

Annexure-I

BILL OF QUANTITIES CUM PRICE SCHEDULE for Erection Testing & Commissioning (ETC) Works (Rev 0)

Project :- 400 kV Switchyard at 5X800MW Yadadri TPS

Customer :- Telangana State Power Generation Corp. Ltd. (TSGENCO)

Consultant :- TCE Bangalore

S.No.	Description of Item	Unit	Qty	Unit Rate Rs.	Amount (Rs.)
1	420kV 125 MVar, 3-Ph, Bus Reactor : 420kV 125 MVar, 3-Ph, Reactor complete in all respect alongwith its MB Box, Radiator Bank and its cooling arrangement, Conservator, Cooler Control Cabinet/Marshalling Kiosk, accessories and insulating oil. Work includes erection of all auxiliaries viz turrets, bushings, terminal connectors, associated earthing works (excluding riser connections to main earthmat), laying of cable from Transformer auxiliaries to MK, Oil filtration, filling of oil, hot oil circulation, Oil testing etc as required to complete the installation of Reactor (Supervision of unloading, Erection, Testing and commissioning will be done by OEM). Note:- 1) Charges for Oil filtration, filling of oil, hot oil circulation etc for first time commissioning of Transformer are deemed to be covered in this line item. 2) Charges for testing of oil supplied in drums are covered separately under item no. 7 below. Unloading of Reactor tank main body is excluded in this scope, the same is covered under a separte line item below.	Set	2	7,46,566.82	14,93,133.64
2	420kV 125 MVar, 3-Ph, Bus Reactor : Unloading of Reactor Tank (main body)	Nos.	2	1,34,382.03	2,68,764.06
3	420kV 125 MVar, 3-Ph, Bus Reactor : Dragging/shifting charges of above mentioned Reactor (1 No.) on ground, upto rail cum road / jacking pad	Meter	25	1,791.76	44,794.00
4	420kV 125 MVar, 3-Ph, Bus Reactor : Dragging / shifting charges of above mentioned Reactor (1 No.) on rail cum road	Meter	25	1,791.76	44,794.00
5	420kV 125 MVar, 3-Ph, Bus Reactor : Complete dryout of 400kV Bus Reactor by N2 filling/ vaccuming/ purging and heating (if required) as per BHEL Bhopal procedure (Annexure-F). Complete in all respect excluding supply N2 gas.	Lot	2	46,741.57	93,483.14
6	420kV 125 MVar, 3-Ph, Bus Reactor: Supply of N2 gas as per instruction of BHEL Site. Mode of measurement shall be number of gas cyliner (returnable) having 50kG N2 gas	Nos.	80	2,596.75	2,07,740.00
7	420kV 125 MVar, 3-Ph, Bus Reactor : Oil Testing (BDV, ppm, Resistivity & Tan delta etc for oil supplied in drums (if required). 1 set equals all the tests on 1 sample.	Set	25	2,596.75	64,918.75
8	Particle count test (fine filtration etc. required to chieve acceptable value is in the scope of the bidder).	Nos.	5	1,16,800.00	5,84,000.00
9	Oil filtration charges (if required) This item is executed only if re-filtration of Transformer/Reactor oil is required.	kl	2	2,343.19	4,686.38
10	11kV/ 415V, Indoor, 1600kVA LT Auxillary dry type Transformer. Work includes (placement inside Cable Spreader Room) erection of all auxiliaries, viz bushings, cable boxes etc.	Nos.	2	27,541.96	55,083.92
11	Bus duct connection between 1600kVA LT dry type Transformer and ACDB (LT trasnformer is situated at ground floor and ACDB at first floor of switchyard control room building, accessories needed for support of bus duct including anchor bolt is in scope of bidder)	Meter	12	3,287.91	39,454.92
12	400kV, 3150A, SF6, 3 Phase Circuit Breaker without PIR without CSD alongwith lattice type GS supporting structure, terminal connectors, Breaker Control Cabinets, ladder and interpole cabling. (Supervision of Erection, Testing and commissioning will be done by supplier. Supplier will bring Timing kit and Gas leak detector only. Necessary manpower support, tools, tackles and testing kit to be in scope of ETC contractor).	Nos.	19	59,864.44	11,37,424.36

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13	400kV, 3150A, SF6, 3 Phase Circuit Breaker without PIR with CSD alongwith lattice type GS supporting structure, terminal connectors, Breaker Control Cabinets, ladder and interpole cabling. (Supervision of Erection, Testing and commissioning will be done by supplier. Supplier will bring Timing kit and Gas leak detector only. Necessary manpower support, tools, tackles and testing kit to be in scope of ETC contractor).	Nos.	14	59,865.57	8,38,117.98
14	Controlled Switching Device : Special cabling between CB and Relay Panel in SPR	Meter	5000	26.25	1,31,250.00
15	400 kV, 3150A, HDB, Electrically ganged, 3 Ph, Isolator, motor/ manual operated complete with 9 nos. of support insulators & terminal connectors without support structure with one earth switch (motor/ manual operated)	Nos.	96	29,932.21	28,73,492.16
16	400 kV, HDB, Electrically ganged, 3 Ph, Isolator, motor/ manual operated complete with 9 nos. of support insulators & terminal connectors without support structure with two earth switch (motor/ manual operated)	Nos.	4	29,932.21	1,19,728.84
17	Arranging supervision of Isolator manufacturer's representative for Erection, testing and commissioning including alignment check of 400kV Isolator with earth switches (if required) (Supervision of ETC including alignment check of 1 no. 400kV Isolator with earth switches is in isolator manufacturer scope)	Nos.	20	4,000.00	80,000.00
18	400 kV, 1 Ph, Current Transformer (3000 A), live/dead tank complete with terminal connectors without support structure.	Nos.	186	10,476.26	19,48,584.36
19	400 kV, 1 Ph, CVT complete with terminal connector without support structure.	Nos.	90	10,476.26	9,42,863.40
20	390 kV, 1 Phase, Gapless type Metal Oxide Surge Arrester complete with surge counter, leakage current meter, insulating base, connecting cable and terminal connectors without support structure.	Nos.	60	3,739.72	2,24,383.20
21	400 kV, Solidcore Post Insulators complete with corona ring & terminal connectors without support structure (low level (upto 8 m height from plinth))	Nos.	720	1,594.46	11,48,011.20
22	400 kV, Solidcore Post Insulators complete with corona ring & terminal connectors without support structure (High level (above 8 m to 10.5 m height from plinth))	Nos.	66	2,125.95	1,40,312.70
23	400kV String Insulators and Hardware: 400 kV Double Tension insulator string with double/single anchoring point, string comprising 2X25 nos. disc with hardware set with all accessories including tension clamp with/ without Turn Buckle set suitable for twin/quad conductor.	Set	288	3,374.20	9,71,769.60
24	400kV String Insulators and Hardware: 400 kV Suspension insulator string comprising 1X25 nos. disc with hardware set with all accessories including drop/through type suspension clamp suitable for twin/quad conductor.	Nos.	84	2,760.71	2,31,899.64
25	ACSR Moose conductor complete with Tee connectors for droppers to equipment connections, PG clamps for busbar jumpering, Twin/Quad bundle rigid/ flexible spacers etc to complete.	Km	36	69,017.63	24,84,634.68
26	ACSR Bersimis conductor complete with Tee connectors for droppers to equipment connections, PG clamps for busbar jumpering, Twin/Quad bundle rigid/ flexible spacers etc to complete.	Km	25	69,017.63	17,25,440.75
27	4.5"(EH) IPS Aluminium Tube: Al Tube (ETC of Al.Tube includes Aluminium welding and bending to be included. Welding sleeve and Al tube will be supplied by BHEL. Including Corona Bell Fixing, Tee Connector Fixing, and other clamps and connectors etc. Connectors shall be provided by BHEL.)	m	8500	383.43	32,59,155.00
28	Supply of 7/8 SWG GI Shield Wire as per customer specification	Km	8.5	86,250.00	7,33,125.00

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29	7/8 SWG GI Shield Wire: GI Shield wire including tension clamp, PG clamp and clamping on structure for down conductor, fixing/bolting with earth strip etc to complete . - In 400kV Switchyard	Km	8.5	53,670.29	4,56,197.47
30	LT Cabling 4Cx4 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	70000	13.69	9,58,300.00
31	LT Cabling 5Cx2.5 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	60000	13.86	8,31,600.00
32	LT Cabling 7Cx2.5 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	15000	14.84	2,22,600.00
33	LT Cabling 9Cx2.5 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	55000	14.84	8,16,200.00
34	LT Cabling 12Cx2.5 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	55000	19.79	10,88,450.00

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35	LT Cabling 19C/20Cx2.5 sqmm Cu HRPVC Armoured Control Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	85000	21.76	18,49,600.00
36	LT Cabling 2Cx2.5 sqmm Cu HRPVC Armoured Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	500	13.86	6,930.00
37	LT Cabling 2Cx16 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	40000	14.24	5,69,600.00
38	LT Cabling 4Cx16 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	22000	16.61	3,65,420.00
39	LT Cabling 4Cx35 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	3500	19.79	69,265.00

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40	LT Cabling 3.5Cx70 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	12000	28.69	3,44,280.00
41	LT Cabling 3.5Cx185 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	500	46.68	23,340.00
42	LT Cabling 3.5Cx300 sqmm Al XLPE Armoured Aux. Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	300	64.66	19,398.00
43	LT Cabling 1Cx150 sqmm Cu EPR Armoured Fire Survival Power Cables including laying, tagging, dressing, ferruling, glanding, lugging, soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates - laying can be either on trays, supports, underground, buried in ground or through GI/PVC/hume pipe over/under ground, 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. Extra holes closing in glands plates with GI sheet shall be in ETC contractor scope. Technical specification of cable tagging intervals, and lugs as per Customer/ field approval shall be followed. Supply of glands shall be quoted separately.	m	1000	49.84	49,840.00
44	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 4Cx4 sqmm Cu HRPVC Armoured Control Cables	Nos.	3000	265.74	7,97,220.00
45	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 5Cx2.5 sqmm Cu HRPVC Armoured Control Cables	Nos.	900	183.61	1,65,249.00
46	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 7Cx2.5 sqmm Cu HRPVC Armoured Control Cables	Nos.	300	220.34	66,102.00

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47	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 9Cx2.5 sqmm Cu HRPVC Armoured Control Cables	Nos.	1000	247.88	2,47,880.00
48	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 12Cx2.5 sqmm Cu HRPVC Armoured Control Cables	Nos.	1400	275.42	3,85,588.00
49	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 19C/20Cx2.5 sqmm Cu HRPVC Armoured Control Cables	Nos.	2200	298.37	6,56,414.00
50	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 2Cx2.5 sqmm Cu HRPVC Armoured Power Cables	Nos.	10	183.61	1,836.10
51	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 2Cx16 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	600	252.47	1,51,482.00
52	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 4Cx16 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	1300	275.42	3,58,046.00
53	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 4Cx35 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	30	321.32	9,639.60
54	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 3.5Cx70 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	150	367.22	55,083.00
55	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 3.5Cx185 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	18	459.03	8,262.54
56	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 3.5Cx300 sqmm Al XLPE Armoured Aux. Power Cables	Nos.	12	2,846.01	34,152.12

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57	SUPPLY OF CABLE GLANDS: Tin - Plated brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc for the following cables (Bidder's Scope is to supply only & ETC is covered under above item LT Cabling) Individual quantity may vary up to any extent (Cable glands to be procured from TSGENCO approved Vendors) 1Cx150 sqmm Cu EPR Armoured Fire Survival Power Cables	Nos.	6	709.13	4,254.78
58	Bay Marshalling Kiosks (Outdoor, Floor mounted on cable trench)	Nos.	33	3,559.19	1,17,453.27
59	CT Junction Box (on CT structure)	Nos.	44	2,299.95	1,01,197.80
60	CVT Junction Box (on CVT structure)	Nos.	12	2,299.95	27,599.40
61	Metering CT Junction Box (Outdoor, Floor mounted)	Nos.	18	2,299.95	41,399.10
62	Metering CVT Junction Box (Outdoor, Floor mounted)	Nos.	18	2,299.95	41,399.10
63	Laying of 600 mm wide, 2.5 M long Ladder type Cable trays: including cross, bends, tees, elbow, reducers, stiffeners coupler plates, bolting to racks, structure etc. to complete. (Refer annexure 1A).	Nos.	4700	99.69	4,68,543.00
64	Laying of 450 mm wide, 2.5 M long Ladder type Cable trays: including cross, bends, tees, elbow, reducers, stiffeners coupler plates, bolting to racks, structure etc. to complete. (Refer annexure 1A).	Nos.	580	76.69	44,480.20
65	Laying of 150 mm wide, 2.5 M long Ladder type Cable trays: including cross, bends, tees, elbow, reducers, stiffeners coupler plates, bolting to racks, structure etc. to complete. (Refer annexure 1A).	Nos.	460	41.52	19,099.20
66	Cable Rack work includes welding of galvanised steel racks on inserts of trench walls in trenches in switchyard and control room. Cable rack assembly will be of 3 tier (Refer fig. 1 of annexure 2A).	Nos.	2420	177.96	4,30,663.20
67	Cable Rack work includes welding of galvanised steel racks on inserts of trench walls in trenches in switchyard and control room. Cable rack assembly will be of 2 tier (Refer fig. 2 of annexure 2A).	Nos.	200	177.96	35,592.00
68	Cable Rack work includes welding of galvanised steel racks on inserts of trench walls in trenches in switchyard and control room. Cable rack assembly will be of 2 tier (Refer fig. 3 of annexure 2A).	Nos.	750	177.96	1,33,470.00
69	Under-hung & Wall mounted Cable Rack work includes welding of assembly on embedded plates/ inserts in ceiling/ walls in cable vault. Cable rack assembly will be of 3 tier. (Refer fig. 4 of annexure 2A).	MT	1.4	29,344.23	41,081.92
70	Under-hung & Wall mounted Cable Rack work includes welding of assembly on embedded plates/ inserts in ceiling/ walls in cable vault. Cable rack assembly will be of 3 tier. (Refer fig. 5 of annexure 2A).	MT	2.2	29,344.23	64,557.31
71	Under-hung & Wall mounted Cable Rack work includes anchor bolting of assembly on embedded plates/ inserts in ceiling/ walls in cable vault. Cable rack assembly will be of 3 tier. The supply of anchor bolts are in bidder scope (Refer fig. 4 of annexure 2A).	MT	0.35	29,344.23	10,270.48
72	Under-hung & Wall mounted Cable Rack work includes anchor bolting of assembly on embedded plates/ inserts in ceiling/ walls in cable vault. Cable rack assembly will be of 3 tier. The supply of anchor bolts are in bidder scope (Refer fig. 5 of annexure 2A).	MT	0.24	29,344.23	7,042.62
73	Supply of 100/110 NB acid fume proof conduits in battery room	m	30	180.33	5,409.90
74	Laying of 100/110 NB acid fume proof conduits in battery room	m	30	98.50	2,955.00
75	Laying of PVC pipe, 50/63 NB s at a depth of 300mm including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete. <u>Both ends of PVC conduits shall be closed by plastering.</u> (Payment will be made for the as erected pipe length)	m	50	82.45	4,122.50

Annexure-I

BILL OF QUANTITIES CUM PRICE SCHEDULE for Erection Testing & Commissioning (ETC) Works (Rev 0)

Project :- 400 kV Switchyard at 5X800MW Yadadri TPS

Customer :- Telangana State Power Generation Corp. Ltd. (TSGENCO)

Consultant :- TCE Bangalore

76	Laying of PVC pipe, 100/110 NB s at a depth of 300mm including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete. <u>Both ends of PVC conduits shall be closed by plastering.</u> (Payment will be made for the as erected pipe length)	m	50	98.50	4,925.00
77	Laying of 50 mm dia heavy duty GI Pipes at a depth of 300mm including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete. <u>Both ends of GI conduits shall be closed by plastering.</u> (Payment will be made for the as erected pipe length)	m	8300	82.45	6,84,335.00
78	Laying of 100 mm dia heavy duty GI Pipes at a depth of 300mm including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete. <u>Both ends of GI conduits shall be closed by plastering.</u> (Payment will be made for the as erected pipe length)	m	11500	98.50	11,32,750.00
79	Laying of 50 mm dia heavy duty GI Pipes in Trenches including cutting, threading, fixing of sockets/ bends/TEEs where required etc. complete. Both ends of conduits shall be closed by plastering. (Payment will be made for the as erected pipe length)	m	5200	82.45	4,28,740.00
80	Supply of 50mm heavy duty GI pipe with socket/bend as per IS:1239. Mode of measurement shall be running length of GI Pipe only. Socket & Bend as per requirements are deemed included. The quantity may vary up to any extent.	m	500	354.07	1,77,035.00
81	Supply of 100mm heavy duty GI pipe with socket/bend as per IS:1239. Mode of measurement shall be running length of GI Pipe only. Socket & Bend as per requirements are deemed included. The quantity may vary up to any extent.	m	500	865.43	4,32,715.00
82	Fixing of 50 mm dia GI Pipes on Lattice/ Pipe Stucture including clamping, fixing of sockets/ bends as required etc. complete. Both ends of GI Pipes shall be closed by plastering. (Payment will be made for the as erected pipe length)	m	2400	80.62	1,93,488.00
83	Fixing of 100 mm dia GI Pipes on Lattice/ Pipe Stucture including clamping, fixing of sockets/ bends as required etc. complete. Both ends of GI Pipes shall be closed by plastering. (Payment will be made for the as erected pipe length)	m	2800	96.31	2,69,668.00
84	Supply of 50mm HDPE pipe including sockets/ bends/TEEs as per relevant IS code. Mode of measurement shall be running length of HDPE Pipe only. sockets/ bends/TEEs as per requirements are deemed included.	m	100	207.74	20,774.00
85	Laying of 50mm HDPE Pipes in Trenches including cutting, threading, fixing of sockets/ bends/TEEs where required etc. complete. Both ends of conduits shall be closed by plastering. (Payment will be made for the as erected pipe length)	m	100	129.84	12,984.00
86	Earthing works- 75X10 mm GI Flat - The earthing includes earthing of all switchyard equipment, towers, LMs, pipe structure, cable trenches, fence, rod electrode, pipe electrode for LA, CVT, neutral of transformer & at interconnections of other grids, Control room equipments using necessary connectors for earthing flats. Earthing clamping shall be carried out 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. to complete. Hardware required for connecting flat on pads of structure & equipment included in scope. The Earthing of equipments shall be carried out as per equipment earthing drgs and customer specification	MT	141	27,299.73	38,49,261.93

Annexure-I					
BILL OF QUANTITIES CUM PRICE SCHEDULE for Erection Testing & Commissioning (ETC) Works (Rev 0)					
Project :- 400 kV Switchyard at 5X800MW Yadadri TPS					
Customer :- Telangana State Power Generation Corp. Ltd. (TSGENCO)					
Consultant :- TCE Bangalore					
87	Earthing works- 50x6 mm GI Flat - The earthing includes earthing of all switchyard equipment, towers, LMs, pipe structure, cable trenches, fence, rod electrode, pipe electrode for LA, CVT, neutral of transformer & at interconnections of other grids, Control room equipments using necessary connectors for earthing flats. Earthing clamping shall be carried out 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. to complete. Hardware required for connecting flat on pads of structure & equipment included in scope. The Earthing of equipments shall be carried out as per equipment earthing drgs and customer specification	MT	36	57,562.66	20,72,255.76
88	Laying of 40 mm dia MS Rods at a depth of 1000 mm measured from the top of Finished Ground Level and bringing out risers 300 mm above ground level to the nearest point of the equipment foundations as per requirement including following works: - excavation of trenches - laying of MS rod - welding of rods (As per approved drawings) - backfilling of soil for bringing out pig tail risers of 40 dia MS rod for equipments. Risers shall be raised from the earthmat (at 1000 mm depth) to 300 mm above ground level to the nearest point of the equipment. This shall include all cutting, bending, welding, fixing, application of paint on cutting & welded surface, etc to the main earthmat as per attached specification for underground earthing and electrodes and equipment earthing details notes (As per approved drawings). - any other work necessary to complete the laying of earthmat (40 mm dia MS rod will be supplied by BHEL).	MT	1	10,333.85	10,333.85
89	Electronic earthing for SAS and OLTE Panels as per customer specification (Copper flats/wire will be supplied by BHEL).	MT	1	30,301.18	30,301.18
90	Galvanised steel Lattice Structures including hardwares for Towers, beams & equipment support	MT	1586	4,808.23	76,25,852.78
91	Auxiliary - LT Distribution Boards: 415V AC distribution board (ACDB) WITH 2 incomers (Location switchyard control room building)	Set	1	64,577.90	64,577.90
92	Auxiliary - LT Distribution Boards: 415V AC emergency power distribution board (EPDB) (Location switchyard control room building)	No.	1	38,746.74	38,746.74
93	Auxiliary - LT Distribution Boards: 220V DCDB with 2 incomers from battery charger (Location switchyard control room building)	No.	1	48,433.42	48,433.42
94	Auxiliary - LT Distribution Boards: 48V DCDB with 2 incomers from battery charger (Location switchyard control room building)	No.	1	29,060.05	29,060.05
95	Auxiliary - 220V, 1605AH Lead Acid Plante Battery bank along with all accessories such as racks, interconnecting cables, connectors etc. complete in all respects with accessories	Nos.	2	57,514.69	1,15,029.38
96	Auxiliary - 48V, 645AH Lead Acid Plante Battery bank along with all accessories such as racks, interconnecting cables, connectors etc. complete in all respects with accessories	Nos.	2	46,011.75	92,023.50
97	Auxiliary -220V, 240A Float and Float cum Boost Charger complete in all respects	Nos.	2	9,969.22	19,938.44
98	Auxiliary -48V, 100A Float and Float cum Boost Charger complete in all respects	Nos.	2	6,134.90	12,269.80
99	AC kiosk (Air conditioned kiosk) of Approx. dimension upto Size L x B x H (7m x 3m x 3m) with split ACs and made of sandwich insulated panels with Poly Urethane Foam (PUF) as filler material between polyester pre-coated cold rolled steel. [Only unloading, storage and handling between store & erection place at site has to be considered]	Nos.	13	6,564.28	85,335.64

Annexure-I					
BILL OF QUANTITIES CUM PRICE SCHEDULE for Erection Testing & Commissioning (ETC) Works (Rev 0)					
Project :- 400 kV Switchyard at 5X800MW Yadadri TPS					
Customer :- Telangana State Power Generation Corp. Ltd. (TSGENCO)					
Consultant :- TCE Bangalore					
100	Back-up control panel Board for 61850 Based Sub station Automation system in AC Kiosk (400kV S/Y)/ Control building (Testing and commissioning of numerical relays/BCU/Energy Meters/SAS equipments in scope of respective equipment supplier. Necessary manpower support for numerical device testing, arranging tools, tackles and testing equipments is in scope of ETC contractor)	Nos	12	5,314.86	63,778.32
101	BCU/BPU (Relay) Panels for Control and Protection of 400kV Switchyard for 61850 Based Sub station Automation system in AC Kiosk (400kV S/Y)/ Control building (Testing and commissioning of numerical relays/BCU/Energy Meters/SAS equipments in scope of respective equipment supplier. Necessary manpower support for numerical device testing, arranging tools, tackles and testing equipments is in scope of ETC contractor)	Nos	55	5,314.86	2,92,317.30
102	Outdoor Metering Panel in 400kV S/Y for 61850 Based Sub station Automation system in AC Kiosk (400kV S/Y)/ Control building (Testing and commissioning of numerical relays/BCU/Energy Meters/SAS equipments in scope of respective equipment supplier. Necessary manpower support for numerical device testing, arranging tools, tackles and testing equipments is in scope of ETC contractor)	Nos	6	5,314.86	31,889.16
103	Networking & Gateway Panels in Control Building for 61850 Based Sub station Automation system in AC Kiosk (400kV S/Y)/ Control building (Testing and commissioning of numerical relays/BCU/Energy Meters/SAS equipments in scope of respective equipment supplier. Necessary manpower support for numerical device testing, arranging tools, tackles and testing equipments is in scope of ETC contractor)	Nos	2	5,314.86	10,629.72
104	Indoor Metering Panels in Control Building for 61850 Based Sub station Automation system in AC Kiosk (400kV S/Y)/ Control building (Testing and commissioning of numerical relays/BCU/Energy Meters/SAS equipments in scope of respective equipment supplier. Necessary manpower support for numerical device testing, arranging tools, tackles and testing equipments is in scope of ETC contractor)	Nos	3	5,314.86	15,944.58
105	Laying of Armoured Fibre Optics cable for SAS, Busbar protection and OLTE (to be laid in GI pipe in trench)	m	17000	23.01	3,91,170.00
106	80" Rear Projection LVS in hot standby arrangement	Nos	2	4,802.36	9,604.72
107	LVS Display controller	Set	1	380.42	380.42
108	Inverter/UPS Installation and testing	Nos.	2	3,834.32	7,668.64
109	Engineering Work Station	Set	1	766.86	766.86
110	Operator Work Station	Sets	4	766.86	3,067.44
111	Dot Matrix Printer	Set	1	383.43	383.43
112	A3 size High speed Line printer	Set	1	383.43	383.43
113	Time Synchronizing equipment (GPS) – complete in all respects including antenna, all cables, processing equipment etc.	Set	1	2,300.59	2,300.59
114	Handling & installation of furniture required in switchyard control room & Power house control room for OWS, printer, servers etc.	Lot	1	2,300.59	2,300.59
115	OLTE Equipment: Equipments cabinet : Base Equipment (Common cards, Cross-connect/control cards, Optical base card, Power supply cards, power cabling, other hardware & accessories including sub-racks, patch cords, DDF etc. fully equipped including interface cards and Tributary cards and equipment Cabinet) (Testing and commissioning of OLTE equipments in scope of OLTE supplier; Necessary manpower support for OLTE testing, arranging tools and tackles is in scope of ETC contractor)	No	4	4,708.81	18,835.24
116	OLTE Equipment: Craft terminal (only unloading, storage and handing over)	Set	2	672.69	1,345.38

Annexure-I					
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Project :- 400 kV Switchyard at 5X800MW Yadadri TPS					
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Consultant :- TCE Bangalore					
117	INSULATION MAT: The scope covers supply and laying of insulating mats of "class A" conforming to IS: 15652-2006. These insulating mats shall be laid in front of all floor mounted AC and DC switchboards and control & relay panels located in control room building/ AC Kiosk e.t.c.refer scope note for details	SQ. M	600	1,848.04	11,08,824.00
118	Supply and Installation of Panel Supporting Angles / Channel / Chequered Plates on cable trench in Control Room & Bay Control Room, Vertical support for cables etc. Structural Steel Work welded in built up sections like angles, channels & framed work etc including providing cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete	MT	5	1,15,029.38	5,75,146.90
119	400 KV GT: Installing terminal connector wherever equipment installation is not in scope of contractor. Connectors shall be provided by BHEL. Any other ETC work related to equipment below is not in the scope of this BOQ. (Nos. of connectors)	Nos.	15	1,779.59	26,693.85
120	400 KV ST/FGD ST: Installing terminal connector wherever equipment installation is not in scope of contractor. Connectors shall be provided by BHEL. Any other ETC work related to equipment below is not in the scope of this BOQ. (Nos. of connectors)	Nos.	15	1,779.59	26,693.85
121	Installation of Fire-Proof Sealing System (as per specification enclosed at Annexure-B). The work includes supply of the material.	sq.m	50	629.77	31,488.50
122	Installation of Fire Protection Coating System (as per specification enclosed at Annexure-B). The work includes supply of the material.	sq.m	50	629.77	31,488.50
123	Unloading, storage & handing over of Essential/ Mandatory spares/ Maintenance equipments to Customer as per Annexure-A.	Lot	1	94,176.10	94,176.10
124	Supply & ETC of TSGENCO approved make 2 HP Automatic Start/ Stop type Centrifugal pump with scheme and accessories for sump pit	Nos.	4	10,097.02	40,388.08
125	Supply & ETC of TSGENCO approved make 0.5 HP Automatic Start/ Stop type Centrifugal pump with scheme and accessories for sump pit	Nos.	4	6,377.06	25,508.24
126	Supply & Mounting of Phase Color Discs, Danger Plate and Identification Plates for bays & Equipments as per IS:2551; 1982 & IS:5; 1978.	Lot	1	1,40,165.39	1,40,165.39
127	Supply of Equipment Fixing Hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - M20 x 70 LG Bolts (Full Threaded) with nut	Kg.	115	96.38	11,083.70
128	Supply of equipment fixing hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - M30 x 140 LG Bolts (Full Threaded) with nut	Kg.	1000	96.38	96,380.00
129	Supply of equipment fixing hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - Plain washer suitable for M20 Bolts	Kg.	13.6	96.38	1,310.77
130	Supply of equipment fixing hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - Plain washer suitable for M30 Bolts	Kg.	88	96.38	8,481.44
131	Supply of equipment fixing hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - Spring washer suitable for M20 Bolts	Kg.	6	96.38	578.28
132	Supply of equipment fixing hardware as per section -2 of specification TB-XXX-618-002C Rev 02 - Spring washer suitable for M30 Bolts	Kg.	36	96.38	3,469.68
133	Making Cut out in the floor of control room, work includes cutting RCC & finishing	Sq.m	10	720.85	7,208.50
134	Supply of required size (M12/M16/M20 upto 150mm long) of Anchor Fastner /Bolts and fixing in Concrete/wall/ceiling wherever required.	kg	25	153.37	3,834.25

Annexure-I

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135	Watch & ward of stored / erected / commissioned material at storage area, project site, erection area or any other locations as per material safety requirement and instruction of site in-charge complete in all aspect. (round the clock security by authorized service agency consisting of armed guard).	Month	24	53,581.50	12,85,956.00
136	Cutting and Modification - Structural Plates Structure Modification - All tools and tackles required for GI structure, any other steel structure modification, Aluminium Items etc. shall be in the scope of bidder. Cutting , drilling, punching, minor civil works also included in the scope. Minor welding and application of protective / zinc rich paint on welded surface is also included in the scope.	kg	50	24.00	1,200.00
137	Modification of Hole Sizes in Structures Structure Modification - All tools and tackles required for GI structure, any other steel structure modification, Aluminium Items etc. shall be in the scope of bidder. Cutting , drilling, punching, minor civil works also included in the scope. Minor welding and application of protective / zinc rich paint on welded surface is also included in the scope.	Nos.	20	57.61	1,152.20
138	Drilling of Additional Holes in Structures Structure Modification - All tools and tackles required for GI structure, any other steel structure modification, Aluminium Items etc. shall be in the scope of bidder. Cutting , drilling, punching, minor civil works also included in the scope. Minor welding and application of protective / zinc rich paint on welded surface is also included in the scope.	Nos.	20	57.61	1,152.20
139	Loading and transportation of equipment/ material from store located upto 5KM from switchyard.	MT	4500	232.52	10,46,340.00
Total Amount (in Rs. Excluding GST)					569,71,932.00

Annexure-I	
BILL OF QUANTITIES CUM PRICE SCHEDULE for Erection Testing & Commissioning (ETC) Works (Rev 0)	
Project :- 400 kV Switchyard at 5X800MW Yadadri TPS	
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Following also forms the scope of ETC work in addition to above, but not limited to this.	
1	This BOQ covers unloading, storage, receipt of material from store, transport to site, storage, security of materials/ equipments both in store as well as those erected at site, material handling, up keeping of records, material verification, assembly, installation, pre-commissioning test and commissioning tests (As per Customer/BHEL FQP) and final handover of Yadadri switchyard are included in the scope. Necessary skilled electrician & labour to be provided by ETC contractor to OEM during testing & commissioning.
2	All the drawings and documents as per Annexure-1 shall be followed for ETC work.
3	Annexure- 2 (Switchyard Erection guidelines) shall be followed for ETC work.
4	Minor Civil works such as modification of civil foundations, making holes in the trenches/ control room building, grouting, fixing of trench material will be in the scope of ETC contractor.
5	Removal of gravel, if gravelling is done, for connection of Equipment earthing strip to the existing mat (wherever earthing mat is already laid), and after completion of earthing, contractor should place the gravel to bring it in original shape.
6	The quantities given in items mentioned above may undergo a change to any extent.
7	Quoted rates are deemed to be inclusive of miscellaneous works viz erection of clamps and connectors.
8	All paint, welding electrodes & other consumable by contract supplies shall be part of ETC works. Paint /welding electrode make etc. is subject to BHEL/CUSTOMER site incharge approval.
9	Equipment erection (say Isolator) means complete erection, metallics, post insulator, connectors (expansion/rigid tubular for AI.Tube / single/double/quadruple conductor), connection to the next in line (if connected to overhead busbar or droppers) including PG clamps/Tee connectors etc. This will be clear from the enclosed electrical layout drawings.
10	Equipment and tower erection would include supply and erection of miscellaneous items, viz Phase colour discs, labels painting of equipments, phase colour painting, phase marking, bay identification board, danger plates, rubber mats, device number marking on the equipment, keyboard etc as per site requirements. Supply & Mounting of phase color discs & Danger plates shall be as per IS-2551; 1982 & IS 5; 1978.
11	Welding of Aluminium tubes (supply of welding sleeve excluded) as per Annexure-3 is in ETC contractor's scope and joints shall be tested by radiography. Welding and Bending machines and any other equipment will be in ETC Contractor scope.
12	Complete ETC package is under the scope of bidder. All TNP including oil filtering machine, cranes etc. required to complete the job shall be provided by bidder only.
13	Supervision of erection, Testing & commissioning of one no. Isolator of each type shall be done by supplier. Necessary manpower support, tools, tackles etc shall be in the scope of ETC contractor.
14	Testing instruments (dully calibrated) have to be arranged by ETC Contractor at it's own cost (List is only provided for information, if any other instrument not mentioned below but required for successful completion of ETC work shall be in ETC contractor's scope), (However OMICRON or equivalent kit for Numerical relay testing shall be arranged by BHEL)
14.1	DCRM (OPERATIONAL ANALYZER)
14.2	Contact Resistance Measurement kit (CRM)
14.3	Capacitance and Tan delta measurement Kit
14.4	Dew Point Measurement kit
14.5	5kV/1kV Megger
14.6	Primary current Injection Kit
14.7	Secondary current/Voltgae Injection kit
14.8	1Ph Variac
14.9	Multimeters
14.10	Clamp on meter
14.11	Relay test kit
15	The scope of supply items as mentioned in the above BOQ are tentative. Items shall be supplied by Contractor as per exact site requirements only.
16	For scope of supply items in ETC contractor scope following should be followed - (1) The approval of makes shall be obtained from BHEL/Customer. (2) Drawings and MQP shall be submitted for approval in line with specification and relevant IS. (3) Quality - Inspection & dispatch clearance shall be given by BHEL/Customer.
17	The site is located in hard rock area. Controlled blasting may be required for Pipe laying.