CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion:

Load flow study has been applied to 14bus Sudanese national grid considering the probable conditions outlined in problem statement, and the results were analyzed based on load flow program using DIgSILENT power factory software.

The results analysis indicates that voltage levels within specified limits, besides the weak buses have been compensated by using SVC compensator consequently voltage levels have been improved perfectly.

In addition, the existing system can be expanded in the future by adding new loads. Also each component of grid can be isolated when the fault take place or to be isolated for maintenance and replacing.

Necessarily, achieving of above mentioned objectives lead to reliability and stability of grid.

5.2 Recommendations:

- Study of addition to existing system new generator sites and new transmission sites.
- Study of double cases like two synchronous machines, two transmission lines or two loads out of service …etc.
- Founding of way out to overcome the loading in generation units of Rosseres.

REFERENCES:

[1] D-Das, “Electrical power system, “New Age International (p) limited 2006.

[2] Hadi Sadat, “power system analysis “Tata McGraw Hill.

[3] J. Duncan Glover, Mulukutla S. Sarma, Thomas J. Overbye, “Power System Analysis and design “Fifth Edition.

[4] Goran Andersson, “Modelling and Analysis of Electric Power Systems “.

[5] Mohamed E. El-Hawary, “Electrical power system Design and Analysis “.

APPENDIXES

System Data:

1- Generation Data:

Gen .NO	Gen .Name	Voltage Magnitude (KV)	Generation		MVAR Limit	
			MW	MVAR	Min	Max
1	MWP_U1	13.8	108	16.795	-60	60
2	MWP_U2	13.8	108	16.795	-60	60
3	MWP_U3	13.8	108	16.795	-60	60
4	MWP_U4	13.8	108	16.795	-60	60
5	MWP_U5	13.8	108	16.795	-60	60
6	MWP_U6	13.8	108	16.795	-60	60
7	MWP_U7	13.8	108	16.795	-60	60
8	MWP_U8	13.8	108	16.795	-60	60
9	MWP_U9	13.8	108	16.796	-60	60
10	MWP_U10	13.8	108	16.796	-60	60
11	ROS-G1	11	21	17.679	-16	21.7
12	ROS-G2	11	21	17.679	-16	21.7
13	ROS-G3	11	21	17.872	-16	21.7
14	ROS-G4	11	35	17.872	-16	21.7
15	ROS-G5	11	35	25.395	-16	21.7
16	ROS-G6	11	20	18.258	-16	21.7
17	ROS-G7	11	20	18.258	-16	21.7
18	RBK-G1	11	80	1.236	-50	50
19	RBK-G2	11	80	1.236	-50	50
20	RBK-G3	11	80	1.236	-50	50
21	RBK-G4	11	100	2.168	-50	77.46
22	GER- U1	10.5	20	-0.585	-20	18
23	GER1- U2	10.5	20	-0.585	-20	18
24	GER1- U3	10.5	20	-0.585	-20	18
25	GER1- U4	10.5	20	-0.585	-20	18
26	GER1- U5	10.5	20	-0.585	-20	18
27	GER1- U6	10.5	20	-0.585	-20	18
28	GER1- U7	10.5	20	-0.585	-20	18
29	GER1- U8	10.5	20	-0.585	-20	18
30	GER2- U9	10.5	20	-0.585	-20	18
31	GER2- U10	10.5	20	-0.585	-20	18

32	GER2- U11	10.5	20	-0.585	-20	18
33	GER2- U12	10.5	20	-0.585	-20	18
34	GER4- U13	11	45	25	-20	45
35	GER4- U14	11	29	25	-20	45

2- Load data:

Bus	Load	
	MW	MVAR
MW2	90	56
ATB2	188	66.3
KAB2	60	25
IBA2	140	75
KLX1	240	120
ROS33	8.2	2.4
ROS2	417	231.9
RBK2	115	50.4
MAR2	512.7	265

3- Line data:

From	To	No. of circuit	Length (km)	R (ohm / km)	X (ohm / km)	B (Siemens / km)
MWP5	ATB5	1	236.7	0.028	0.276	4.019
MWP5	MAR5	2	345	0.028	0.276	4.109
ATB2	KAB2	2	293	0.067	0.276	4.103
ATB2	GER2	2	260	0.067	0.276	4.103
GER2	IBA2	2	60	0.067	0.276	4.103
IBA2	KLX2	2	14	0.067	0.276	4.103
IBA2	KAB2	2	30	0.067	0.276	4.103
ROS2	KLX2	2	246	0.067	0.276	4.103
ROS2	RAB2	2	303.3	0.067	0.276	4.103
RAB2	MAR2	2	329.9	0.067	0.276	4.103

4- Two winding transformer data:

TRS Name	Number	MVA Rated	Primary (KV)	Secondary (KV)
GER_TRS	7	50	10.5	220
	7	50	11	220
ROS_TRS	2	60	220	33
RBK_TRS	4	160	11	220

5- Three winding transformer data:

TRS Name	Number	MVA Rating			Rated Voltage (KV)		
		Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
MW_TRS	5	282	141	141	500	13.8	13.8
	2	150	150	36	500	220	33
ATB_TRS	2	300	300	75	500	220	33
KAB_TRS	2	300	300	75	500	220	33
KLX_TRS	3	100	100	15	220	110	11
ROS_TRS	1	86	43	43	220	11	11
	1	87	43.5	43.5	220	11	11
	2	89	44.5	44.5	220	11	11
MRK_TRS	3	300	300	75	500	220	33