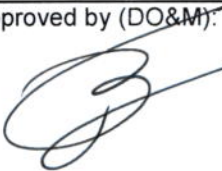


QUALITY MANAGEMENT SYSTEM	POWER GRID COMPANY OF BANGLADESH LTD.					QUALITY PROCEDURES			
	TITLE: PROCEDURE FOR SUB-STATION MAINTENANCE					Page:	1	of	5
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1. Scope: Applies to the whole of POWER GRID COMPANY OF BANGLADESH LTD.					
2. Purpose: To Standardize 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>				
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.	QF-GMD-20	-do-	-do-	Draft plan prepared
		Manufacturer's instruction manual.	DM/AM GMD	Monthly	

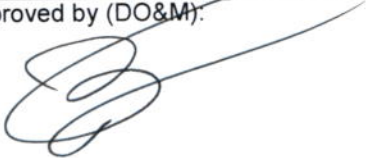
Reviewed by (GMT-1): 

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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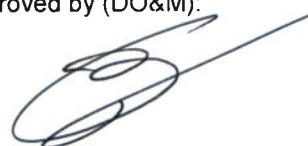
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3.2.4	After getting the requested shutdown of the equipment and necessary clearance, maintenance work is done.		DM/AM GMD	As required	Actual maintenance
3.2.5	Proper safety measures must be followed throughout the work by the maintenance gang.	QD-TSS-01	-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	Break down Maintenance:				
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	Monthly Equipment inspection & maintenance:				
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): *finm*

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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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