Scope of work

11 KV Ring Network (Substation and Mini Substation) Locations

Substations	1.Main Sub (Airside)	***Prefabricated (Miniature) Substation***
	2.Basement (Airside)	All, e.g.,
	3.Sub 08 (Airside)	1.No.1, 2 and 3 (Landside)
	4. Vortac (Airside)	2. Gateway (Landside)
	5.Radar (Airside)	3.Hotel (Landside)
		3.Car rentals (Landside), etc.
RMU's	All, e.g.	
	1.Car rentals (Landside)	
	2.Next to mini sub-No.3 (Landside), etc.	

Yearly Maintenance - MV Switchgear	
Item	**Description**
1	**MV Board Housing Panel:** • Check integrity of panel structure • Clean the casing with a vacuum cleaner and a dry cloth. • Check and record the phase to phase and phase to casing insulation resistance **Cleaning products with solvents are strictly prohibited.**
2	**Cabling and Termination Accessories:** • Visual inspection. Check for signs of burn marks
3	**Indication Lighting:** • Visual inspect • Test for functionality
4	**Battery Tripping Unit:** • Clean tripping batteries and terminals • Top up cells with distilled water • Check battery charger for loose connections and tighten if required • Ensure TRICKLE charge operational • Measure and record battery voltage • Check Amp/Volt meters for proper operation •
5	**Operating Mechanisms** • Open and close the mechanism to verify its integrity • Vacuum clean the compartment • Ensure all moving parts are adequately lubricated. • Check the operation and charging time of the gear motor

	• For breakers that are linked to the generator, simulate a change over to ensure breaker operates
7	**Circuit Breakers (Air):** • Check for alignment, regrease • Check for tolerances and vibration
8	Perform thermographic scans on bus connections and breakers contacts. (A thorough risk assessment is required)

Yearly Inspection on Mini-Substation	
Item	**Description**
1	• Check if General Signage is still attached to LV Door • Check mini substation labelling, if the name stenciled on the outside of the mini sub, as well as the inner side of the LV door, is done according to the labelling standard • Check the incoming MV labelling if it is according to labelling standard • Check the outgoing MV labelling if it is according to labelling standard • Check LV cable labelling • Are Warning notices on MV side visible and acceptable • Are Warning notices on LV side visible and acceptable • Check that colour coding was attached to left hand side of inner cubicle in MV side
2	**Labelling:** • Check if General Signage is still attached to LV Door • Check mini substation labelling, if the name stencilled on the outside of the mini sub, as well as the inner side of the LV door, is done according to the labelling standard • Check the incoming MV labelling if it is according to labelling standard • Check the outgoing MV labelling if it is according to labelling standard • Check LV cable labelling • Are Warning notices on MV side visible and acceptable • Are Warning notices on LV side visible and acceptable • Check that colour coding was attached to left hand side of inner cubicle in MV side
3	**Mechanical (Mini-sub)** • Check the condition of MV compartment doors • Check the condition of LV doors • Check if locks are available on the MV door side • Check if locks are available on the LV door side • Are all locking devices still in good condition? • Are safety devices fitted to MV & LV doors? • Check the condition of the cooling fins • Check for grass and vermin proofing still in good condition • Check for any visible holes that can lead to unauthorised access and blanked off with a plain rivet or device suitable to overcome the problem. • Check if roof bolts are still intact and no open gaps visible. • Check for operating handles available on site
4	**Oil/Gas (Mini-sub)** • Check oil leaks on the MV bushings • Check oil leaks on the LV bushings • Check oil leaks on the Switchgear • Check oil level on the transformer • Check the condition of oil level on the Switchgear

5	**Breakers / Fuses (Mini-Sub)** • Check if all safety barriers are still in position and no live connections exposed. • Check for hot connections with infra-red scanning • Check (Visual Inspection) for loose connections on the LV breakers • Check MV safety barrier fitted • Check (Visual Inspection) the neutral for any loose connections • Check if phase barrier boards are fitted between phases • Check if safety sign is installed on safety barrier • Check and/or Test for fuses if in good condition • Check overall condition of mini sub inside and outside • Check if tap-changer is locked • Check for grass and weeds on outer side of Mini substation that needs to be removed. • Check for back-filling if it needs attention. • Check for interface seal if intact
6	**Maintenance:** • Check for corona discharge • Operation of tap changers • Painting of corroded Mini Substation boxes • Repairing of oil leaks • Correct operation of circuit breakers • Replacement of fuses where applicable • Repairing of corroded or broken mini substation enclosures • Fitting and cleaning of Perspex covers, covering live busbars • Check for hot connection on LV side • Check LV breakers if mounted properly • Check/test for loose connections on the LV breakers • Check the neutral for any loose connections • Check or test fuses if they are in a good condition • Check transformer earthing to be intact • Check earthing on MV cables • Check earthing on all LV cables • Check earthing on the mini substation housing to be intact • Check status and condition of earth fault indicator (where applicable) • Test the neutral for any loose connections • Test for Oil condition
7	

Yearly Inspection on Ring Main Unit	
Item	**Description**
1	**Labelling:** • Check if general Signage is still attached • Check RMU labelling, if the name stencilled on the outside and inside and that it is done according to the correct labelling standard • Check the incoming MV labelling if it is according to correct labelling standard • Check the outgoing MV labelling if it is according to correct labelling standard • Check LV labelling • Are Warning notices on MV side visible and acceptable • Are Warning notices are visible and acceptable • Check that colour coding on the inner cubicle in MV side

2	**Mechanical:** • Check the condition of MV compartment doors • Check the condition of LV doors • Check if locks are available on the MV door side • Check if locks are available on the LV door side • Are all locking devices still in good condition? • Are safety devices fitted to MV & LV doors? • Check for grass and vermin proofing still in good condition • Check for any visible holes that can lead to unauthorised access and blanked off with a plain rivet or device suitable to overcome the problem. • Check if roof bolts are still in tack and no open gaps visible. • Check for operating handles available on site
3	**Oil/Gas:** • Check oil leaks • Check the condition of oil level on the Switchgear (where applicable) • Breakers / Fuses • Check if all safety barriers are still in position and no live connections exposed. • Check for hot connections on MV side • Check (Visual Inspection) for loose connections on the LV breakers • Check MV safety barrier fitted • Check (Visual Inspection) the neutral for any loose connections • Check if phase barrier boards are fitted between phase • Check if safety sign is installed on safety barrier • Check and/or test for fuses if in good condition • Check overall condition of mini sub inside and outside • Check if tap-changer is locked • Check for grass and weeds on outer side of mini sub that needs to be removed. • Check for back-filling if it needs attention. • Check for interface seal if intact.

TABLE 9: ADDITIONAL SCOPE OF OPERATING SO AS TO MINIMISE SWITCHING INTO FAULT

1	***When work is to be carried out on the outdoor units, i.e. (Mini subs and RMU's) isolations should start at the brick-built substation by racking out the circuit breaker feeder and earth the MV cable, i.e. in other words the whole ring should be isolated and earthed.***	Each	1
2	***No live switching must be done on the local mini sub and RMU's. This is addition to point No.1 above***	Each	1
3	**Statutory Requirements:**		

a	Safety file	Each	1
b	Labor	Each	1
c	Personnel and vehicle access permits	Each	1
d	Airside induction	Each	1
e	Provision for the service report	Each	1