

ETC OF 220kV DC Transmission Line, Interconnecting cabling system of 400kV & 220kV Switchyards & associated works at Rayalseema Thermal Power Plant Stage-IV, Unit-6 (1x600MW)					
Project : 400/220 KV SWITCHYARD- 1X600 MW RTPP UNIT#6 (STAGE-IV)					
Customer: APGENCO					
<b>PART - B (ETC WORKS)</b>					
S. No.	Item / Work description	Unit	Quantity	Unit Rate	Amount (Rs.)
1	ETC (Erection , Testing and Commissioning ) of 220 kV lines (Complete line length of approx. 700m from take off gantry in 220kV yard to take off ganty of 400kV yard/ ST stringing on Service building in Transformer yard)				
1.1	Unloading, storage & erection of various type of tower angles , tower parts and tower body / leg (equal & unequal) extensions (complete) including bolts and nuts, step bolts, hangers, D-Shackles, tower accessories etc., including tack welding and supply and application of zinc rich paint for both Tension and Suspension type towers for 220 kV Double Circuit Transmission Line (400kV Towers are being used for 220kV Line)	MT	115		
1.2	ACSR Moose Conductor complete with rigid/bundle spacers, preformed armour rod, Mid span compression joint, Repair sleeves , vibration dampers , etc. to complete.	kM	7		
1.3	Shield Wires(7/3.66) with Tension Clamps, Down lead clamp, PG clamp, flexible copper bond etc),Mid span compression joint,Repair sleeves, vibration dampers , etc to complete. <b>(Unloading of this item covered in supply part, rate to be quoted except unloading)</b>	m	2000		
1.4	Double tension string hardware with 2x15 nos. 120 kN disc insulators in each string, etc. to complete suitable for twin moose conductor.	Nos	30		
1.5	Double tension string hardware with 2x15 nos. 120 kN disc insulators in each string, etc. to complete suitable for single moose conductor.	Nos	30		
1.6	Single suspension string hardware for Pilot string with 1x 15 nos. 120 kN disc insulators in each string suitable for single/ twin moose conductor	Nos	9		
1.7	<b>Complete earthing of all towers (Scope includes complete work includes testing to show that the tower resistance meets the acceptable limits.). Unloading of this item covered in supply part, rate to be quoted except unloading.</b>				
1.7.1	3 m long , 40 NB pipe electrode	Nos.	8		
1.7.2	Counterpoise type (120 m long)	Nos.	2		
2	ETC (Erection , Testing and Commissioning ) of 220kV Tower & Gantry in 220kV yard				

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2.1	Galvanised steel Lattice Structures including hardwares for Towers, beams & equipment support	MT	22		
<b>3</b>	<b>ETC (Erection , Testing and Commissioning ) of Interconnecting cable system (cable trench, trestle &amp; RCC pedestal as per drg. no. TB 0 344 316 422) from 220kV extension Switchyard to 400kV Switchyard/ Transformer yard (Erection of trestle is not in scope)</b>				
3.1	<b>Cable trays:</b> including bends, tees, elbow, reducers, stiffeners coupler plates, <u>bolting to racks, structure</u> etc. to complete				
3.1.1	350mm wide, 2.5 M long Ladder type (Approx. weight 28Kg/No)	Nos.	700		
3.2	Outdoor cable racks assembly (Two, three & four tier), work includes welding of GI Racks with inserts on trench walls in trenches.	MT	3.8		
3.3	Laying of cable trays including bends, tees, elbow, reducers, stiffeners coupler plates, bolting/ Welding to Cable trestle structure to complete				
3.3.1	350mm wide, 2.5 M long Ladder type	Nos.	165		
3.4	Laying of cable trays including bends, tees, elbow, reducers, stiffeners coupler plates, bolting/ Welding to RCC pedestals etc. to complete				
3.4.1	350mm wide, 2.5 M long Ladder type	Nos.	245		
3.5	Laying of 40 mm dia MS Rods 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 ground level near the cable trench/ trestle/ RCC pedestal as per requirement including following works: - excavation of trenches - laying of MS rod - welding of rods (refer Equipment Earthing drawing, TB-4-344-509-013 for WELDING for Welding details of rods) - backfilling of soil for bringing out pig tail risers of 40 dia MS rod for equipments. - any other work necessary to complete the laying of earthmat  (40 mm Diameter MS rod will be supplied by BHEL)	MT	10		

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3.6	Installing of 40 mm diameter Rod Electrode without test pit/link as per Equipment Earthing drawing, TB-4-344-509-013 including following works including following works: - excavation/hammering of rod in earth - installing the rod electrode - backfilling and compaction - any other work necessary to complete the work (40 mm Diameter MS rod will be supplied by BHEL)	Nos.	24		
3.7	<b>Earthing in trenches &amp; RCC pedestals using GI flat-</b> The earthing includes earthing of all cable trenches, trays using necessary Connectors for earthing flats. Earthing clamping shall be carried by ETC contractor. GS strip including cutting, bending, welding with 40 mm dia MS rod riser/earth strip, applying zinc rich paint, clamping to structure/building wall etc. The Earthing of equipments shall be carried out as per Drg. No. TB-4-344-509-013				
3.7.1	50 x 6 mm GI Flat	M	1000		
3.8	<b>Earthing of trays over trestle-</b> The earthing includes earthing of all cable trestle structures, cable trays on trestle using necessary Connectors for earthing flats. Earthing clamping shall be carried by ETC contractor. GS strip including cutting, bending, welding with 40 mm dia MS rod riser/earth strip, applying zinc rich paint, clamping to structure/building wall etc. The Earthing of equipments shall be carried out as per Drg. No. TB-4-344-509-013				
3.8.1	50 x 6 mm GI Flat	M	200		
3.8.2	75 x 12 mm GI Flat	M	200		
3.9	Cabling including laying, dressing, ferruling, lugging, tagging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates- laying can be either on trays, supports, underground, buried in ground, through GI pipe, over ground on cable trestle/ RCC pedestals, through wall etc. All erection materials viz. ferrules, copper lugs, cable ties / straps, Al. tags, markers, GI / PVC wall sleeves with rubber / nylon bushes and flexible steel conduits shall be supplied by bidder. Glands shall be quoted separately.				
3.9.1	4Cx4 sqmm PVC/Cu	km	6		
3.9.2	5Cx2.5 sqmm PVC/Cu	km	1		
3.9.3	10Cx2.5 sqmm PVC/Cu	km	3		
3.9.4	14Cx2.5 sqmm PVC/Cu	km	3		
3.9.5	19Cx2.5 sqmm PVC/Cu	km	4		
	<b>TOTAL AMOUNT (RS.)</b>				

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<b>Notes :</b>					
1	Scope includes: 1. storage, unloading, erection, testing & commissioning of 220kV D/C (Double Circuit) line consisting one Twin Moose circuit & one Single Moose circuit from 220kV Switchyard to 400kV Switchyard inside Plant boundary of Rayalseema Thermal Power Plant Stage-IV, Unit-6 (1x600MW) complete in all respects. The approximate distance between two substions is 700 m (approx.). i.e. total route length of the double circuit line to be constructed by the bidder. 2. ETC of cable trench material & cabling including earthing between 400kV & 220kV Switchyards through trench, overhead cable trestle (for road crossings) & laying on trays mounted on RCC pedestals.				
2	Unloading & Storage of all items is in the scope of bidder.				
3	Handling, shifting to & from stores at Rayalseema TPP proper storage are also included in the scope of the bidder.				
4	MS welding - apply red lead paint then aluminium paint then bitumen after welding.				
5	GI welding - apply 2 coats of cold galvanising anti corrosive paint after welding.				
6	Equipment/ tower labels to be painted as per requirement.				
7	Quoted rates are deemed to be inclusive of miscellaneous works, viz.. erection of clamps and connectors, phase colour discs etc.				
8	All associated items, though specifically not mentioned but required for safe and satisfactory execution and commissioning of transmission line will also be treated as included and same shall be supplied, ETC to be done at no extra cost to BHEL/ APGENCO.				
9	400kV Towers are being used for stringing 220kV lines. GA drawing of tower is enclosed for reference purpose.				
10	Supply of MS Rod, GI flat, cable trays, racks, Lattice structure for Towers & beams and transmission line stringing hardware & disc insulators is in BHEL scope. However, shifting of material from BHEL stores to erection locations & erection of same are in bidder's scope.				
11	Refer drawing no. TB-0-344-316-422 Rev-04 for location of all transmission line towers, gantry locations & route of interconnecting trench between 400kV & 220kV Switchyards. Route of interconnecting trench & trestle arrangement may change slightly to suit site conditions.				
12	'#' - Drawings of tension hardware (with double anchoring) and Tower top cross arm & GW X-arm drawing are enclosed for identifying matching hardware. Bidder has to identify all the componets required for matching holes on tower with stringing hardware.				
13	The quantities mentioned in the BOQ are tentative and may vary to any extent for individual items.				
14	Any material/services required for successful completion of the project but not covered in the BOQ shall be deemed to be included in the scope of contractor without any cost implications to BHEL. <u>The bidder is advised to visit Rayalseema site before submission of bid.</u>				
15	Make of items to be supplied/used under this contract shall be subject to acceptance by customer/BHEL at contract stage.				
16	Bidder may note that any damage of material at site during erection work shall be avoided. Further, owner (APGENCO/BHEL) shall not pay any compensation for any loss or damage to the properties during work of execution of transmission line job or for tree cutting due to bidder's work.				