

QUALITY MANAGEMENT SYSTEM	POWER GRID COMPANY OF BANGLADESH LTD.					WORK INSTRUCTION			
	TITLE: FREQUENCY & VOLTAGE CONTROL								
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1. Scope: Applies to the whole of Power System Network of POWER GRID COMPANY OF BANGLADESH LTD.

2. Purpose: To ensure quality power supply to the consumers by controlling the frequency and voltage of the electrical energy.

SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq./Time	Output
1.0	<u>Frequency control:</u> LDC is responsible for maintaining the system frequency at 50Hz $\pm 2\%$ to ensure quality power to the customer.	GRID CODE	MLDD	As required	Customer requirement is fulfilled
1.1	<i>If system frequency goes above the allowable range</i>		DM/AM LDC	As required	
1.1.1	Switch on the feeders in stages, as needed, that tripped (if any) under the "Under Frequency Scheme".	QF-SPM-13	DM/AM LDC	As required	Frequency tends to normalize
1.1.2	Switch on the feeders that were manually switched off temporarily to control the load. (Except those switched off due to the capacity limitation of transmission line and/or transformer.)	QF-LDC-07	DM/AM LDC	As required	- do -
1.1.3	Withdraw the load shedding as required in stages (if any).	QF-LDC-07	DM/AM LDC	As required	- do -
1.1.4	Generation of the running generating units is reduced as per economy order of generation and/or operating conditions of the generators.		DM/AM LDC	As required	- do -
1.1.5	Check the frequency status for the conformity with the requisite condition after each stage of operation.		DM/AM LDC	As required	conformity checked
1.1.6	If step 1.1.1 to 1.1.4 is not enough, generating units are given instruction for shut down on temporary basis to ensure the conformity with the requisite condition.		DM/AM LDC	As required	Frequency normalized
1.1.7	Record the activity in the shift register.		DM/AM LDC	As required	QF-CNP-01 QF-LDC-06
1.2	<i>If system frequency goes below allowable range</i>		DM/AM LDC	As required	
1.2.1	Generation of the generating units are increased (If spinning is available) as per economy order of generation and/or operating conditions of the generators.		DM/AM LDC	As required	Frequency tends to normalize
1.2.2	Switch off the feeders temporarily to control load by manual intervention.		DM/AM LDC	As required	- do -
1.2.3	New generators are added in the system (if standby generation is available).	QF-LDC-01	DM/AM LDC	As required	- do -
1.2.4	Check the frequency status for the conformity with the requisite condition after each stage of operation.		DM/AM LDC	As required	conformity checked
1.2.5	If step 1.2.1 to 1.2.3 is not enough, load control is imposed all over the country in proportionate of demand of the respective areas. (Refer to: Work instruction on "Load Control")	WI-PSO-02	DM/AM LDC	As required	Frequency normalized
1.2.6	Record the activity in the shift register.		DM/AM LDC	As required	QF-CNP-01 QF-LDC-06

Reviewed by: (GMSO)

Approved by: (DT)

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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq./Time	Output
2.0	<u>Voltage Control:</u> Controlling voltage within desired level (230kV \pm 10% & 132kV \pm 10%) is also required to ensure quality power.	GRID CODE	MLDD	As required	Customer requirement is fulfilled
2.1	<i>If grid voltage comes down below the required level</i>		DM/AM LDC	As required	
2.1.1	Capacitor banks which are connected with 33 KV bus are switched on automatically (As applicable)		DM/AM GMD	As required	Voltage tends to normalize
2.1.2	If step 1.1.1 is not enough, capacitor banks which are connected with 33 KV bus are switched on manually to raise the voltage.		DM/AM LDC	As required	- do -
2.1.3	If step 1.1.1 & 1.1.2 is not enough Generation of MVAR of the running generating units needs to be increased.	QF-LDC-02	DM/AM LDC	As required	- do -
2.1.4	Check the voltage status for the conformity with the requisite condition after each stage of operation.		DM/AM LDC	As required	conformity checked
2.1.5	If step 1.1.1 to 1.1.3 is not enough, load control is imposed in the respective areas where voltage is low.		DM/AM LDC	As required	Load control is done
2.1.6	Record the activity in the shift register.		DM/AM LDC	As required	QF-CNP-01 QF-LDC-06
2.2	<i>If grid voltage goes high beyond the required level</i>		DM/AM LDC	As required	
2.2.1	The capacitor banks connected with 33KV bus are automatically switched off (as applicable).		DM/AM GMD	As required	Voltage tends to normalize
2.2.2	If step 1.2.1 is not enough, MVAR generation of the running generating units needs to be reduced.	QF-LDC-02	DM/AM LDC	As required	- do -
2.2.3	If step 1.2.1 & 1.2.2 is not enough, the capacitor banks connected with 33KV bus are switched off manually to lower the voltage.		DM/AM LDC	As required	- do -
2.2.4	Check the voltage status for the conformity with the requisite condition after each stage of operation.		DM/AM LDC	As required	conformity checked
2.2.5	If step 1.2.1 to 1.2.3 is not enough, related transmission lines are switched off to control voltage.		DM/AM LDC	As required	Voltage normalized
2.2.6	Record the activity in the shift register.		DM/AM LDC	As required	QF-CNP-01 QF-LDC-06
3.0	The effectiveness of the work instruction for Frequency Control will be evaluated and reviewed during internal audits.		Management Review Committee, MR.	During internal audit	Review of review system
4.0	The Management will take actions on the basis of the evaluation.		MD, DT, MR.	At least 1 time in a year	Improvement

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