

Annexure-A

BILL OF QUANTITIES FOR UNDER GROUND EARTHING AND ELECTRODES**NAME OF PROJECT : 400/ 220KV SWITCHYARD AT CHANDRAPUR-II.**

Sl. No.	Description	Unit	400/220kV CHANDRAPUR-II	400kV WARDHA	220kV MIDC CHANDRAPUR	Total Qty.	Rate (Rs.)	Amount (Rs.)
1	Unloading, storing and laying of 75x10 mm MS Earthing strip at a depth of 600 mm measured from the top of FGL (either top of gravel or top of land as the case may be) for bringing out risers just below gravel level near the equipment foundations as per requirement including following works: - excavation of trenches - laying of Earthing Strip - welding of Earthing strip (75x10 mm MS Earthing strip will be supplied by BHEL.)	MT	34	0	0	34		
2	Backfilling of soil for bringing out pig tail risers of 50x8 mm strip for equipments. Risers shall be raised from the earthmat (at 600 mm depth) to 150 mm above ground level to the nearest point of the equipment. This shall include all cutting, bending, welding, fixing, application of zinc rich paint on cutting surface, etc to the main earthmesh. - any other work necessary to complete the laying of earthmat. (50x8 mm MS Earthing strip will be supplied by BHEL.)	MT	45	5	4	54		
3	Installing of 150 mm diameter CI pipe Electrode (3m long) with test pit as per Annexure III-O including following works: - excavation - filling with layer of salt, charcoal - installing the rod electrode - backfilling and compaction - Casting the Test Pit with Cast Iron covers with provision of Cast Iron Covers - any other work necessary to complete the work (150 Diameter CI pipe will be supplied by BHEL.)	Nos.	250	12	12	274		
	Total amount (Rs.)							

**SPECIFICATION FOR C.I.PIPE EARTHING SET STATION
TYPE 'A' FOR EHV SUBSTATION AND EARTH MAT**

1.0	The earthing electrode, station type 'A', shall be cast iron pipe of 150mm nominal diameter with standard length of 3 meters (Tolerance +/-5%). The cast iron pipe shall have clamping arrangement for connecting to the Earth Grid as per the enclosed drawing No.EE/PI/WM-I/056 Rev. A, the description of which shall be as follows:
1.1	Two strips of M.S. Flats (hot dip galvanized) of size 75 x 10mm shall form two half rings around the socket position of the C.I. Pipe for fixing to the pipe and extend on either side for clamping and fixing the earth grid as shown in the drawing.
1.2	The half rings of M.S. Flats shall be bolted rigidly to the C.I.Pipe at four points 90 deg. apart with 16mm bolts and nuts and shall be punched for rigid fixing as shown in the drawing.
1.3	The two strips of M.S. Flats shall be bolted together on either side with 16mm bolts and nuts as shown in the drawing.
1.4	Two pairs of holes on either side of the M.S.Flat shall be provided at 40mm centre to centre for fixing the earth grid to the Electrode with 12mm dia bolts.
1.5	All bolts nuts and washers shall be hot dip galvanized, of GKW or equivalent approved make, and the spring washer shall be of spring steel, duly electro galvanized.
1.6	M S Flat of size 75x10 mm shall be used to form 'Main' conductor of the earth mat and of size 50x8 mm shall be used to form 'Grid' conductor of earth mat & for risers meant for structures and equipments earthing. Joints between GI flats shall be welded and painted. Earth terminal connection with equipments shall be bolted tightly for firm contact.