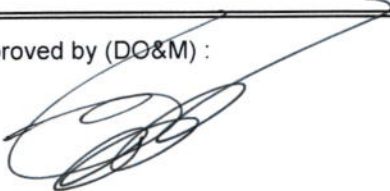


QUALITY MANAGEMENT SYSTEM	POWER GRID COMPANY OF BANGLADESH LTD.				QUALITY PROCEDURES		
	TITLE: PROCEDURE FOR SUB-STATION OPERATION						
Document No:	QP-SSO-01	Revision No.:	01	Effective Date:	11/11/12	Page:	1 of 4

1. Scope : Applies to the whole of POWER GRID COMPANY OF BANGLADESH LTD.					
2. Purpose: To Standardize the operation of Grid Sub-Station which stand out as an indispensable component affecting quality, stability and reliability of power system					
SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
1.0	Transmission of Power				
1.1	In power stations, the output power of the generating units is stepped up to 230kV or 132kV voltage by unit transformer.		MGMD	Continuous	Power is wheeled from power stations to different distribution entities
1.2	The power is then transmitted to the grid sub-stations through 230 kV & 132 kV transmission lines.				
1.3	At grid sub-stations the high voltage is stepped down to 132 kV and/or 33 kV voltage level.				
1.4	From the 132 kV and/or 33kV bus of grid sub-stations the power is then supplied to 132 kV and 33 kV consumers, i.e. to various distribution entities.				
2.0	Reference documents/information				
2.1	A master list of Sub-station equipment is maintained.		MGMD	Once	QF-GMD-40
2.2	Safety Manual QD-TSS-01 is maintained				
2.3	Operation Instruction for the following 230/132 kV and 132/33 kV equipment are maintained (As necessary and applicable). <ul style="list-style-type: none"> • Power Transformer • Circuit Breakers • Protective & Metering Instruments • AC/DC Power Supply Panel • Battery Charger • Battery etc. 	O&M manuals of respective equipment.	MGMD	Once	
3.0	Planning of Operation				
3.1	In the planning of grid sub-station operation, the main considerations should be the <ul style="list-style-type: none"> • Manpower available for operation • Competency of available manpower • Effective coordination of manpower. 		MGMD DM/AM GMD	As required	
3.2	The operation plan should be in such a way that the operation of all equipment can be carried out efficiently and effectively. To implement it, <ul style="list-style-type: none"> • All personnel should be trained as far as possible 		-do-	-do-	
3.3	Each sub-station of grid Maintenance Division makes a detailed planning for operation Program for the succeeding month. <i>(The monthly operation schedule shows the day & shift wise distribution of duties in a particular month)</i>		-do-	Once in a month	Draft pan is prepared
3.4	Monthly operation schedule for the succeeding month should be developed within the last week of running month.		DM/AM GMD	-do-	
3.5	The prepared monthly operation schedule should be checked for error (if any) properly and will be signed by the concerned sub-station in Charge.		-do-	As required	QF-GMD-14
3.6	The schedule is then approved by the Manager of concerned GMD.		MGMD	-do-	Plan is approved
3.7	After getting the required approval the plan becomes ready for implementation.		DM/AM GMD	-do-	QF-GMD-14
3.8	If change in operation schedule is needed, revised schedule must be approved by the competent authority before enforcing it in action	QF-GMD-14	-do-		QF-GMD-14

Reviewed by (GMT-1): 

Approved by (DO&M) : 

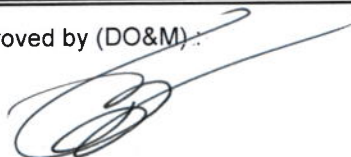
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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
4.0	Implementation				
4.1	<u>Scheduled Operation:</u> <ul style="list-style-type: none"> Keeping operational records Monitoring the loading of equipment (Lines/Transformers) Monitoring line & bus voltage Switching operation in cooperation with LDC Operating fire fighting equipment Monitoring the security of the sub-station 	WI-PSO-01, 02, 03,05,06 and QD-TSS-01	DM/AM GMD	As required	
4.1.1	<i>Keeping operational records:</i> A checklist is followed to carry out normal operation steps.		JAM GMD	-do-	QF-GMD-19
4.1.2	<i>Monitoring the loading of equipment:</i> Hourly reading (MW, MVAR, A) of line & transformers are recorded in the log sheet and monitored for loading of lines and/or transformers.		-do-	-do-	QF-GMD-01
4.1.3	<i>Monitoring line & bus voltage:</i> Hourly reading (kV) of line & bus (as applicable) are recorded in the log sheet and monitored for over and/or under voltage for compliance with the grid code.	GRID CODE	-do-	-do-	QF-GMD-01 and QF-CNP-01
4.1.4	<i>Switching operation in cooperation with LDC:</i> Switching operation is performed in association and/or direction of LDC to facilitate the following tasks <ul style="list-style-type: none"> Implementation of load shedding Outage management System restoration from tripping/grid failure. 	WI-PSO-01 WI-PSO-02 WI-PSO-03 WI-PSO-05 WI-PSO-06	-do-	-do-	QF-GMD-15 and QF-GMD-18
4.1.5	<i>Operating fire fighting equipment:</i> If by any means fire breaks out in the control room or in the switchyard, <ul style="list-style-type: none"> Operation people will operate the fire extinguishers & instantly call the nearest fire bridged office. The event will be recorded in shift diary. 	QD-TSS-01	-do-	-do-	QF-GMD-15
4.1.6	<i>Monitoring the security of sub-station:</i> In course of monitoring the security, operation people will identify the following <ul style="list-style-type: none"> Lighting, in & around the switchyard, boundary wall & control room is adequate. Security guards/Ansars are in duty in proper positions. Main entrance to the sub-station is well protected, as specified. If any deficiency is observed JAM on shift will immediately inform the sub-station in charge and will record it in the shift register.		-do-	-do-	QF-GMD-19 and QF-GMD-15
4.2	<u>Outage Management:</u>				
4.2.1	Outage of lines/equipment is required for the implementation of the <ul style="list-style-type: none"> Schedule maintenance Emergency maintenance Development work 		JAM GMD	As required	
4.2.2	When shutdown of the lines / equipment is required for maintenance / development work, team leader of the working party will submit the work permit form duly filled-up and signed in to the JAM on duty in grid sub-station control room requesting clearance for work.	WI-PSO-03	-do-	-do-	QF-GMD-39
4.2.3	The JAM on duty will issue clearance to the team leader of the working party following WI-PSO-03.	WI-PSO-03	JAM GMD	As required	QF-GMD-18 QF-GMD-39

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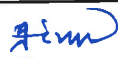
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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
4.2.4	After obtaining clearance from the team leader of the working party, the JAM on duty will take necessary actions in association with LDC to resume the service of the equipment under shutdown.	WI-PSO-03	JAM GMD	As required	QF-GMD-39 QF-GMD-18
4.2.5	After energizing the equipment to resume its service, a record will be maintained by the JAM on duty in grid sub-station control room in the shift operation register including <ol style="list-style-type: none"> Nature of Work (Scheduled/ Unscheduled maintenance and/or Development work) Cause of break down (If applicable) Time required for maintenance / work Power interruption in (MW), its time duration and the amount of un-served energy in MkWh. (if any) Load shed in MW (if any) and its duration. 		-do-	-do-	QF-GMD-15
4.3	Tripping Management:				
4.3.1	Tripping may occur in transmission line & sub-station equipment due to <ul style="list-style-type: none"> Internal and/or external fault (Over current, earth fault, under frequency etc.) Natural calamities (Wind, thunder storm etc.) 				
4.3.2	In each and every case of tripping, LDC control room must be informed immediately.				
4.3.3	WI-PSO-05 will be followed for tripping management.				
4.3.4	In case of Partial Grid Fail or Full Grid Fail, which results from cascading tripping of numerous generators, transformers and transmission lines, WI-PSO-06 will be followed to restore the system from grid failure.				
4.4	Preparation of Wheeling Bill:				
4.4.1	The main operating function of PGCB is wheeling of energy from BPDB power stations and Generation Companies to Distribution entities utilizing transmission network. In this process PGCB will <ul style="list-style-type: none"> Receive the energy from power stations Wheel the energy through its network Supply the wheeled energy to distribution entities. PGCB gets its energy wheeling charge from distribution entities		DM/AM GMD	Monthly	
4.4.2	It is the responsibility of the in charge of the Grid sub-stations to facilitate the process of billing of energy wheeled through the sub-station. To accomplish it <ul style="list-style-type: none"> Energy Meter readings for different feeders are taken at a predefined time in each month Feeder wise energy wheeled by the concerned Grid sub-station is calculated A report is prepared showing feeder wise energy wheeled and total energy wheeled by the concerned grid sub-station for that month. 	WI-SSO-01 QF-GMD-09	-do-	-do-	QF-GMD-11
4.5	SAFETY PROCEDURES TO FOLLOW				
4.5.1	NO MATTER HOW IMPORTANT THE WORK IS, SAFETY OF THE PERSONNEL MUST BE THE PRIME CONCERN.				
4.5.2	Safety of both man (maintenance gang) and equipment must be considered.	QD-TSS-01	DM/AM GMD JAMGMD	Continuous	
4.5.3	It must be ensured that, the equipment is de-energized, isolated from the system, properly grounded (by both Earth Switch & locally) and & safe for working.				

Reviewed by (GMT-1):



Approved by (DO&M) :



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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
4.5.4	the JAM on duty in grid sub-station control room will made the maintenance zone marked in association with the team leader of the working party & will give permission for work.		-do-	As required	
4.5.5	In the marked maintenance zone, no person, irrespective of designation, would be allowed to enter, without wearing appropriate protective gears like 1. Helmet 2. Safety Belt 3. Gloves 4. Protective Shoe 5. Eye protecting Glasses etc. As necessary in cases.		-do-	-do-	
4.5.6	COLOURED Tags must be used for easy recognition of equipment under maintenance and/or out of operation.	QD-TSS-01	DM/AM GMD JAMGMD	As required	Safety is ensured
4.5.7	All the personnel working in the control room must have proper knowledge of operating Fire Extinguishers kept both in the control room & in switchyard.	-do-	MGMD DM/AM GMD	-do-	
5.0	Monitoring				
5.01	Operational Records & Monthly Reports are maintained for monitoring & future reference.		DM/AM GMD	Continuous	As required
5.1	<u>Recording:</u>				
5.1.1	A checklist is followed to carry out normal operation steps.		JAMGMD	Daily	QF-GMD-19
5.1.2	The JAM on duty in grid sub-station control room will record the operational data in the log sheet		-do-	-do-	QF-GMD-01
5.1.3	In case of tripping of the line/equipment, the JAM on duty in grid sub-station control room will record all the information regarding tripping of line/equipment with detailed cause, time of tripping, duration of outage, un-served energy, relay status/flags and will inform the Engineer in Charge immediately.		-do-	As required	QF-GMD-15
5.1.4	The JAM on duty in grid sub-station control room must put brief note of maintenance work describing the cause and duration of interruption (if any) in shift operation register duly signed by him.		-do-	-do-	QF-GMD-15
5.1.5	The JAM on duty in grid sub-station control room will record the switching operations data in a register.		-do-	-do-	QF-GMD-18
5.2	<u>Monthly Reporting:</u>				
5.2.1	Outage Statement Of Sub-Station Equipment & Transmission Lines due to tripping / emergency maintenance/ schedule maintenance/ project work		MGMD DM/AM GMD (as applied)	Monthly	QF-GMD-02 QF-GMD-03 QF-GMD-04 QF-GMD-05
5.2.2	Consolidated Statement Of Sub-Station & Transmission Line Performance		-do-	-do-	QF-GMD-06 QF-GMD-07
5.2.3	Under Frequency Relay Tripping Report		-do-	-do-	QF-GMD-08
5.2.4	Joint Energy Meter Reading		-do-	-do-	QF-GMD-09
5.2.5	Energy Balance Of Sub-Station		-do-	-do-	QF-GMD-10
5.2.6	Billing Statement Of Sub-Station		-do-	-do-	QF-GMD-11
6.0	Action for improvement				
6.1	The reports are compiled in the office of DGM Grid circle and monitored for sustainability of performance. Whenever deficiency is identified, concerned MGMD is advised accordingly to overcome the problem.	QF-GMD-03 QF-GMD-05 QF-GMD-07 QF-GMD-08 QF-GMD-17	DGMGMD	As required	Analysis for performance deficiency
7.0	The effectiveness of the procedure of operation regarding the operation of grid sub-stations followed in PGCB will be evaluated by the management.		MR, MD, Management review Committee	During Internal Quality Audit	Review of the system
8.0	Actions will be taken on the basis of evaluation by the Management.		MR, MD	When required	Improvement

Reviewed by (GMT-1): 

Approved by (DO&M): 