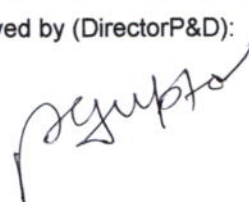**1. Scope:** Preparation of System Planning for Development Projects covering the whole of PGCB.

2. Purpose: To plan a suitable, dependable and reliable transmission network to ensure quality power transmission to its customers in different parts of the country.

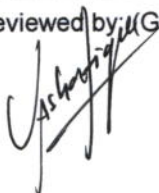| SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
1.0	**System Planning strategy**				
1.1	In order to create Integrated Power System Plan, the Power System Planning group will look ahead 20 years into the future. To achieve it the planner needs to • Work with power providers and customers to ensure reliable power system performance and cost-effective use of that power • Simulate power systems, and study virtually any situation that can impact performance, exploring them from both technical an economic standpoint. • Optimize power quality, which is not only dependent on the performance of the utility power system, but also the customer system. It is needed to ensure a better working relationship between utilities and customers.	PSMP (Power System Master Plan)	GMP&D DGMPL MSPL	As required	
1.2	The plan will address: • Transmission System adequacy covering power evacuation from generating plants and transmission to distribution and reliability along with Environmental issues		-do-	-do-	-do-
1.2.1	Transmission system adequacy and reliability: • In order to identify appropriate expansion plans, the degree of Transmission Systems' overloading under normal and contingent operating conditions is identified, through historic operating data • Exploring the use of compact and multi-voltage line designs (as applicable and necessary) for different voltage levels. *Compact lines are much smaller and need smaller right-of- ways. They are less expensive, can carry more power and have lower outage rates.* • Examining different types of emerging new conductors with higher operating temperatures and smaller sag to identify the most suitable for use in line upgrading and construction of new lines for different operating voltages. • Dynamic loading of transmission lines, according to ambient conditions of temperature, wind and sun, without violating clearance criteria or deteriorating conductor properties. • Reducing line outages due to short circuits to improve system reliability. • Limiting single phase and three phase short circuit levels of transmission grids to avoid replacing existing breakers and limiting the size	Seminar by concerned manufactur er, Website etc.	MSPL	As required	

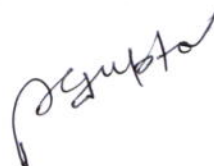Reviewed by: (GMP&D):   Approved by (DirectorP&D):

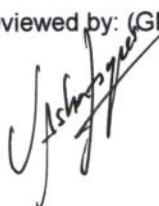| SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
1.3	**Power Systems Design and Operations Analysis.** On both transmission and distribution systems, wide range of analyses is conducted by exploring the current situation as well as potential impacts from changes or expansion of the system. Areas of expertise include • Reactive power management • Voltage regulation • System dynamics including capacitor operations • Event analysis to determine root causes • System and equipment performance validation and design improvements • Investigations of equipment mal operation & failure.		GMP&D DGMPL MSPL	As required	QF-SPL-22 & 23
2.0	**Reference information**				
2.1	For efficient & effective system planning following information is necessary & maintained. ⇨ Existing Power System Master Plan ⇨ Existing System parameters ⇨ Generation Expansion plan ⇨ Retirement Schedule of Generators, prepared by System Planning (PDB). ⇨ Expansion plan of Distribution utility identifying load growth centre, substations, reactive power information etc. ⇨ Monthly MIS data from different Grid Circle PGCB ⇨ Monthly MIS data from Efficiency Division LDC. ⇨ Enquiry by the Distribution agencies & some specific bulk consumer. ⇨ Enquiry from GC & Project offices for network/ capacity modification. ⇨ Enquiry from LDC in the form of problem in system operation	External QF-SPL-01 to QF-SPL-05 *QF-SPL-18* *QF-SPL-21 &* *QF-SPL-24* External - Do- QF-GMD-02 to QF-GMD-03 QF-LDC- 22 to QF-LDC-38	MSPL	As required	Input Data
2.2	Above Input data is collected from: • Offices of BPDB (Directorate of System Planning) • Offices of PGCB (Grid Circles, Load Dispatch Circle etc.) • Office of Distribution utilities viz. PDB, DESA, DESCO, WZPDCO, REB etc.		DGM (Grid Circle) MEFD, MSPL	As required	QF-SPL-18 to 21 & 24

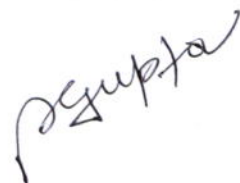Reviewed by (GMP&D):   Approved by (DirectorP&D):

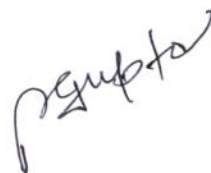| SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
3.0	**Planning**				
3.1	Network expansion plan:				
3.1.1	Following the criteria as in clause 1.0 (System Planning strategy) and clause 2.0 (Reference information) mentioned above, preliminary network expansion requirement is planned by brainstorming.		GMP&D, DGMPL & MSPL	As required	
3.1.2	Network analysis is done by Load Flow study using customized software	PSAF 2.60 & 2.81 software	MSPL	As required	QF-SPL-15
3.1.3	Load Flow study report is then checked for fulfillment of the requirements while keeping the voltage, loading of lines & transformers within allowable range.		DGMPL, MSPL	As required	Validation process
3.1.4	If any shortcoming exists, necessary modification/ adjustments are made and step 3.1.1 to 3.1.3 is repeated until satisfactory result is obtained.		DGMPL, MSPL	As required	correcting for short-comings
3.1.5	Short circuit study is performed to facilitate equipment identification and protection using customized software.	PSAF 2.60 & 2.81 software	MSPL	As required	QF-SPL-15
3.1.6	A report is prepared based on the study with necessary recommendation.		DGMPL, MSPL	As required	QF-SPL-06
3.2	Network modification plan:				
3.2.1	Planning of network modification is performed considering the following requirements: • Addition of bulk consumer in the system • Expansion in distribution agencies etc. • Enquiry from Grid Circles & Project offices for network / capacity modification. • Enquiry from LDC in the form of problem in system operation		GMP&D, DGMPL & MSPL	As required	
3.2.2	Following the requirements as described in clause 3.2.1 necessary network expansion modification is planned.		GMP&D, DGMPL & MSPL	As required	
3.2.3	Network analysis is done by Load Flow study using customized software	PSAF 2.60 & 2.81 software	MSPL	As required	Network Analysis QF-SPL-15
3.2.4	Load Flow study report is then analyzed to validate the fulfillment of the requirements while keeping the voltage, loading of lines & transformers within allowable range.		GMP&D, DGMPL & MSPL	As required	Validation for fulfillment of requirement
3.2.5	If any shortcoming exists, necessary modification/adjustments are made and step 3.1.2 to 3.1.4 is repeated until satisfactory result is obtained.		DGMPL, MSPL	As required	corrected for short-comings QF-SPL-15
3.2.6	Short circuit study is performed to facilitate equipment design and protection using customized software.	PSAF 2.60 & 2.81 software	MSPL	As required	
3.2.7	A report is prepared based on the study with necessary recommendation.		DGMPL, MSPL	As required	Network modification is planned. QF-SPL-06

Reviewed by: (GMP&D):

Approved by (DirectorP&D):

QUALITY MANAGEMENT SYSTEM	POWER GRID COMPANY OF BANGLADESH LTD.	QUALITY PROCEDURES
	TITLE: PROCEDURE FOR SYSTEM PLANNING	

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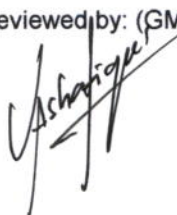| SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
3.3	Reactive power compensation requirement plan:		DGMPL & MSPL	As required	
3.3.1	Planning of reactive power compensation requirement is performed considering the following aspects: • Location wise generation capacity (MW and MVAR) in the system. • Location wise load requirements (MW and MVAR) in the system. • Allowable voltage limit in different points of the system for 132kV & higher buses.	Report of Network Expansion Plan QF-SPL-06	DGMPL & MSPL	As required	
3.3.2	Following the criteria as in clause 3.3.1 reactive power requirement is calculated by Load Flow study using customized software.	PSAF 2.60 & 2.81 software	MSPL	As required	Identification of MVAR requirement QF-SPL-15
3.3.3	Load Flow study report is then analyzed to validate the fulfillment of the requirements.		GMP&D, DGMPL & MSPL	As required	QF-SPL-15
3.3.4	If any shortcoming exists, necessary adjustments in reactive power compensators are made, both in terms of location and capacity.		GMP&D, DGMPL & MSPL	As required	QF-SPL-15
3.3.5	A report is prepared based on the study with necessary recommendation.		DGMPL, MSPL	As required	QF-SPL-06
4.0	**Implementation**				
4.1	In house study: In house study for network expansion plan will be performed. This study will include		DGMPL, MSPL	As required	
4.1.1	Technical viability through Load Flow study using customized software for different cases under different conditions.	PSAF 2.60 & 2.81 software	MSPL	As required	Finding for different cases
4.1.2	Preliminary Data Collection For IEE & EIA (This should be done with the help of environmental consultant)	QF-SPL-22 QF-SPL-23			QF-SPL-22 QF-SPL-23
4.1.3	Time frame of expansion by the growth rate of demand.	QF-SPL-10...13	MSPL	As required	
4.1.4	Preliminary estimated cost from documented records and/or estimated cost from different suppliers.		MSPL	As required	In house study report
4.1.5	In house study for network expansion plan will be signed by GM (P&D), DGMPL & MSPL.		GM (P&D)	As required	QF-SPL-06
4.2	Feasibility study (In special cases): In special cases feasibility study will be performed for network expansion plan by appointing foreign / local consultant to justify the project viability		GMP&D, DGMPL, MSPL	As required	
4.2.1	Technical viability through Load Flow study using customized software.	PSAF 2.60 & 2.81 software	MSPL	As required	
4.2.2	Time frame of expansion by the growth rate of demand.	QF-SPL-10...13	MSPL	As required	
4.2.3	Preliminary estimated cost from documented records and/or estimated cost from different suppliers.		MSPL	As required	
4.2.4	A report on Feasibility Study will be prepared		GMP&D, DGMPL	As required	QF-SPL-06

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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
4.2.5	The Feasibility study for network expansion plan will be checked by GM (P&D), DGMPL & MSPL.		GM (P&D)	As planned	Feasibility Study report is checked
4.2.6	After checking of the feasibility study report it will be forwarded to Director (Technical) / Managing Director for comments and directives. The feasibility study report will then be sent to project planning for further action.		MSPL, MD, DT	As planned	Feasibility Study report is Approved
5.0	**Monitoring**				
5.1	Updated Information regarding Network modification by concerned Grid Circle		GMTD, GMTDO, DGM (Grid Circle)	As required	QF-SPL-14
5.2	Updated Network expansion report after the completion of project work.		Concerned DGM Project	As required	QF-SPL-14 & QF-SPL-17
6.0	**Action for improvement**				
6.1	To update the system parameters and concerned drawings based on the information collected from the different grid circles/project offices after verification & numbering by LDC. Then the sub-station drawings are finalized and sent to respective section / divisions as required.		DGMPL, MSPL	As required	QF-SPL-14 & QF-SPL-17
7.0	The effectiveness of the procedure of system planning followed in PGCB is reviewed for sustainability. It is also checked and reviewed during internal audits.		DGMPL, MSPL, MR, Management Review Committee	When necessary	Action to be taken for the improvement by the Management
8.0	Actions are taken on the basis of evaluation/ review by the Management.		MD, MR		Improvement

Reviewed by: (GMP&D):

Approved by (DirectorP&D):