	0	0	0	0	63.186	87.6	245.8	
Bus 51	161.000		0	0	0	0	0	0	0	0	19.209	87.6	74.7	
Bus 52	33.000		0	0	0	0	0	0	0	0	43.161	89.1	834.7	
Bus 53	33.000		0	0	0	0	0	0	0	0	32.682	89.1	632.0	
Bus 54	33.000		0	0	0	0	0	0	0	0	15.504	89.1	299.8	
Bus 55	33.000		0	0	0	0	0	0	0	0	17.178	89.1	332.2	
Bus56	33.000		0	0	0	0	0	0	0	0	61.655	89.3	1199.5	
Bus 57	33.000		4.055	1.964	12.921	6.258	0	0	0	0	18.862	90.0	369.8	
Bus 58	33.000		12.166	5.892	6.451	3.124	0	0	0	0	20.685	90.0	405.8	
Bus 59	33.000		16.041	8.218	3.186	1.632	0	0	0	0	21.604	89.0	424.1	

* Indicates operating load of a bus exceeds the bus critical limit (100.0% of the Continuous Ampere rating).

Indicates operating load of a bus exceeds the bus marginal limit (95.0% of the Continuous Ampere rating).

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 18
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Branch Loading Summary Report

CKT / Branch		Cable & Reactor			Transformer				
ID	Type	Ampacity (Amp)	Loading Amp	%	Capability (MVA)	Loading (input)		Loading (output)	
						MVA	%	MVA	%
* Cable1	Cable	935.49	1532.84	163.85					
* Cable3	Cable	935.49	1532.84	163.85					
* Cable7	Cable	626.50	1052.18	167.95					
* Cable8	Cable	626.50	1052.18	167.95					
Cable11	Cable	626.50	336.55	53.72					
Cable12	Cable	626.50	336.55	53.72					
Cable13	Cable	626.50	37.37	5.96					
Cable14	Cable	626.50	37.37	5.96					
T 1	Transformer				75.000	72.696	96.9	71.673	95.6
T 2	Transformer				75.000	68.159	90.9	67.291	89.7
T 3	Transformer				200.000	191.272	95.6	189.783	94.9
T 4	Transformer				200.000	172.240	86.1	171.134	85.6
* T 5	Transformer				200.000	203.475	101.7	201.755	100.9
T 6	Transformer				150.000	111.122	74.1	110.233	73.5
T 7	Transformer				50.000	43.977	88.0	43.161	86.3
T 8	Transformer				25.000	19.209	76.8	18.853	75.4

* Indicates a branch with operating load exceeding the branch capability.

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 19
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Branch Losses Summary Report

CKT / Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop in Vmag
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Line1	271.487	148.134	-270.727	-145.956	760.2	2177.4	100.0	99.4	0.57
Line3	542.974	296.375	-541.454	-291.807	1520.4	4567.6	100.0	99.4	0.57
Cable1	373.553	202.680	-373.315	-201.916	238.2	763.2	99.4	99.3	0.13
Cable3	373.553	202.680	-373.315	-201.916	238.2	763.2	99.4	99.3	0.13
T 1	65.075	32.404	-64.968	-30.269	106.8	2135.7	99.4	98.0	1.40
Line15	342.501	187.358	-335.794	-168.998	6706.8	18359.8	99.3	95.5	3.76
Line16	342.501	187.358	-335.794	-168.998	6706.8	18359.8	99.3	95.5	3.76
T 2	61.627	29.116	-61.533	-27.234	94.1	1882.5	99.3	98.0	1.27
Line4	31.625	14.376	-31.427	-13.905	198.6	471.0	98.0	97.0	1.06
Line5	31.625	14.376	-31.427	-13.905	198.6	471.0	98.0	97.0	1.06
Line7	31.625	14.376	-31.427	-13.905	198.6	471.0	98.0	97.0	1.06
Line6	31.625	14.376	-31.427	-13.905	198.6	471.0	98.0	97.0	1.06
Line44	15.542	6.581	-15.496	-6.457	46.1	124.3	97.0	96.4	0.53
Line45	15.599	6.606	-15.553	-6.480	46.5	125.3	97.0	96.4	0.53
Line46	16.295	6.906	-16.244	-6.769	50.7	137.2	97.0	96.4	0.56
Line47	15.599	6.606	-15.553	-6.480	46.5	125.3	97.0	96.4	0.53
Line48	15.839	7.310	-15.790	-7.177	49.3	133.2	97.0	96.4	0.57
Line49	15.381	7.095	-15.334	-6.970	46.4	125.3	97.0	96.4	0.55
Line91	15.381	7.095	-15.334	-6.970	46.4	125.3	97.0	96.4	0.55
Line92	16.070	7.419	-16.020	-7.282	50.7	137.2	97.0	96.4	0.58
Cable7	250.743	125.266	-250.525	-124.841	218.2	425.0	95.5	95.4	0.13
Cable8	250.743	125.266	-250.525	-124.841	218.2	425.0	95.5	95.4	0.13
T 3	170.103	87.465	-169.953	-84.462	150.1	3003.0	95.5	94.8	0.74
Line27	169.159	88.844	-166.670	-82.480	2489.4	6364.8	95.4	92.6	2.76
Line28	175.020	89.716	-172.383	-83.164	2637.3	6552.8	95.4	92.6	2.76
T 4	156.870	71.122	-156.748	-68.680	122.1	2441.8	95.4	94.8	0.61
Line17	79.970	38.248	-78.587	-34.936	1382.8	3312.6	94.8	92.0	2.83
Line18	79.970	38.248	-78.587	-34.936	1382.8	3312.6	94.8	92.0	2.83
Line19	79.970	38.248	-78.587	-34.936	1382.8	3312.6	94.8	92.0	2.83
Line14	86.791	38.396	-85.206	-34.895	1585.0	3501.4	94.8	92.0	2.83
Line56	33.844	14.682	-33.599	-14.000	245.0	682.2	92.0	90.7	1.23
Line57	38.042	16.586	-37.732	-15.722	310.0	864.5	92.0	90.6	1.39
Line58	33.764	14.789	-33.520	-13.967	244.6	822.7	92.0	90.6	1.37
Line59	38.042	16.586	-37.732	-15.722	310.0	864.5	92.0	90.6	1.39
Line60	33.501	14.527	-33.261	-13.859	240.0	668.3	92.0	90.7	1.22

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 20
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

CKT / Branch ID	From-To Bus Flow		To-From Bus Flow		Losses		% Bus Voltage		Vd % Drop in Vmag
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Line61	38.043	16.584	-37.733	-15.719	310.0	864.5	92.0	90.6	1.39
Line94	33.845	14.680	-33.600	-13.998	245.0	682.2	92.0	90.7	1.23
Line95	38.042	16.586	-37.732	-15.722	310.0	864.5	92.0	90.6	1.39
Line96	33.844	14.682	-33.599	-14.000	245.0	682.2	92.0	90.7	1.23
Cable11	78.052	38.291	-78.030	-38.247	22.3	43.5	92.6	92.6	0.04
Cable12	78.052	38.291	-78.030	-38.247	22.3	43.5	92.6	92.6	0.04
T 5	182.948	89.062	-182.768	-85.448	180.7	3614.0	92.6	91.9	0.78
Line33	27.742	14.621	-27.680	-15.230	62.3	-608.9	92.6	92.2	0.42
Line34	27.742	14.621	-27.680	-15.230	62.3	-608.9	92.6	92.2	0.42
T 6	100.575	47.252	-100.479	-45.334	95.9	1918.0	92.6	91.9	0.74
Line30	71.804	32.728	-70.637	-30.086	1166.9	2642.2	91.9	89.4	2.49
Line29	67.835	32.598	-66.773	-30.056	1061.4	2541.8	91.9	89.4	2.49
Line26	71.804	32.728	-70.637	-30.086	1166.9	2642.2	91.9	89.4	2.49
Line31	71.804	32.728	-70.637	-30.086	1166.9	2642.2	91.9	89.4	2.49
Line62	30.007	13.178	-29.803	-12.609	204.7	569.6	89.4	88.2	1.13
Line63	25.880	11.307	-25.728	-10.885	152.0	421.9	89.4	88.4	0.97
Line64	30.175	12.780	-29.970	-12.210	204.6	569.5	89.4	88.3	1.12
Line65	26.030	10.965	-25.878	-10.543	152.0	422.0	89.4	88.4	0.96
Line66	30.175	12.780	-29.970	-12.210	204.6	569.5	89.4	88.3	1.12
Line67	26.030	10.965	-25.878	-10.543	152.0	422.0	89.4	88.4	0.96
Line98	30.007	13.178	-29.803	-12.609	204.7	569.6	89.4	88.2	1.13
Line99	25.880	11.307	-25.728	-10.885	152.0	421.9	89.4	88.4	0.97
Line100	28.619	12.547	-28.433	-12.029	186.1	517.4	89.4	88.3	1.08
Line101	25.880	11.307	-25.728	-10.885	152.0	421.9	89.4	88.4	0.97
Cable13	8.417	4.626	-8.417	-4.625	0.3	0.5	92.2	92.2	0.00
Cable14	8.417	4.626	-8.417	-4.625	0.3	0.5	92.2	92.2	0.00
T 7	38.525	21.208	-38.445	-19.617	79.6	1591.3	92.2	90.5	1.71
T 8	16.834	9.251	-16.799	-8.557	34.7	694.0	92.2	90.5	1.71
Line35	13.811	7.043	-13.765	-6.937	46.4	106.8	90.5	89.9	0.54
Line36	13.811	7.043	-13.765	-6.937	46.4	106.8	90.5	89.9	0.54
Line32	13.811	7.043	-13.765	-6.937	46.4	106.8	90.5	89.9	0.54
Line37	13.811	7.043	-13.765	-6.937	46.4	106.8	90.5	89.9	0.54
Line74	17.044	8.408	-16.976	-8.222	68.0	186.3	89.9	89.2	0.68
Line75	18.699	9.242	-18.617	-9.017	81.9	225.3	89.9	89.2	0.75
Line76	19.317	10.097	-19.227	-9.850	89.4	246.4	89.9	89.1	0.80
					38888.8	114719.8			

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 21
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Alert Summary Report

% Alert Settings

	<u>Critical</u>	<u>Marginal</u>
<u>Loading</u>		
Bus	100.0	95.0
Cable	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0
Inverter/Charger	100.0	95.0
<u>Bus Voltage</u>		
OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0
<u>Generator Excitation</u>		
OverExcited (Q Max.)	100.0	95.0
UnderExcited (Q Min.)	100.0	

Critical Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Bus 23	Bus	Under Voltage	33.00	kV	30.35	92.0	3-Phase
Bus 24	Bus	Under Voltage	33.00	kV	29.94	90.7	3-Phase
Bus 25	Bus	Under Voltage	33.00	kV	29.89	90.6	3-Phase
Bus 26	Bus	Under Voltage	33.00	kV	29.94	90.7	3-Phase
Bus 27	Bus	Under Voltage	33.00	kV	29.89	90.6	3-Phase
Bus 28	Bus	Under Voltage	33.00	kV	29.89	90.6	3-Phase
Bus 29	Bus	Under Voltage	33.00	kV	29.89	90.6	3-Phase
Bus 30	Bus	Under Voltage	33.00	kV	29.94	90.7	3-Phase
Bus 31	Bus	Under Voltage	33.00	kV	29.89	90.6	3-Phase
Bus 32	Bus	Under Voltage	33.00	kV	29.94	90.7	3-Phase
Bus 33	Bus	Under Voltage	161.00	kV	149.14	92.6	3-Phase
Bus 34	Bus	Under Voltage	161.00	kV	149.07	92.6	3-Phase
Bus 35	Bus	Under Voltage	33.00	kV	30.31	91.9	3-Phase
Bus 36	Bus	Under Voltage	33.00	kV	30.31	91.9	3-Phase
Bus 37	Bus	Under Voltage	33.00	kV	30.31	91.9	3-Phase

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 22
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Critical Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Bus 38	Bus	Under Voltage	33.00	kV	30.31	91.9	3-Phase
Bus 39	Bus	Under Voltage	33.00	kV	29.49	89.4	3-Phase
Bus 40	Bus	Under Voltage	33.00	kV	29.17	88.4	3-Phase
Bus 41	Bus	Under Voltage	33.00	kV	29.12	88.2	3-Phase
Bus 42	Bus	Under Voltage	33.00	kV	29.17	88.4	3-Phase
Bus 43	Bus	Under Voltage	33.00	kV	29.12	88.3	3-Phase
Bus 44	Bus	Under Voltage	33.00	kV	29.17	88.4	3-Phase
Bus 45	Bus	Under Voltage	33.00	kV	29.12	88.3	3-Phase
Bus 46	Bus	Under Voltage	33.00	kV	29.17	88.4	3-Phase
Bus 47	Bus	Under Voltage	33.00	kV	29.12	88.2	3-Phase
Bus 48	Bus	Under Voltage	33.00	kV	29.17	88.4	3-Phase
Bus 49	Bus	Under Voltage	33.00	kV	29.13	88.3	3-Phase
Bus 50	Bus	Under Voltage	161.00	kV	148.41	92.2	3-Phase
Bus 51	Bus	Under Voltage	161.00	kV	148.40	92.2	3-Phase
Bus 52	Bus	Under Voltage	33.00	kV	29.85	90.5	3-Phase
Bus 53	Bus	Under Voltage	33.00	kV	29.85	90.5	3-Phase
Bus 54	Bus	Under Voltage	33.00	kV	29.85	90.5	3-Phase
Bus 55	Bus	Under Voltage	33.00	kV	29.85	90.5	3-Phase
Bus 57	Bus	Under Voltage	33.00	kV	29.45	89.2	3-Phase
Bus 58	Bus	Under Voltage	33.00	kV	29.43	89.2	3-Phase
Bus 59	Bus	Under Voltage	33.00	kV	29.41	89.1	3-Phase
Bus19	Bus	Under Voltage	33.00	kV	31.28	94.8	3-Phase
Bus20	Bus	Under Voltage	33.00	kV	31.28	94.8	3-Phase
Bus21	Bus	Under Voltage	33.00	kV	31.28	94.8	3-Phase
Bus22	Bus	Under Voltage	33.00	kV	31.28	94.8	3-Phase
Bus56	Bus	Under Voltage	33.00	kV	29.68	89.9	3-Phase
Cable1	Cable	Overload	935.49	Amp	1,532.84	163.9	3-Phase
Cable3	Cable	Overload	935.49	Amp	1,532.84	163.9	3-Phase
Cable7	Cable	Overload	626.50	Amp	1,052.18	167.9	3-Phase
Cable8	Cable	Overload	626.50	Amp	1,052.18	167.9	3-Phase
T 5	Transformer	Overload	200.00	MVA	201.76	100.9	3-Phase

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Bus 10	Bus	Under Voltage	33.00	kV	31.82	96.4	3-Phase
Bus 11	Bus	Under Voltage	33.00	kV	31.82	96.4	3-Phase

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 23
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Bus 12	Bus	Under Voltage	33.00	kV	31.81	96.4	3-Phase
Bus 13	Bus	Under Voltage	33.00	kV	31.82	96.4	3-Phase
Bus 14	Bus	Under Voltage	33.00	kV	31.81	96.4	3-Phase
Bus 15	Bus	Under Voltage	33.00	kV	31.82	96.4	3-Phase
Bus 16	Bus	Under Voltage	33.00	kV	31.81	96.4	3-Phase
Bus 9	Bus	Under Voltage	33.00	kV	31.82	96.4	3-Phase
Bus17	Bus	Under Voltage	161.00	kV	153.80	95.5	3-Phase
Bus18	Bus	Under Voltage	161.00	kV	153.59	95.4	3-Phase
Bus8	Bus	Under Voltage	33.00	kV	32.00	97.0	3-Phase
T 1	Transformer	Overload	75.00	MVA	71.67	95.6	3-Phase

Project:
Location:
Contract:
Engineer:
Filename: ali

ETAP
12.6.0H

Study Case: LF

Page: 24
Date: 04-02-2017
SN:
Revision: Base
Config.: Normal

SUMMARY OF TOTAL GENERATION , LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Source (Swing Buses):	814.461	444.508	927.866	87.78 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	
Total Demand:	814.461	444.508	927.866	87.78 Lagging
Total Motor Load:	396.213	168.805	430.673	92.00 Lagging
Total Static Load:	379.360	160.984	412.104	92.05 Lagging
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	38.889	114.720		
System Mismatch:	0.000	0.000		

Number of Iterations: 4