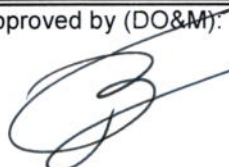


QUALITY MANAGEMENT SYSTEM	POWER GRID COMPANY OF BANGLADESH LTD.					QUALITY PROCEDURES			
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1. Scope: Applies to the whole of POWER GRID COMPANY OF BANGLADESH LTD.
2. Purpose: To Standardize the maintenance works of Sub-Station equipment for effective 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	Reference documents				
1.1	A master list of Sub-station equipment is maintained.	QF-GMD-40	MGMD	As required	Facility record
1.2	Maintenance Instruction for the following equipment is maintained & followed (As applicable & required) <ul style="list-style-type: none"> 230/132 kV and 132/33 kV Power Transformer 230 and/or 132 kV Circuit Breaker 230 and/or 132 kV Isolator Battery Charger Battery Sets etc. 	Maintenance Manual of respective equipment.	-do-	-do-	Reference documents are maintained
2.0	Planning				
2.01	In sub-station maintenance planning, the first consideration should be the <ul style="list-style-type: none"> Sub-station bus-bar and bay arrangement Available manpower for maintenance Minimum Interruption Minimum outage time Minimum cost involvement possible 	Equipment Layout	MGMD	As planned	Minimum possible outage time, resulting in less power interruption which leads to customer satisfaction
2.02	Maintenance plan should be in such a way that <ul style="list-style-type: none"> The maintenance of all equipment in the bay or feeder can be carried out in single interruption To implement it, <ul style="list-style-type: none"> All bay equipment should be kept in one shutdown plan as far as possible. 		-do-	-do-	
2.1	<u>Annual maintenance planning: (Scheduled)</u>				
2.1.1	Grid Maintenance Division (GMD) makes detailed planning for Annual Maintenance Program for the scheduled maintenance of Sub-station equipment.		DM/AM GMD	Annual	Draft maintenance planning
2.1.2	The prepared annual maintenance plan is then checked for error and/or omission of component (if any) and then submitted to the competent authority for approval.		-do-	-do-	
2.1.3	After getting the required approval the plan becomes ready for implementation.		-do-	-do-	QF-GMD-20
2.1.4	The finalized maintenance plan will be plotted on a broad sheet and will be displayed in the control room or any other place clearly visible by the concerned personnel.		-do-	-do-	Visual control is ensured
2.1.5	COLOURED pins will be used for displaying/ marking the maintenance activities such as maintenance planned or executed.		-do-	-do-	
2.1.6	Following color codes will be followed <ul style="list-style-type: none"> RED – Annual Maintenance program WHITE – Half yearly Maintenance program BLUE – Monthly Maintenance program GREEN – Executed maintenance program 		-do-	-do-	
2.2	<u>Planning for monthly maintenance: (The monthly maintenance schedule is just month wise division of the yearly maintenance schedule. It shows the day wise distribution of yearly maintenance of a particular month, depending on the annual maintenance plan and the status of the machine condition.)</u>	QF-GMD-20	-do-	-do-	Draft plan prepared
2.2.1	Monthly maintenance schedule for the succeeding month should be developed within the last week of current month by the concerned engineer in charge.	Manufacturer's instruction manual.	DM/AM GMD	Monthly	

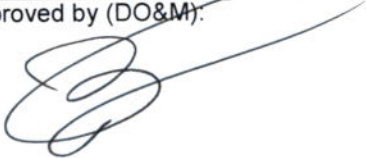
Reviewed by (GMT-1): 

Approved by (DO&M): 

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2.2.2	The monthly maintenance schedule should be properly signed by Engineer in Charge and Work in charge (foreman/electrician). After getting this monthly schedule the work in charge gets acknowledged which work he have to do in the following month.		DM/AM GMD	As required	QF-GMD-21
3.0	Implementation				
3.1	<u>Scheduled Maintenance:</u> The frequency of scheduled maintenance should be decided by the equipment manufacturer's maintenance guide/ manual, location of equipment and also the condition of the system.		DM/AM GMD	As planned	
3.1.1	If there is a question of shutdown of the equipment for the implementation of maintenance schedule, the engineer in charge will submit a requisition for shutdown in prescribed format through proper channel.		-do-	As required	QF-GMD-38
3.1.2	After getting approval for shutdown copies should be sent to 1. JAM on duty in grid sub-station control room. 2. LDC Control Room	QF-GMD-38	-do-	-do-	Outage of equipment is obtained
3.1.3	In tentative day the team leader of the working party will submit the work permit form and safety meeting form QF-GMD-41 duly filled-up and signed in, to the JAM on duty in grid sub-station control room requesting shutdown of line and/or equipment.		Team leader of the working party	-do-	QF-GMD-41 QF-GMD-39
3.1.4	The JAM on duty will issue clearance to the team leader of the working party following WI-PSO-03.	QF-GMD-41 WI-PSO-03	JAM GMD	-do-	QF-GMD-18 QF-GMD-39
3.1.5	After getting the requested shutdown of the equipment & necessary clearance, maintenance work is done as planned in the annual/monthly maintenance program.		DM/AM GMD	-do-	Actual maintenance work done
3.1.6	Proper safety measures must be followed throughout by the maintenance gang.	QD-TSS-01	-do-	-do-	Safety ensured
3.1.7	After completion of maintenance work, team leader of the working party will give clearance to both LDC & concerned Grid sub-station control room.	QF-GMD-39	-do-	-do-	Clearance for energizing
3.1.8	A report will be prepared by the engineer in charge for record including 1. Nature of maintenance 2. Repair/rectification work done 3. Spare parts issued (If any) 4. Time required for maintenance 5. Persons engaged in the work.	QF-GMD-33 QF-GMD-34 QF-GMD-35	-do-	-do-	QF-HRM-48
3.1.9	Maintenance work that can not be completed within the stipulate time frame of will be carried forward.		-do-	-do-	Rescheduling
3.1.10	The maintenance activity display board will be updated using appropriate coloured pin as described in clause 2.1.6		-do-	-do-	QF-GMD-20
3.2	<u>Emergency Maintenance:</u>				
3.2.1	Senior executive concerned is informed over telephone about the outage required.		DM/AM GMD	-do-	Seniors informed
3.2.2	Working party from grid substation 1. Directly contacts LDC control room over telephone for the outage of equipment/ lines. 2. Submit the work permit form and safety meeting form QF-GMD-41 duly filled-up and signed in, to the JAM on duty in grid sub-station control room		Team leader of the working party	-do-	QF-GMD-41 QF-GMD-39
3.2.3	The JAM on duty will issue clearance to the team leader of the working party following WI-PSO-03.	QF-GMD-41 WI-PSO-03	JAM GMD	-do-	QF-GMD-18 QF-GMD-39

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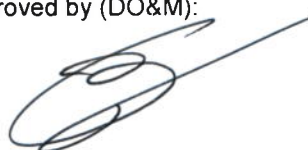
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SL. No.	Activity (including check points)	Ref. Doc.	Responsibility	Freq. /Time	Output
3.2.4	After getting the requested shutdown of the equipment and necessary clearance, maintenance work is done.		DM/AM GMD	As required	Actual maintenance
3.2.5	Proper safety measures must be followed throughout the work by the maintenance gang.	QD-TSS-01	-do-	-do-	Safety ensured
3.2.6	After completion of maintenance work, team leader of the working party will give clearance to both LDC & concerned Grid sub-station control room.	WI-PSO-03 QF-GMD-39	Team leader of the working party	-do-	Clearance for energizing
3.2.7	A report will be prepared by the engineer in charge for record including 1. Nature of maintenance 2. Repair/rectification work done 3. Spare parts issued (If any) 4. Time required for maintenance 5. Persons engaged in the work.	QF-GMD-33 QF-GMD-34 QF-GMD-35	DM/AM GMD	-do-	QF-HRM-48
3.3	<u>Break down Maintenance:</u>				
3.3.1	Whenever a fault occurs in sub-station equipment the tripping record is analyzed to confirm whether there is a break down.		DM/AM GMD	As required	Fault analysis
3.3.2	Senior executives concerned DGM and/or GM, is informed over telephone about the break down within quickest possible time.		-do-	-do-	Seniors informed
3.3.4	Maintenance personnel inspect the equipment & send feedback information confirming the fault nature.		-do-	-do-	Fault identified
3.3.5	Action plan for repairing and maintenance of the equipment is taken up immediately.		-do-	-do-	Action plan
3.3.6	The Engineer in Charge will 1. Contact LDC control room over telephone for the outage of equipment/ lines. 2. Submit the work permit form and safety meeting form QF-GMD-41 duly filled-up and signed in, to the JAM on duty in grid sub-station control room		DM/AM GMD, Team leader of the working party	-do-	QF-GMD-39
3.3.7	The JAM on duty will issue clearance to the team leader of the working party following WI-PSO-03.	WI-PSO-03	JAM GMD	-do-	QF-GMD-18 QF-GMD-39
3.3.8	After getting the requested shutdown of the equipment and necessary clearance, maintenance work is done.	QF-GMD-39	DM/AM GMD	-do-	Actual maintenance
3.3.9	Proper safety measures must be followed throughout the work by the maintenance gang.	QD-TSS-01	-do-	-do-	Safety ensured
3.3.10	After completion of maintenance work, team leader of the working party will give clearance to both LDC & concerned Grid sub-station control room.	WI-PSO-03	Team leader of the working party	-do-	QF-GMD-39
3.3.11	A report will be prepared by the engineer in Charge for record including 1. Nature of fault 2. Cause of break down 3. Repair/rectification work done 4. Spare parts issued 5. Time required for maintenance 6. Person engaged for executing the breakdown maintenance work.	QF-GMD-33 QF-GMD-34 QF-GMD-35	DM/AM GMD	-do-	QF-HRM-48
3.4	<u>Monthly Equipment inspection & maintenance:</u>				
3.4.1	All equipment is visually inspected monthly		DM/AM GMD	As required	QF-GMD-19
3.4.2	Maintenance works to be carried out in the equipment is earmarked		DM/AM GMD	-do-	Identification of items
3.4.3	Immediate repair works are carried out if no outage is required		-do-	-do-	Actual maintenance
3.4.4	Proper safety measures must be followed throughout the work by the maintenance gang.	QD-TSS-01	-do-	-do-	Safety ensured

Reviewed by (GMT-1): *Amu*

Approved by (DO&M):

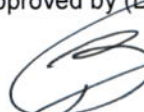


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3.4.5	Program schedule for maintenance works will be submitted for necessary approval of outage, except those done as per 3.4.3.		DM/AM GMD	-do-	QF-GMD-38
3.4.6	A report will be prepared by the engineer in charge for record.	QF-GMD-33, 34 & 35	-do-	-do-	QF-HRM-48
3.5	<u>Hot Spot Check of junction points in switchyard</u>				
3.5.1	Junction point temperatures of lines, transformers etc in the switchyard will be measured by thermo vision camera and temperature will be recorded		DM/AM GMD JAMGMD Foreman	Monthly	QF-GMD-
3.5.2	If any abnormality is observed then remedial action will be carried out and record shall be maintained,			As required	QF-GMD-
3.6	<u>Insulation Oil test</u>				
3.6.1	Insulation oil for transformer, MOCB etc. shall be tested for determining <ul style="list-style-type: none"> Break Down voltage – once in a year Tan Delta value – once in 2 year Acidity number – once in 2 year Dissolved gas content – once in 2 year 	IEC	DM/AM GMD	As required	Test Reports QF-RTS-12
3.6.2	If any abnormality is observed then remedial action will be carried out and record shall be maintained,		-do-	As required	
3.7	<u>Ground Resistance test</u>				
3.7.1	During annual maintenance ground resistance value in several points shall be measured (0-1 Ohm).		DM/AM GMD	Annual	QF-GMD-
3.7.2	Extra electrode will be driven to minimize ground resistance (as necessary and applicable).		-do-	As required	Conformity achieved
3.7.3	Record shall be maintained,		-do-		
3.8	<u>Preservation of spares in open yard.</u>				
3.8.1	When proper infrastructure required is unavailable, spares like CT / PT / LA / Insulators may be kept in open yard but with proper preservation technique.		DM/AM GMD	As required	
4.0	SAFETY PROCEDURES TO FOLLOW				
4.01	NO MATTER HOW IMPORTANT THE WORK IS, SAFETY OF THE PERSONNEL MUST BE THE PRIME CONCERN.	QD-TSS-01	Everybody	Continuous	Safety of both man and equipment ensured.
4.1	Safety of both man (maintenance gang) and equipment must be considered.	QD-TSS-01	DM/AM GMD	Continuous	
4.2	Team leader of the working party must ensure that, the equipment is de-energized, isolated from the system & properly grounded (by both Earth Switch & locally) and & safe for working.				
4.3	The maintenance zone should be marked in association with the JAM on duty in grid sub-station control room.	-do-	JAMGMD	As required	QF-GMD-18
4.4	In the marked maintenance zone, no person, irrespective of designation, would be allowed to enter without wearing appropriate (as necessary in cases) protective gears like : <ol style="list-style-type: none"> Helmet Safety Belt Protective Shoe Protective Shoe Eye Protecting Glass etc. 	-do-	-do-	-do-	
4.5	COLOURED Tags must be used for easy recognition of equipment under maintenance and/or out of operation.	-do-	-do-	-do-	
4.6	Before giving clearance, team leader of the working party will ensure that <ul style="list-style-type: none"> All personnel have cleared the maintenance zone. All tools & equipment are removed from the area. Local grounding is removed. 	-do-	Team leader of the working party	-do-	Safety of the personnel is ensured

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5.0	Monitoring				
5.1	Maintenance Records & Reports are maintained for monitoring & future reference.		DM/AM GMD	Continuous	As required
5.2	Recording:				
5.2.1	All equipment test reports along with the records of the actual maintenance works performed including the spare parts used and the list of manpower engaged are maintained for future reference.		DM/AM GMD	As required	QF-GMD-22, 23, 24, 25, 26, 27, 30, 31, 32.
5.2.2	All kind of maintenance work should be recorded, both in the maintenance log & in maintenance / inspection card of relevant equipment.		-do-	-do-	QF-GMD-34 QF-GMD-35
5.2.3	Work in charge must put brief note on maintenance work in maintenance log duly signed by him and will submit the same to the engineer in charge.		-do-	-do-	QF-GMD-34
5.2.4	The engineer in charge will check & verify the report on maintenance work. If he finds the report satisfactory, then he will sign in the maintenance log & will keep the same in proper place.		-do-	-do-	QF-GMD-34
5.2.5	A history card is maintained for all equipment where records of all breakdowns maintenance and major repair works & modifications are recorded.		-do-	-do-	QF-GMD-33
5.2.6	Break down maintenance work should be recorded in all three maintenance record cards: maintenance log, maintenance/inspection card and history card.		-do-	-do-	QF-GMD-33 QF-GMD-34 QF-GMD-35
5.3	Reporting:				
5.3.1	After the completion of annual maintenance program, Manager of concerned GMD will submit the report to the management.	QF-GMD-22, 23, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35.	MGMD	As required	QF-HRM-48
5.3.2	In the case of Emergency maintenance and Break down maintenance, Manager of concerned GMD will submit the report to the management describing probable cause of failure and the remedial action taken to rectify the fault				
6.0	Follow-up Action for improvement				
6.1	Report on Emergency maintenance and Breakdown maintenance along with the maintenance log, maintenance/inspection card and history card will be studied to identify the most frequent cause of failure.	QF-GMD-33 QF-GMD-34 QF-GMD-35	GMT-1/GMT-2, DGM (Grid Circles), MGMD	As required	Analysis for improvement
6.2	In-each equipment history card and maintenance log, there is a column for cause of maintenance and from the information recorded in this column the engineer in charge would be able to identify the most frequent cause of failure.				
6.3	Recommendation of remedial action necessary to prevent the recurrence of the same in future (If possible) will be prepared. So that concerned MGMD can take necessary actions to reduce the number of failure to the satisfactory level.	-do-	GMT-1/GMT-2, DGM (Grid Circles), MGMD	-do-	Proposal for improvement
6.4	Recommendation of remedial action will be submitted to the Management.	-do-	GMT-1/GMT-2	-do-	
6.5	Management will give proper instruction/ guide equipment to follow.	-do-	DT, MR GMT-1/GMT-2	-do-	
7.0	The effectiveness of the procedure of transmission equipment maintenance activities followed in PGCB will be evaluated by the management.	QF-IQA-05 QF-IQA-06 QF-IQA-07 QF-IQA-08	MD, MR, Management review Committee	During internal audit	QF-MNG-01
8.0	Actions will be taken on the basis of evaluation by the Management.	QF-MNG-01	MD,MR, GMT-1/GMT-2	When required	Improvement

Reviewed by (GMT-1): 

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