

Project: **ETAP**
Location: **16.0.0C**
Contract:
Engineer:
Filename: project

Study Case: LF

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SN: 4359168
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				
A	33.000										81.131	96.3	1423.8	
Al-Birj Bus	33.000		0.901	0.296	3.325	1.093					4.448	95.0	81.0	
Al-Dahiriya Bus	33.000		8.106	2.664	29.563	9.717					39.652	95.0	726.5	
Al-Kom Bus	33.000		0.540	0.178	2.084	0.685					2.763	95.0	49.2	
Al-Majd Bus	33.000		0.450	0.148	1.693	0.557					2.257	95.0	40.7	
B	33.000										80.293	96.0	1430.4	
Beat-Alroush Bus	33.000		0.640	0.210	2.378	0.782					3.177	95.0	57.6	
Beat-Aulla generation Bus	161.000										163.439	95.2	586.1	
Beat-Aulla Substation	33.000										162.171	95.7	2790.1	
Beat-Awwa Bus	33.000		6.125	2.013	23.376	7.683					31.053	95.0	556.2	
Bus1	33.000		7.206	2.368	29.046	9.547					38.160	95.0	665.0	
Bus14	33.000										39.591	98.0	680.9	
Bus15	33.000										39.588	98.0	680.8	
Bus16	33.000										39.591	98.0	680.9	
Bus18	33.000										39.588	98.0	680.8	
Bus23	33.000										39.591	98.0	680.9	
Bus24	33.000										39.588	98.0	680.8	
Bus25	33.000										39.591	98.0	680.9	
Bus26	33.000										39.588	98.0	680.8	
Bus100	0.600										7.818	95.0	7650.4	
Bus101	0.600										0.864	95.0	850.8	
Bus102	0.600										0.611	95.0	602.3	
Bus103	0.600										0.540	95.0	526.1	
Bus104	0.600										0.435	95.0	424.0	
Bus105	0.600										0.435	95.0	422.7	
Bus106	0.600										6.018	95.0	5794.5	
Bus107	0.600										2.135	95.0	2045.6	
Bus108	0.600										11.061	95.0	10547.1	
Bus109	0.600										0.501	95.0	482.0	
Bus110	0.600										7.241	98.0	6832.7	
Bus111	33.000										113.830	95.8	1958.4	
Bus112	33.000										48.344	95.4	831.7	
C	33.000										68.972	96.1	1234.2	
D	33.000										43.816	96.6	787.2	
Dear-Alassal Bus	33.000		0.558	0.184	2.086	0.686					2.784	95.0	50.4	

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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				
Dear-Samet Bus	33.000		2.154	0.708	8.246	2.710					10.947	95.0	195.8	
E	33.000										42.011	96.3	757.9	
F	33.000										40.209	96.0	727.6	
G	33.000										37.983	95.8	688.8	
H	33.000										35.476	95.5	645.3	
Idna Bus	33.000		11.381	3.319	43.942	12.816					57.628	96.0	1026.2	
Sika Bus	33.000		0.450	0.148	1.704	0.560					2.268	95.0	40.8	
Tarqoumia Bus	33.000										112.629	95.7	1962.9	

* 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).

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Branch Loading Summary Report

CKT / Branch		Cable & Reactor			Transformer				
ID	Type	Ampacity (Amp)	Loading Amp	%	Capability (MVA)	Loading (input)		Loading (output)	
						MVA	%	MVA	%
Cable2	Cable	775.22	680.87	87.83					
Cable4	Cable	775.22	680.99	87.84					
Cable5	Cable	775.22	680.87	87.83					
Cable7	Cable	775.22	680.99	87.84					
Cable8	Cable	231.93	40.48	17.45					
Cable9	Cable	267.61	158.75	59.32					
Cable10	Cable	667.05	451.19	67.64					
Cable11	Cable	231.93	33.13	14.28					
Cable12	Cable	267.61	33.03	12.34					
Cable13	Cable	231.93	40.86	17.62					
Cable14	Cable	231.93	46.70	20.14					
Cable15	Cable	231.93	65.57	28.27					
T27	Transformer				45.000	40.863	90.8	39.591	88.0
T28	Transformer				45.000	40.856	90.8	39.588	88.0
T29	Transformer				45.000	40.863	90.8	39.591	88.0
T30	Transformer				45.000	40.856	90.8	39.588	88.0
T51	Transformer				10.000	7.818	78.2	7.591	75.9
T53	Transformer				2.000	0.864	43.2	0.849	42.5
T54	Transformer				2.000	0.611	30.6	0.604	30.2
T58	Transformer				1.000	0.435	43.5	0.427	42.7
T59	Transformer				1.000	0.540	54.0	0.528	52.8
T60	Transformer				1.000	0.435	43.5	0.427	42.7
T61	Transformer				10.000	6.018	60.2	5.882	58.8
T62	Transformer				3.000	2.135	71.2	2.080	69.3
T63	Transformer				15.000	11.061	73.7	10.769	71.8
T64	Transformer				1.000	0.501	50.1	0.492	49.2
T65	Transformer				10.000	7.241	72.4	7.128	71.3

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

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Branch Losses Summary Report

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	
Line9	78.152	21.783	-77.118	-22.358	1034.5	-574.7	99.7	98.2	1.48
Line18	-78.152	-21.783	78.639	21.494	487.2	-289.1	99.7	100.4	0.70
Cable15	-3.406	-1.168	3.410	1.125	3.9	-43.3	96.1	96.2	0.11
T53	-0.820	-0.221	0.821	0.270	1.1	48.9	96.1	97.8	1.70
Line16	-30.260	-10.730	30.455	9.447	195.3	-1283.3	95.5	96.2	0.69
T51	-7.410	-1.651	7.427	2.441	17.6	789.9	95.5	98.3	2.85
Cable8	-2.149	-0.737	2.149	0.713	0.2	-24.6	98.2	98.2	0.01
T64	-0.476	-0.125	0.476	0.157	0.7	31.4	98.2	100.1	1.91
Cable12	-1.732	-0.593	1.732	0.557	0.5	-36.5	96.9	97.0	0.03
T58	-0.412	-0.111	0.413	0.136	0.5	24.3	96.9	98.6	1.70
Cable9	8.408	2.881	-8.376	-2.940	32.1	-59.2	98.2	97.8	0.38
Line10	66.560	18.765	-66.298	-19.018	262.7	-253.7	98.2	97.8	0.44
Cable14	-2.438	-0.826	2.439	0.793	1.4	-32.5	96.4	96.5	0.06
T54	-0.580	-0.166	0.581	0.191	0.5	24.5	96.4	97.7	1.23
T27	38.908	12.490	-38.805	-7.853	103.0	4637.2	100.0	101.7	1.73
T28	38.912	12.455	-38.809	-7.819	103.0	4635.6	100.0	101.7	1.74
T29	38.908	12.490	-38.805	-7.853	103.0	4637.2	100.0	101.7	1.73
T30	38.912	12.455	-38.809	-7.819	103.0	4635.6	100.0	101.7	1.74
Cable2	-38.792	-7.837	38.809	7.819	17.0	-17.7	101.7	101.7	0.05
Cable4	-38.792	-7.871	38.805	7.853	13.0	-18.4	101.7	101.7	0.04
Cable5	-38.792	-7.837	38.809	7.819	17.0	-17.7	101.7	101.7	0.05
Cable7	-38.792	-7.871	38.805	7.853	13.0	-18.4	101.7	101.7	0.04
Cable10	-23.794	-8.271	23.814	8.234	19.7	-36.4	97.7	97.8	0.09
T61	-5.707	-1.426	5.717	1.879	10.1	453.2	97.7	99.9	2.25
Line22	-29.170	-11.105	29.170	11.103	0.2	-1.7	100.4	100.4	0.00
T65	-7.082	-0.811	7.096	1.441	14.0	630.1	100.4	102.0	1.59
T59	0.513	0.169	-0.512	-0.131	0.8	37.4	98.7	96.6	2.06
T60	0.413	0.136	-0.412	-0.112	0.5	24.1	98.9	97.2	1.69
T62	2.028	0.667	-2.024	-0.478	4.2	188.3	100.4	97.8	2.59
T63	10.508	3.454	-10.486	-2.453	22.2	1000.9	100.9	98.2	2.67
Line5	109.052	32.634	-107.809	-32.597	1243.1	37.0	101.7	100.4	1.30
Line6	46.114	14.513	-44.837	-13.683	1277.1	830.5	101.7	98.2	3.44
Line11	42.484	10.784	-42.332	-11.308	152.2	-524.0	97.8	97.4	0.39
Cable11	1.744	0.479	-1.742	-0.596	2.5	-117.2	97.4	97.2	0.15

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	
Line12	40.587	10.829	-40.436	-11.396	151.8	-567.5	97.4	97.0	0.41
Cable13	-2.133	-0.738	2.134	0.716	0.8	-22.4	96.6	96.7	0.04
Line13	38.703	10.839	-38.599	-11.265	104.3	-425.7	97.0	96.7	0.29
Line14	36.466	10.549	-36.400	-10.854	66.0	-304.5	96.7	96.5	0.20
Line15	33.960	10.061	-33.865	-10.571	95.6	-510.5	96.5	96.2	0.31
					5675.5	17487.0			

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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	

Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Al-Birj Bus	Bus	Under Voltage	33.000	kV	31.701	96.1	3-Phase
Al-Dahiriya Bus	Bus	Under Voltage	33.000	kV	31.51	95.5	3-Phase
Al-Majd Bus	Bus	Under Voltage	33.000	kV	31.99	96.9	3-Phase
Beat-Alroush Bus	Bus	Under Voltage	33.000	kV	31.82	96.4	3-Phase
Beat-Awwa Bus	Bus	Under Voltage	33.000	kV	32.23	97.7	3-Phase
Bus101	Bus	Under Voltage	0.600	kV	0.59	97.8	3-Phase
Bus102	Bus	Under Voltage	0.600	kV	0.59	97.7	3-Phase
C	Bus	Under Voltage	33.000	kV	32.27	97.8	3-Phase
D	Bus	Under Voltage	33.000	kV	32.14	97.4	3-Phase
Dear-Alassal Bus	Bus	Under Voltage	33.000	kV	31.89	96.6	3-Phase
Dear-Samet Bus	Bus	Under Voltage	33.000	kV	32.28	97.8	3-Phase
E	Bus	Under Voltage	33.000	kV	32.00	97.0	3-Phase
F	Bus	Under Voltage	33.000	kV	31.90	96.7	3-Phase
G	Bus	Under Voltage	33.000	kV	31.84	96.5	3-Phase
H	Bus	Under Voltage	33.000	kV	31.74	96.2	3-Phase

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Marginal Report

Device ID	Type	Condition	Rating/Limit	Unit	Operating	% Operating	Phase Type
Sika Bus	Bus	Under Voltage	33.000	kV	32.088	97.2	3-Phase

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SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Source (Swing Buses):	155.638	49.890	163.439	95.23 Lagging
Source (Non-Swing Buses):	35.993	10.939	37.619	95.68 Lagging
Total Demand:	191.631	60.829	201.054	95.31 Lagging
Total Motor Load:	38.512	12.237	40.409	95.30 Lagging
Total Static Load:	147.444	31.105	150.689	97.85 Lagging
Total Constant I Load:	0.000	0.000	0.000	
Total Generic Load:	0.000	0.000	0.000	
Apparent Losses:	5.675	17.487		
System Mismatch:	0.000	0.000		

Number of Iterations: 4